

The Influence of Visual 3D Media and Graphics Media for Design Machine Models

¹Diplan

Department of Elementary Education,
Universitas Muhammadiyah Surakarta
Palangkaraya, Indonesia
diplan161181@gmail.com

²Chandra Anugrah Putra

Department of Elementary Education,
Universitas Muhammadiyah Surakarta
Palangkaraya, Indonesia
chandra.anugrah@umpalangkaraya.ac.id

Abstract. Quality education requires qualified and capable educators to play a professional role in school and community settings. In line with this, the teacher's competence demands also adjust to these developments. Teachers are not only able to deliver the subject matter, but the teacher must also be able to teach children. The purpose of this study is to prove that there is a significant difference between the learning that uses three dimensional visual media with learning using graphic media during the learning process takes place. Research method used in this research is experiment, because researcher try to see difference or influence happened to research subject. The learning process will be effective if supported by adequate means used to facilitate the learning process in school. With the supporting facilities in learning can lead to interaction between teachers with learners where there is mutual in the learning process. One of the means referred to as learning support is learning media. By using appropriate and appropriate media can improve learners' learning outcomes. Media can attract the attention of learners in learning, even can make it easier for learners to understand the material delivered.

Keywords: Visual, Media, Graphics, Machines, Model

A. Introduction

Quality education requires qualified and capable educators to play a professional role in school and community settings. In line with this, the demand for teacher competence also adjusts to these developments. Teachers are not only able to deliver the subject matter, but the teacher must also be able to learners. Teachers should be able to carry out instructional for learning, which is organizing activities, managing information or learning resources to facilitate teaching and learning activities. Because it takes the mastery of resources and learning media. Mastery is not only the determination of resources and instructional media, but also the accuracy between the material to be delivered with source criteria

and learning media used.

School education in the world as well as in Indonesia is generally held in class in the form of learning process held at the same time and place. Where teachers or educators educators not only provide information, but leads and provides learning facilities in accordance with the needs of learners.

Hope that teachers always demand is how the learning or material presented by the teacher can be mastered and understood by learners, because if learners do not understand clearly about the material described and submitted by the teacher will have an impact on the learning, for example in subjects of Natural Sciences.

The learning process will be effective if supported by adequate means used to facilitate the learning process in school. With the supporting facilities in learning can lead to interaction between teachers with learners where there is reciprocal in the learning process. One of the means referred to as supporting learning is learning media. Using appropriate and appropriate media can improve students' learning outcomes. Media can attract the attention of learners in learning, even can make it easier for learners to understand the material presented.

Therefore, the researcher wanted to test empirically how the learning activity if implemented by using 3 dimensional visual media and graphic media (picture / photo) with the aim of improving learners' learning outcomes, so that learners become more active, and more easily understand the subject matter especially in science lessons.

Miarso (2009: 17) The learning process will be said to be effective if the learning can achieve the expected learning objectives. Associated with natural science learning, the existence of instructional media clearly has an influence on the success of teaching and learning, especially in improving learning outcomes of learners.

The whole process of education in schools, learning activities is the most fundamental learning activities, this means the success or absence of achievement of educational goals which much depends on how the learning process experienced by learners as a child is marked by a change in behavior in a person. Teaching work should not be interpreted as an activity to present the subject matter. While presenting the subject matter is

indeed part of the teaching activity, but not the only one, there are still many other ways that teachers can make students learn. The role that should be done by the teacher is to ensure that each learner can interact actively by sharing the existing learning resources.

Learning is an activity that is done every day at home and at home. Learning is complex. Learning goals are very important for teachers and learners themselves. In terms of teachers, teachers provide information about learning objectives, for the targeted learners is a goal of learning while. By learning, the ability of learners increases. Increased ability of learners encourages these learners to achieve new learning goals.

Munir (2008: 36) "Learning outcomes are the abilities that are possessed after the participants did after receiving the learning experience".

Suharsimi Arikunto (2006: 7) Learning outcomes of learners can be seen from the achievement test results achieved by learners after attending learning activities ".

Knowing the success or failure of learners in learning, it is necessary to do an evaluation. Munir (2008: 30) states that "Learning outcomes are when a person has learned and will change the behavior of the person, for example from the do not know to know, from the not understand to understand".

The learning process of natural science emphasizes the provision of direct experience to develop the competence in order to explore and understand the natural surroundings scientifically. Natural science education also has an important role in improving the quality of education, especially in producing quality learners who are able to think critically in responding to the current challenges of global warming.

Based on the above opinion, it can be concluded the study of natural science is a way of knowing principles, facts, concepts, systematically and scientific methods derived from experiments, or observations that are studied continuously so that the process of discovery is scientific.

Miarso (2009: 12) word media comes from the Latin *Medius* which literally means middle, intermediary or introduction. More specifically the media in the learning process is defined as graphic tools, graphics, or electronic, to capture, process and rearrange visual / verbal information. O'Bannon, Blanche and Puckett, (2010: 105) "Media is an intermediary or messenger of the message sends a message to the recipient of the message".

From the above opinion, it can be concluded that the media is a tool that can be used to convey information (messages) from the sender to the intended recipient, which aims to stimulate the attention, interest, thoughts and feelings of learners in the learning process. The sender and recipient of the message in question are teachers and learners, where teachers convey information through learning media to learners with the aim to improve motivation and learning outcomes of learners.

Visual media is a medium whose message can only be observed with the sense of sight. This media is a type of media that has information visually, but does not display

sound or motion for example: pictures, photos, graphics, and posters. Visual Media is also called Graphic media where graphic media is a media that combines facts, ideas clearly and strongly through a combination of expressions of words and images. Graphical media can also be defined as visual media that provides information / messages of dots, lines, drawings, or other symbols, aiming to describe an idea or idea, state data or an event.

Stacey and Williams, (2003: 64) "Graphics media including visual media, graphics media serves to distribute messages from source to message recipient. The message conveyed poured into the symbols of visual communication ".

Visual-based media has a very important role in the learning process, where the media serve as a tool that helps to facilitate the understanding of learners of the subject matter delivered, especially in studying the lessons of natural science are often considered difficult for learners.

Audio media is related to the sense of hearing that can help learners to think well, grow memory, and sharpen the hearing. Audio media is a media that generates messages only with sounds are poured into the verbal and non-verbal audible symbols such as radio, tape recorder, and language laboratories. The constraints or weaknesses in using audio media due to one-way, technical disturbances, and the existence of hearing loss. Audio media also has advantages where audio media can overcome the problem place at the time of learning process, also can present message or information through voice. In line with the development of science and technology in the use of media lessons, both visual and audio can be done or used simultaneously and simultaneously in the same time through one media called Multimedia.

Judging from the learning process then the function of the media is as a carrier of information from the source (educator / teacher) to the recipient (learners / learners). The main function of the instructional media is for instructional purposes, where the information contained in the media must involve students both in mental form and in the form of real activity so that learning can occur. In addition to generate motivation, interest, and learning outcomes can also to arouse stimulus actions of learners to more active learning, as well as for information purposes (presents information) in front of a group of students / people.

The function of learning media helps create a fun learning atmosphere for learners. Develop creativity and make learners become more active in accordance with the curriculum of education, develop the curiosity of learners to grow motivation in learners to learn with the aim to get a satisfactory learning outcomes.

The use of learning media not only as a tool in learning, but also aims to generate motivation or the spirit of learners to learn. The learning media used in applying the subject matter especially on the subject of natural science can also attract attention and cultivate great curiosity, facilitate the achievement of learning objectives, focus

the learner, and can overcome the limitations of the senses, space and time by presenting the visual media three dimensions and graphics media in the learning process.

With the learning media will provide convenience to learners to more easily understand the subject matter, and also attract the attention of learners at the time of learning took place. Basically every teacher wants the learning activities can run smoothly. The use of media in learning activities is one component as an integral part or very important in the learning process, and greatly help the effectiveness of the learning process. As already explained before, visual media serves as a tool to deliver messages or information from the sender to the recipient of the message.

Learning is a change in knowledge, behavior and personal activity based on individual or individual experience that is permanent. Learning outcomes of learners can be seen from the results of achievement tests achieved by learners after learning activities.

The use of visual media in learning not only as a tool, but also as an integral part in a very important sense in the learning process as a form of problem solving and also facilitate the understanding of learners.

In relation to the learning of natural science, the media serve as one of the decisive factors that can facilitate explain the subject matter, as well as a determinant of the achievement of learning objectives. The use of appropriate visual media can affect the high low learning outcomes of learners.

This is reinforced by the results of previous research, Smaldino (2011: 13) states that "Media is not just as a teaching tool, but as an integral part in the learning process".

Their teaching tools that use visual learning aids in the form of a model (animation) can help a learning process. The use of props teaching visual animation is expected to raise the motivation and stimulation of student learning activities, help the effectiveness of the learning process, draw and direct the attention of learners to concentrate on the content, facilitate the achievement of the aim to understand and remember information, or given, learning becomes more attractive, brings freshness and new variations for the learning experience so that students do not get bored and not be passive, and can overcome the limitations of the senses, space, and time, by presenting a picture of the object being studied in the classroom.

According Suyanto (2005: 27) Learning is modifying behavior through experience and practice. In the study defines as behavior modification or alteration of behavior, one must not only perform actions beyond the visible to the eye, but also perform actions in such thinking and imagination.

B. Method

Research method plays an important role in a study, because if not using research methods then research can not be justified scientifically. Research method used in this research is experiment, because researcher try to see

difference or influence happened to research subject.

Valacich and Schneider (2012: 79), suggests that "experimental method is a method that reveals the relationship between two or more variables or look for the influence of a variable against other variables".

Based on this understanding, it can be concluded that the experimental method is a method that wants certainty between which variables causes causal relationships can be done by giving certain treatment.

Suyanto (2005: 118) says that the population is all the data that concern us in a scope and time that we specify.

Vaughan, Tay. (2006: 131), suggests that "a partial or representative of the population studied if the subject is less than 100 is better to take all of this study population studies, but if a larger number of subjects can be taken between 10-15% and 20- 25% or more".

Variables can be interpreted as a concept that has a double value or with other words a factor that if measured will produce a score or a value that varies.

Vaughan, Tay. (2006: 117), argues that "Variable is the object of research, or what is the point of research".

Based on the description, the researcher involves two variables:

- a. Free Variable X: Three-dimensional visual media and graphics media.
- b. Variable Bounded Y: Learning outcomes.

A test is a systematic and objective tool or procedure for obtaining desirable data or descriptions of a person, in a manner that is arguably correct and prompt.

Based on the above opinion can be concluded that the test is a tool or procedure that systematic and objective to obtain data and descriptions desired about a learner to know the presence or absence of learning outcomes implemented. The tests in this study were used to measure the outcomes of natural science learning.

According to Valacich and Schneider (2012: 79), "Content validity is required to answer the question of the extent to which items on the test can measure the overall material that has been taught."

The high degree of content validity can be determined based on rational analysis or expert judgment on the contents of the test. The validity of the contents of a learning outcome test can be determined by comparing the content contained in the learning outcome test, with the indicator of the subject being clearly represented in the learning result test or not. The more refresher the material that can be expressed in the test shows the higher the validity of the content.

The results of content validity test conducted by natural science subject teachers from the 20 items of the problem, that is the number 4 and 19 are corrected because less can science knowledge by learners.

Based on the data obtained related to the hypothesis and framework proposed two variables namely, independent variables. The data analysis used by the researcher in this research is using t test formula as follows:

According Sugiyono, (2007: 130):

$$t = \frac{(\bar{x}_1 - \bar{x}_2)}{\sqrt{((s_1^2) / (N_1) + (s_2^2) / (N_2))}}$$

Information :

\bar{x}_1 = The average value of the experimental group1

\bar{x}_2 = The average value of the experimental group2

s_1^2 = Variance of data in experiment group1

s_2^2 = Variance of data in experiment group2

N_1 = Number of subjects in experiment group1

N_2 = Number of subjects in the experimental group2

C. Results and Discussion

Right now we see as if the world is moving very fast. All the conveniences in the world of information and industry increasingly can be enjoyed by all circles. This is directly proportional to the human need for graphic design, as almost all industries and information require graphic designers to translate ideas and ideas into various media creatively and effectively.

The design of a learning product, so that the product can meet the appropriate functional values and be a solution to the problems faced by humans by not leaving the user comfort aspects through certain techniques and provisions. Looking at the various series of various fields of fact above, we can see that the role of graphic designers is still very wide open.

Before the researchers apply the learning by using three-dimensional visual media and graphic media on natural science subjects, researchers first do a preliminary test (pre test) to see student learning outcomes class which amounted to 36 students. With the details of class IV as the experimental class1 which amounted, and class as the experimental class2 with the number of questions given as much as 20 items. After the researchers do the initial tests on the students, the researchers can see the results of learning science there is a difference or not. If there is no difference, then research can be continued, because in this study researchers want to see the difference of natural science learning results in terms of media usage visual three-dimensional and graphic media.

After being given pre test, then both classes are seen the difference in the form of ability in the form of prerequisites (initial ability before being given treatment) based on the results of initial ability tests obtained by learners. This can be seen in the table results of data collection as follows:

Table 1. Results Answer Pre test experiment class 1

No	Name	Item
		X
1	Annisa	70
2	Armida	50
3	Darwati	65
4	Dinny	80
5	Dwi	70

6	Indah	75
7	Irvan	55
8	Juita	85
9	Khoirul	55
10	Mila	55
11	Ninndy	55
12	Novita	70
13	Rianto	80
14	Rio	65
15	Slamet	85
16	Sri Utami	85
17	Umi	50
18	Qiesya	70
		1120

From the table above, we can determine the mean and deviation of the pre test score of the experimental class1 as follows:

$$\begin{aligned} \bar{X} &= (\Sigma X_1) / N = 1220 / (18) = 67,77 \\ Sb1 &= \sqrt{((\Sigma X_1^2) / N) - (\bar{X})^2} \\ &= \sqrt{(85250 / (18) - (67,77)^2)} \\ &= \sqrt{(4736,11 - 4592,77)} \\ &= \sqrt{143,34} \\ &= 11,97 \end{aligned}$$

Table 2. Results Answer Pre test experiment class 2

No	Name	Item
		X
1	Andi	40
2	Astrit	70
3	Bela	40
4	Dani	40
5	Della	70
6	Doni	70
7	Desi	70
8	Faisal	60
9	Fazar	65
10	Noval	65
11	Puja	75
12	Rahma	55
13	Restiani	60
14	Sindi	65
15	Taufik	80
16	Utami	75

17	Winda	55
18	Wulan	75
Total		1145

To determine whether there is a difference between the experimental class1 and the experimental class2 then do Test-t as follows:

$$\bar{X}_1 = 67.77$$

$$\bar{X}_2 = 63.61$$

$$[Sb]_{-1}^2 = 11.97$$

$$[Sb]_{-2}^2 = 13.10$$

$$t = (\bar{X}_1 - \bar{X}_2) / \sqrt{(([SB]_{-1}^2) / N_{-1} - ([SB]_{-2}^2) / N_{-2})}$$

$$= (67,77-63,61) / \sqrt{ ([11,97] ^2 / (18-1) + [13,10] ^2 / (18-1))}$$

$$= 4.16 / \sqrt{ (143,28 / 17 + 171,61 / 17) }$$

$$= 4.16 / \sqrt{ (8.42 + 10.09) }$$

$$= 4.16 / \sqrt{18,51}$$

$$= 4.26 / 4.30$$

$$= 0.96$$

From that count, it was found that the value of t arithmetic = 0.96 db = n1 + n2 - 2 = 18 + 18 - 2 = 34 with significance 5% (two tails) = 2.030. Means t arithmetic < t table (0.96 < 2.030). So it can be concluded that there is no difference from the pre test of learners between the experimental class1 and experiment2.

Learning outcomes of learners are taken from the results of post test. Prior to being given a post test the researcher did the teaching 2 times on the experimental class1 and the experimental class2. After that, the researcher gave 20 test items in the experimental class1 and experiment2 which amounted to 36 people. The data from the learning result of natural science learners of experimental class can be seen in the following table:

Table 3. Results Answer post test experiment class 1

No	Name	Item
		X
1	Annisa	100
2	Armida	100
3	Darwati	85
4	Dinny	90
5	Dwi	85
6	Indah	85
7	Irvan	55
8	Juita	85

9	Khoirul	95
10	Mila	90
11	Ninndy	50
12	Novita	90
13	Rianto	100
14	Rio	95
15	Slamet	85
16	Sri Utami	90
17	Umi	80
18	Qiesya	80
Total		1540

From the above data, it can be determined the average value and standard deviation from the post test class score experiment2 as follows:

$$\bar{X} = (\Sigma X) / N = 1230 / 18 = 68.33$$

$$Sb1 = \sqrt{ ((\Sigma X_{-1}^2) / N) - (\bar{X})^2 }$$

$$= \sqrt{ (92750 / 18) - (68,33)^2 }$$

$$= \sqrt{ (5152,77 - 4668,98) }$$

$$= \sqrt{483,79}$$

$$= 21.99$$

Table 4. Results Answer post test experiment class 2

No	Name	Item
		X
1	Andi	95
2	Astrit	35
3	Bela	35
4	Dani	35
5	Della	85
6	Doni	80
7	Desi	95
8	Faisal	70
9	Fazar	55
10	Noval	70
11	Puja	75
12	Rahma	40
13	Restiani	75
14	Sindi	40
15	Taufik	90
16	Utami	100
17	Winda	80
18	Wulan	75
Total		1230

Before conducting hypothesis testing research, first converted to the statistical hypothesis as follows:

Ho: There is no difference in natural science learning outcomes between learning that uses three dimensional visual media and graphic media.

Ha: There is a difference The results of natural science learning between learning that uses three dimensional visual media and that use graphics media.

To test the science learning outcomes it is better to use three dimensional visual media compared with learning using graphic media, the researchers used the test as a tool or instrument in the assessment. The test result data is processed in the form of a score which is then calculated using Test - t. So the hypothesis testing about the result of learning of natural science is done by using Test-t.

The following hypothesis testing by using Test-t:

$$\begin{aligned} X_1 &= 85,55 \\ X_2 &= 68.33 \\ S_{b1} &= 13.28 \\ S_{b2} &= 21.99 \\ t &= \frac{(X_1 - X_2) / \sqrt{((S_{b1}^2) / N_1 + (S_{b2}^2) / N_2)}}{(85.55 - 68.33) / \sqrt{((13.28)^2 / (18-1) + (21.99)^2 / (18-1))}} \\ &= (85.55 - 68.33) / \sqrt{(176.35 / 17 + 483.56 / 17)} \\ &= 17.22 / \sqrt{(10,37 + 28,44)} \\ &= 17.22 / \sqrt{38.81} \\ &= 17.22 / 6.22 \\ &= 2.76 \end{aligned}$$

Based on the above calculation, it is found that the value of t arithmetic = 2.76 db = $n_1 + n_2 - 2 = 18 + 18 - 2 = 34$, with significance 5% (two tails) = 2.030. $t_{hitung} > t_{table}$ or $2.76 > 2.030$.

This can be proved by the calculation of the statistical value $t_{hitung} > t_{table}$. Because the value of t arithmetic $> t_{table}$ then Ha accepted and Ho rejected, so there is a significant difference between the learning that uses three-dimensional visual media with learning using graphic media during the learning process takes place. So, it can be concluded that the learning outcomes of natural science learning using visual media three dimensions better than the learning of natural science that uses graphics media.

D. Conclusion

Based on the results of data analysis in chapter IV, it can be concluded that there are differences in learning outcomes of natural science learners viewed from the use of three-dimensional visual media and graphics media applied to the fourth grade, according to the results that have been calculated ie $t_{hitung} > t_{table}$ ($2.76 > 2.030$) thus Ha accepted and Ho is rejected as evidence, the researcher uses the -t test formula.

Based on the results of this study, there are some suggestions that if necessary to be submitted are as follows:

a. First, it can be used as a study material to improve

students' learning outcomes.

b. Second, can be used as a study to use the right media in applying the subject matter so that the learning atmosphere does not look monotonous, where learners become more motivated and easy in understanding the subject matter that is delivered.

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References

- [1] Miarso, Yusufhadi. *Sowing Seeds Technology Education*. Jakarta: Prenada Media, (2004).
- [2] Munir. *Curriculum-Based Information and Communications Technology*. Bandung: Alfabeta, (2008).
- [3] O'Bannon, Blanche W. And Kathleen Puckett. *Preparing To Use Technology: A Practical Guide To Curriculum Integration*. Boston: Pearson, (2010).
- [4] Sawyer, Stacey and Brian Williams, *Using Information Technology*. New York: Mcgraw-Hill, (2003).
- [5] Sharon, Smaldino, E, et al. *Learning Technology And Media For Learning*, Translated By Arif Rahman From *Istruktural Technology And Media For Learning*, Jakarta: Kencana Prenada Media Group, (2011).
- [6] Suyanto, M., *Multimedia Tools To Increase Competitive Advantage*, Yogyakarta: Andi, (2005).
- [7] Valacich, Joe and Christoph Schneider, *Information Systems Today: Managing In The Digital World*. London: Pearson, (2012).
- [8] Vaughan, Tay. *Multimedia Making It Work Edition 6*. Yogyakarta: Andi Offset, (2006).