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Effectiveness Of Use Of Historical Educational Games On Student Learning Outcomes

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Abstract.

Learning media has a significant role in achieving learning objectives. Teachers must also select suitable learning media under learning objectives and student characteristics. This article aims to present the results of experiments using historical, educational games on learning outcomes. This study focuses on two learning media: educational games and animated videos. The form of research used is a quasi-experimental, with the research design used Nonequivalent Control Group Pretest Posttest Design. The research instrument used is a Learning outcome test instrument. The research procedure includes the pre-experimental testing stage, the experimental implementation stage, and the post-experiment testing stage. Eighty-two students in two classes, experimental activities were carried out. One class uses educational game media, the experimental class, and one learns using animated video media, called the control class. The experiment carries out in three stages: the pre-experimental testing stage, the implementation of the experiment, and the post-experimental testing—data analysis using the U Mann Whitney test. The results showed increased student learning outcomes after using historical, educational game media, and historical animation video media. The data also show that differences in learning outcomes between students who use educational game media and animation videos in learning using historical educational games have an effect of 27.34% on improving student learning outcomes in class XI IPS SMA Negeri 3 Medan.

Keywords: Effectiveness; Educational Games; Learning Outcomes; Animated Videos and History.

I. INTRODUCTION

The Education in the 21st century requires a comprehensive mastery of science and knowledge, and various skills to provide life in society. Such as learning skills and innovation skills, and technology literacy skills. Various learning skills can be trained and taught to students using various models or appropriate learning approaches to be skilled in problem-solving, critical thinking, communicating and collaborating, creativity, and innovation. Likewise, learning in schools must encourage and facilitate students to develop skills in mastering media and ICT-based information technology. 21st-century learning requires teachers to design innovative learning oriented towards Technological Pedagogical Content Knowledge (TPACK) as the basic framework for integrating technology in the learning process based on neurosciences, STEAM learning approaches, Higher Order Thinking Skills (HOTS), and demands for 4C competencies. Demands for the use of technology in learning where the use of technology affects learning [1]. Therefore, teachers must design various learning tools oriented towards 21st-century learning by utilizing advances in digital technology, including in the design and use of learning media. There are various kinds of learning media that can be developed to be used by teachers and students. The teacher must choose the learning media used must be in accordance with the learning objectives. Teachers must also pay attention to the characteristics and needs of students in learning. Including the things that are liked by many learners. So that the media will be interactive, interesting, and effective to achieve goals. Various kinds of learning media can teachers and students use.

The teacher must choose the learning media to follow the learning objectives. Teachers must also pay attention to the characteristics and needs of students in learning, including the things that many learners like. The media will be interactive, engaging, and effective in achieving goals. A news report from the Faculty of Medicine, the University of Indonesia, regarding the number of online game addicts in Indonesia stated that currently, Indonesia occupies the highest country of game addicts in the world. Research results show that 14% of middle and high school students are addicted to playing the internet and online games. This figure is much higher than the level of internet addiction and online games from South Korea and

continues to increase during the corona virus disease [2]. Shows that there is a very high interest in these games. This situation is a big challenge for schools, teachers, and all elements of society to overcome these problems. Universities are also responsible for facing these challenges through research and service activities to help solve these problems. One of them is by producing educational games that suit the needs of pedagogy and learning content. Learning that is integrated with games can improve students' abilities in terms of learning motivation [3], Acquisition of Vocabulary [4], and satisfaction which are future trends for education [5]; [6]. Game-based Learning (GBL) is a digital educational game integrated with learning to help users certain subjects [5]. GBL is a learning process that utilizes educational game applications with the aim of learning effectiveness.

Educational games in Huizinga aim to support the learning process with a fun and more creative activities. Game-Based learning is very effective as a learning medium and is successful in getting the younger generation involved in a better learning process [7]. Educational game media will facilitate the socialization process and even the learning process. Educational games can effectively encourage interest and teach knowledge while considering the pedagogical aspects. Educational games can be used as learning aids in the form of learning media, one of which is for learning history. Game media that can be used in learning can be packaged in several types of educational games of these types used in learning history, one of which is adventure games. From this genre, it is very suitable to be able to provide imagination and construct students' understanding of events that have occurred. Video animation learning media is also one of the learning media in history learning. The teacher combines multimedia, namely video, to provide an overview of historical events, which reconstruct through visual images of moving images and audio to clarify the material with animation to make the material more interesting. It makes it easier for students to achieve learning goals. Research and development of animated videos for learning carry out at various levels of education and various fields of study, such as at the elementary school level [8] in the field of mathematics [9] in the field of Science, Middle school level first [10] in Physics, high school level [11] in biology, and [12] in history, at university level [13]. These studies show that animated videos can be used in the learning process at all levels of education and in various fields of study.

Animated videos can inspire users to feel more interested in learning. History learning aims to develop critical thinking skills historically, understand the values contained in these events, and make events valuable lessons and experiences as a future provision for students' lives. For this reason, teachers must be able to create learning that supports the achievement of these goals by using various learning aids. Teachers can use various learning media by learning objectives. Using learning media helps teachers create engaging learning for students so that student's motivation to learn history increases, which will impact learning objectives. One of the essential characteristics of educational games and animated videos as historical learning media is the ability of the media to provide a more tangible form of material that gives birth to students' imagination that what has happened in the past must be based on facts that have happened. So, learning media need that can help students to be able to observe and get a chronological picture of the event so that the ability of students' memory of learning materials and the values contained therein can stay in the long term. In this paper, the author tries to determine whether the use of educational games based on history and historical animation videos is effective for learning and whether there is a significant difference in learning outcomes due to the impact given to each learning media.

II. METHODS

The research method used in this research is quasi-experimental research. The research design used is the Nonequivalent Control Group Pre-test and Post-test Design which is as follows:

Tabel 1. Research Design Nonequivalent Control Group Pretest Postest Design

E	Q1	X1	Q2
K	Q3	X2	Q4

Description:

E : Experiment Class

K : Control Class

- Q1 : Pretest eksperimnet class
 Q2 : Pretest control class
 Q3 : Posttest eksperimnet class
 Q4 : Posttest control class
 X1 : Treatment in the experimental class with educational game media
 X2 : Treatment in the experimental class with animated video media

The population in this study consisted of two classes, namely class XI IPS 1 and XI IPS 2 at SMAN 3 Medan, in which students learn by the same teacher, the same material, and the same learning objectives but using different learning media. The sample in this study is a saturated sample consisting of class XI IPS 1 and XI IPS 2 who have the subject of the Japanese Occupation in Indonesia and its impact. Class XI IPS 1 is the control class (K), and class XI IPS 2 is the experimental class. The data collection technique in this study is a measurement technique in the form of questions pretest and post-test) in the form of multiple choice, which was developed with a higher order thinking skills approach. The validity used is Gregory's content validity. Two Validator is validation the test validation in this study-namely the history education expert from the program lecturer and the history teacher who taught in the class. The results of validating the pretest and post-test questions were as very high. Based on the test results, with a Cronbach Alpha value of 0.45 obtained, the researchers classified the level of reliability of the questions as moderate. The described research procedure is in the following stages:

Pre-Experimental Testing Stage

The steps in the preparation stage include (1) Making research instruments in the form of learning outcomes tests, including pretest and post-test questions. (2) Making learning tools in lesson plans (RPP), learning media for educational games, and historical video animations. (3) Validating research instruments and learning tools. (4) Revise research instruments and learning tools based on validation results. (5) Conducting trials of research instruments in the form of learning outcomes tests for students of class XII social studies at SMAN 3 Medan. (6) Analyzing the test results data to determine the level of test reliability. (7) Determine the experimental and control classes as the research samples.

Experiment Implementation Stage

The implementation of the research includes: (1) Giving a pretest to the control class and the experimental class to see the student's initial abilities. (2) Give treatment to the experimental class and control class, where the experimental class learns using historical, educational game media, and the control class learns using historical animation video media. (3) Giving a post-test to the experimental and control classes after determining the effectiveness of experimental activities are the learning media on learning outcomes.

Post-experimental Testing Stage

The final stage of this research includes: (1) Conducting analysis and processing of research data in the experimental class and control class using appropriate statistical tests. (2) Conclude response to the researcher's questions. (3) Prepare research reports

The difference in learning outcomes between the experimental and control classes on the matter of the Japanese occupation in Indonesia and its impact can see by assessing the results of the pretest and post-test of the two classes. With Shapiro-Wilk, normality gets that the value data is normality. Parametric statistical testing uses a T-test if both classes are standard. However, if one or both classes are generally not, then a non-parametric statistical test is performed using the Mann-Whitney U test.

The calculation from the effect of using historical video games and historical animation uses the percentage value of the influence of the application of historical game media and historical animation videos to show the effect on student learning outcomes.

III. RESULT AND DISCUSSION

Learning Outcomes of Experiment Class and Control Class

The number of students in the experimental class whose data is processed was 42, while the number of students in the control class whose data was processed was 40. The average value of the pretest in

the experimental class and the control class is 19.06 and 19, respectively. The processing of the pretest score is to determine the student's initial abilities before being taught the Japanese Occupation Period in Indonesia and its impact. The percentage of completeness of the pretest and post-test results of the experimental class is as follows:

Table 2 Percentage of Pretest and Posttest Results of Experiment Class

Score	Pretest		Posttest	
	Finished	Not Finished	Finished	Not Finished
Total Students	0	42	35	7
Percentage (%)	0%	100%	78,13%	21,87%
Average Score	19,06	4	72,19	

The percentage of completeness of the results of the pretest and post-test of the control class is as follows:

Table 3 Percentage of Pretest and Posttest Results for Control Class

Score	Pretest		Posttest	
	Finished	Not Finished	Finished	Not Finished
Total Students	0	40	26	14
Percentage (%)	0%	100%	53,33%	46,67%
Average Score	19		63,67	

Based on the pretest test using the SPSS 17 for the windows program, the Sig value in the Shapiro-Wilk test in the experimental class was 0.000, and the control class obtained a Sig value of 0.000 which means $\text{sig} < 0.05$ ($0.000 < 0.05$) so that the pretest data in both classes not normally distributed. Because the two classes are not standard, the hypothesis testing uses a non-parametric statistical test, namely the U-Man Whitney test. The results of the U-Man Whitney test with a significance level of $\alpha = 5\%$ on the pretest value obtained the Asymp.Sig (2-tailed) value of 0.928, which means $0.928 > 0.05$, then H_0 is accepted, or H_a rejected. It can conclude that there is no difference in initial ability between experimental class student and control class students on the subject of the Japanese occupation in Indonesia and its impact. The average post-test scores in the experimental and control classes were 72.19 and 63.67, respectively.

The processing of post-test scores determines student learning outcomes after being taught the material during the Japanese occupation in Indonesia and its impact. Based on the analysis of the post-test normality test using the SPSS 17 for windows program, the sig value in the Shapiro-Wilk test in the experimental class was 0.000. In the control class, the Sig value was 0.000, which means the sig value < 0.05 ($0.000 < 0.05$), so the post-test data in both classes are not standard. Because the two classes are not typical, The Hypothesis used the non-parametric statistical test, namely the U-Man Whitney test. The results of the U-Man Whitney test with a significance level of $\alpha = 5\%$ on the post-test value obtained an Asymp.Sig (2-tailed) value of 0.003 because the asymp.sig (2-tailed) value < 0.05 ($0.003 < 0.05$), then H_0 is not accepted, and H_a is accepted. It can conclude that there are differences in learning outcomes between students who taught using educational game media and using animated video media in the history learning class XI SMA Negeri 3 Medan.

The Effectiveness of Using History Educational Games on Student Learning Outcomes

The result of the effect size calculation on the increase in learning outcomes is 0.75 is classified as moderate. When viewed from the standard normal curve from table 0 to Z, the use of educational games during the Historical Japanese Occupation in Indonesia and its impact has an effect of 27.34%, which means that this historical education game has a significant effect on improving student learning outcomes in grades. XI SMAN 3 Medan.

Discussion

The research produced positive results, namely improving student learning outcomes after learning by using learning multimedia, namely educational games based on history, and historical animation videos. It is in line with the results of previous studies, which provide information that educational game media and animated videos affect students' abilities. The results of previous research on Ahmad's animated videos [14] provide information that students who learn to use animated videos have a sensitive effect on improving student learning outcomes. Likewise, research related to educational games [15] also provides information about the effectiveness of educational games in improving student learning outcomes. Likewise, the results

of research on educational games for the deaf and hard of hearing [16] to improve their emotional intelligence, which increased by using interactive multimedia in games. If students with special needs can increase their motivation and learning outcomes through educational games that suit their needs, then similar products also provide a better effect for regular students. From these studies, of course, the use of appropriate and effective media to help students learn has been tested. In this study, we tried to see the difference in effect if students with the same homogeneity used the two media.

Based on the data on the percentage of pretest and post-test results in the experimental class and control class, the experimental class's average value is higher than the average student learning outcomes of the control class can be clarified by the following figure:



Fig 1. Description of the difference in learning outcomes

The cause of the higher average increase in student learning outcomes in the experimental class is the understanding of the material obtained by students. Students in the experimental class gain understanding from using educational game media. Using this educational game makes it easier for students to understand the material of historical events because students seem to experience the event firsthand, can respond, and give an attitude towards the material that students learn to create images. Educational games stimulate students' curiosity to complete the game so that students are more focused and have a target to complete the game as a way for students to learn. Student learning outcomes using educational game media have the advantage of higher effectiveness than animated videos because educational games can make students feel like they are doing activities directly from events in historical material.

Meanwhile, historical animation videos allow students to observe the events that are broadcast but do not make students directly carry out activities related to the historical events experienced. It follows what describe in the cone theory of Edgar Dale's experience [17], where direct experience has a substantial effect on the influence of the use of learning media for students. For educators, the author recommends taking advantage of educational games to stimulate curiosity to learn history. Besides animated videos and other media, teachers must analyze what students like. Games can make people of all ages addicted, so we still use history education games to make our students addicted to studying history. Teachers need to design interesting educational games and learn evaluation activities, for example, by developing educational game media as learning evaluation media, such as quiz games. Students become more focused and will seriously complete the evaluation. Other researchers hope they can test the effectiveness of existing educational games on students with unique characteristics in areas with a broader range.

IV. CONCLUSION

Based on the research data, the researcher can conclude that there are differences in the learning outcomes of students who learn to use educational games and animated videos. The difference in student learning outcomes using educational games is higher than those using historical animation videos. These results are significant for educators in making decisions on the use of learning media teachers will use. We

have found that the media is essential in building students' psychology for learning. We also need to see that games significantly affect users, causing addiction. If games outside the field of education provide an addiction that has a destructive impact, then it is time for us to take advantage of the tools that make this addiction focus on learning.

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