USING WORDWALLS IN GAME-BASED LEARNING TO IMPROVE UNDERSTANDING OF MATHEMATICAL CONCEPTS

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Abstract

This research was carried out because students still had difficulty understanding and applying mathematical concepts to various questions which were still low, so the aim of this research was to find out whether there was an improvement before and after treatment, as well as the effect of using wordwall. in game-based learning to improve the ability to understand mathematical concepts in social arithmetic learning. This research approach is a quantitative approach. This type of research uses a pre-experimental design with a One-Group Pretest-Posttest Design research design. The experimental sample is class VIIA. The instruments used are questionnaires and tests. The results of the paired t test showed $|t_{count}$=-8.651 | > t_{table}=2.0395, meaning that the ability to understand mathematical concepts before and after treatment increased. Meanwhile, simple regression analysis shows that the influence of using wordwalls in game based learning on the ability to understand mathematical concepts is significant with a contribution of 32% and the remaining 68% is influenced by other factors.

Keywords: wordwall, game based learning, understanding mathematical concepts, social arithmetic

INTRODUCTION

Mathematics is a universal intelligence that is used in various scientific fields and has unique characteristics from other sciences (Akbar et al., 2018: 144). Students consider mathematics to be a difficult science because mathematics is synonymous with many formulas, it takes time to understand concepts, causing students to be less interested in mathematics (Ulfa, 2019:49).

Understanding mathematical concepts is still the focus of educators in delivering mathematics material because it is a basic skill that students must have and it is hoped that students will be able to use these concepts after studying them.

Based on the results of interviews with teachers at SMP Negeri 1 Adiwerna, it was explained that students experienced problems in connecting concepts in different questions with examples, especially if there were changes in the number or variations in the questions. Although they can start working on the questions, they have not achieved the correct results. He added that learning took place using conventional teaching methods, and no media was available during teaching. This shows that students' understanding of mathematical concepts is still lacking. Therefore, educators strive to optimize conceptual understanding, especially in the indicators taught.

Indicators of understanding mathematical concepts (Hanifah & Abadi, 2018:237-238) include, (1) restating an idea, (2) grouping objects according to certain characteristics, (3) providing examples and non-examples, (4) expressing ideas in the form of a mathematical representation, (5) developing necessary or sufficient conditions for a concept, (6) Using, utilizing, and selecting certain procedures or operations (7) Implementing ideas or problem solving algorithms.

The seven indicators of conceptual understanding were summarized in this research into four, namely restating an idea, expressing an idea in the form of a mathematical representation, using, exploiting, and choosing certain procedures or operations. Implement a problem-solving idea or algorithm. This indicator is limited because it already represents the ability to be measured.

Achieving students' ability to understand mathematical concepts requires support in learning, for example choosing a learning model helps the learning process be more interesting and varied. However, most educators tend to deliver teaching resources using the lecture method, and there is a lack of effort to make learning more interactive due to the lack of use of learning media.

Students often only pay attention to the teacher's explanations, take notes, and tend to be passive so that students judge mathematics to be boring (Nursidik, 2022). The impact is that the understanding of

the material is less than optimal and the interest in learning decreases, which causes students to feel bored. So by using game based learning it is hoped that it can provide a new experience of learning by playing and understanding ideas are absorbed quickly while learning mathematics. In game based learning using the wordwall website game. Wordwall is a site that is used as a learning resource to make it easier for students to grasp the mathematical concepts of social arithmetic.

Social arithmetic is a part of mathematics that is often encountered in life so that students can connect the understanding they learn with concrete situations. If students do not have conceptualization, the impact is that students cannot apply concepts when solving mathematical problems. Looking at this description, the researcher intends to determine the improvement before and after treatment as well as the effect of using wordwalls in game-based learning to improve the ability to understand mathematical concepts of class VII students at SMP Negeri 1 Adiwerna.

1.1 WORDWALL

Wordwall is a digital interactive learning media site that allows educators to create interesting learning activities (Octaviana et al, 2023). Wordwall is a digital platform that is used online as a game-based learning tool (Intan Setya Yuniar et al., 2021). Wordwall is a site that has the advantages of being easy to use, practical, interesting and interactive.

1.2 Game based learning

Game based learning is learning to use games as an interactive medium in conveying material. Game based learning is a game-based learning model to support students in understanding the concepts being studied. In this case, students are still required to learn, but with a play approach so that learning is more fun (Noviyanti, 2018: 112)

1.3 Understanding mathematics concepts

Understanding mathematical concepts according to Karunia (Firdausi & Suparni, 2022:448) is the individual's capacity to understand mathematical concepts in a comprehensive and functional manner. Mastery of mathematical concepts is the ability to interpret a mathematical concept correctly. The ability to understand mathematical concepts can be divided into two types according to Skemp (Ruqoyyah et al., 2020: 7), namely instrumental understanding and relational understanding:

a. Instrumental understanding is the ability to understand only knowing and memorizing a formula and being able to use it in solving problems algorithmically.

b. Relational understanding is the ability to understand not just knowing and memorizing a formula, but being able to apply the formula to solve mathematical problems.

METHODOLOGY

This research uses a quantitative approach with a pre-experimental design method. The One-Group Pretest-Posttest Design research design was chosen because the results of the treatment can be known more accurately (Sugiyono, 2013:74). The sample taken was only one experimental class sample from class VIIA students at SMP Negeri 1 Adiwerna. From the research design it can be illustrated:

***Table** 1 Research Design*

Description	*Pre-test*	Treatment	*Post-test*
Experiment Class	H_1	X	H_2

This research uses questionnaires and test instruments. Before the test instrument is used, it is first tested for validity, reliability, level of difficulty and distinguishing power so that 5 questions are obtained for each question description. Meanwhile, the questionnaire instrument was validated by expert validators. In data analysis using the paired t test, simple linear regression.

RESULTS

This research was carried out at SMP Negeri 01 Adiwerna with the aim of finding out students' ability to understand mathematical concepts by giving special treatment to the use of wordwalls in game-based learning which can improve and influence class VII students in the 2023/2024 school year. year. The research was carried out in 4 meetings, at the first meeting a pretest was carried out to determine the

ability to understand concepts before being given treatment. The 2-3rd meeting provides treatment and fills out student response questionnaires as a form of assessment of the learning model that has been used. The 4th meeting provided a posttest to determine students' ability to understand concepts after being given treatment. Obtained recapitulation of research data for filling out questionnaires, pretest and posttest in the table below:

Table 2 Summary of research data for filling out questionnaires, pretest and posttest

Distribution	*Questionnaire*	*Pre-test*	*Post-test*
Average	65.48	54.34	71.56
Standard Deviation	4.77	18.53	18.96
Variance	22.75	343.46	359.42
Highest score	77.5	93	96
Lowest value	55	22	25

The results of table 2 on the questionnaire obtained an average of 65.48. The standard deviation is 4.77 and the variance is 22.75. The highest and lowest scores were 77.5 and 55 respectively. The pretest results obtained an average of 54.34. The standard deviation is 18.53 so the variance is 343.46. The highest score was 93 and the lowest was 22. Meanwhile, the posttest results obtained an average of 71.56. The standard deviation is 18.96 and the data variance is 359.42. The highest value was 96 and the lowest was 25. The pretest and posttest data obtained were tested using a paired difference test (paired sample t-test) to determine the improvement before and after treatment, and the questionnaire and posttest data were processed using simple regression analysis.. The calculation results are below:

Table 3 Results of paired t-test

	t_{count}	t_{table}	Decision
Understanding of pretest and posttest concepts	-8.651	2.040	H_0 rejected

Based on the results of table 3, t_{count} = -8.651 and t_{table}= 2.040. So $|t_{count}| > t_{table}$, meaning that H_0 is rejected, meaning there is an increase in the ability to understand concepts before and after treatment.

Table 4 Simple regression analysis test results

	N	Regression equation model	F_{count}	t_{count}	*Coefficient of determination*
Regression analysis results	32	$\hat{Y} =$ -71.043+2.179X	14.231	3.772	32%

Based on table 3, a simple linear regression model is obtained, which means a change in the coefficient value of 2.179 on variable Y, if the model feasibility test variable F_{count} = 14.231 > F_{table}= 4.16 then H_0 is rejected, meaning it is feasible according to the data and linear regression. t_{count}=3.772 and t_{table}=2.040. So $t_{count} > t_{table}$ so that H_0 is rejected, meaning that there is a significant influence of the use of wordwalls in game based learning on increasing understanding of mathematical concepts with a contribution of 32%.

In game-based learning using word walls, students are required to work together with each other, practice teamwork in finding information about material and concepts that match the question, learning is focused on the students and makes learning a meaningful experience for them.

Providing game-based learning to students has been proven to be able to improve their ability to understand concepts in line with research (Meitriani et al., 2023) entitled the application of game-based learning to improve concept understanding, proving that providing game-based learning can improve concept understanding. based learning is able to improve students' conceptual understanding. Medila et al (2023) also did the same thing with the results of game based learning which can be used as a reference for learning models in developing students' understanding of mathematical concepts, so that the discovery of this model has an influence on students' understanding. the ability to understand concepts. The results of the analysis show an increase before and after treatment as well as the influence of using wordwalls in game-based learning.

CONCLUSIONS

The research results showed an increase before and after treatment, as well as a significant effect of using wordwalls in game based learning to increase the ability to understand mathematical concepts by 32%.

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