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Evaluating the Effectiveness of Game-Based Learning with Geometry Dash on Grade III Students' Numeracy Skills

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ABSTRAK. *Kemampuan numerasi siswa sekolah dasar, khususnya pada kelas rendah, masih tergolong rendah. Penelitian ini bertujuan untuk menganalisis model pembelajaran* Game-Based Learning *berbantuan media* game digital Geometry Dash *terhadap kemampuan numerasi siswa kelas III. Metode yang digunakan adalah* quasi experiment *dengan desain* Nonequivalent Control Group Design*, yang melibatkan dua kelompok: kelompok eksperimen dan kelompok kontrol. Populasi penelitian ini adalah seluruh siswa kelas III berjumlah 413 siswa. Sampel ditentukan dengan teknik* cluster random sampling *melalui dua tahap pengundian. Metode dan instrumen pengumpulan data pada penelitian ini menggunakan metode tes. Data kemampuan numerasi siswa diperoleh melalui instrumen tes objektif berbentuk pilihan ganda dan dianalisis menggunakan uji-t setelah memenuhi prasyarat uji normalitas dan homogenitas. Hasil uji-t menunjukkan bahwa nilai* t_{hitung} *sebesar 5,402 dan* t_{tabel} *sebesar 1,996 pada taraf signifikansi 5% dengan derajat kebebasan (dk) 66. Karena* t_{hitung} *lebih besar dari* t_{tabel}*, maka* H_0 *ditolak dan* H_a *diterima. Artinya, terdapat perbedaan yang signifikan dalam kemampuan numerasi antara kelompok yang dibelajarkan dengan model* Game-Based Learning *berbantuan* Geometry Dash *dan kelompok yang tidak. Dengan demikian, model pembelajaran ini terbukti berpengaruh positif dan signifikan terhadap kemampuan numerasi siswa kelas III. Implikasi dari temuan ini mengarah pada perlunya guru untuk mulai mengeksplorasi model pembelajaran inovatif yang berbasis teknologi dan berbasis minat siswa.*

ABSTRACT. The numeracy ability of elementary school students, especially in the lower grades, is still relatively low. This study aims to analyze the Game-Based Learning learning model assisted by the Geometry Dash digital game media on the numeracy ability of third-grade students. The method used is a quasi-experiment with a Nonequivalent Control Group Design, which involves the experimental and control groups. The population of this study was all third-grade students, totaling 413 students. A cluster random sampling technique determined the sample through two stages of drawing. The method and instrument for data collection in this study used a test method. Data on students' numeracy ability were obtained through an objective test instrument in multiple-choice questions and analyzed using a t-test after fulfilling the prerequisites for normality and homogeneity tests. The t-test results show that the t_{count} value is 5.402 and the t_{table} is 1.996 at a significance level of 5% with degrees of freedom (dk) of 66. Because the t_{count} is greater than the t_{table}, H_0 is rejected and H_a is accepted. This means there is a significant difference in numeracy skills between the group that was taught using the Geometry Dash Game-Based Learning model and the group that was not. Thus, this learning model has been proven to have a positive and significant effect on the numeracy skills of third-grade students. The implications of this finding point to the need for teachers to begin exploring innovative learning models that are technology-based and based on student interests.

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1. INTRODUCTION

Numeracy skills are an integral part of mathematical literacy that must be mastered early. Numeracy is not just the ability to calculate, but also understanding the concepts of numbers, measurement, problem solving, and applying mathematics in real-life contexts (Parulian Siregar, 2022; Taufiqurrahman, 2023). Numeracy literacy skills can also utilize various symbols and numbers related to basic mathematics to solve practical life problems. Students who have good numeracy and literacy skills can achieve good learning achievements. Conversely, students who do not have good numeracy literacy skills will achieve low learning achievements (Mumayizah et al., 2023; Silaban & Sari, 2023; Sitepu & Nainggolan, 2023). Numeracy literacy is the knowledge and skills to use various numbers and symbols related to basic mathematics to solve practical problems in everyday life, then analyze information presented in various forms and interpret the results of the analysis to predict and make decisions. Mathematics learning is inseparable from numeracy activities (Deda et al., 2023). However, numeracy differs from thematic abilities, although both are based on similar insights and skills. The difference lies in empowering these insights and skills (Bela et al., 2024). Mathematical insight alone does not make an individual possess numeracy capabilities. Numeracy encompasses the skill of applying mathematical rules and concepts to real-life situations, where the problems encountered are usually unstructured, have various methods for solving them, or even no method for solving them to the end, and are related to non-mathematical aspects (Amuda et al., 2024; Arono, Arsyad et al., 2022).

Various studies show that elementary school students' numeracy skills, especially in lower grades, are relatively low. Reports from the National Assessment indicate that many students have difficulty understanding contextual problems that require basic numerical and logical reasoning. In reality, mathematics learning still faces various challenges. One such challenge is students' perception that mathematics is frightening, making it disliked and hated (Fitrianingrum & Murtiyasa, 2023; Ismail et al., 2022; Nisa et al., 2020). Many students still hold the general view that mathematics is difficult, boring, and uninteresting. This dislike influences their perspective on mathematics learning, resulting in poor conceptual understanding and less than satisfactory student achievement (Litkowski et al., 2020). However, despite the importance of numeracy in everyday life, data show that Indonesian students' numeracy skills are still very low. The 2022 PISA report released by the OECD shows that Indonesian students struggle with numeracy-related problem-solving skills. Indonesia ranks 66th out of 81 countries in mathematics numeracy, with an average score of 366, far below the OECD average of 472 (Parwati et al., 2024). Furthermore, approximately 60% of elementary school students have not yet achieved the minimum standard in numeracy skills. This confirms the low level of numeracy skills in basic education in Indonesia. Strong numeracy skills are essential because they serve as a foundation for understanding various more complex aspects of science and technology (Amuda et al., 2024; Bela et al., 2024). For example, understanding fractions, measurement, and patterns can help students understand concepts in physics, economics, and even social sciences. Therefore, good numeracy education aims not only to equip students with numeracy skills but also analytical skills, which are highly needed in this modern era (Mutaf-Yıldız et al., 2020; Räsänen et al., 2009). In this regard, students often face obstacles in understanding basic numeracy concepts, such as arithmetic operations, measurement, and patterns, which is a challenge in efforts to improve the quality of education in Indonesia.

To address the problem of low numeracy skills among third-grade elementary school students and the lack of active student engagement in the mathematics learning process, the solution offered in this study is implementing a Game-Based Learning model assisted by the digital game Geometry Dash. This model creates a fun and challenging learning experience by utilizing a digital game that students enjoy, while explicitly integrating numeracy learning objectives (Bado, 2022; Widiana, 2022; Wiseza et al., 2024). In the learning context, Geometry Dash is used to practice skills such as pattern recognition, time and distance estimation, accuracy, and problem-solving, all of which contribute to developing basic numeracy skills. The Geometry Dash game is not only used for entertainment, but is also adapted into a learning tool through the design of structured activities oriented towards achieving competencies. Students are invited to reflect on their playing experiences through discussions and analysis, and to work on worksheets prepared to connect aspects of the game with the studied numeracy concepts. The teacher acts as a facilitator who guides students to understand the relationship between challenges in the game and mathematical thinking strategies that can be applied (Amalia & Athiyyah, 2024; Antara et al., 2024).

The urgency of this research lies in the importance of designing a learning approach that emphasizes content and delivery methods that motivate students and facilitate their active engagement. According to Piaget, elementary school-aged children, especially third-grade students, are at the concrete-operational stage of cognitive development, meaning they learn more effectively through direct experience and enjoyable activities. Therefore, applying the Game-Based Learning model is highly relevant as an innovative alternative in the numeracy learning process (Anggraini et al., 2021; Erşen & Ergül, 2022; Winatha & Setiawan, 2020). Based on interviews with third-grade homeroom teachers, it was found that students tend to be more passive in mathematics learning because they have difficulty conveying mathematical arguments and ideas (Putri et al., 2024; Silalahi et al., 2024). Students also have limitations in understanding and solving contextual and theoretical problems in mathematics learning. Mistakes and errors still frequently occur when students perform mathematical arithmetic operations. Furthermore, some students' math test results still fell short of the 80-89 mark, based on the benchmark assessment guidelines (PAP). In this study, 413 students were considered to have failed to meet the PAP. Based on the Education Standards, Curriculum, and Assessment Agency

standards, students who achieve a score or percentage of mastery of 86 are considered to have achieved mastery. However, additional enrichment is still needed to ensure a deeper understanding.

Previous research findings have demonstrated the effectiveness of Game-Based Learning in improving mathematics learning outcomes. However, most of these studies utilize conventional or educational games designed for learning. This study differs because it utilizes the popular digital game Geometry Dash, generally known as an entertainment game, but adapted for numeracy learning. Therefore, the novelty of this study lies in the integration of Geometry Dash as a supporting tool in the Game-Based Learning model to improve students' numeracy skills (Amalia & Athiyyah, 2024; Chang & Yeh, 2021; Tapingkae et al., 2020). A problem identified in several previous studies is the lack of student engagement in numeracy learning, which is often abstract and boring. Furthermore, the use of technology in mathematics learning in elementary schools is still limited to practice problems or instructional videos. Therefore, this study attempts to address these challenges by presenting more interactive, challenging, and enjoyable media through a digital game-based approach. This study aims to analyze the Game-Based Learning model supported by the Geometry Dash digital game on the numeracy skills of third-grade elementary school students. This research will provide teachers with innovative and engaging learning strategies to develop students' numeracy skills. Furthermore, the results are expected to be a basis for developing more effective digital-based learning models, particularly in elementary school mathematics.

2. METHOD

This study used a quasi-experimental research design. The quasi-experimental design applied was the Nonequivalent Control Group Design, which involved two groups, namely the experimental group and the control group, where each group was given different treatments. This study was conducted through 3 stages, namely the research preparation stage, the implementation stage, and the final stage of the study. In the preparation stage, the activities carried out included conducting observations and interviews with the Head of the Kompyang Sujana Cluster, the principal, and the third-grade homeroom teacher of each school in the Kompyang Sujana Cluster before the study was conducted. Drawing research samples to determine the experimental group using Geometry Dash learning media and the control group using traditional learning methods. Compiling a learning module using Geometry Dash media based on Game-Based Learning that is in accordance with the objectives of mathematics learning. Consulting the learning module prepared with the homeroom teacher and the supervising lecturer to get input and adjustments before being used in the study. Consulting the research instruments in the form of pre-tests and post-tests with the third-grade homeroom teacher and the supervising lecturer to ensure the validity and reliability of the test. Conducting a pre-test trial of the research instrument to ensure its reliability and validity. Conducting a pre-test on two sample groups: an experimental group using Geometry Dash and a control group using traditional learning methods, to ensure the equivalence of the two groups. The equivalence of these groups will be tested using a t-test.

The second stage is the research implementation stage. At this stage, the activities carried out are experiments by providing treatment to the experimental group, namely using Geometry Dash learning media based on Game-Based Learning in the mathematics learning process. The control group will continue to learn using conventional learning methods or models usually applied in class. The intervention was given in 6 sessions to the experimental and control groups, with a schedule adjusted based on the allocation of learning time relevant to the research material. The third stage is the final stage of the research, which involves carrying out post-test activities for the experimental group and the control group after the end of the experiment. Conducting data analysis from the results obtained during the research, conducting hypothesis testing based on the research results, and compiling conclusions from the research results. The population of this study was all third graders at SD Gugus Kompyang Sujana for the 2024/2025 Academic Year, consisting of 13 classes with a total of 413 students. The research sampling technique used was cluster random sampling. Based on the draw results, it was found that class IIIB of SDN 8 Peguyangan was chosen as the experimental group, taught using the Game-Based Learning model assisted by Geometry Dash.

In contrast, class III of SDN 4 Peguyangan was chosen as the control group, taught using conventional methods. The method and instrument for data collection in this study used a test method. Before using the instrument, a grid was first created. The instrument grid in this study can be seen in Table 1.

Table 1. Research Instrument Grid

Numeration	Numeracy Indicator	Indicator
Numeracy is the ability to think using mathematical concepts, facts, and tools to solve everyday problems in various contexts relevant to individuals as citizens of Indonesia and the world. Numeracy encompasses the	Order numbers or data from smallest to largest or vice versa. (C2)	Students are able to sort simple data, such as the number of fruits or heights, in a specific order.
	Compare two or more numbers using comparison signs or simple words. (C4)	Students can determine which is greater, less, or the same amount.
	Complete a table with simple data according to category. (C3)	Students are able to complete or understand tables based on the given data.

Numeration	Numeracy Indicator	Indicator
skills of applying mathematical concepts and rules in real-world situations.	Calculate results from information provided in a table. (C3)	Students are able to determine results from the information presented in simple tables.

Before the test instrument was distributed, a trial was conducted to ensure that each question met the criteria for good quality and was suitable for use, or whether it needed improvement. Testing the instrument for students' numeracy skills included several tests: validity, reliability, difficulty index, and discrimination. The data analysis techniques used were descriptive and inferential statistical analysis. Descriptive statistics is a statistical method used to analyze data by describing or presenting the data obtained as is, without drawing general conclusions or generalizing. Inferential statistical analysis is a method for testing research hypotheses using specific statistical formulas, and conclusions are drawn based on the results of the hypothesis testing. In inferential statistical analysis, only post-test data is analyzed, and the t-test technique is used to test it. Before conducting the t-test, prerequisite tests such as normality and homogeneity tests are necessary.

3. RESULT AND DISCUSSION

Result

The data description in this study discusses the data obtained during the implementation of the research. The collected data concerns the numeracy skills of third-grade students at SD Gugus Kompyang Sujana, North Denpasar, in the 2024/2025 Academic Year. These data result from the treatment of using the Game-Based Learning learning model assisted by the Geometry Dash digital game media and learning that does not use the Game-Based Learning model. The experimental group in this study was grade IIIB students at SD Negeri 8 Peguyangan with 32 participants. Before the treatment, this group took a pre-test to determine the students' numeracy skills. Based on the calculation results, the highest pre-test score in the experimental group was 75, and the lowest was 40. The average pre-test score of the experimental group was 56.25. The size of the standard deviation is 11.777, with a diversity of values of 138.709. Thi research found that in the experimental class, the number of students who obtained scores between 40–45 was 7 students, who obtained scores between 46–51 were 4 students, who obtained scores between 52–57 were 4 students, who obtained scores between 58–63 were 3 students, who obtained scores between 64–69 were 4 students, and who obtained scores between 70–75 were 7 students. The grouped frequency distribution in the table is depicted in the histogram graph in Figure 1.

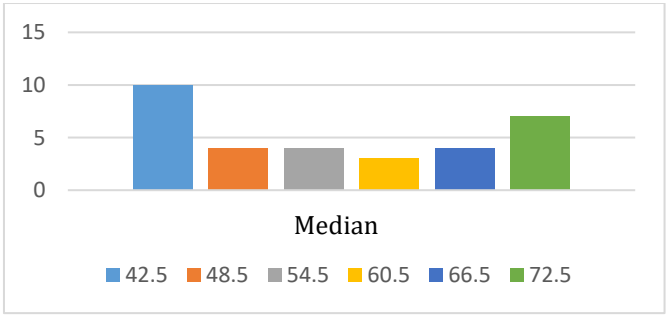

Figure 1. Histogram of Pre-test Data for the Experimental Group

Furthermore, the average (mean) value of students' numeracy ability in the experimental group was categorized by converting it into the Benchmark Reference Guidelines (PAP) scale 5. Based on the average (mean), the numeracy ability of students in the experimental group was 56.25% which is included in the low category. The control group in this study was grade III students at SD Negeri 4 Peguyangan with 36 participants. Before the treatment, this group took a pre-test to determine students' numeracy ability. Based on the calculation results, it can be seen that the highest pre-test value in the control group was 75, and the lowest value was 40. The average pre-test value of the experimental group was 52.22. The size of the standard deviation is 11.165, with a diversity of values of 124.673. Based on the results of the calculation, it is known that in the experimental class, the number of students who obtained a score between 40–45 was 10 students, who obtained a score between 46–51 was 3 students, who obtained a score between 52–57 was 6 students, who obtained a score between 58–63 was 5 students, who obtained a score between 64–69 was 6 students, and who obtained a score between 70–75 was 6 students. The grouped frequency distribution in the table is depicted in the histogram graph in Figure 2.

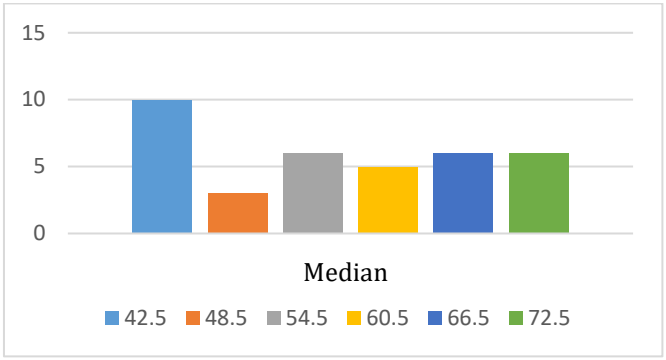

Figure 2. Histogram of Pre-test Data for the Control Group

Furthermore, the average (mean) value of students' numeracy ability in the control group was categorized by converting it into the Benchmark Reference Guidelines (PAP) scale of 5. Based on the average (mean) of the experimental group's students' numeracy ability of 56.25%, it is included in the low category. The experimental group in this study was grade III B students at SD Negeri 8 Peguyangan with 32 participants. After the treatment was given, students took a post-test to measure the development of their numeracy ability. Based on the calculation results, it was known that the highest post-test value in the experimental group was 95, and the lowest value was 65. The average post-test value of the experimental group was 80.42. The size of the standard deviation was 8.647, with a diversity of values of 74.773. Based on data analysis, it is known that in the experimental group, 7 students obtained scores between 65–70, 5 students with scores between 71–76, 6 students with scores between 77–82, 7 students with scores between 83–88, 4 students with scores between 89–94, and 3 students with scores between 95–100. The grouped frequency distribution arranged in the table is then visualized as a histogram graph in Figure 3.

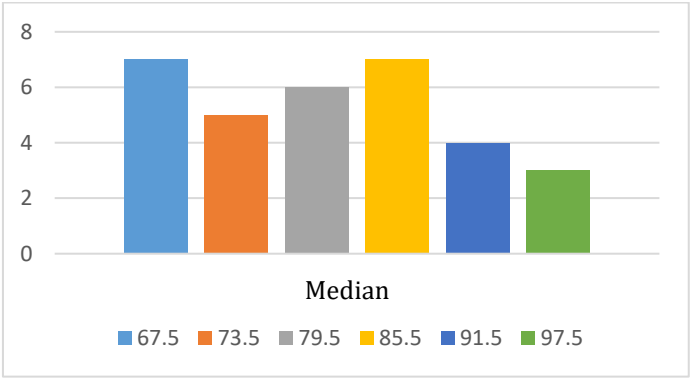

Figure 3. Histogram of Post-test Data for the Experimental Group

Next, the average (mean) value of students' numeracy ability in the experimental group was categorized by converting it into a 5-point scale of Benchmark Reference Guidelines (PAP) as follows. Based on the average (mean) of students' numeracy ability in the experimental group of 80.47%, which is included in the high category. The control group in this study comprised third-grade students at SD Negeri 4 Peguyangan, with 36 participants. After the treatment, the control group was given treatment in the form of learning using a learning model provided by the teacher, other than the Game-Based Learning model, for six meetings. After all treatments were given, students took a post-test to measure the development of their numeracy abilities. Based on the calculation results, it can be seen that the highest pre-test score in the control group was 85, and the lowest score was 55. The average pre-test score of the control group was 70. The size of the standard deviation is 7.221, with a diversity of values of 52.142. Based on the calculation results, it is known that in the experimental group, 8 students obtained scores between 55–60, 7 students with scores between 61–66, 5 students with scores between 67–72, 8 students with scores between 73–78, 6 students with scores between 79–84, and 2 students with scores between 85–90. The group frequency distribution arranged in the table is then visualized as a histogram graph in Figure 4.

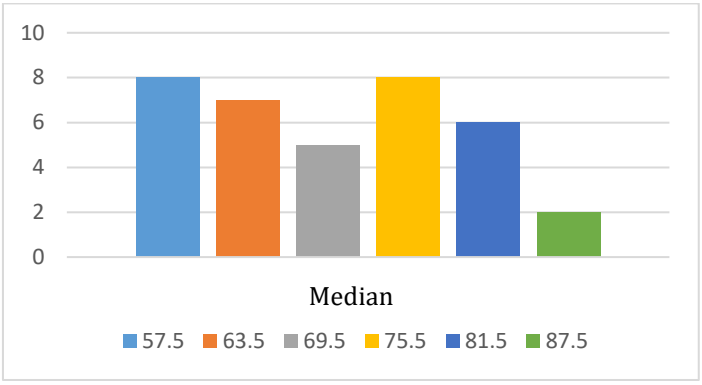

Figure 4. Histogram of Post-test Data of Control Group Students

Next, the average (mean) value of numeracy ability of students in the control group was categorized by converting it into a 5-point scale of Benchmark Reference Guidelines (PAP) as follows. Based on the average (mean) of the numeracy ability of students in the control group of 70%, which is included in the moderate category. Before hypothesis testing was conducted, assumption testing was first carried out in accordance with the inferential statistics used. In this study, hypothesis testing was carried out using the Polled Variance t-test or a comparative analysis of the means of two unpaired groups, with the condition that the assumptions of normality of data distribution and homogeneity of variance between the two groups were met. The following presents the results of the normality test of data distribution and the homogeneity of variance test on the numeracy ability of grade III students in the sample group. The normality test on the distribution of data on the numeracy ability of students in the experimental group was carried out using the Shapiro-Wilk test. Based on the calculation results in the data normality test work table listed in Appendix 40, the T3 value was 1.741, while the Shapiro-Wilk table value for a sample of 36 students was 0.935. Because the T3 value is greater than the table value ($1.741 > 0.935$), it can be concluded that the numeracy ability data of the control group students are normally distributed. The data homogeneity test in this study used the F test (Fisher). Based on the results of the variance homogeneity test calculation on the post-test data, the F_{count} value was 1.434. At the same time, the F_{table} value at a significance level of 5% with degrees of freedom of the numerator ($db_1 = 31$) and degrees of freedom of the denominator ($db_2 = 35$) was 1.779. Because the F_{count} is smaller than the F_{table} ($1.434 < 1.779$), it can be concluded that the variance of the numeracy ability data of the experimental and control groups is homogeneous. Based on the analysis prerequisite test results, it is known that the data from the sample group has been normally distributed and has homogeneous variance. Thus, the data met the requirements for hypothesis testing using the pooled variance t-test. The recapitulation of the post-test t-test of students' numeracy abilities in the experimental and control groups is presented in Table 2.

Table 2. Summary of t-test

Research Group	Number of Students	Mean	S^2	Degrees of Freedom (dk)	t_{count}	t_{table}
Experiment Group (SDN 8 Peguyangan)	32 students	80.47	74.77319	66	5.402	1.996
Experiment Control (SDN 4 Peguyangan	36 students	70	52.14286			

The results of the hypothesis test show a t_{count} value of 5.402348265. At a significance level of 5% with degrees of freedom (dk) = 66, a t_{table} of 1.996 is obtained. Because the t_{count} is greater than the t_{table} ($5.402 > 1.996$), H_0 is rejected and H_a is accepted. This shows that there is a significant difference in numeracy skills between the group of students who are taught using the Game-Based Learning model assisted by the Geometry Dash digital game media and the group of students who do not use the model in class III students of the Kompyang Sujana Group in the 2024/2025 Academic Year.

Discussion

The results of the study indicate that the application of the game-based learning model assisted by the Geometry Dash digital game media positively influences the numeracy skills of third-grade elementary school students. This is evident from comparing pretest and posttest scores between the experimental and control classes. Students who participated in learning with this approach experienced significant improvements in understanding number patterns, estimation, mathematical logic, and problem-solving skills related to everyday life contexts. Learning with Geometry Dash has been proven to attract students' attention, increase learning motivation, and create a more interactive and enjoyable learning atmosphere. This game indirectly requires students to identify patterns, measure jump times and distances, and think quickly and accurately in making decisions (Siregar & Sitepu, 2023). These activities align with important elements of numeracy skills, which are usually difficult to teach abstractly in conventional classes.

Furthermore, accompanying worksheets and post-game reflection sessions allow students to reflect on their thinking strategies and explicitly link them to numeracy concepts (Mulyati et al., 2024; Sudianto et al., 2023).

This significant difference arises because the GBL model can create a learning environment far more interactive, challenging, and enjoyable than conventional learning methods. In learning using Geometry Dash, students are not only cognitively engaged, but also affectively and psychomotorically. This game demands attention, focus, logical thinking, managing time, and strategizing to complete challenges. This process creates a rich learning experience, where students learn through real-life action, exploration, and reflection on their actions in the game. Unlike traditional methods that tend to position students as passive recipients of information, the GBL model encourages students to become active participants in the learning process (Amalia & Athiyyah, 2024; Erşen & Ergül, 2022). The teacher acts as a guiding facilitator, not as the sole source of information, giving students space to explore, discuss, and construct their own knowledge based on their experiences during play. Through this approach, students memorize numeracy concepts and internalize and apply them in the context of the game.

These findings align with the constructivist learning theory developed by Jerome Bruner and Lev S. Vygotsky. According to Bruner, the learning process becomes more meaningful when students actively discover and construct their own understanding. Vygotsky added that with support (scaffolding) from teachers or peers, students can learn optimally within the zone of proximal development (ZPD), which is the area of ability that can be achieved with the help of others (Cho & Kim, 2020; Erna Muliastrini et al., 2019; Hayanah et al., 2019). In the context of GBL, games like Geometry Dash challenge students slightly above their ability level, allowing them to develop a deeper understanding with teacher guidance. Constructivism positions students as active subjects in constructing understanding, while the teacher is a facilitator who provides a learning environment that encourages social interaction, exploration, and reflection. Thus, Game-Based Learning is consistent with constructivist theory and implements these principles in real-world classroom practice.

This research's significant contribution lies in the innovative use of popular, non-educational digital games contextualized within numeracy learning activities. This approach offers a new alternative to digital learning media beyond formal educational applications. Furthermore, the structured implementation of the game-based learning model demonstrates that play activities can also have high pedagogical value when properly guided. This finding corroborates previous research findings. Digital-based games with strong visual and interactive elements significantly improve students' mathematics learning outcomes (Asani, 2023; Bangun et al., 2023; Handoko et al., 2021). Although not designed for education, games like Geometry Dash possess these elements and can improve students' concentration, thinking strategies, and resilience in solving challenges. Furthermore, a systematic review confirmed that GBL significantly contributes to developing students' cognitive and affective abilities in mathematics learning (Amalia & Athiyyah, 2024). Students' motivation and enjoyment while playing games positively impact their learning readiness and outcomes. The strength of this research is its successful integration of students' interests and worlds, namely digital games, into meaningful learning activities, and the design of contextual, enjoyable learning that accommodates the learning styles of lower-grade students. Furthermore, this game-based learning also supports the development of soft skills such as focus, persistence, and collaboration during discussions.

The implications of these findings point to the need for teachers to begin exploring innovative, technology-based, and student-interest-driven learning models. Teachers must be provided with training and space to design game-based learning and integrate digital media wisely and purposefully into the curriculum. This aligns with the demands of 21st-century learning, which emphasizes critical thinking skills, collaboration, and the use of technology. However, this study has several limitations. It was conducted over a limited period and at one grade level, so it does not yet describe its long-term impact or effectiveness at different levels. Therefore, further research that involves longer durations, the development of specific games integrated with the curriculum, and broader impact measurements encompassing students' affective, social, and metacognitive aspects is recommended. Nevertheless, this study still contributes to elementary education by developing innovative and adaptive numeracy learning models to meet changing times.

4. CONCLUSION

The game-based learning model, supported by the digital game Geometry Dash, positively impacts the numeracy skills of third-grade elementary school students. This approach has been proven to increase student engagement, motivate them to learn, and help them understand numeracy concepts through a fun and contextual learning experience. Using Geometry Dash as a learning medium provides students a new and engaging experience while indirectly training their logical thinking, pattern recognition, estimation, and problem-solving skills. This game can be transformed into an effective educational tool with proper guidance.

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