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APPLICATION OF THE AUDITORY INTELLECTUALLY REPETITION (AIR) LEARNING MODEL TO IMPROVE THE MATHEMATICAL CONNECTION ABILITY OF STUDENTS IN MTS SERANG DISTRICT

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ABSTRACT

The aim of this study is to know a difference in the initial ability of mathematical connections of control class students with experimental classes; the mathematical connection ability of students whose learning uses the Auditory Intellectually Repetition (AIR) model is better than that of students whose learning uses conventional models; and an increase in the mathematical connection ability of students given the Auditory Intellectually Repetition (AIR) learning model with the conventional model. This study used an experimental study with saturated sampling technique. The results are:(1) there is no difference in the initial ability of mathematical connections of control class students with experimental classes; (2) the mathematical connection ability of students whose learning using the Auditory Intellectually Repetition (AIR) model is better than students whose learning uses conventional models; (3) improving the mathematical connection ability of students given the Auditory Intellectually Repetition (AIR) learning model better than students given the conventional model.

Keywords: Auditory Intellectually Repetition (AIR) Learning Model, Students' Mathematical Connection Ability

1. Introduction

Mathematics learning is a learning that is considered difficult and requires high concentration in learning it (Ningsih et al., 2021). Therefore, not a few students prefer to give up before trying to learn mathematics so that this can affect students' absorption and mathematical ability. Students' weak absorption and mathematical ability to mathematical material can affect student learning outcomes.

A strong mastery of mathematics from an early age is necessary for students to master and create technology in the future (Fendrik, 2019). Therefore, mathematics subjects need to be taught at every level of education to equip students by developing the ability to use mathematical language in communicating mathematical ideas or ideas as an explanation of a situation or problem.

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According to research by the National Council Of Teachers Of Mathematics (NCTM) in (Afryany et al. , 2015) **,** mathematics has an important role in improving the quality of education. In addition, mathematics is a fundamental knowledge and is almost present in all other branches of knowledge. Often in mathematics learning, teachers are only oriented towards mastering mathematics as a science, not mastering mathematical skills to be able to understand the surrounding world and use mathematics as their mindset in everyday life. The understanding, knowledge, and skills that students need to have are covered by process standards which include problem solving, reasoning and proof, communication, connection, and representation.

One of the mathematical abilities that must be developed is the ability of mathematical connection. The ability of mathematical connections in students in Indonesia is still quite low. This can be proven by the results of research

conducted by the Indonesia Mathematics and Science Teacher Education Project (IMSTEP) - Japan International Cooperation Agency (JICA). According to the results of the Indonesia Mathematics and Science Teacher Education Project (IMSTEP) - Japan International Cooperation Agency (JICA) survey in (Abidin, 2020), one of the causes of the low quality of student understanding in mathematics is that teachers concentrate too much on procedural and mechanistic things such as teacher-centered learning, mathematical concepts are delivered informatively, and students are trained to solve many problems without deep understanding. As a result, students' mathematical connection abilities do not develop as they should.

The conclusion from the results of the research above is that the low ability of student connections is a problem in the world of education, especially in mathematics learning. Meanwhile, in the 2013 curriculum, the ability of mathematical connection is an ability that is highly emphasized in the learning curriculum in schools.

From the observations of researchers at MTs Al-Jauharotunnaqiyah Wanasaba, with the following scheme:

Table 1 Preliminary Investigation Stage Table

No.	Question
1	Did you study math in school?
2	Are you having difficulty learning mathematics?
3	Will you be able to understand all the material in mathematics learning?
4	Do you like math lessons?
5	Do you always do math assignments given by the teacher?
6	Do you like to study in groups?
7	Do you like to study independently?
8	Do you like to discuss while studying mathematics?
9	Do you feel happy if teachers associate mathematics learning into everyday life?
10	Can you connect mathematics into everyday life?

In accordance with the table above, the results of observations that have been made by researchers on students of MTs Al-Jauharotunnaqiyyah Wanasaba, researchers can conclude the following including the following: (1) there are as many as 80% of 25 students who find it difficult while learning mathematics; (2) 88% of the 25 students prefer to study in groups rather than individuals; (3) there are as many as 96% of the 25 students like to discuss in learning mathematics; and (4) the student's connection ability is fairly low, which is about 28% of the 25 students.

As teachers, we must have various innovations both in terms of learning methods, learning media and learning systems that can arouse students' curiosity and the ability of students' mathematical connections to mathematics learning. One of them is to use the Auditory learning method, Intellectually Repetition (AIR). In accordance with what was stated by Risdianti (2019) the Auditory learning model, Intellectually Repetition (AIR) is one of the cooperative learning models, so that the characteristics of the nature of cooperative learning are contained in this learning model. The Auditory Intellectualy Repetition (AIR) learning model according to Alawi, (2019) this model is able to train the hearing (attention) and courage of students to express opinions (Auditory). This model can also train learners to solve problems creatively (Intellectually) and train learners to recall about the material that has been learned (Repetition). In particular, this learning model can trigger learners to become more active and creative so that it can trigger an increase in students' mathematical connection ability. This means that students can easily connect mathematics learning into everyday life. By applying the Auditory Intellectualy Repetition (AIR) learning model, it means that students can do things together by helping each other as a group or a team.

Based on some of the reasons above, the researcher decided to conduct a study at MTs Al-Jauharotunnaqiyah Wanasaba with the title "Application of auditory intellectually repetition (AIR) learning model to improve the mathematical connection ability of students in MTs Serang Regency".

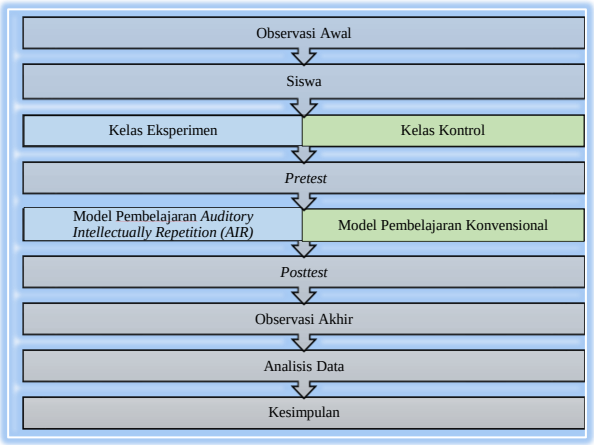
2. Research Methods

This research uses quantitative research. Quantitative research (Priyono, 2008) is a study whose analysis generally uses statistical analysis, in quantitative research the measurement of the observed symptoms becomes important, so that data collection is carried out using a structured list of questions based on measurements of variables arranged based on measurements of the variables studied and then produce quantitative data. The method used in this study is a quasi-experimental method, because this study was conducted to

determine the relationship between the treatment given and certain aspects to be measured. The treatment given in this study is in the form of auditory, intellectually, repetition (AIR) learning models while the aspects to be measured are students' mathematical connection ability.

According to (Jaedun, 2011) in quasi-experimental subjects are not grouped randomly, but researchers accept sober subjects. For example, there is a case of a school principal objecting to the holding of a study because he objected to his students being randomly grouped into a new group. So that the researcher does not choose students to determine the experimental class and control class, but the researcher will receive a makeshift class where the class will be determined by the school. The frame of mind in this study is as follows:

Figure 1 Frame of Mind Image



The research design in this study is as follows:

Table 2 Research Design Table

Group	Pretest	Treatment	posttest
Experiment	O	X	O
Control	O	-	O

This class experimental research was carried out at MTs Al-Jauharotunnaqiyah Wanasaba which is located at Jln. Krapyak no.178 Kp Wanasaba Ds.Toyomerto Kec Kramatwatu Kab Serang Banten. May 13-June 28, 2022 with 6 meetings. Where the first meeting was conducted pretest, the next four meetings were given treatment in the experimental class using the Auditory Intellectually Repetition (AIR) learning model and in the control's class using the model conventional.

Data analysis techniques in this study using prerequisite tests and hypothesis tests and by using n-gain tests. A normality test is carried out to find out whether the samples taken in the study are normally distributed or not. The normality test used by researchers is the Liliefors test (Slamet Riyanto, S.T., M.M.; Dr. Aglis Anditha Hatmawan, S.E., 2020). After the normality test, a homogeneity test is then carried out. The homogeneity test (Riyanto & Hatmawan, 2020) can be passed in various ways, namely the graph, the similarity test of two variants and the barllet test. The homogeneity test used by researchers is a similarity test of two variants used to test whether the data is homogeneous, namely by comparing the two variances. To test the two averages, formulations are used according to the prerequisite test, namely if a data is normal and homogeneous, it will be continued with a t-test, but if a data is normal but not homogeneous, it will be continued with the t-test', in contrast to the case if a data is abnormal continue with a non-parametric mann whitney test. Calculating data gain is carried out to find out the difference in increasing students' mathematical connections before and after learning. Then the calculation of the gain index is carried out to determine the increase in mathematical connections of students in both classes.

3. Results and Discussion

The results of this study are proven by the results of inferential statistics and descriptive statistical results. The results of inferential statistics are as follows:

Table 3 Inferential Statistical Test Results Table

Statistics	Statistical Value					
	Experiential Class		Control classes		Gain Value	
	Pretest	Posttest	Pretest	posttest	Experiment	Control
Normality test	0,195 (Normal)	0,406 (Normal)	0,213 (Normal)	0,238 (Normal)	0,877 (Normal)	0,624 (Normal)
Homogeneity	0,143 (Homogeneous)	0,055 (Homogeneous)	0,143 (Homogeneous)	0,055 (Homogeneous)	0,064 (Homogeneous)	0,064 (Homogeneous)
T test	0,976	0,005	0,976	0,005	0,003	0,003

The results of the sapiro-wilk test (sample ≤ 50) data can be said to be normally distributed if the P (Sig.) value > 0.05. When viewed from the results of the SPSS test version 25, the P value (Sig.) obtained is 0.406 which means that P > 0.05 so that the data is said to be normally distributed. The results of the sapiro-wilk test (sample ≤ 50) data can be said to be normally distributed if the P (Sig.) value > 0.05. When viewed from the results of the SPSS test version 25, the P value (Sig.) obtained is 0.238 which means that P > 0.05 so that the data is said to be normally distributed. Based on the output of SPSS version 25 that has been carried out by researchers, the results of Sig.(P-Value) = 0.055 this shows that the P value > 0.05. This it can be concluded that the variants of such data are the same or it can be said that the data is homogeneous.

Since both the data are normal and homogeneous, the researcher proceeded to calculate the average difference using the t-test (Slamet Riyanto, S.T., M.M.; Dr. Aglis Anditha Hatmawan, S.E., 2020). Based on the output of SPSS version 25 that has been carried out by researchers, the results of Sig.(2-tailed) = 0.005 this shows that the P value < 0.05. This it can be concluded that H_0 is rejected and H_1 is accepted. This means that there is an average difference between the final ability of the mathematical connection (posttest) of the experimental class and the control class. To see if the mathematical connection ability of students whose learning uses the Auditory Intellectually Repetition (AIR) model is better than that of students whose learning uses conventional models we can see in the results of the posttest descriptive statistical analysis of students' mathematical connection ability in experimental classes and control classes.

The gain value is obtained from the results of calculating pretest and posttest data in the experimental class and control class with the formula that the researcher has listed in the research methodology. The results of calculating the gain value of the experimental class and the control class are as follows:

Table 4 Experimental Class and Control Class Gain Value Table

NO	GAIN VALUE	
	EXPERIMENTAL CLASS	CONTROL CLASS
1	0,75	0,75
2	0,68	0,79
3	0,76	0,78
4	0,70	0,63
5	0,54	0,69
6	0,79	0,74
7	0,60	0,69
8	0,60	0,72
9	0,73	0,84
10	0,59	0,63
11	0,83	0,74
12	0,71	0,77
13	0,63	0,72
14	0,87	0,73
15	0,74	0,86
16	0,68	0,95
17	0,84	0,81
18	0,70	0,84
19	0,71	0,76
20	0,66	0,88
21	0,76	0,92
22	0,70	0,67
23	0,49	0,83
24	0,68	0,74
25	0,77	0,92

The results of the sapiro-wilk test (sample ≤ 50) data can be said to be normally distributed if the P(Sig.) value > 0.05. When viewed from the results of the SPSS test version 25 the value of P (Sig.) obtained from the experimental class gain data is 0.877 which means that P > 0.05 so that the data is said to be normally distributed. The results of the sapiro-wilk test (sample ≤ 50) data can be said to be normally distributed if the P(Sig.) value > 0.05. When viewed from the results of the SPSS test version 25, the P value (Sig.) obtained from the control class gain data is 0.624 which means that P > 0.05 so that the data is said to be normally distributed. Based on the output of SPSS version 25, the result of Sig. (P-Value) = 0.064 is obtained, this shows that the P value > 0.05. This it can be concluded that the variants of such data are the same or it can be said that the data is homogeneous. Since both the data are normal and homogeneous, the researcher proceeds to calculate the average difference using the t-test. Based on the SPSS output, the gain data of the experimental class and the control class obtained the result Sig.(2-tailed) = 0.003 this indicates that the P value < 0.05. This it can be concluded that H_0 is rejected and H_1 is accepted. This means that there is a difference in the average increase in the gain value of the experimental class and the control class. To see whether the improvement in the mathematical connection ability of students whose learning using the Auditory Intellectually Repetition (AIR) model is better than students whose learning uses conventional models, we can see in the results of descriptive statistical analysis

of data gain of students' mathematical connection ability in experimental classes and control classes.

The results of descriptive statistics are as follows:

Table 5 Table of Descriptive Statistical Results

Statistics	Statistical Value					
	Experiential Class		Control classes		Gain Value	
	Pretest	Post test	Pretest	post test	Experiment	Control
Sample Size	25	25	25	25	25	25
Ideal Score	100	100	100	100	1	1
Maximum Score	46	97	45	90	0,95	0,87
Minimum Score	13	74	14	72	0,63	0,49
Score Range	33	23	31	18	0,32	0,38
Average Score	33,73	86,91	33,27	81,27	0,81	0,73
Variance	108,09	39,39	92,67	21,57	0,76	0,83
Standard Deviation	10,39	6,27	9,09	4,64	0,087	0,9

The average score of the initial ability (pretest) of connections of class VIIA students in MTs Al-Jauharotunnaqiyah Wanasaba before the application of the Auditory, Intellectually, Repetition (AIR) learning model of 33.73 is very low. the average score of the connection ability of class VIIA students in MTs Al-Jauharotunnaqiyah Wanasaba after the application of the Auditory, Intellectually, Repetition (AIR) learning model is 86.91 relatively good. the average score of the connection ability of class VIIB students in MTs Al-Jauharotunnaqiyah Wanasaba before the implementation of the conventional learning model of 33.27 was very low. the average score of the gain score of class VIIA students in MTs Al-Jauharotunnaqiyah Wanasaba after applying the Auditory, Intellectually, Repetition (AIR) learning model of 0.81 is relatively high. Skor the average score of class VIIB students in MTs Al-Jauharotunnaqiyah Wanasaba after the implementation of the conventional learning model of 0.73 is relatively high.

In the table below, there are observations that have been made by researchers during learning using the Auditory, Intellectually, Repetition (AIR) learning model:

Table 6 Table of Observation Results During Learning

No.	What to observe	The meeting-						Average (n= 25)	Percentage
		I	Ii	Iii	Iv	V	Vi		
1	Students present at the time of learning	PRETEST	24	25	23	25	POSTEST	24,25	97
2	Students sitting by group		20	25	23	25		23,25	93
3	Students who pay attention to the teacher's explanations during learning		20	22	23	25		22,5	90
4	Students who ask about subject matter that is not yet understood		19	16	16	14		16,25	65
5	Students who ask the teacher for guidance when doing questions in the		6	5	4	6		5,25	21

	module								
6	Students who ask their friends for guidance		19	22	21	22		21	84
7	Students who collect group work on time		20	20	25	25		22,5	90
8	Students who respond to other group presentations		16	17	15	16		16	64
Total									604
Average									75,5

The average percentage of student activity is 75.5% > 75% (Priyono, 2008), students can be said to be active in mathematics learning using the Auditory, Intellectually, Repetition (AIR) learning model. Where the highest percentage is in the indicator of student attendance during 4 meetings, which is 97%. In the indicator, students ask the teacher for guidance by 21% because students prefer to ask friends or discuss with their group. This is evidenced by the percentage of indicators of students asking their friends for guidance of 84%.

The table below is the result of the final observation by providing a response questionnaire to students after learning with the Auditory, Intellectually, Repetition (AIR) learning model ends:

Table 7 The Result of The Final Observation

No.	Question	Frequency (n=25)		Percentage	
		Yes	Not	Yes	Not
1	Do you feel good when you learn mathematics?	22	3	88	12
2	Do you feel happy when learning mathematics by means of group discussions?	21	4	84	16
3	Will you be able to understand all the material in mathematics learning when a friend is explaining?	19	6	76	24
4	Do you feel happy when teachers apply the learning process by means of group discussions?	23	2	92	8
5	After learning mathematics by listening to the teacher explain the material and then re-explained by other groups, can you easily do the math assignments given by the teacher?	20	5	80	20
6	Do you like to learn by listening to the teacher's explanation and then you solve the problem by discussing with the group?	25	0	100	0
7	After learning mathematics by means of group discussions, is learning mathematics an interesting thing?	20	5	80	20
8	After learning mathematics in a group way, do you like to discuss while learning mathematics?	23	2	92	8
9	After learning mathematics by means of group discussions, can you relate mathematics	22	3	88	12

	learning to everyday life?				
10	After discussing with your friends, can establishing learning with daily life be easier?	22	3	88	12
Total				868	132
Average				86,8	13,2

If averaged, the student's positive aspect answer score reached 86.8% and the percentage of students who answered not was 13.2%. According to (Priyono, 2008) the student response is said to be positive if the average student's answer to the positive aspect statement is obtained by a percentage of ≥ 75%. Thus, the application of the Auditory, Intellectually, Repetition (AIR) learning model received a positive response from students.

Based on the results of the hypothesis test of the above study, researchers found that there was no difference in the initial ability of mathematical connections of students in the experimental class and the control class. This is evidenced by the t-test results in the pretest answer results, which means that there is no average difference between the experimental class pretest learning outcomes and the control class pretest. It is also proven by the existence of descriptive statistical results where the average pretest score of the experimental class is 33.73 from the maximum score of 100 and 33.27 from the maximum score of 100 in the control class which is included in the low category. This is supported by the theory by Piaget in (Elisa. et al., 2019) that human cognitive abilities are initially the same before being formed or treated. In the results of preliminary observations made by researchers, researchers found that students' mathematical connection ability was only 28%, which means that it is still relatively low.

After being given the Auditory Intellectually Repetition (AIR) learning model in experimental class students and conventional learning in the control class, the results of the t-test analysis showed that there was an average difference in the final ability of student mathematical connections between the experimental class and the control class. This is also supported by the results of a descriptive statistical test which shows that the average score of the experimental class posttest is 86.91 out of a maximum score of 100 and the average score of the control class is 81.27 out of a maximum score of 100. So that researchers can conclude that the mathematical connection ability of students whose learning uses the Auditory Intellectually Repetition (AIR) model is better than students whose learning uses conventional models. Researchers also concluded that several factors that can cause students with the Auditory Intellectually Repetition (AIR) learning model to have an increase in mathematical connection ability that is better than students with conventional learning, namely as follows: (a) There are differences in treatment between experimental classes (learning with the Auditory Intellectually Repetition (AIR) learning model) and control classes (conventional learning models). Where in the experimental class at the end of each lesson, an evaluation of the practice questions regarding the statistical material that has been learned is carried out to remind the material that has been delivered or learned by students. Because according to (Hermawati et al., 2021) with the evaluation, the ability of mathematical connections in students can also increase. (b) Students in the experimental class feel more comfortable and comfortable with Auditory Intellectually Repetition (AIR) learning because the learning process is carried out in heterogeneous groups. Heterogeneous groups can help students who are slow to understand the material then other students are affected to compete with students who understand the learning material faster. It is in accordance with the opinion of (SIyoto, 2015) that heterogeneous groups can help students with their shortcomings and advantages with each other. When one student does not understand about a problem while the other student understands, then they can cooperate with each other in the process of solving the problem. (c) Students in the experimental class are more prepared and active in the learning process because the learning uses the Auditory Intellectually Repetition (AIR) learning model. This will help students to be easier and more focused when students solve math problems by connecting them to their daily lives. This is supported by research by (Risdianti et al., 2019) that when students are more prepared and active in learning, students will be more receptive to the material taught by the teacher. (d) In this study, the researcher gave praise and rewards to students, so that when the teacher gave a reward to the most active group as a supporter of learning the Auditory Intellectually Repetition (AIR) learning model, the other group was motivated to become

more active and better prepared in learning so that this could improve their mathematical connection ability. This is in accordance with (Purwati et al., 2018) that when one or several active students are rewarded, other students will be motivated to do better things than their peers.

4. Conclusions

Based on the results of data analysis and discussion, it can be concluded that: (1) There is no difference in the initial ability of mathematical connections between control class students and experimental classes. (2) The mathematical connection ability of students whose learning uses the Auditory Intellectually Repetition (AIR) model is better than that of students whose learning uses conventional models. (3) Improved mathematical connection ability of students given the Auditory Intellectually Repetition (AIR) learning model better than students given the conventional model.

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