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THE EFFECT OF GAME-BASED LEARNING MODEL ASSISTED BY A BAMBOOZLE ON THE MULTIPLICATION OPERATION SKILLS OF ELEMENTARY SCHOOL STUDENTS

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PENGARUH MODEL PEMBELAJARAN BERBASIS *GAME* BERBANTUAN "*BAAMBOOZLE*" TERHADAP KETERAMPILAN OPERASI HITUNG PERKALIAN SISWA SEKOLAH DASAR

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ABSTRACT

Abstract: *Skills in solving multiplication operations are categorized as very low for second-grade elementary school students. The purpose of the research in this article is to determine the effect of the game-based learning model assisted by "Bamboozle" on the multiplication operation skills of elementary school students at Islamic Elementary School of Al Hidayah in the academic year 2021/2002. The research used experimental quantitative research with a One Group Pretest-Posttest design. The research used a saturated sample as a sampling technique and a test as a data collection method. The results showed that the pre-treatment mean score was 63.33 lower than the post-treatment mean score of 91.90. By using the Wilcoxon test data analysis method, based on 21 study samples all of them have increased from pre-test to post-test with an average score of 11.00. In addition, by looking at the Asymp value. Sig. (2-tailed) 0.000 < 0.05, it could be concluded that there was a significant effect of the implementation of the game-based learning model assisted by the "Bamboozle" on the multiplication operation skills for the second-grade students of SD Islam Al-Hidayah in the academic year 2021/2022.*

Keywords: bamboozle, game-based learning model, mathematic, multiplication

Abstrak: *Keterampilan dalam melakukan operasi hitung perkalian sangat rendah dimiliki oleh siswa SD kelas 2. Tujuan dari penelitian pada artikel ini adalah untuk mengetahui pengaruh model pembelajaran berbasis game berbantuan "baamboozle" terhadap keterampilan operasi hitung perkalian siswa kelas 2 SD Islam Al Hidayah Tahun Pelajaran 2021/2022. Penelitian menggunakan penelitian kuantitaif eksperimen dengan desain One Group Pretest-Posttest. Penelitian menggunakan sampel jenuh sebagai teknik pengambilan sampel dan tes sebagai metode pengumpulan data. Hasil penelitian menunjukkan bahwa rerata skor sebelum perlakuan sebesar 63,33 lebih rendah dari skor rerata pasca perlakuan sebesar 91,90. Dengan teknik analisis data uji wilcoxon, dari 21 sampel penelitian semuanya mengalami kenaikan nilai dari pretes ke postes dengan rata-rata kenaikan sebesar 11.00. Kemudian dengan melihat nilai Asymp. Sig. (2-tailed) 0.000 < 0.05 yang berarti bahwa terdapat pengaruh yang signifikan penerapan pembelajaran berbasis model Game berbantuan "Baamboozle" terhadap keterampilan operasi hitung perkalian siswa kelas 2 SD Islam Al-Hidayah tahun pelajaran 2021/2022.*

Kata Kunci: ***baamboozle, model pembelajaran berbasis game, Matematika, Perkalian***

CITATION

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INTRODUCTION

Today's education is currently faced with a variety of complex challenges related to social technological development and social restructuring. At least second-generation societies, defined as digital natives, are growing today. They are people who have lived in a digital environment since they were born and consider it their natural environment. Given the challenges of learning in the global age, all groups directly or indirectly involved must be able to use technology as a learning tools.

In Permendikbud RI number 22 of 2016 states that one of the principles needed in learning is the use of science and technology to improve the effectiveness and effectiveness of learning (Pratama & Setyaningrum, 2018). In addition, the National Council for Mathematics Teachers recommends incorporating technology into mathematics learning. This mandate motivates mathematics education practitioners to produce learning media from technology that can attract students to be more willing to understand the concepts of Mathematics subjects (Maulyda, 2020). Given the characteristics of mathematics learning which is quite complicated for students because the learning often uses various formulas that need to be remembered and students also need to interpret what they have learned. This is similar to research (Febriani et al., 2019) which says mastery of mathematical concepts is the ability of students to interpret them in their own language and can practice the concept in a problem, then it can involve one perception with another.

There are several factors that make it difficult for students to learn math. Influential factors come from yourself, your school environment, your family, and society. (Qolbi et al., 2019) Parental, school environment, family and community sensibilities can be very helpful in motivating students to learn as soon as possible so that they can learn according to the expectations of teachers and parents. In addition to parental sensitivity, learning institution sensitivity also needs to be optimized. One of the optimizations that can be done by teachers is through the provision of technology-based learning facilities which are expected to increase students' motivation and achievement in mathematics.

Based on the results of an interview with an elementary school teacher in the South Jakarta area, information was obtained that when face-to-face learning took place again after a long time of online learning, there were still many students who did not understand the concept of multiplication correctly and were also not skilled in performing multiplication arithmetic operations. There are several factors that cause this to happen, firstly when schools conduct online distance learning, all schools conducted PJJ so that students were pampered for too long while learning online. (Sadikin & Hamidah, 2020) Teachers only provide material via *Youtube* and give assignments without direct communication, causing students' abilities not to be monitored directly by the teacher. Second, the lack of support and guidance from parents during home learning takes place because parents are busy working and taking care of the house. So that when students do face-to-face learning again, they do not understand the concept well and are less skilled in performing multiplication operations during class learning.

To overcome these problems, researchers offer a solution to carry out fun learning with the Game Based Learning model. Game based learning is a learning model that utilizes game/game applications that have been specially created to help maximize the learning process. (Pérez et al., 2018) So that it can provide a stimulus in learning such as psychomotor, emotional and intellectual. The advantages of this model are that it can train collaboration and new innovations, make it easier in the learning stage because it has an attraction that can eliminate boredom in learning and then get satisfying and useful input, and can also measure levels of understanding, train memory capacity, calm down after learning, and generate motivation to learn (Wibawa et al., 2021).

Because gadgets and games are familiar to Generation Z and games are

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generally liked by students, the use of game-based learning models will be suitable to be applied in learning in this generation's conditions. Based on previous research, objective calculations show that when game-based learning is applied, 88.55% of the students in the study group showed great interest in continuing to learn through play. In addition, none of the participants in the study group showed disinterest in the learning process (Liu et al., 2020).

Digital games can increase engagement and foster a student-centric environment. Game-based learning allows teachers to break away from the lecture-based classroom structure and free up more time for exploration and independent thinking.(Tokac et al., 2019) Students also interact, communicate and collaborate more with peers and teachers. In this more relaxed environment, students reduce their workload and grow from passive recipients to active thinkers (Deng et al., 2020). The research confirms that game-based learning has a positive influence on learning in schools. So that researchers make it as a solution offered to overcome problems in learning Mathematics.

However, it is different from previous research, if previous research used quizziz and wuzzit trouble media, this research uses the "*Baamboozle*" website application which is easy to use by educators who are unfamiliar with technology and also new innovations in edugames. Viewed that the learning approach with a digital-based game seeks to increase the learning stimulus that is in students compared to conventional approaches, such as lectures or giving questions, one of which is by using edugames. Teachers can also use these edugames as capital to share attractive and exciting learning facilities for technology-based generation Z. Based on the above background, the question of this research is "Is there any effect of Game Based Learning Model assisted by Baamboozle on the multiplication operation skills of second grade elementary school students?"

THEORETICAL SUPPORT

Multiplication skills in elementary school

In general, multiplication operations of original numbers can be interpreted as the result of repeated addition of original numbers (Alhusna et al., 2020). Multiplying skills play an important role in the development of mathematics as they are the first operations in a larger number of spaces that require the use of strategies other than finger counting (Burns et al., 2015). In everyday life, students often find it easy to operate numbers in the form of subtraction and addition, but there are still many who find it difficult to multiplication operations. however, given the importance of multiplication skills, teachers need to make more efforts in order to improve these abilities.

Game Based Learning Model

Game based learning is a learning model that utilizes unique game applications in the learning process. When learning takes place students can play and learn at the same time. Usually learning is made in a game that combines the fantasy side with real life problems. This is meant to make the problem path more attractive to solve (Wibawa et al., 2021).

Teachers play an important role in digital game-based learning. This is useful for basic education, especially for students with multiplication skills. Game-based learning is influential in learning abstract concepts and fun, allowing students to benefit from the experience of other classmates. It also has the fun, thrilling, emotionally stimulating, excitement and other characteristics of this game-based learning learning concept (Partovi & Razavi, 2019).

Website "Bamboozle"

Baamboozle is an edugames game model that is similar to quiz competitions, but runs online and students don't have to create an account. How to play this game by ringing the bell per group (Krisbiantoro, 2020) The advantages of the *Baamboozle* website include being practical, can be used even if you don't create an account, flexible use because it can

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be used for offline and online learning Inviting students to learn and play at the same time so that children are not bored in learning mathematics, and hope that students are able to be more proficient in performing multiplication arithmetic operations.

The relationship between game-based learning models, bamboozle and the multiplication skills

Game Based Learning model is a learning model that presents teaching materials in the form of games. Games are media that are used to be used as motivational learning. Skills affect the cognitive and emotional users who use power as a medium of learning (Wibawa et al., 2021). Educational game-based learning can be used to increase students' creativity according to school situations and conditions and finally the use of game-based learning which is an instructional and educative recommended in learning mathematics. (Mohd et al., 2020)

Teachers play a key role in digital game-based learning, which can be useful for students in basic education especially in multiplication arithmetic operations skills. Game-Based Learning is influential in learning abstract concepts, is fun, and allows students to benefit from the experiences of other classmates. Also, with characteristics such as engaging, exciting and emotionally arousing, and considering the excitement of the learning concept in this Game-Based Learning (Partovi & Razavi, 2019).

Because multiplication material requires repeated practice in order to have skills fluently (Mei et al., 2020). So with the use of the Game Based Learning model and also assisted by the "Baamboozle" media, can help students to continue to practice multiplication repeatedly,where Baamboozle is a game model of edugames that breeds quiz competitions (Krisbiantoro, 2020). Through the bamboozle game, students can learn and play at the same time so that children do not get bored in learning mathematics, and hope that students are able to be more proficient in performing arithmetic operations quickly.

METHOD

This research uses experimental quantitative research with the type of Pre-Experimental Design research. The research design used in this study was the One-Group Pretest-Posttest. (Sugiyono, 2019) In the study, two tests were conducted, namely the pretest before learning and the posttest after the learning was carried out. The effect of the application of the learning model will be seen from the changes in the average pretest and posttest scores. (Yusuf, 2014)

This research was conducted on second grade students at Al-Hidayah Islamic Elementary School whose address is at Jl. Srengseng Sawah No. 74 Kelurahan Srengseng Sawah, Jagakarsa Subdistrict, South Jakarta DKI Jakarta 12640. The time of conducting the research is in the even semester in May of the 2021/2022 academic year. The research sample used was 21 students consisting of 10 male and 11 female.

In this study, researchers using several techniques in data collection such as observation, and measurement technique in the form of a test. The data collection method used is a test where the instrument used is in the form of 20 multiple choice questions that have gone through the examination stage of two experts in the field of mathematics and tested for validity and reliability by conducting trials.

This research was carried out for 2 meetings referring to the prepared syllabus and lesson plans. The treatment used in this research is game based learning with the help of "*Baamboozle*". This treatment consists of several stages as show in figure 1.

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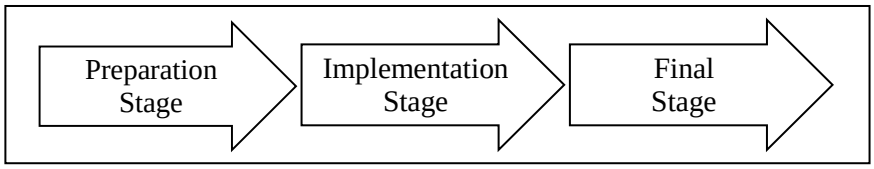

Figure 1. **Research stage**

The first step is the *preparation stage*. At this stage the researcher made observations at the school where the research was conducted and the mathematics learning process in class 2. then identify problems based on the results of these observations and make learning tools such as lesson plans for carrying out the teaching and learning process. before doing the research, the researcher validated the instrument which was tested by expert lecturers, then tested the questions in the class where the research was carried out after getting the data followed by calculating the reliability of the instrument. The second step is the *implementation stage*, at this stage the researchers carried out the planned learning in accordance with the lesson plans that had been made by applying game-based learning with the help of "Baamboozle" to the class being studied. After that, the researcher gave questions after carrying out the treatment to find out how far the students' multiplication arithmetic operation skills were. The third step is the *final stage*, at this stage the researcher begins to analyze the data that has been obtained and then makes a report and concludes the results of the research

The data analysis method uses the SPSS 25.0 *for windows* application which consists of three stages. First, a descriptive statistical test was conducted to see the general condition of the research data. Second, normality test and homogeneity test were carried out as prerequisite tests for parametric statistics. Third, a hypothesis test was conducted to see whether there was a significant difference from the average of the two samples at the significance level of = 5%.

RESULTS

Based on the results of the descriptive statistical test as shown in table 1, it was found that the results of the pretest were in the range of values of 30-90 with an average value of 63.33, while the results of the post-test were in the range of 80-100 with an average value of 91.90. both results showed an increase from the pretest score to the posttest score.

Table 1. Descriptive Statistics

	N	Range	Minimum	Maximum	Mean	Std. Deviation	Variance
Pretest	21	60	30	90	63.33	13.540	183.333
Postest	21	20	80	100	91.90	6.796	46.190
Valid N (listwise)	21						

Based on the normality test which was analyzed using SPSS 25.0 *for windows* as shown in table 2, it was found that the significance value was 0.046 < 0.05, which means that the data is not normally distributed.

Table 2. Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Pretest	.260	21	.001	.906	21	.046
Postest	.277	21	.000	.797	21	.001

a. Lilliefors Significance Correction

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Because the data are not normally distributed, the hypothesis testing will use non-parametric statistics using the Wilcoxon test. Based on the Wilcoxon test as shown in table 3, it was found that of the 21 research samples, all of them experienced an increase in value from pretest to posttest with an average increase of 11.00.

Table 3. Ranks

		N	Mean Rank	Sum of Ranks
Postest - Pretest	Negative Ranks	0[a]	.00	.00
	Positive Ranks	21[b]	11.00	231.00
	Ties	0[c]		
	Total	21		

a. Postest < Pretest
b. Postest > Pretest
c. Postest = Pretest

Table 4. Test Statistics[a]

	Postest - Pretest
Z	-4.051[b]
Asymp. Sig. (2-tailed)	.000

a. Wilcoxon Signed Ranks Test
b. Based on negative ranks.

Furthermore, by looking at the Asymp value. Sig. (2-tailed) 0.000 < 0.05, which means that there is a significant increase from the pretest score to the posttest score, so it can be concluded that there is a significant effect from the application of the "*Baamboozle*" assisted Game Based Learning learning model on the multiplication operation skills of 2nd grade elementary school students.

DISCUSSION

Before conducting the research, the validity and reliability tests were carried out at SD Negeri Cijantung 06 Pagi with the number of students as many as 23 students. The results of the validity test of the 20 questions tested were obtained as many as 10 questions which were declared valid and then the instrument reliability test was carried out on the 10 questions. And based on the calculation of the results obtained rcount = 0.866 and rtable = 0.396. Because rcount > rtable, the instrument is declared to be very reliable and feasible to be used in research. The research was conducted to determine the multiplication arithmetic operation skills obtained from the pretest and posttest scores.

The data from the results of students' arithmetic operations skills consist of pretest and posttest scores that have been done by students. The pretest was carried out by the researcher by giving an initial test before the implementation of the learning model in the experimental class. Skills in multiplication operations for class 2 SDI Al Hidayah using the Game Based Learning model assisted by "*Baamboozle*" shows that the results of the study indicate that the average score before being given treatment (63.33) is lower than the average score after the treatment is given (91.90). The results of the hypothesis test revealed that of the 21 students who were given treatment, all of them experienced an increase in grades, with an average increase of 11.00. Then by looking at the Asymp value. Sig. (2-tailed) 0.000 < 0.05 which means that there is a significant increase in the value, so it can be concluded that there is an influence of the "*Baamboozle*" assisted Game Based Learning learning model on students'

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multiplication arithmetic operation skills. This is reinforced by the theory which says that game-based learning has succeeded in attracting students' attention. Learning becomes more fun and interactive because students immerse themselves in it and participate more actively in learning activities. (Hung et al., 2019)

Figure 2. Learning situations when students are actively involved in games on the bamboozle website

Learning with game-based learning models has advantages including: The advantages of Game-Based Learning include: (1) Interactive, fun and trains collaboration and new thinking, (2) Facilitates the learning stage because it can relieve stress, (3) Has its own charm to learn and gets good feedback. fun and useful, (4) Can measure the level of understanding, train memory, relax after learning, and trigger enthusiasm for learning (Wibawa et al., 2021). This advantage makes learning fun and encourages students to think positively to solve all in-game tasks. The Bamboozle website allows classroom games to be presented in digital format, with a compelling look and automatic evaluation of each student's answers, making it difficult for students to have fun performing multiplication operations.

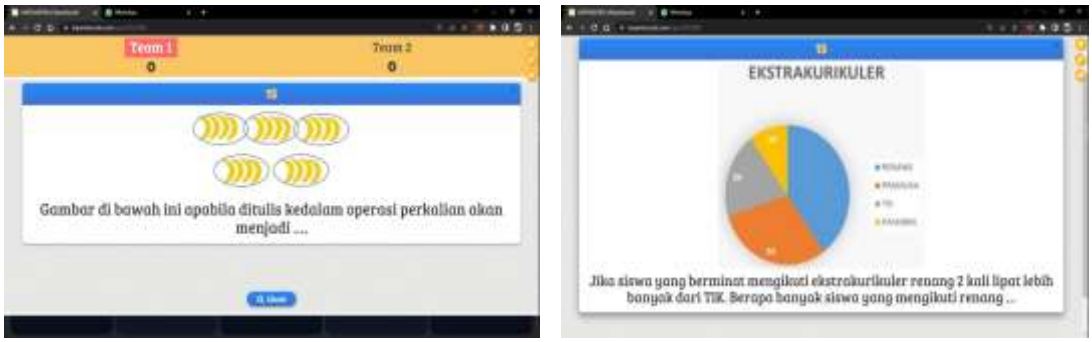

Figure 3. Examples of multiplication questions shown on *Bamboozle Website*

So as to improve student learning abilities (Mao et al., 2022). One of the benefits of using a game-based learning model with Bamboozle is that it can improve the classroom atmosphere and student motivation. This facilitates continuous learning and improves student learning outcomes.

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CONCLUSIONS

This study of digital game-based learning experiences for elementary school students provides evidence that the use of Game Based Learning learning models can affect learning knowledge, multiplication arithmetic operations skills, and the development of students' interest in mathematics. In particular, the use of digital game-based learning models in basic education is very useful. It can be seen from the analysis of the Wilcoxon test hypothesis which shows that of the 21 research samples, all of them experienced an increase in value from pretest to posttest with an average increase of 11.00. then by looking at the Asymp value. Sig. (2-tailed) 0.000 < 0.05 which means that there is a significant increase in the value, so it can be concluded that there is an influence of the "*Baamboozle*" assisted Game Based Learning learning model on students' multiplication arithmetic operation skills. Although this research produces a new addition of knowledge for teachers in order to increase students' learning motivation, this research still has many shortcomings. The small number of samples used makes the sample not normally distributed which in the end uses non-parameteric data analysis to test the hypothesis. As a result, the results of this study cannot be generalized and only apply specifically to the school where the study is located. In the next research, it is recommended for researchers who will research similar things to use a larger sample so that the data is normally distributed which in turn makes the research results can be generalized more broadly.

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