

Application of Simulation-Based Media to Physics Learning Achievement of Student at XI IPA Grade SMAN 1 Bontonompo

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Abstract. This study is pre-experimental research with One-Shot Case Study Design that aims to describe learning physics and to know the average of physics learning achievement after taught by using simulation-based media that achieved 75% of an ideal score. The subject in this study was class XI IPA 6 SMAN 1 Bontonompo academic year 2015/2016 consist of 31 students. Descriptive analysis result was obtained the average of physics learning achievement at in very good category and percentage of highest score at the knowledge level analysis (C4) and lowest score at analysis level comprehension (C2). Result of hypothesis test was obtained the average of physics learning achievement after taught by using simulation-based media can reach over 75% of the ideal score 38,25.

INTRODUCTION

Human life is influenced by the development of science and technology. These developments indicate the necessity of improving the quality of human resources, but human resources quality of Indonesia will be grown requires a systematic, consistent, and professional education, not naturally. (Nasution, 2005)

Education has a very important role in determining the future. In practice education established in the learning process which in an educational interaction this should pay attention to several aspects of education and teaching purposes. (Danim, 2008)

An initial survey has been conducted by researchers on January 7th to 9th 2016 shows that the process of learning physics at SMAN 1 Bontonompo still using media of white. Teachers rarely interact in group so that the activity of communication in exchanging ideas between learners are less. Teachers seem to dominate the learning process because they only describes the subject matter and the provision of duty without giving learners the opportunity to express opinions and discuss with colleagues. Thus, the learning process becomes uninteractive and uncommunicative.

Another reasons are materials too will limited tools (laboratory), a lot of learners, no laboratory asistant provides tools practicum, and ability of learners tounderstand are not same. Physics is abstract, then calculation is quite complicated, and analysis are quite high, so the learners assume that physics think that physics is difficult to understand and then it will impact on learning achievement of them.

Based of these observations result, the researcher designed a learning that was expected to improve learning achievement of physics students. especially, in physics by applying media of simulation-based on Macromedia Flash.

Macromedia Flash as a medium of learning can to concrete the abstract material that is easier to understand and minimize the level of confusion learners during the learning process. So that will be obtained, better learning achievement.

Media that used in this study was a media that obtained from internet downloads in *Pustekkom.com* sites for the subject kinetic theory of gases and media the subject thermodynamics at under gratually student of physics FMIPA Universitas Negeri Makassar developed by Siti Hafizah as the final project guided by Nurhayati and

Ahmad Yani. The researchers wanted to see if the media being used has an impact on learning achievement of physics students whose characteristics are different from the time in this simulation-based media test.

Based on the description above, as the formulation of research in this study were: (1) How to describe of physics learning achievement after taught by using simulation-based media? (2) Is the results of learning physics after taught by using simulation-based media can reach over 75% of the ideal score?. While the purpose were: (1) To describe of physics learning achievement after taught by using simulation-based media (2) To know the average of physics learning achievement after taught by using simulation-based media can reach over 75% of the ideal score.

RESEARCH METHODS

Type of Research

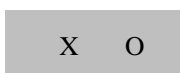
The type of research used in this study is the Pre-Experimental Design.

Location of Research

The location of research is SMAN 1 Bontonompo of Gowa, Sulawesi Selatan Province.

Design Research

The design research is the One-Shot Case Study, according Sugiyono (2015:110) described as follows:



Information:

X : Treatment

O : Measurement of dependent variable

Variable Research

a. Independent Variable

The independent variable is learning by using simulation-based media.

b. Dependent Variable

The dependent variable is physics learning achievement students.

Variable Operational Definition

- a. Learning by using simulation-based media in this research is the instructional media used in the process of delivering teaching material to students at XI IPA grade SMAN 1 Bontonompo form of images simulated, text, graphics, animation accompanied displayed on the screen by using an LCD projector. The subject matter deliver, the Kinetic Theory of Gases and Thermodynamics with Macromedia Flash Professional 8 format.
- b. Physics learning achievement students is the level of mastery of physics "kinetic theory of gases and thermodynamics" obtained after taught by using simulation-based media. The level of mastery is reflected in the scores achieved learners of physics test, based on indicators of cognitive learning achievement include (C1) knowledge, (C2) comprehension, (C3) application, and (C4) analysis.

Population and Sample Research

The population in this study are the characteristics of students with the subject population is all students of XI IPA grade SMAN 1 Bontonompo the academic year 2015/2016 consisting of 8 classes with of 255 students. While the sample are students of XI IPA 6 SMAN 1 Bontonompo the academic year 2015/2016 with 31 students consisting of 10 men and 21 women.

Data Collection Techniques

Data of physics learning achievement students use the test with subject kinetic theory of gases and thermodynamics. The tests used in this study a merger of multiple-choice and essays given at the last meeting. Scoring procedure is performed using a scoring model of multiple-choice and essay. For multiple-choice, students who answered the item correctly given a score of 1 and item with wrong answer or no answer is given a score of 0. As for the essay using essay scoring rubric. (Dewanthikumala, 2016:158)

Data Analysis Techniques

Data from this study were analyzed using descriptive statistical and inferential statistical analysis. Descriptive statistical analysis is intended to describe the physics learning achievement score after taught by using simulation-based media, especially on the subject kinetic theory of gases and thermodynamics of students at XI IPA grade SMAN 1 Bontonompo the academic year 2015/2016. While, inferential statistics are used to test the hypothesis of the study using a test but before the *t-test* was first tested the basic statistical normality test.

RESULTS AND DISCUSSION

Results

The descriptive scores physics learning achievement of students at XI IPA 6 SMAN 1 Bontonompo the academic year 2015/2016 are taught by using simulation-based media can be seen in Table 1 below:

TABLE 1. Statistic analysis descriptive the physics learning achievement score

Statistics	Value Statistics
Number of samples (n)	28
Average (\bar{x})	40,11
The minimum score (x_{min})	28
The maximum score (x_{max})	45
Ideal score	51
Range of data	17
Standard deviation (S)	3,73
Variance (S^2)	13,88

The recovery percentage score per category physics learning achievement of students at XI IPA 6 SMAN 1 Bontonompo the academic year 2015/2016 are taught by using simulation-based media can be seen in Table 2.

TABLE 2. Percentage data score per category physics learning achievement

Percentage Interval (%)	Physics Learning Achievement Category	Many Students (f)	Percentage (%)
$X > 36$	Very good	23	82,14
$27 < X \leq 36$	Good	5	17,86
$18 < X \leq 27$	Enough	0	0
$9 < X \leq 18$	Less	0	0
$X \leq 9$	Very Less	0	0
Jumlah		28	100

(Arikunto, 2010)

If Table 2 illustrated with pie diagram, shown in Figure 1.

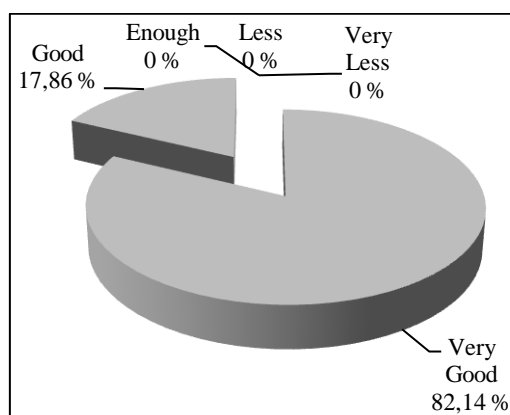


FIGURE 1. Pie chart percentage categories score physics learning achievement

Figure 1, it can be seen that the percentage category score physics learning achievement of students at XI IPA 6 SMAN 1 Bontonompo the academic year 2015/2016 showed that the frequency of the largest data lies in the very good category with a percentage of 82,14% while the smallest data frequency lies in good categories with a percentage of 17,86%.

The percentage score is based on learning achievement cognitive level is as follows:

TABLE 3. Percentage score physics learning achievement cognitive level

Cognitive Level	Percentage (%)
Knowledge (C1)	48,27
Comprehension (C2)	46,10
Application (C3)	61,02
Analysis (C4)	82,57

If Table 3 to described with bar diagram, it will look as follows:

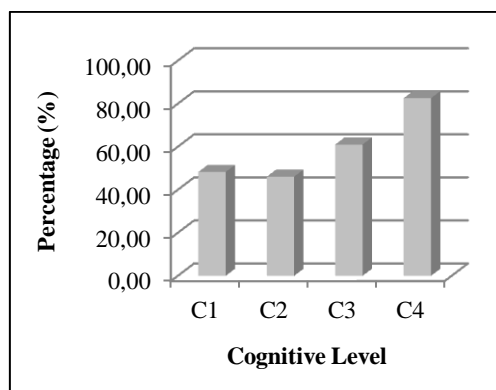


FIGURE 2. Bar diagram percentage score physics learning achievement by cognitive level

Figure 2, it can be seen that the highest percentage score cognitive level is at the level of C4 (analysis) and the lowest at level C2 (comprehension). There are 82,57% of learners who can answer correctly about C4 (analysis); 61,02% of C3 (application); 48,27% of C1 (knowledge) and the lowest at 46,10% of C2 (comprehension).

The data were also analyzed to test the hypothesis. To test this hypothesis test was used right party that:

$$H_0 : \mu \leq 38,25$$

$$H_a : \mu > 38,25$$

Information:

$H_0 : \mu \leq 38,25$: Average physics learning achievement of students at XI IPA 6 SMAN 1 Bontonompo the academic year 2015/2016 is lower than or equal to 38,25

$H_a : \mu > 38,25$: Average physics learning achievement of students at XI IPA 6 SMAN 1 Bontonompo the academic year 2015/2016 higher than 38,25

Based on the results obtained $t_{hitung} = 2,66 > t_{tabel} = 1,70$ and fell to the reception area H_a while H_0 is rejected. This means, on average, physics learning achievement of students at XI grade IPA 6 SMAN 1 Bontonompo the academic year 2015/2016 after being taught using simulation-based media can exceed 75% of the ideal score of 38,25.

Discussion

This study aimed to describe the physics learning achievement after taught by using simulation-based media, and To know the average of physics learning achievement after taught by using simulation-based media can reach over 75% of the ideal score, especially on the subject kinetic theory of gases and thermodynamics of student at XI IPA grade SMAN 1 Bontonompo the academic year 205/2016. Through these research activities is expected to give the feel of learning more interesting and not boring so that physics learning achievement students increased.

Based on the results of descriptive statistical analysis, it was revealed that the completeness of physics learning achievement of students after taught by using simulation-based media is greater than the completeness of physics learning achievement of learners before being given treatment. The results to describe is average score of physics learning achievement of 40,11 from an ideal score 38,25 with a standard deviation of 3,73 and a variance of 13,88. When viewed from the minimum and maximum scores obtained by students of 28 and 45. This shows that based on physics category, the average score of physics learning achievement are in the very good category where it is known minimum score are in good categories while the maximum score in very good categories.

Results overview of the percentage score is based on learning achievement cognitive level of lowest to highest are comprehension (C2) of 46,10%, knowledge (C1) of 48,27%, the application (C3) of 61,02%, and analysis (C4) of 82,57%. Based on these data showed that more students answered correctly about the level of analysis (C4) and at least at the level of comprehension (C2). This is due to the factor of habit. Where the school is known to never leave questions in the form of multiple choice to students well in every daily tests, and semester MID. So, when the researchers gave the students about the form of multiple choice. Students look ambiguous select answers from multiple choice given answers.

The results of the analysis of hypothesis testing showed that the average physics learning achievement of students at XI IPA grade SMAN 1 Bontonompo the academic year 2015/2016 after taught by using simulation-based media can over 75% of ideal score 38,25. By paying attention to these data, it can be said that the physics learning achievement as the target of teaching, provide quantitative information that level of mastery students to teaching materials after the learning process. This indicates that the learning of physics by using simulation-based media can be used to achieve the physics learning achievement increased of SMAN 1 Bontonompo students.

Empirical data was in line with the results of research conducted by Ary Susanti and Gunawan (2013), found that by using computer simulations help students has increased mastery of concepts. This is evidenced by the average percentage of N-gain experimental class of 48,83% (medium category) higher than the control class of 36,24%.

These results were also seen in the research that has been done by Salihun (2010: 26) with the title "Use of Macromedia Flash On Physics Education Class X SMA Pesantren Al-Ikhlas Polewali Mandar", it is known that the result of learning physics class X after being treated are in high category with a percentage of 74,29%.

Based on the above, it can be argued that by using simulation-based media is quite influential in improving physics learning achievement of students at XI IPA grade SMAN 1 Bontonompo. This is clearly evident from the data acquisition percentage score per category physics learning achievement.

CONCLUSION

Based on research data, it can be concluded that:

1. The average score of physics learning achievement once taught by using simulation-based media, especially on the subject Kinetic Theory of Gases and Thermodynamics of student at XI IPA grade SMAN 1 Bontonompo the academic year 2015/2016 are in the very good category.
2. The average of physics learning achievement once taught by using simulation-based media, especially on the subject Kinetic Theory of Gases and Thermodynamics of student at XI IPA grade SMAN 1 Bontonompo the academic year 2015/2016 can reach over 75% of the ideal score.

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