

Engaging Elementary Student in Learning Science Using Video to Improve Learning Outcome

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Abstract—this study aims to determine the learning outcomes of science subjects of the life cycle of animals in class IV odd semester students of Adhiwarno State Elementary School Selomerto, Wonosobo, in the 2017/2018 academic year using video and without using video. Comparatively, this study is intended to find out the differences in interactive videos on learning outcomes of science subject matter in the life cycle of animals at fourth-grade students of the odd semester in Adhiwarno State Elementary School, Selomerto, Wonosobo in the 2017/2018 academic year. This study is a quasi-experimental study with the Nonequivalent Control Group Design. Data collection techniques are documentation (to obtain students' initial abilities) and test techniques (to obtain data on science learning outcomes). For data analysis techniques, there are t-test after the requirements test, distribution normality test, and variance homogeneity test. The results of the study descriptively showed that the tendency of learning outcomes of science is the subject of the life cycle of animals, whose learning uses video is in the high category, and those whose learning does not use video is included in the medium category. In the t-test, it is obtained $t\text{-count} = 3,485$ and $p = 0,001$, because $p < 0.01$, then comparatively from the results of the t-test, it was concluded that the proposed hypothesis was accepted. There were very significant differences in science learning outcomes between students whose learning use video and learning without use video.

Keywords: *video learning, learning achievement, natural science*

I. INTRODUCTION

Science learning is a learning based on principles and processes that can foster students' scientific attitudes toward science concepts. Therefore, learning science in elementary schools is done with a simple investigation without memorizing the collection of science concepts. Perhaps, applying investigative activities such as observation, discussion, and simple inquiry activities can lead students to be more active in learning process. Through this activity, students are expected to gain direct experience of the material learned. Such learning can foster students' scientific attitudes that are indicated by formulating problems, drawing conclusions, so that they can think critically through learning science [1]. [2] added that science subjects are lessons that emphasize act and direct experience to find out in order to explore and to understand the natural environment scientifically.

The results of the observations at Adhiwarno Public Elementary School in Wonosobo reveal that the teachers have not yet fully implemented active and creative learning in involving students and have not used various approaches/strategies or learning media. In science learning activities, teachers still use the lecture method, and students only get the source of learning material from books or information only from the teacher, which leads to the low visualization of students about the material studied. According to Piaget's theory in [3], the characteristics of child development in elementary school or at the age of 7 to 12 years are in the concrete operational phase. Children at this age stage still think based on their real experiences. They have not been able to think of something abstract, for example, imagine how the process of turning an egg into a butterfly in an animal's life cycle would require media to visualize the process. Without having experience of the visual process as media deserved, it is difficult for the students to get the idea of the material explained. Besides, the learning causes boredom for students in learning science. According to [4] student learning becomes an inseparable part of teacher education. Teachers as parents and friends during school need to create a learning process which supports students' achievement. Good learning outcomes are expected to lead students achieve their goals.

[5] states that learning outcomes can be improved by using software in learning. The software used can be realized in the form of technology-based learning media. As stated by [6] that computer based learning media can make learning more interesting and impactful so the knowledge taught can be inherent longer on memory. Video can be a new alternative in obtaining information for each learning activity. Information presented through video is in the form of a live document which can be viewed on the monitor screen, or when it is projected onto the screen where the sound can be heard and seen in motion (video or animation). Video aims to present information in a fun and interesting, easy to understand, clear, and more tangible/concrete. Information will be easy to understand because of many senses as possible, especially the ears and eyes that are used to get the information [7].

According to Vernom in [8], we learn, 10% from what is read, 20% from what is heard, 30% from what is seen, 50% from what is seen and heard, 70% from what is said, and 90% from what is done. Based on this concept, it can be concluded that learning using video technology can improve learning ability by 50%, rather than not using it. Interactive

video learning has the advantage of having longer retention compared to using other learning media. For this reason, learning using video is significant, especially for the students' development in the process of improving student learning outcomes.

Video provides vibrant and lively resources for multimedia applications. Video is a moving image. If the object in the animation is artificial, the object in the video is real. This is in accordance with research [9] which states that for understand an object, do not need to present a real object but can be replaced with objects that can represent the object's role.

Interactive video learning can be interpreted as a learning model that can be used to channel messages, stimulate students' thoughts, feelings, concerns, and desires so that they can encourage the learning process to be more interesting [10]. There are any advantages of the use of video in learning, one of them as stated by [11] that the use of video can improve students' language skills. From the mastery of language that is increased will certainly make it easier for students to understand the material presented. The advantages of interactive videos in learning according to [8] [12] [13] are: 1) The learning system is more innovative and interactive; 2) Educators will always be required to be creative, innovative in finding learning breakthroughs; 3) Able to combine text, images, sound, video and animation in a single unit that supports each other; 4) Adding student motivation during the teaching and learning process; 5) Able to visualize material that is difficult to explain only with conventional explanations or teaching aids; 6) Train students to be more independent in gaining knowledge.

II. RESEARCH METHODS

This study was a quasi-experimental study with the Nonequivalent Control Group Design research design [14]. The same as pure experimental research, the difference is only the controlling variables. In quasi-experimental control, the research carries out one variable only that is considered the most dominant. In this study, there are two classes, the first class is called the control group, and the second class is called the experimental group [15].

In this study, the population was grade IV students of Adhiwarno State Elementary School in the odd semester of the 2017/2018 academic year consisting of two classes totaling 58 students. Furthermore, all members of the population become the research sample, namely class IVA as the experimental class and class IVB as the control class. Research design used was the pretest-posttest non-equivalent control group design, as shown in table 1.

Table 1
Research design

Group	Pre-test	Treatment	Post-test
Experiment	X_{E1}	X_1	Y_{E1}
Control	X_{E2}	X_2	Y_{E2}

Note:

X_{E1} : Pre-test of experiment group

X_{E2} : Pre-test of control group

X_1 : Learning using video

X_2 : Learning without video

Y_{E1} : Post-test of experiment group

Y_{E2} : Post-test of control group

Before giving the treatment to find out whether the experimental group with the control group departed from the same initial ability or not, then both groups were tested using t-test. The calculation of T-test is using SPSS 2000 software. T-test calculation results obtained value of $t\text{-early} = 0.114$ and $p = 0.906$. Because of $p > 0.05$, the two groups did not have differences or have the same initial ability. Data collection techniques use documentation techniques to obtain students' initial abilities and test techniques to obtain data on science learning outcomes on the subject of the animal life cycle.

To find out the validity of items used correlation formula. The correlation formula used is the Pearson Product Moment correlation formula [16]. From the results of the analysis of 30 items, it states that valid questions are 29 items, and 1 item is missing. Moreover, to find out the amount of reliability in this research, Kuder and Richardson formula known as the KR-20 formula is the instrument used [17]. The results of the KR-20 reliability test analysis are $r_{tt} = 0.872$ and $P = 0,000$. Because $P = 0,000$, the instrument is reliable with reliable status.

III. RESEARCH RESULTS AND DISCUSSION

Testing the analysis requirements in this study includes the homogeneity test of variance and test for normality of distribution. The homogeneity variance test is used to determine whether the sample used in the study comes from a homogeneous population or not [15]. The calculation of homogeneity test was using SPSS-2000 software. Based on data analysis obtained data $F = 1,248$ with $p = 0,280$. Because $p > 0.05$, the variants of both groups are homogeneous.

This normality test aims to determine whether the data in this study are normally distributed or not. The calculation of normality test was using SPSS=2000 software. Based on the results of the distribution normality test, the results obtained for the learning group using video are $\chi^2 = 10.090$ and $P = 0.343$ while for groups whose learning without using video are $\chi^2 = 12.826$ and $P = 0.171$. Because $P > 0.05$, the data distribution is normally distributed.

Table 2
Normality Test

Group	SD	χ^2	P	Spread
Experiment	22,103	10.090	0.343	Normal
Control	16,793	12.826	0.171	Normal

After analyzing the items, 29 items are valid so the provisions for the maximum score ideally should be 29. The minimum ideal score is 0. According to [16], the criteria for the normal curve are as follows in table 2.

On the science learning outcomes test for fourth-grade students of Adhiwarno Selomerto Wonosobo State Elementary School in the odd semester of the 2017/2018 academic year, the average group of students who learned using video obtained the highest score is 29, the lowest score is 12, the average score is 22,103, and the standard

deviation is 5,473. Based on the score, it lies in a normal curve at intervals of $20.42 < \leq 26.25$ and includes in the high category. While the average group of students whose learning without using video obtained the highest score of 27, the lowest score of 6, an average score of 16,793, and a standard deviation of 6,114, based on the score, it lies at the normal curve at intervals of $14.58 < \leq 20.42$ and included in the medium category.

Table 3

Normal curve criteria:

$26.25 \leq \leq 29.00$	Very high
$20.42 \leq < 26.25$	High
$14.58 \leq < 20.42$	Moderate
$8.75 \leq < 14.58$	Low
$0.0 \leq < 8.75$	Very Low

Table 4

Group	HS	Mean	LS	SD
Experiment	29	22,103	12	5,473
Control	27	16,793	6	6,114

Note:

HS : High Score

LS : Low Score

SD : Standard Deviation

In accordance with the proposed hypothesis "There are differences in the results of science learning on the subject of the animal life cycle of fourth-grade students of SD Negeri Adhiwarno Selomerto Wonosobo in the odd semester of the 2017/2018 academic year learning using interactive video and without using interactive video", this section is presented testing hypothesis by t-test. The calculation of t-test was using SPSS-2000 software. Based on the t-test, it is obtained that the value of $p = 0.001$ means $p \leq 0.01$, and the hypothesis proposed is accepted and very significant.

The tendency of science learning outcomes on the subject of the animal life cycle, fourth-grade students of SD Negeri Adhiwarno Selomerto Wonosobo in the odd semester of the 2017/2018 school year using interactive videos is in a high category. It is because in the age of elementary school students, they have not been able to think something abstract. They still think based on the real experience. Learning using interactive videos can make abstract lessons more tangible/concrete. The more concrete the information provided to students, the easier it will be for students to receive that information. Interactive videos can also help teachers to design science learning creatively. With a creative design, the science learning process in primary schools becomes more innovative, exciting, more interactive, and more effective, so the quality of student learning can be improved as well. On the other hand, the tendency of science learning outcomes on the subject of the animal life cycle without using interactive video is included in the medium category. It might happen because in the learning process, students only get learning the material from books or information from the teacher only, which causes low visualization of students about the material learned.

From the reason above, it shows that the learning outcomes of science on the subject of the life cycle of fourth-

grade students of SD Negeri Adhiwarno Selomerto Wonosobo in the odd semester of the 2017/2018 school year learning using interactive videos are better than learning without using interactive videos. The results of natural science learning that use video are better because it can provide real/concrete experiences about the lessons given by the teacher in the form of pictures, videos, and narrative sounds. It is easier for the students to understand the lesson. As with learning not using interactive videos, students only get material from the teacher and books, without any real visualization of the material, so that it will cause the difficulties for students to understand the material. The conclusion obtained is that science learning on the subject of the life cycle of the fourth-grade students of SD Negeri Adhiwarno Selomerto Wonosobo in the odd semester of the 2017/2018 school year, is more effective and produces better learning outcomes if the learning uses interactive video.

The results of this study show that the tendency of science learning outcomes on the subject of the animal life cycle, fourth-grade students of Adhiwarno state elementary Selomerto Wonosobo odd semester of the 2017/2018 academic year by using interactive videos is in the high category. Furthermore, those who do not use interactive videos are in the medium category. Comparatively, there are very significant differences in science learning outcomes between those who use interactive video and without interactive video on the subject of the animal life cycle at fourth-grade students of SD Negeri Adhiwarno Selomerto Wonosobo in the odd semester of the 2017/2018 academic year.

IV. CONCLUSIONS

The teacher is expected to design a creative learning using interactive videos to engage students and to improve students' learning outcomes in science optimally. Moreover, students are expected to develop their activity and creativity in learning process in order to achieve the target outcomes for science learning. For this reason, schools should provide adequate facilities for all students specifically in the field of technology and information, and provide training and guidance on information technology for the teachers.

Based on the conclusions regarding the using of video media in learning science, it is recommended for teachers to use video products as an alternative medium for learning, specifically to increase students' motivation and cognitive learning outcomes.

ACKNOWLEDGMENT

The researcher thanks to Dr. Ali Muhtadi, M.Pd. as a supervisor of this research. The author also thanks to the principal, classroom teacher of fourth-grade students and all fourth grade students of SD Negeri Adhiwarno Selomerto. Also, the author thanks to all college friends who gave a lot of contribution during writing this paper.

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