

## The Effectiveness of Science Multimedia Interactive Based on Aurora 3D Presentation on Student Learning Outcomes

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### Abstract

**Keywords:**  
*Science*  
*Multimedia*  
*Interactive;*  
*Aurora 3D*  
*Presentation;*  
*Learning Outcomes*

This research aims to study significant differences between learning by using interactive multimedia based on Aurora 3D Presentation with conventional methods on student learning outcomes in Environmental pollution material. This type of research is a quantitative study using a research design consisting of a post-test control group. The sample in this study was grade VII students of SMP Negeri 1 Jember. There are two groups namely the experimental group taken from class VII C and the control group taken from class VII A which is determined by a purposive sampling technique. The instrument to collect data using a post-test. Analysis of the data used is a t-test consisting of independent sample t-tests. Based on the t-test on student learning outcomes through the post-test, the t-count value was 2.015 and the t-table value was 1.669. Because t-count is greater than t-table, The use of Aurora 3D Presentation in learning is effective for the subject environmental pollution at the Seventh Grade of junior high school students.

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### Introduction

Learning is a conscious effort of educators to teach students to make changes in student behavior by involving the learning components. The learning and learning process will achieve optimal learning goals if the components inside interact with each other and run optimally. Thus, science learning is a process of interaction between the components of science learning that are designed in the form of a learning process that suits the objectives to be achieved and its development.

Science as the process of learning should create a joyful learning atmosphere so that students are always active as well as have a curiosity about the problems that exist in the natural environment so that students can explore their potential to be developed (Prawesthy & Wijayanti, 2017). Besides, science learning must be carried out interactively between learning components and its theories to achieve the aspects of knowledge, attitudes, and skills. Due to active learning is a creative solution to foster motivation, attention, and student involvement, it can help students to engage in the learning process. The higher the motivation for learning will lead students to their higher effort for learning. The appropriate learning effort can improve students' good learning achievement. So, students who have high learning motivation, they will be able to achieve good learning achievement (Handhika, 2012).

Attractive science learning can foster student concentration in learning. Ratminingsih, (2016) stated that the same thing in terms of attention span, the concentration of students in learning depends on the packaging of teacher learning. Meaningful learning will help students understand the material presented by the teacher. A meaningful science learning process is expected to be able to improve the quality of learning. The concept of learning that is meaningful in the science learning process will be able to answer a problem faced by students (Wisudawati & Sulistyowati, 2014). However, if the material being taught looks boring, difficult to understand, and lacks meaning, students will tend not to pay attention to the teacher's explanation. The use of conventional learning is no longer appropriate with the current conditions because the teacher's limited method can only transfer material to students.

However, obstacles in the field indicate that the implementation of natural science learning is still not optimal. This is because the variation of teachers in teaching is still lacking in inviting students to focus on learning. The result of observation indicates that teachers tend to use monotonous methods in teaching science material so that students look get bored during the learning process. Furthermore, the results of interviews show that students' participation in the learning, will focus to follow the learning well. Meanwhile, other students will talk with their peers and do not pay attention to the teacher. Besides, it is also known that teachers have never used instructional media in the form of interactive multimedia in the science learning process.

In realizing an optimal learning process, the teacher must link within the learning components, and one of them is the use of learning media. Srimaya (2017) states that learning media is one component that is able to support the success of teaching and learning activities. High and low learning outcomes obtained by students depend so much on several things, one of which is the use of instructional media in the teaching and learning process (Mardhiah & Akbar, 2018). Therefore, instructional media is needed in the learning process to facilitate students with the material delivered by the teacher so that varied learning occurs in the classroom. Learning media gives a positive value in the learning process. Besides, in making students active in learning, fostering motivation, and student interest in learning, learning media can also improve achievement in the form of student learning outcomes.

In line with the development of sophisticated technology, the areas of education also innovate the media in utilizing technology as a medium of learning for students. There is various kind of learning media that can be used by teachers. Even today there are a lot of research done in the development of instructional media to improve the quality of learning. The selection in using the appropriate learning media also influences students' understanding of the material learned to obtain maximum learning results. The selection of appropriate learning media if it meets several criteria such as conformity to the objectives to be achieved, student characteristics, efficiency and effectiveness of media use, the ability of the media to make students active and creative and create a learning atmosphere of learning, and safety for students (Akbar, 2013).

Therefore, teachers must be engaged in choosing, providing, and presenting the effective media, so that the material delivered through learning media can be well received by students. Teacher strategies play an important role in the learning process in providing opportunities for students to be active so that students easily remember and understand the material that has been given by the teacher (Nataliya, 2015). The more active students

participate in learning, the more senses are used to absorb the material they learn, so they achieve better learning achievement (Sujatmika, 2016). Based on the explanation above, it can be seen that the teacher plays an important role in helping students to learn according to the needs and interests of their students. One way to make students actively participate in the learning process is by presenting interactive multimedia in learning. Interactive multimedia is the media of the combination of several elements in the form of text, images, audio, video, and animation that are presented interactively to students (Suhirman, 2015).

One interactive multimedia that can be implemented in the learning process is the Aurora 3D Presentation. Aurora 3D Presentation Software is software that can combine text, images, audio, video, and data with 3-dimensional features (Wahyuni, Amran, & Herdini, 2016). The use of Aurora 3D Presentation media can help students in obtaining feedback on learning and can trigger motivation with positive reinforcement (Khaerotin, 2019). Also, using Aurora 3D Presentation media can improve student learning outcomes. This is in line with research conducted by Mu'tasim & Suyitno (2016) that there are differences in average learning outcomes between experimental classes using Aurora 3D Presentation media and control classes that do not use.

Based on the explanation above, the purpose of this research is to find out the effective learning by using interactive multimedia based on Aurora 3D Presentation and conventional methods on student learning outcomes in natural science, especially environmental pollution.

**Method**

This research is quantitative. This type of research uses a quasi-experimental design research method because students who are given treatment cannot be controlled or fully controlled. The experimental design in this research uses a nonequivalent group posttest only design. In this study, there are two groups: the control group and the experimental group. A control group is a group that does not get treatment (using conventional methods), while the experimental group is a group that is given treatment by using interactive learning media based on Aurora 3D Presentation in the learning process. After each treatment is given, at the end of the learning each group gets the same posttest (final test). The research procedure used is the design model adapted by Jakni (2016) as follows in Table 1.

**Table 1. Nonequivalent Group Posttest Only Design**

<b>Group</b>	<b>Treatment</b>	<b>Posttest</b>
NR <sub>1</sub> (Experiment)	X	O <sub>1</sub>
NR <sub>2</sub> (Control)	-	O <sub>2</sub>

**Information:**

- NR<sub>1</sub> : The experimental group was not chosen randomly
- NR<sub>2</sub> : The control group was not chosen randomly
- X : Treatment
- O<sub>1</sub>& O<sub>2</sub> : *Posttest* the experimental and control groups after treatment

The research was carried out in SMP Jember 1 in the span of February-March 2020. The population in this study was SMP Negeri 1 Jember with a sample of research, namely two classes consisting of classes VII A and VII C which were selected by using a purposive sampling technique. Two groups were not chosen randomly because they were taken based on certain considerations of the sample, namely one group that was given treatment as an experimental class, namely class VII C, and a class that was not treated as a control class, namely class VII-A.

Data collection techniques used in the study were test techniques in the form of a posttest. The instrument used in this study was in the form of a posttest sheet of environmental pollution in class VII Natural Sciences (IPA) material. The post-test instrument consists of 20 items made in the form of multiple choice. Before being given to students, the post-test is tested for validity and reliability. The data that has been obtained is then analyzed using a t-test in the form of an independent sample t-test which aims to determine the effectiveness of interactive learning media based on Aurora 3D Presentation on student learning outcomes. There is an analysis prerequisite test conducted to determine the statistical test that is the normality test and homogeneity test which aims to determine the validity of the sample. Analysis of this data was processed using SPSS (Statistical Program for Social Sciences) software version 21.0.

## **Results and Discussion**

Before testing the hypothesis there is an analysis of prerequisite test that is normality test and homogeneity test. The analysis of prerequisite test results are presented as follows:

### **Normality Test Results**

This normality test is done to test whether the variables are normally distributed or not. This normality test uses Shapiro Wilk. If the significant value is greater than 0.05 then the data is normally distributed and vice versa. The calculation results obtained can be shown in the following table 2.

**Table 2. Summary of Normality Test**

<b>No</b>	<b>Group</b>	<b>Significant</b>	<b>Conclusion</b>
1	Class 7C (Experiment)	0,327	Normal
2	Class 7A (Control)	0,077	Normal

Based on table 2 above, it can be seen that the learning outcomes (posttest) for both the experimental class and the control class respectively 0.327 and 0.077, meaning that both groups have a significance value > 0.05, it can be concluded that the data are normally distributed.

### Homogeneity Variance Test Results

After knowing the normality of the posttest data results, then the homogeneity test was performed. The homogeneity test is used to determine the similarity of variance between two groups, namely the experimental group and the control group as shown in Table 3.

**Table 3. Test of Homogeneity of Variances**

<i>Posttest</i>				
Levene Statistic	df1	df2	Sig.	
3.426	1	62	.069	

Based on Table 3 homogeneity test results using the Lavene statistical test obtained a significant result of 0.069. From the results of these calculations, both the experimental class and the control class both have values greater than significant values (sig > 0.05). Thus, both classes have homogeneous variance in the sense that the ability of the control class is the same as the experimental class.

### Students' Learning Outcomes

From the implementation of the Posttest in the control class and the experimental class of State Junior High School 1 Jember students, grade VII is presented in table 4 and Table 5.

**Table 4. Categories of Student Learning Outcomes Control Classes**

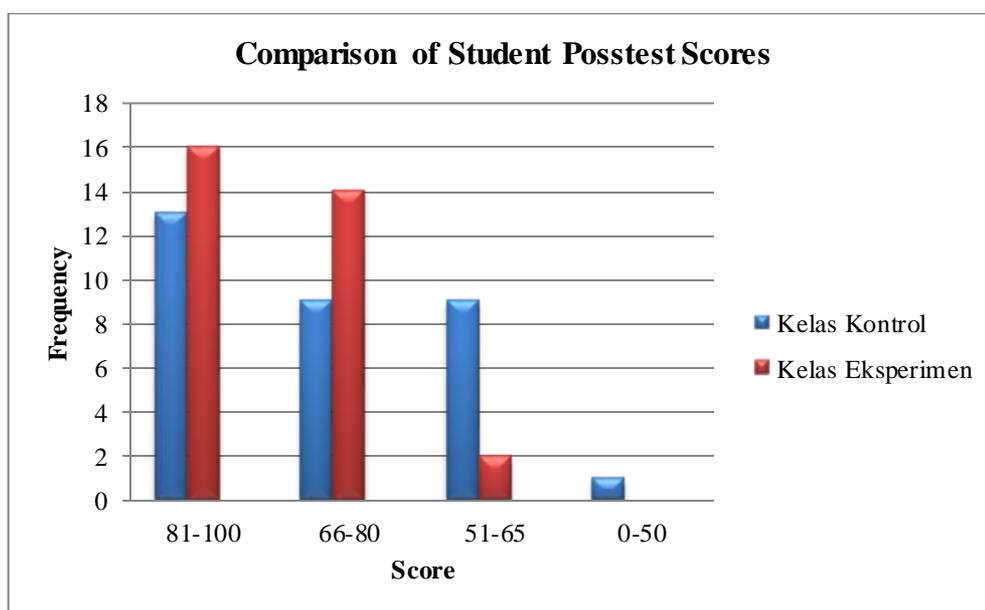
No	Score	Frequency	Percentage (%)	Category
1	81 – 100	13	40,625	Very good
2	66 – 80	9	28,125	Good
3	51 – 65	9	28,125	Enough
4	0 – 50	1	3,125	Less
Total		32	100,0	

**Table 5. Categories of Student Learning Outcomes Experimen Classes**

No	Score	Frequency	Percentage (%)	Category
1	81 – 100	16	50,00	Very good
2	66 – 80	14	43,75	Good
3	51 – 65	2	6,25	Enough
4	0 – 50	0	0,00	Less
Total		32	100,0	

Based on the data in both tables 4 and 5 show the posttest values in the control class and experimental class, respectively. Posttest value data is the ability of students after the treatment is given. The treatment referred to by researchers is students in the experimental class using interactive multimedia based on Aurora 3D presentation, while in the control class

using conventional methods. The provision of the posttest is to determine the ability of students to understand the material by using interactive multimedia Aurora 3D Presentation and those who do not use it as shown in Figure 1.



**Figure 1. Comparison of Student Post-test Scores**

Based on Figure 1 shows that the posttest score of students in the experimental class is higher than the control class. This can be seen from the number of frequencies in the range of values 81-100 and 66-80 achieved by the experimental class is higher than the control class. While the frequency of students with posttest scores in the range of grades 51-65 is higher than the experimental class. The comparison result between the experiment and control group as shown in table 6 and table 7.

**Table 6. Average Post-test Student Results in the Experiment and Control Group**

	Class	N	Mean	Std. Deviation	Std. Error Mean
Score Posttest	Class 7C	32	82.3438	9.83611	1.73879
Student	Class 7A	32	76.7188	12.35297	2.18372

**Table7. Summary Comparison of Posttest Value of Experiment and Control Classes**

No	Class	Total Student	Minimal Value	Maximal Value	Average
1	Experiment	32	60	100	82,34
2	Control	32	50	95	76,71

Data in tables 6 and 7 show that in the experimental class the lowest value is 60 and the highest value is 100. The average value of the experimental class is 82.34 and the standard deviation is 9.83. Whereas in the control class the lowest value is 50 and the highest value is 95. The average value of the control class is 76.71 and the standard deviation is 12.35. Thus it

is known that classes that use interactive multimedia based on Aurora 3D Presentation developed by researchers show better results than control classes, ie classes that do not use the media developed by researchers and only use teaching materials provided by schools.

**Hypothesis Test Result**

The use of Aurora 3D Presentation is effective for the result of students learning outcome on the Environment Polution.

The results of the hypothesis test on the posttest value data of the experimental class and the control class were further analyzed using the t-test, namely the t-test (Independent Sample T-test) with a significance level of 0.05. This analysis technique is used to determine whether there is an effect of a treatment using Aurora 3D Presentation-based interactive learning media on groups that are used as research objects. This analysis was carried out using SPSS software version 21.0 as shown in Table 8.

**Table 8. Independent Samples Test Results**

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	T	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Posttest Student Result	Equal variances assumed	2.671	.107	2.015	62	.048	5.62500	2.79142	.04503	11.20497
	Equal variances not assumed			2.015	59.038	.048	5.62500	2.79142	.03946	11.21054

Based on the results of the statistical tests in table 8 it was found that df (equal variance assumed) was 62 so that t tables were obtained with a 2-sided test (significance = 0.025), 1.669, and t count obtained was 2.015. So it can be seen that the value of t (2.015) is greater than the value of t-table (1.669). Then it can be concluded that Ha was accepted and Ho was rejected. In the sense that students who are taught using interactive multimedia based on Aurora 3D Presentation with students who are taught using conventional methods there are significant differences in the average of students' posttest results. This indicates the use of interactive multimedia based on Aurora 3D Presentation is effective because it can improve student learning outcomes.

From the explanation of the above results, the normality test of the two groups (class) both the experimental group and the normally distributed control group, seen from the significance value obtained is greater than 0.05. in the homogeneity test 1. The two groups are homogeneous, meaning that both groups both the experimental group and the control group have the same initial ability or homogeneous, seen from the significance value of the two groups greater than 0.05. The average student learning outcomes taught using interactive

multimedia based on Aurora 3D Presentation are higher than students who are taught using conventional methods or who only use teaching materials provided by the school.

Aurora 3D Presentation-based interactive multimedia is a learning media that is packaged interactively for students by integrating or integrating various elements such as text, audio, video, animation, and games. The advantages of using instructional media in the form of interactive multimedia include making it easy to understand the concepts presented, providing opportunities for students to learn following the speed of each student, and not causing boredom because it is equipped with various elements of images, animations to practice questions (Wulandari, Sibuea, & Siagian, 2018). Also, by using this interactive multimedia can learn faster and more interesting (Akmal, Mursid, & Munir, 2018). Based on this it can be seen that interactive multimedia can be used as an alternative instructional media both conventionally and individually.

Learning multimedia can increase learning interest because it combines text, images, videos, and animations that are designed to be interesting with learning activities that involve students and are easy to use (Nuzulia, Suyanto, & Nurcahyo, 2016). Also, the use of interactive multimedia in effective learning in improving the process and learning outcomes achieved by students (Siagian, Mursit, & Wau, 2014). This is confirmed by research conducted by Santoso & Agung (2017) that students show responses with very good criteria for learning media based on Aurora 3D Presentation.

Thus the use of interactive multimedia in learning helps the effectiveness of the teaching and learning process in the delivery of material. The effectiveness of the use of interactive multimedia based on Aurora 3D Presentation can be seen from the motivation and curiosity of students when operating the media. So students can focus on understanding the material and are active in their learning. Student learning motivation can have an impact on increasing student learning activities. If student motivation is high then student learning activities will also be high (Srimaya, 2017). This will affect the improvement of student learning outcomes. This is also in line with previous research which revealed that interesting learning media can motivate students to want and maintain their learning, facilitate the learning process, make learning effective and efficient, and can improve learning outcomes (Ratminingsih, 2016). This is because environmental pollution material presented in Aurora 3D Presentation media can simplify complicated concepts accompanied by images, animations, audio, videos, practice exercises, and games. Besides, Aurora 3D Presentation media is designed interactively so students can control themselves in their use. Aurora 3D Presentation-based learning media is also more interactive with the practice of questions and evaluation with feedback (Wahyuni et al., 2016).

The results of the statistical test using a descriptive t-test revealed that the posttest value of the experimental class was higher than the control class. This indicates that learning using instructional media in the form of interactive multimedia based on Aurora 3D Presentation is effective for use in classroom learning. Whereas in the independent sample t-test, the significance value obtained was less than 0.05, meaning that there were differences between the two groups in their learning outcomes. In other words, effective learning in groups using interactive multimedia. The results of research conducted by Hakim & Dalle (2015) show that there are significant differences in learning outcomes using interactive learning media based on Aurora 3D Presentation and conventional learning models. This is

also supported by research conducted by Iqbal (2017) revealing that learning media using Aurora 3D Presentation has proven to be effective in learning by fulfilling 70% completeness and an average percentage of activity of 93.4%.

## **Conclusion**

Based on the results of the research is effective learning of using interactive multimedia based on Aurora 3D Presentation and students who use conventional methods on environmental pollution material. So that interactive multimedia based on Aurora 3D Presentation is effective for use in the learning process because it can improve student learning outcomes and trigger motivation for learning.

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