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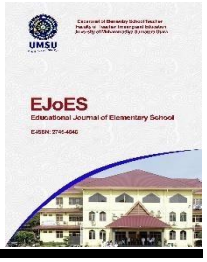

THE INFLUENCE OF THE *ARGUMENT DRIVEN INQUIRY* (ADI) MODEL ON THE ARGUMENTATION SKILLS OFV GRADE STUDENTS OF INTEGRATED MUHAMMADIYAH 36 MEDAN

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Abstract

This study aims to determine whether there is an effect of using the *Argument Driven Inquiry* (ADI) model on students' argumentation skills in class V of Integrated Elementary School Muhammadiyah 36 Medan. This type of research is quantitative research. The study used two classes, namely experimental and control classes. The population and sample of this study were all students of class V-A and V-B of Integrated Elementary School Muhammadiyah 36 Medan, totaling 56 students. This research instrument uses a test totaling 15 questions in the form of descriptions that have been tested for validity and reliability. Based on the results conducted in the experimental class (argument driven inquiry learning model), the average pre-test result was 38.68 and post-test result was 84.69, while in the control class (conventional learning model) the average *pre-test* result was 34.82 and *post-test* result was 76.79. Learning using the argument driven inquiry learning model has a significant impact on students' argumentation skills. Judging from the significance value of 0.001, which is 0.001 <0.05. So it can be concluded that there is an effect of using the *argument driven inquiry* model on the argumentation skills of fifth grade students of Integrated Elementary School Muhammadiyah 36 Medan.

Keywords*: Argument Driven Inquiry (ADI) Model, Argumentation.*

1. INTRODUCTION

Human resource development in Indonesia has been carried out in various ways, the most important of which is done through education. The targets appliedto encourage the ability of students to produce contextual work in the world ofeducation that needs to be improved, one of which is skills through physical (hard skills) and skills through mental (soft skills), (Permendikbud No. 22 of 2016).

Education is one of the most important components in the development of world authority. Whether a nation is progressing or not is measured by the progress of education. Indonesia has rules and guidelines that have been organized in such a way as an effort to progress education in Indonesia. The rules are contained in the System

National Education (Sisdiknas). In learning the 2013 curriculum or often called K13, learning must be student-centered (student-centered learning).

According to Rusman (2019:92) that the purpose of the 2013 curriculum aims to prepare Indonesian people to have the ability to live as individuals and citizens who are faithful, productive, creative, innovative and effective and able to contribute to community life, berbanga, state and world civilization. Learning that is meaningful and can activate students is learning based on memorable learning experiences. In learning science, students must be fully involved actively in the learning process. Learning science is not just remembering and memorizing theories but must be able to apply them in everyday life by exploring and understanding the natural world scientifically.

According to Nur (2018), learners who are experienced and skilled in the 21st century are identical to students who are accustomed to doing higher-level thinking activities. Among the higher-level thinking activities or higher

older thinking (HOTS), namely problem solving, critical thinking, creative thinking, and decision making. This is related to student reasoning. Student reasoning is needed to train individuals to become critical thinkers and effective problem solvers. . In addition, the involvement of argumentation is an important part of science learning.

Argumentation skills are one of the main objectives of science learning because students who study science must know scientific explanations of natural phenomena, use them to solve problems and be able to understand other findings they get (Probosari et al., 2014). et al, 2016). Argumentation skills are used to analyze information about a topic then the results of the analysis are communicated to others, thus the use of argumentation in science learning is part of the development of high-level thinking.

According to Maiturrohmah (2020) argumentation skills are able to form cognitive abilities and are able to construct a connection between theory and concept understanding. Therefore, millennial students are not only memorizing material but are fragile about the concepts underlying the material, by realizing argumentation skills, students are expected to be able to become out put who have superior and based thinking power.

According to Shandy, et al (2018), the focus of argumentation skills is included in the 21st century skills component in the form of decision making. The characteristics of people who have high-level thinking skills are having argumentation skills based on concepts. Therefore, to realize students with 21st century skills, it is necessary to pay attention to the realization of students' argumentation skills.

Based on initial observations made by researchers on Friday, November 04, 2022 by interviewing one of the fifth grade homeroom teachers of Muhammadiyah 36 Integrated Elementary School in Medan, namely Mrs. Nurhayati, S.Pd. The video interview can be accessed through https://drive.google.com/file/d/1gzjRjkq0iMoqnRGOxh0KxkzxI-2BGh23/view?usp=drivesdk.

The results of the interview stated that students' argumentation skills were still low because of students' ability to solve problems they encountered in science lessons. is still low. Students also often have difficulty in understanding abstract science concepts, many students complain that they are unable to understand and work on problems because they cannot analyze the problem correctly so that the development of argumentation skills is needed in the science learning process. In addition, the learning model used is still conventional or not varied. Learning models that are often used are only discussion learning models, and lectures. In addition, teachers also often experience obstacles when delivering learning. The difficulties experienced by teachers are usually when dealing with students who feel bored in participating in learning, especially in thematic learning of science content. This makes only a few students active in learning, while other students become passive when participating in learning activities so that it has an impact on low student learning outcomes.

Teachers should need to hone students' argumentation skills so that since elementary school students have been accustomed to arguing based on data that is in accordance with the problem. Because to argue is not just arguing, but must be based on strong data to support the statement. And statements are made based on critical thinking. Although the weakness of students in argumentation skills is not an easy thing to fix, with the role of responsibility that educators have, they should try to fix it. One of the effective ways used is to utilize the power of the learning model.

Using a learning model can help students play an active role in learning activities. According to Handayani (2019: 8) that the learning model is a plan that is used as a guide in planning learning in the classroom. Using a learning model in the classroom can make students discuss in a group, establish interactions between groups, and make students responsible in the learning group.

For this reason, a varied and interesting learning model is needed to support student learning activeness in class, so as to increase the effectiveness of student learning and it is hoped that with the appropriate learning model, student learning outcomes can increase,

Because an interesting model plays an important role in influencing the level of success or failure of student learning and the achievement of learning objectives that the teacher wants to achieve in the classroom teaching and learning process. Therefore, if students are passive in learning, the learning to be achieved will not be successful.

One alternative learning approach that seeks students to be actively involved in solving problems is to use the argument driven inquiry model. According to Gresi & Woro (2018), the *argument driven inquiry model* provides opportunities for students to express opinions according to their understanding and there are also discussion sessions between peers so that they can exchange ideas accompanied by investigation reports and form groups for each student.

The argument driven inquiry model is needed in applying natural science in thematic learning of science content on the material "Heat Transfer or Caloric" because it can provide opportunities for learners to build their own explanations and share ideas in small groups during class discussions. This can create an active classroom atmosphere so that learners can develop argumentation skills through critical thinking and reasoning. Thus the *argument driven inquiry* learning model becomes an alternative in the learning process to improve students' argumentation skills in science learning.

Therefore, the researcher considers that he will conduct research with the title: **"The Effect of *Argument Driven Inquiry* (ADI) Model on Argumentation Ability of Fifth Grade Students of Integrated Elementary School Muhammadiyah 36 Medan"**

2. RESEARCH METHODOLOGY

This type of research is quantitative research. This research was conducted at Muhammadiyah 36 Integrated Elementary School in Medan located at Jl. Jermal III No. 10, Medan Denai District, Medan City, North Sumatra 20371. Of the 4 classes of samples that will be taken, namely as many as 2 classes, one class will be used as an experimental class, namely class V-A with 28 students and one other class will be used as a control class, namely class V-B with 28 students. Then the total sample in this study was 56 students.

The instrument in this research is a test. At this test stage, two tests were carried out, namely *pretest* and *posttest. The pretest* was conducted at the beginning of the meeting before starting learning. The purpose of the *pretest* is to determine the initial ability of students regarding the learning that will be delivered. While the *posttest is* given at the end of learning which aims to measure students' argumentation skills on the material taught. In the experimental class using *argument driven inquiry* learning model while in the control class will be taught material with conventional learning model. Each student's answer from this description test will be given a score.

3. RESULTS AND DISCUSSION

The data collection technique in this study is to use a test given before treatment (*pre-test*) and after treatment (*post-test*). This study was conducted as many as 2 meetings used to provide learning in the experimental class and as many as 2 meetings used to provide learning in the control class. Before distributing the test, validation is carried out to see whether the test can be tested on students who will be given treatment, namely grade V students in experimental and control classes. In this case the research instrument test will be validated in class VI-A with 28 students.

A. Research Data Analysis

1. Validity Test

The validity of the instrument in this study has been validated in advance by VI-A class students before the researchers conducted the research. After validating the instrument to 28 students, the researchers tested the validity of the validation results using the help of the *Statistical Package for the Social Sciences* (SPSS) 29 program. The instrument analyzed was in the form of 12 items. To find out whether the question is valid or not, it will also be compared with the r *Product Moment Table*. *r-Table Product Moment is* sought at a significance of 0.05 with (*n*) 28 because the number of students is 28 people.

Table 4.1 Validity Test Results

Test	R-count	R-table	Description
1	0,842	0.3610	Valid
2	0,699	0.3610	Valid
3	0,764	0.3610	Valid
4	0,596	0.3610	Valid
5	0,669	0.3610	Valid

6	0,597	0.3610	Valid
7	0,734	0.3610	Valid
8	-0,058	0.3610	Invalid
9	0,547	0.3610	Valid
10	0,420	0.3610	Valid
11	-0,367	0.3610	Invalid
12	-0,052	0.3610	Invalid

Based on table 4.1 above, of the 12 questions that have been tested on 28 respondents, there are 9 valid questions, namely questions number 1, 2, 3, 4, 5, 6, 7, 9, and 10. And there are 3 invalid questions, namely questions number 8, 11, and 12. So that only 9 questions will be used for research.

2. Reliability Test

The reliability test on this research instrument uses the *Cronbach's alpha* formula with the help of the SPSS *for windows* application.

Table 4.2 Reliability Test Results

Reliability Statistics	
Cronbach's Alpha	N of Items
.847	9

Based on table 4.2 above shows that the results of the reliability test on the test that has been used get a value of 0.847 at the *Cronbach's Alpha* table point, with a total of 9 question items. This means that the increase in the conclusion of this reliability test can be seen from the reliability coefficient classification table, namely 0.80 ≤ 0.847 ≤ 1.00 is included in the very high criteria.

B. Initial Data Analysis

1. Experiment *Pre-test*

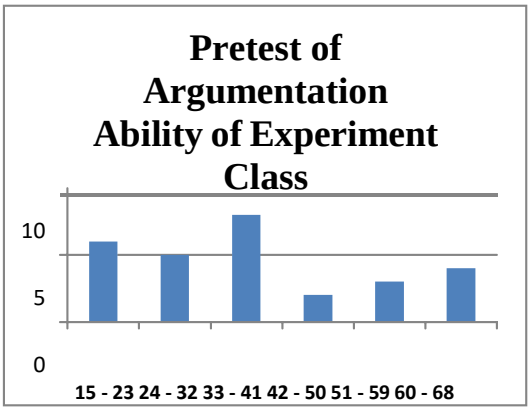
The pre-test was given with the aim of knowing the extent of students' argumentation skills and students' understanding of the material to be taught whether it could be mastered by students before treatment in the experimental class.

Table 4.3 Frequency Distribution of *Pre-test* Argumentation Ability of Experimental Class Students

No.	Value Interval Test	Frequency	Percentage (%)
1	15 - 23	6	22%
2	24 - 32	5	18%
3	33 - 41	8	28%
4	42 - 50	2	7%
5	51 - 59	3	11%
6	60 - 68	4	14%
Total		28	100%

Based on table 4.3 above, it is known that the pre-test scores of students' argumentation skills in the experimental class on average students have not met the school's KKM standard of 75. It is known that there are no students who meet the KKM score and as many as 28 students have not met the KKM score.

Figure 4.1 Diagram of Pre-Test of Argumentation Ability of Experimental Class Students



The following is the distribution of *pre-test* scores of argumentation skills of experimental class students before being given treatment using the *Argument Driven Inquiry* (ADI) model for fifth grade students of Integrated Elementary School Muhammadiyah 36 Medan.

Table 4.4 Pre-test Distribution of Argumentation Ability of Experimental

No. Item soal	Class Students Alternative Answer									
	SB		B		K		SK		Total	
	F	%	F	%	F	%	F	%	F	%
1	4	14,2	11	39,2	13	46,4	0	0	28	100
2	3	10,7	9	32,2	16	57,1	0	0	28	100
3	3	10,7	8	28,5	17	60,7	0	0	28	100
4	0	0	9	32,2	19	67,8	0	0	28	100
5	0	0	6	21,4	22	78,5	0	0	28	100
6	0	0	5	17,8	21	75,0	2	7,1	28	100
7	0	0	2	7,1	18	64,2	8	28,5	28	100
8	0	0	1	3,5	15	53,5	12	42,8	28	100
9	0	0	2	7,1	15	53,5	11	39,2	28	100

2. Experiment *Post-Test*

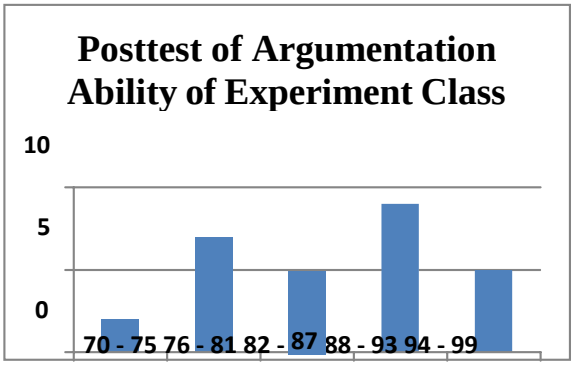
After the pre-test is given then give the *Argument Driven Inquiry* (ADI) model treatment, then give a post-test to students to determine the ability to argue and student knowledge of the material that has been taught.

Table 4.5 Frequency Distribution of *Post-test* Argumentation Ability of Experimental Class

No.	Value Interval Test	Frequency	Percentage (%)
1	70 - 75	2	7%
2	76 - 81	7	25%
3	82 - 87	5	18%
4	88 - 93	9	32%
5	94 - 99	5	18%
Total		28	100%

Based on table 4.5 above, it is known that the *post-test* scores of students' argumentation skills in the experimental class have met the school's KKM standard of 75. It is known that 26 students who meet the KKM score, and 2 more students have not met the KKM score.

Figure 4.2 *Post-test* Diagram of Argumentation Ability of Experimental Class Students



The following is the distribution of *post-test* scores of argumentation skills of experimental class students after being given treatment using the *Argument Driven Inquiry* (ADI) model in fifth grade students of Muhammadiyah 36 Integrated Elementary School in Medan.

Table 4.6 *Post-test* Distribution of Argumentation Ability of Experimental Class Students

No. Item soal	Alternative Answer									
	SB		B		K		SK		Total	
	F	%	F	%	F	%	F	%	F	%
1	28	100	0	0	0	0	0	0	28	100
2	2	10	0	0	0	0	0	0	2	10
	8	0							8	0
3	28	100	0	0	0	0	0	0	28	100
4	24	85,7	4	14,2	0	0	0	0	28	100
5	19	67,8	9	32,2	0	0	0	0	28	100
6	16	57,1	12	42,8	0	0	0	0	28	100
7	6	21,4	21	75,0	1	3,5	0	0	28	100
8	4	14,2	20	71,4	4	14,2	0	0	28	100
9	7	25,0	16	57,1	5	17,8	0	0	28	100

3. Control *Pre-Test*

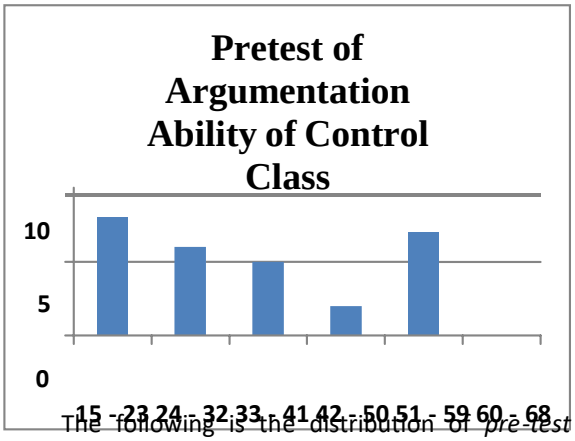
The pre-test was given with the aim of knowing the extent of students' argumentation skills and students' understanding of the material to be taught whether it could be mastered by students before treatment in the control class.

Table 4.7 Frequency Distribution of Pre-Test Score of Argumentation Ability of Control Class Students

No.	Value Interval Test	Frequency	Percentage (%)
1	15 - 23	8	28%
2	24 - 32	6	22%
3	33 - 41	5	18%
4	42 - 50	2	7%
5	51 - 59	7	25%
6	60 - 68	0	0%
Total		28	100%

Based on table 4.7 above, it is known that the *pre-test* scores of students' argumentation skills in the control class on average students have not met the school's KKM standard of 75. It is known that there are no students who meet the KKM score and as many as 28 more students have not met the KKM score.

Figure 4.3 Diagram of *Pre-test of* Students' Argumentation Ability in the Control Class



The following is the distribution of *pre-test* scores of argumentation skills of control class students before being given treatment using the *Argument Driven Inquiry (ADI)* model for fifth grade students of Integrated Elementary School Muhammadiyah 36 Medan.

Table 4.8 Distribution of *Pre-Test* Score of Argumentation Ability of Control Class Students

No. Item soal	Alternative Answer									
	SB		B		K		SK		Total	
	F	%	F	%	F	%	F	%	F	%
1	1	3,5	15	53,5	12	42,8	0	0	28	100
2	0	0	12	42,8	16	57,1	0	0	28	100
3	0	0	12	42,8	16	57,1	0	0	28	100
4	0	0	8	28,5	20	71,4	0	0	28	100
5	0	0	7	25,0	18	64,2	3	10,7	28	100
6	0	0	4	14,2	18	64,2	6	21,4	28	100
7	0	0	2	7,1	17	60,7	9	32,1	28	100
8	0	0	0	0	12	42,8	16	57,1	28	100
9	0	0	0	0	14	50,0	14	50,0	28	100

4. Control Post-Test

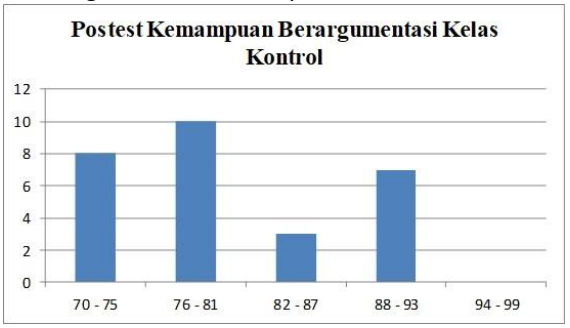
After the *pre-test is* given treatment using a conventional learning model. After the treatment is given, a post-test is given to students to determine their argumentation skills and knowledge of the material that has been taught.

Table 4.9 Frequency Distribution of *Post-test* Values Students' Argumentation Ability in Control Class

No.	Value Interval Test	Frequency	Percentage (%)
1	70 - 75	8	28%
2	76 - 81	10	36%
3	82 - 87	3	11%
4	88 - 93	7	25%
5	94 - 99	0	0%
Total		28	100%

Based on table 4.9 above, it is known that the *post-test* scores of students' argumentation skills in the control class of some students have met the school's KKM standard of 75. It is known that students who meet the KKM score are 20 students, and 8 more students have not met the KKM score.

Figure 4.4 *Post-test* Diagram of Students' Argumentation Ability in the Control Class



The following is the distribution of *post-test* scores of argumentation skills of control class students after being given treatment using conventional learning models in fifth grade students of Muhammadiyah 36 Integrated Elementary School in Medan.

Table 4.10 Distribution of Post-test Score of Argumentation Ability of Control Class

No. Item soal	Students Alternative Answer									
	SB		B		K		SK		Total	
	F	%	F	%	F	%	F	%	F	%
1	25	89,2	3	10,7	0	0	0	0	28	100
2	21	75,0	7	25,0	0	0	0	0	28	100
3	21	75,0	7	25,0	0	0	0	0	28	100
4	14	50,0	14	50,0	0	0	0	0	28	100
5	9	32,1	19	67,8	0	0	0	0	28	100
6	6	21,4	22	78,5	0	0	0	0	28	100
7	1	3,5	24	85,7	3	10,7	0	0	28	100
8	1	3,5	18	64,2	9	32,1	0	0	28	100

9	0	0	21	75,0	7	25	0	0	28	100

C. Analysis Requirements Testing

1. Normality Test

The normality test aims to test whether the dependent variable and the independent variable in the regression model both have normal data distribution or not.

Table 4.11 Normality Test Results

Tests of Normality							
		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	class	Statistic	df	Sig.	Statistic	df	Sig.
kemampuan berargumentasi	*pre-test* experiment imen	.149	28	.111	.899	28	.011
	experimental *post-test* imen	.138	28	.185	.928	28	.055
	pre-test control	.132	28	.200*	.926	28	.049
	control *post-test*	.154	28	.089	.932	28	.066

Based on the output results of the normality test results on Kolmogorov-Smirnov, it can be seen that the significance value (Sig.) for the experimental class pretest is 0.111> 0.05, experimental class *posttest is 0.*185> 0.05, control *pretest is 0.*200> 0.05, control *posttest is* 0.089> 0.05. Because all sig. > 0.05, it can be concluded that the data variants of the control class and experimental class are normally distributed.

2. Homogeneity Test

After it is known that the sample comes from a normally distributed population, the next step is to conduct a homogeneity test. The data homogeneity test is carried out to see whether the data is homogeneous or not, or the samples have the same variant or not.

Table 4.12 Homogeneity Test Results

Test of Homogeneity of Variance				
	Levene	df	df2	Sig.
argumentation skills	Statistic	1		
	Based on Mean	.006	1	54	.937
	Based on Median	.011	1	54	.915
	Based on Median and with adjusted df	.011	1	53.045	.915
	Based on trimmed mean	.005	1	54	.942

The table above explains that the significance value of sig. *Based on* mean of 0.937> 0.05. This means that the research data used is homogeneous. This means that the sample in this study can represent the population, in other words, the conclusions drawn from the sample can represent conclusions for the population.

3. Hypothesis Test

After the research prerequisite test, namely the normality test and homogeneity test, is fulfilled, it can be continued with the research hypothesis test. Hypothesis testing is used to test the hypothesis formulated and will then lead to conclusions to accept the hypothesis or reject the hypothesis.

Table 4.13 Hypothesis Test Results

Independent Samples Test											
		Levene's Test for Equality of Variances		t-test for Equality of Means							
						Significance		Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
		F	Sig.	t	df	One-Sided p	Two-Sided p			Lower	Upper
kemampuan berargumentasi	Equal variances assumed	.000	.937	5.301	54	.001	.001	9.929	1.873	6.173	13.684
	Equal variances not assumed			5.301	53.994	.001	.001	9.929	1.873	6.173	13.684

Based on the table above, the *significance* value of *2-sided Equal variances assumed* is 0.001. Where 0.001 <0.05 based on the testing criteria, H0 is rejected and Ha is accepted, meaning that there is an effect of the *Argument Driven Inquiry* (ADI) learning model on students' argumentation skills.

Table 4.14 *Independent* Sample T- Statistical *Output test*

Group Statistics					
	Class	N	Mean	Std. Deviation	Std. Error Mean
argumentation skills	experimental class *post-test* en	28	86.71	6.970	1.317
	post-test class control	28	76.79	7.047	1.332

Based on the table above, it can be seen that the mean *post-test* value of the experimental class is 86.71 while the mean *post-test of the* control class is 76.79 where 86.71> 76.79. This means that the argumentation skills of experimental class students are greater than the argumentation skills of control class students. Based on the testing criteria Ha is accepted, which means that the *argumentation* skills of students who use the *argument driven inquiry* learning model are higher than the argumentation skills of students who use conventional learning models.

CONCLUSIONS

The conclusions in this study are as follows:

1. Students' argumentation skills in the control class at the beginning of learning were still low with an average pretest result of 34.82 and a posttest result of 76.79 at the end of learning after using the model conventional learning model. This proves that students' argumentation skills are still low, so that it can result in student scores being at a low point.
2. Students' *argumentation* skills in the experimental class at the beginning of learning the average pretest results were 38.68 before using the *argument driven inquiry* model. After carrying out teaching and learning activities using the *argument driven inquiry* learning model, students' argumentation skills increased marked by the results of the average post-test score of 84.69 which was applied by 28 respondents. Students are also more interested, focused and feel motivated when learning using the *argument driven inquiry model*. Students also feel that learning activities using the *argument driven inquiry* model are very different from learning without using conventional learning models.
3. There is an effect of using the *argument driven inquiry* model on students' argumentation skills. This is found in the average (*mean*) *post-test* results of the experimental class of 86.71 while the average (*mean*) posttest of the control class is 76.79, where 86.71> 76.79. This means that the argumentation skills of experimental class students are greater than the argumentation skills of control class students (μ1> μ2). From the output results the *significance of 2-sided Equal variances assumed* is 0.001. So it can be concluded that Ha is accepted and H0 is rejected. Thus it can be said that there are differences in learning outcomes using the *argument driven inquiry* model in the experimental and control classes. Because there is a significant difference, it can be said that there is an effect of using the *argument driven inquiry* model on the argumentation skills of fifth grade students of Muhammadiyah 36 Integrated Elementary School in Medan.

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