

Numeracy Literacy Game in the World of Adventure

Ayyas Yahya¹, Gunarhadi², and Riyadi³

¹Student, Sebelas Maret University

^{2,3}Lecturer, Sebelas Maret University

Abstract— The learning process activities according to [2] is a process that contains a series of actions by teachers and students on the basis of reciprocal relationships that take place in educational situations to achieve certain goals. Learning media can be used by teachers in teaching and learning activities. This is in line with the opinion of Falahudin (2014) that the use of learning media in teaching and learning activities can generate new interests and desires, generate motivation and stimulate learning activities, and even have a psychological influence on learners. The data collection technique in this research uses a test technique which consists of two stages, namely the pretest and posttest stages. The posttest is given at the beginning before implementing the model to be tested. The purpose of giving the posttest is to find out and measure the students' initial abilities.

Based on data analysis of students' cognitive abilities processed using SPSS version 26, data was obtained that the normality of the data tested using Shapiro-Wilk obtained a significance level for the pretest results, namely 0.638 for the experimental class and 0.229 for the control class, so it can be concluded that the data obtained was normally distributed. Furthermore, the significance level for the posttest value was 0.311 in the experimental class and 0.557 in the control class so it can be concluded that the data is normally distributed. The homogeneity of the pretest data in this study was carried out using the Levene's test which produced a significance level value of 0.130 so it can be concluded that the experimental class and control class data came from homogeneous variances.

Based on the results of the independent sample t-test, $t_{count} = xx$ and t_{table} in the distribution table of t values, namely a confidence level of 95% ($\alpha = 5\%$ and because the t test is two-sided, the α value referred to is $\alpha/2 = 5\%/2 = 0.025$) and degrees of freedom ($df = 44$), so the value of $t_{table} = 2.015$. Because $3.769 > 2.015$, it can be concluded that H_0 is rejected. Based on this description, it can be proven that at the 95% confidence level the average posttest scores of grade IV elementary school students are not the same. This shows that the learning outcomes of students in the experimental group are better than the control class.

The conclusion of this research is that the results of testing adventure game learning media show that the media is effective for use in learning. Testing was carried out using the nonequivalent control group method. The test results showed an increase in pretest scores in the experimental class reaching 25% compared to the control class. The effectiveness test results show that the experimental class is better than the control class with a significance level of $0.000 < 0.05$ so that H_0 is rejected. Based on the average gain score obtained in the experimental class, it is 74.63, which means that the adventure game learning media is effective for use in fourth grade elementary school learning in numeracy literacy, length measurement material using standard and non-standard units.

Keywords— Numeracy, Literacy, Game, Adventure.

I. INTRODUCTION

Based on PISA for the field of Numeracy Literacy in 2021, Indonesia is ranked 45th out of 50 countries participating in PISA [1]. In Indonesia, as many as 71% of students have not been able to reach the minimum level of competency in numeracy literacy subjects. PISA in Central Java shows that their ability is still low in working on questions that require mathematical reasoning such as numeracy literacy. Teachers need to familiarize their students with solving numeracy literacy questions with various types of questions to improve reading skills and interpreting questions into mathematical sentences. Numeracy literacy is one of the

biggest challenges for teachers in learning in the independent curriculum.

The curriculum implemented in the City of Surakarta is the Merdeka Curriculum. The curriculum directs teachers to be more innovative and creative in learning activities for students. This allows teaching and learning activities between students and teachers to be more interesting, and students can more easily absorb learning material.

The learning process activities according to [2] is a process that contains a series of actions by teachers and

students on the basis of reciprocal relationships that take place in educational situations to achieve certain goals. Teaching is a form of activity in which there is a relationship of interaction in the learning and teaching process between educational staff and students. Training is almost the same as teaching but is more about developing certain skills.

The results of initial observations regarding the numeracy literacy learning process in class IV show that so far teachers have used learning media in the form of textbooks and worksheets. Learning activities take place with students working on questions in the book and taking notes from the teacher in front of the class. This shows that teachers have not been able to maximize learning media, so teachers need interactive learning media. Media according to [3] is a means of conveying messages or learning information that the message source wishes to convey to the target or recipient of the message. Learning media can be used by teachers in teaching and learning activities. This is in line with the opinion of Falahudin (2014) that the use of learning media in teaching and learning activities can generate new interests and desires, generate motivation and stimulate learning activities, and even have a psychological influence on learners. Thus, learning media that are less than optimal in implementing teaching and learning activities can affect student learning outcomes. According to Bloom, quoted by [4], he classifies the types of learning outcomes into 3, namely (1) cognitive learning outcomes, (2) affective learning outcomes, and (3) psychomotor learning outcomes.

The assessment of class IV numeracy literacy learning outcomes was carried out comprehensively, namely cognitive, affective and psychomotor. Cognitive learning outcomes are closely related to thinking abilities, and affective learning outcomes include behavioral traits, while psychomotor learning outcomes are related to physical activity. It is hoped that educational games can become a learning medium for students in understanding numeracy literacy material. Educational games are games that contain learning material so that students can better understand lessons with high learning motivation through playing while learning.

Educational game tools are a medium or facility that can stimulate student activity to study learning material and can increase understanding of something, either by using advanced technology or simple technology. This

technology is used as an educational tool that provides opportunities to increase students' desire to learn and behave [5].

Adventure games are interactive stories about protagonist characters played by players [6]. Story and exploration are very important elements in this game. Puzzle solving and conceptual challenges are a large part of the gameplay because combat challenges, economic management, and conflict are lacking or non-existent [7]. This definition does not mean there is no conflict in adventure games, although many adventure games do not have conflict so only fighting is not the main activity. The characteristics of adventure genre games are that at each level the player character and location of the game will be different or change, apart from that, they usually collect coins to get points or scores. In some adventure genre games, the time to complete the game plays a role.

Numeracy learning in schools has often been considered rigid and theoretical, giving rise to reluctance among students [8]. The use of innovative and fun learning methods is important to increase motivation and learning effectiveness. One interesting method to try is the use of adventure games in learning numeracy literacy. Therefore, researchers tested the effectiveness of using adventure games in learning numeracy literacy.

II. METHOD

Researchers used quantitative research methods with a nonequivalent control group design. This design is almost the same as the pretest and posttest control group, the only difference is that the experimental and control groups were not chosen randomly [9]. This research uses two groups, namely the control group and the experimental group or those that will be treated using adventure game media. At the beginning of the implementation, the two groups were given a pretest to determine the students' initial knowledge regarding the material to be tested. After being given an initial test, then the two groups will be given different treatment. The experimental group will be given adventure game media, while the control group will only be given the quiz game media. After receiving the necessary treatment, a final posttest was held for both groups to determine the effectiveness of the students' learning outcomes.

One of the non-probability sampling techniques that will be used is purposive sampling where the researcher will determine the sample with certain considerations

(Sugiyono, 2016). The samples that will be used in this research are class IV A as the experimental group and class IV B as the control group, each consisting of 28 students. The reason for taking the sample was that class IV students met the requirements for the purposive sampling technique and had received numeracy literacy subjects, especially measurement material.

The data collection technique in this research uses a test technique which consists of two stages, namely the pretest and posttest stages.

The posttest is given at the beginning before implementing the model to be tested. The purpose of giving the posttest is to find out and measure the students' initial abilities. Meanwhile, the posttest will be given if activities involving game media have been carried out to measure the final abilities of the students. This test technique is used to measure students' ability to measure the effectiveness of learning outcomes in the form of 20 multiple choice questions.

The implementation stage is the next stage where the activities include providing treatment for the experimental class and also collecting the required data from the two groups of the experimental and control classes. At this stage there is also the implementation of learning activities using game media and also providing questions for learning numeracy literacy.

III. RESULT AND DISCUSSION

Pretest data with a total of 28 students obtained an average score of 65.95; standard deviation of 6.05; the minimum score is 57, and the maximum score is 77. Posttest data obtained an average score of 91.27; The

standard deviation is 3.77, the minimum score is 84, and the maximum score is 98.

The product testing flow above was carried out using a comparative approach between the experimental class which used the learning media developed, and the control class used the quizizz game media. Pretest posttest data on learning outcomes in the control class using learning media.

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Pretest data with a total of 28 students obtained an average score of 61.00; standard deviation of 3.37; The minimum score is 55.00 and the maximum score is 68.00. Posttest data obtained an average score of 84.31; The standard deviation is 3.42, the minimum score is 80.00 and the maximum score is 93.00.

The learning outcomes of students in the experimental class and control class have increased when seen based on the average increase in students' pretest and posttest. The increase in scores in the experimental and control classes can be seen in the following table.

Table 1. Mean Score Pretest Posttest Group

| Group | Mean | | |
|--------------------|---------|----------|-------------|
| | Pretest | Posttest | Enhancement |
| Eksperiment | 65,95 | 91,27 | 25,32% |
| Control | 60,12 | 87,50 | 23,00% |

Based on data analysis of students' cognitive abilities processed using SPSS version 26, data was obtained that the normality of the data tested using Shapiro-Wilk obtained a significance level for the pretest results, namely 0.638 for the experimental class and 0.229 for the control class, so it can be concluded that the data obtained was normally distributed. Furthermore, the significance level for the posttest value was 0.311 in the experimental class and 0.557 in the control class so it

can be concluded that the data is normally distributed. The homogeneity of the pretest data in this study was carried out using the Levene's test which produced a significance level value of 0.130 so it can be concluded that the experimental class and control class data came from homogeneous variances.

VI. DISCUSSION

Testing the effectiveness of adventure game media was carried out in the experimental class and quizizz game

media in the control class. The prerequisite test is carried out by giving pretest questions to the two class groups. The results of the prerequisite test show that the data studied is normally distributed and the variance of the two class groups is homogeneous. The design used in this testing stage is a nonequivalent control group. This can be explained that there are two groups consisting of an experimental group and a control group. Students in the experimental group carry out learning using the adventure game learning media, while students in the control class use the quizizz game learning media. Next, the researcher carried out learning using this learning media. After completing learning, both groups will do the posttest.

The average pretest score of students in the experimental class was 65.95, then after learning using adventure game learning media it increased to 91.27. Meanwhile, in the control class, the pretest score was 61.00 and after implementing learning with the Quizizz game the posttest score was 84.31. Even though both classes experienced an increase, the experimental class achieved an increase of 25.32% and the control class only 23%. This proves that the adventure game learning media implemented in elementary schools can improve student learning outcomes better than the quizizz game. In line with previous research which states that Android-based game learning media can optimally improve the mathematics learning outcomes of students in elementary schools [7], [10]–[12]

Tests carried out in the control and experimental classes resulted in an increase in grades after learning. Even though both have increased, it is necessary to carry out a difference test to determine the differences in student learning outcomes in the experimental class and the control class. The difference test was carried out using an independent sample t-test to determine the effect of using adventure game media in the experimental class. Based on the results of the independent sample t-test, $t_{count} = xx$ and t_{table} in the distribution table of t values, namely a confidence level of 95% ($\alpha = 5\%$ and because the t test is two-sided, the α value referred to is $\alpha/2 = 5\%/2 = 0.025$) and degrees of freedom ($df = 44$), so the value of $t_{table} = 2.015$. Because $3.769 > 2.015$, it can be concluded that H_0 is rejected. Based on this description, it can be proven that at the 95% confidence level the average posttest scores of grade IV elementary school students are not the same. This shows that the learning outcomes of students in the experimental group are better than the control class.

CONCLUSION

The conclusion of this research is that the results of testing adventure game learning media show that the media is effective for use in learning. Testing was carried out using the nonequivalent control group method. The test results showed an increase in pretest scores in the experimental class reaching 25% compared to the control class. The effectiveness test results show that the experimental class is better than the control class with a significance level of $0.000 < 0.05$ so that H_0 is rejected. Based on the average gain score obtained in the experimental class, it is 74.63, which means that the adventure game learning media is effective for use in fourth grade elementary school learning in numeracy literacy, length measurement material using standard and non-standard units.

Implications of research results testing the effectiveness of the adventure game learning media that was developed effectively in improving the learning outcomes of class IV students in numeracy literacy subjects in elementary schools. Adventure game learning media can be an alternative media used in numeracy literacy learning in elementary schools to increase the effectiveness of student learning outcomes because this learning media is still relatively new for students. With the integration of this technology, via cellphones owned by students, they can see the learning material presented more interestingly. Apart from that, learning media can be used independently by students to study both at home and at school. The existence of adventure game learning media can provide information and increase students' knowledge and understanding. Furthermore, adventure game learning media can also be combined with any learning model and learning technique flexibly. Teachers can use this learning media by adjusting the characteristics of their students at school.

SUGGESTION

The suggestions given by researchers are aimed at teachers as users, teachers and other researchers who will continue this research. Adventure game learning media can be used as an innovation in numeracy literacy learning, especially in elementary schools. This can help teachers to improve the quality of learning with the integration of technology. Teachers as users of learning media are advised to explore learning media before using it in learning. Teachers need to provide appropriate methods and techniques to combine with adventure game learning media so that they can achieve learning objectives optimally. Advice that can be given

to students is that students should properly understand the use of adventure game media and the tools they need so that the learning process can be directed. The results of this research can be used as a reference point and benchmark for carrying out subsequent similar research. Researchers can use other learning materials to develop them using adventure game media that suit different materials and competencies.

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