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Gamifying Education: Evaluating the Role of 'Corner' Video Game in Improving Conceptual Understanding and Learning Interest

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ABSTRAK

Kebutuhan akan pendekatan inovatif dalam pembelajaran matematika semakin mendesak untuk mengatasi tantangan pemahaman konsep dan menumbuhkan minat belajar yang berkelanjutan di kalangan siswa. Penelitian ini bertujuan mengevaluasi efektivitas penggunaan video game edukasi "Corner" dalam meningkatkan pemahaman konsep matematis serta memperkuat minat belajar matematika siswa. Penelitian ini menggunakan metode kuasi eksperimen dengan desain Non-equivalent *(*Pre-test and Post-test) Control Group Design*. Instrumen penelitian mencakup tes pemahaman konsep matematis dan kuesioner minat belajar matematika. Analisis data dilakukan dengan uji statistik independent* sample t-test *dan* paired sample t-test *untuk membandingkan hasil antara kelompok eksperimen dan kelompok kontrol. Hasil penelitian menunjukkan bahwa penggunaan game edukasi "Corner" secara signifikan meningkatkan pemahaman konsep matematis siswa. Selain itu, terdapat peningkatan minat belajar matematika yang ditunjukkan melalui perbedaan signifikan antara hasil* pre-test *dan* post-test *pada kelompok eksperimen dibandingkan dengan kelompok kontrol. Temuan ini menunjukkan bahwa media pembelajaran berbasis game edukasi tidak hanya efektif dalam membantu siswa memahami konsep-konsep matematis, tetapi juga mampu memotivasi mereka untuk lebih aktif dan antusias dalam mempelajari matematika. Dengan demikian, penggunaan media pembelajaran berbasis game seperti "Corner" dapat diadopsi oleh pendidik sebagai strategi yang efektif dalam meningkatkan kualitas pembelajaran matematika di sekolah.*

ABSTRAK

The need for innovative approaches in mathematics learning has become increasingly urgent to address the challenges of conceptual understanding and foster sustainable learning interest among students. This study aims to evaluate the effectiveness of the educational video game "Corner" in enhancing students' mathematical conceptual understanding and strengthening their interest in learning mathematics. The research employed a quasi-experimental method with a Non-equivalent (Pre-test and Post-test) Control Group Design. The instruments used included a mathematical conceptual understanding test and a mathematics learning interest questionnaire. Data were analyzed using independent sample t-tests and paired sample t-tests to compare the results between the experimental and control groups. The findings revealed that the use of the educational game "Corner" significantly improved students' mathematical conceptual understanding. Additionally, there was an increase in students' interest in learning mathematics, as indicated by significant differences between the pre-test and post-test results in the experimental group compared to the control group. These findings suggest that game-based educational media is not only effective in helping students grasp mathematical concepts but also motivates them to become more active and enthusiastic in learning mathematics. Therefore, the use of game-based learning media such as "Corner" can be adopted by educators as an effective strategy to improve the quality of mathematics education in schools.

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1. INTRODUCTION

The resurgence of interest in instructional games for mathematics education stems from several factors. Firstly, the continuous advancement of technology has provided educators with increasingly sophisticated tools for creating engaging and interactive learning experiences. These technological advancements have facilitated the development of educational games that can effectively convey complex mathematical concepts in an enjoyable manner (Asfar et al., 2021; Mustakim et al., 2023). Secondly, the widespread popularity of entertaining computer games among learners has highlighted the potential of harnessing this engagement for educational purposes. By integrating elements of gameplay into mathematical instruction, educators can leverage the intrinsic motivation that games offer to enhance students' interest and participation in learning mathematics. Additionally, recent reports have underscored the effectiveness of game-based learning approaches in improving students' mathematical proficiency and problem-solving skills (Anjasari et al., 2020; Asfar et al., 2021; Mustakim et al., 2023; Smiderle et al., 2020). These findings have further fueled the adoption of instructional games in mathematics education, as educators seek innovative strategies to meet the diverse learning needs of their students. Given these benefits, an increasing number of educators are incorporating instructional games into formal school environments for mathematics learning. Numerous studies have revealed improvements in learning outcomes, learning interest, and other aspects within the field of mathematics education (Deng et al., 2020; Ong et al., 2020; Pratama & Setyaningrum, 2018; Sumarwati et al., 2020; Yemi et al., 2018). The issue lies in the scarcity of empirical research on the effectiveness of games in mathematics education, particularly in enhancing conceptual understanding skills, within formal school settings. However, conceptual understanding is a crucial component of the knowledge required to address non-routine problems (Arisoy & Aybek, 2021; Peters, 2013; Yuniarti & Radia, 2020).

The review of 16 research articles on the impact of instructional games on mathematics learning revealed significant findings. Empirical studies showed that instructional games enhanced students' achievements in 9 out of the 16 studies (Akman & Çakır, 2020; Cohrssen & Niklas, 2019; Curto Prieto et al., 2019; Deng et al., 2020; Fokides, 2017; Pritami & Muhimmah, 2018; Tokac et al., 2019; Yeh et al., 2019). Additionally, instructional games were found to increase interest in learning in 2 out of the 16 studies (Dohn, 2019; Mavridis et al., 2017) and motivation in 5 out of the 16 studies (Faddar & Kjeldsen, 2022; Jacobi et al., 2016; Mangowal et al., 2017). The literature review presented utilized 16 previous empirical studies to shape this research. Most of the studies employed mathematical games as the treatment, with learning outcomes and motivation as dependent variables. Consequently, the use of instructional mathematical games to enhance conceptual understanding and interest in learning mathematics remains rare. However, students with a strong conceptual understanding can apply concepts by manipulating procedural skills to solve mathematical problems (Fitriyah & Bisri, 2023; Maskur et al., 2019). Students with conceptual understanding are better equipped to discern facts and understandings beyond what is taught. Recent empirical findings also indicate that conceptual understanding and interest are important variables in determining the success of the mathematics teaching and learning process (Birgin & Uzun Yazıcı, 2021; Hewagallage et al., 2022; Ozkan & Umdu Topsakal, 2020). Therefore, this research will investigate the effectiveness of the "Corner" mathematical game, which has been previously developed, on students' mathematical conceptual understanding and interest in learning mathematics (Handican & Setyaningrum, 2021).

Examining the effectiveness of video games in mathematics education is crucial due to their potential to enhance students' understanding of mathematical concepts and their interest in learning. Firstly, video games can present mathematical concepts visually and interactively, allowing students to grasp concepts more deeply. Video provide rich and relevant contexts for students to apply mathematical concepts in engaging and meaningful situations (Diah Purnami Dewi & Wayan Suniasih, 2022; Nurdin et al., 2019). Moreover, video can also help students overcome mathematical difficulties in a fun and non-threatening manner (Puspita & Raida, 2021; Rachmavita, 2020). Furthermore, video games can stimulate students' interest in learning mathematics. Using video games in mathematics education can enhance students' intrinsic motivation by providing challenges appropriate to their skill levels and immediate feedback. With high interest, students are more likely to be active and diligent in learning mathematics, which in turn can enhance their understanding of challenging mathematical concepts.

In addition to conceptual understanding and interest in learning, the use of video games in education can also increase students' engagement in the learning process (Eskasasnanda, 2017; Rose et al., 2016). Video games can trigger high levels of engagement by providing enjoyable and engaging learning experiences (Clark & Mayer, 2016; Gashaj et al., 2021). With high engagement, students are more likely to actively participate in exploring and solving complex mathematical problems. In the context of mathematics education, it is important to achieve both of these goals: enhancing students' understanding of mathematical concepts and their interest in learning. Thus, examining the effectiveness of video games in

mathematics education is imperative in efforts to improve the quality of mathematics education in schools. Research on educational gamification with a focus on the "Corner" video game presents several unique aspects and fills an important gap in the existing literature. First, while gamification in education has been studied extensively, the specific evaluation of a game like "Corner" for increasing conceptual understanding and interest in learning mathematics is relatively new.

Most research on gamification in education has explored generic gamification elements or other types of educational games, so focusing on specific games such as "Corner" is an important contribution to the field. In addition, the urgency of this research stems from the growing recognition of the need for innovative teaching methods to engage students and improve their learning outcomes, especially in STEM subjects such as math. Traditional teaching methods often struggle to attract and maintain student interest, leading to disengagement and poor conceptual understanding. By exploring the potential of video games like "Corner" to address these challenges, the research conducted addresses a pressing need in contemporary education. Moreover, with the increasing prevalence of digital technologies in educational settings, understanding the effectiveness of specific educational games is of paramount importance to educators and policy makers. This study aims to evaluate the effectiveness of the educational video game "Corner" in enhancing students' mathematical conceptual understanding and strengthening their interest in learning mathematics.

2. METHOD

This study employs a quantitative approach with a quasi-experimental research design using a Non-equivalent-(Pre-test and Post-Test)-Control-Group-Design. A quasi-experimental design is chosen because there are numerous factors that can influence the study, but not all of these factors can be controlled by the researcher. The study involves two classes, which will be designated as the control group and the experimental group. Both classes will be administered pre-tests and post-tests. The pre-test is conducted to allow the researcher to assess the initial conditions of the variables under investigation in both classes. The post-test is administered to observe the conditions of the variables under investigation after the treatment is applied. The chosen experimental design is a Pretest and Posttest Design. The study will be carried out following the predetermined experimental design and procedures as outlined (Creswell, 2012). The research process begins with administering a pre-test to both classes in the form of a test on conceptual understanding ability and a questionnaire on students' interest in learning mathematics. The experimental class receives treatment in the form of learning using the educational game "Corner," while the control class receives treatment through conventional learning methods. After receiving different treatments, both classes are given a post-test using instruments to measure mathematical conceptual understanding ability and students' interest in learning mathematics. Subsequently, the results of both classes' work are analyzed to address the research problem formulation. The instruments used in this study are in the form of concept understanding ability test questions and questionnaires of interest in learning mathematics before and after using the game "corner". the research instrument lattice in the following Table 1.

Tabel 1. Research Instruments Grid

Concept Understanding Ability		**Interest in Learning Mathematics**	
Indicator	**Item No.**	**Indicator**	**Item No.**
The ability to classify objects based on whether or not the requirements that make up the concept are met.	1,2,3,16	Enjoyment	1,6,12,10
Use certain algorithmic procedures or operations in solving problems using the concepts learned.	4,5,6,7,17	Interest Satisfaction	2,15,7,8 14,16,3
Ability to apply concepts in problem solving Ability to choose examples and counter examples of concepts that have been learned	8,9,18,19	Motivation	4,11,17,19
Ability to link various concepts (internal and external to mathematics)	10,11,12	Desire	9,13
Ability to present concepts in various forms of mathematical representations	13,14,15	Curiosity	18,5

3. RESULT AND DISCUSSION

Results

The mathematical instructional game to be used in this research is the "Corner" Game (Handican & Setyaningrum, 2021). This game is an Android-based game designed for learning Line and Angle topics. The learning model incorporated into the game is Scientific Learning, which involves five syntaxes: observing, questioning, associating, reasoning, and communicating. The "Corner" Game has been assessed by experts and users and deemed valid and practical. The design of the "Corner" Game can be seen in the illustration provided in Figure 1.

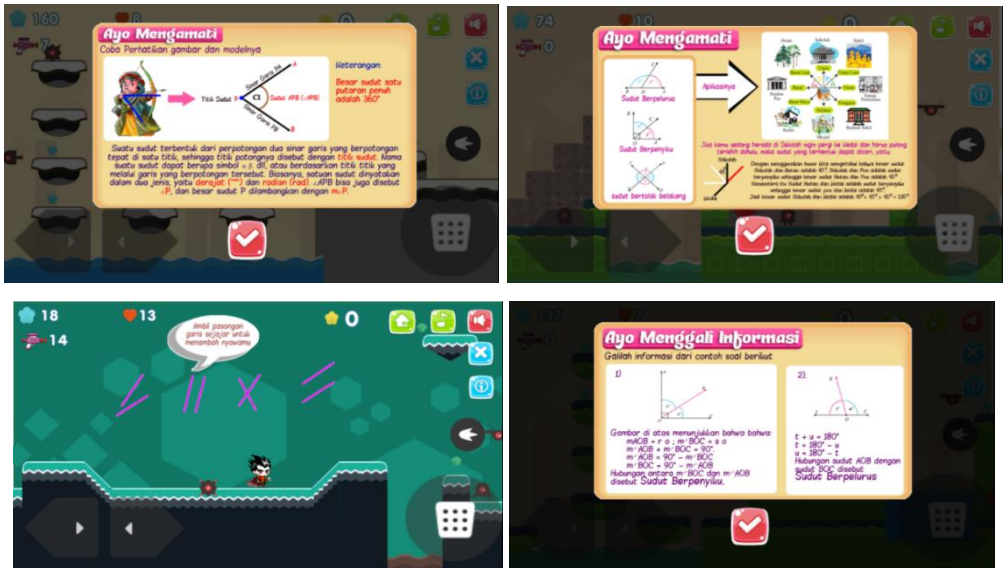

Figure 1. Scientific Learning Process in the "Corner" Game

Positive results from the product moment validity test enable educators, researchers, or educational institutions to have more confidence in using this test instrument to measure students' mathematical conceptual understanding abilities. This also enhances trust in the assessment results and facilitates a deeper and more scientific interpretation of the test outcomes. The product moment validity test results for mathematical conceptual understanding ability questions can be seen in the following Table 2.

Table 2. Results of Validity Test for Mathematical Concept Understanding Ability Test Items

Item	Total Score	Decision	Item	Total Score	Decision
Item_1	0.568	Valid	Item_11	0.601	Valid
Item_2	0.800	Valid	Item_12	-0.601	Valid
Item_3	-0.021	Not Valid	Item_13	-0.184	Not Valid
Item_4	0.540	Valid	Item_14	0.814	Valid
Item_5	0.541	Valid	Item_15	0.628	Valid
Item_6	0.847	Valid	Item_16	0.522	Valid
Item_7	0.601	Valid	Item_17	-0.601	Valid
Item_8	0.761	Valid	Item_18	0.344	Not Valid
Item_9	-0.180	Not Valid	Item_19	-0.094	Valid
Item_10	0.564	Valid			

These results indicate that out of all the developed items, the majority (15 items) can be relied upon as good measurement tools for assessing students' mathematical conceptual understanding abilities, thus providing a dependable means to evaluate students' comprehension levels in this field. However, it's important to note that there are some items (4 items) that need improvement or revision to enhance their validity in measuring the intended concepts or to remove these four items. Further evaluation of invalid items can be conducted to determine which items are suitable for testing the effectiveness of educational games in enhancing students' mathematical conceptual understanding abilities. The results of the reliability analysis of the concept understanding test instrument explained that there were 19 items with a Cronbach's

Alpha value of 0.805. Because the Cronbach's Alpha value of 0.805 is greater than 0.60, it can be concluded that the 19 items are reliable or consistent. Difficulty Level of Mathematical Concept Understanding Ability Test Items showed in Table 3.

Table 3. Difficulty Level of Mathematical Concept Understanding Ability Test Items

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
N	Valid	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29	29
Mean		0.52	0.62	0.62	0.55	0.55	0.76	0.48	0.34	0.76	0.34	0.48	0.52	0.59	0.52	0.79	0.24	0.52	0.45	0.69

Based on the Table 3 above, it can be observed that all items (19 items) have varying difficulty levels. From this, it can be concluded that items 1, 2, 3, 4, 5, 7, 8, 10, 11, 12, 13, 14, 16, 17, 18, and 19 have moderate difficulty levels, while items 6, 9, and 15 have easy difficulty levels. Therefore, these results also serve as considerations for researchers to use the three items in their study. The results of the Differential Item Functioning (DIF) test for mathematical conceptual understanding ability questions in Table 4. Based on the Table 4 above, it is found that out of 19 items, 4 items have poor discriminatory power, leading to their rejection and exclusion from this study. These items are item 3, item 9, item 13, and item 18. Results of Validity Test for Interest in Learning Questionnaire in Table 5.

Table 4. Results of Discriminant Power Test for Test Items

Item	Total Score	Decision	Item	Total Score	Decision
Item_1	0.568	Good	Item_11	0.601	Good
Item_2	0.800	Good	Item_12	0.601	Good
Item_3	-0.021	Rejected	Item_13	-0.184	Rejected
Item_4	0.540	Good	Item_14	0.814	Good
Item_5	0.541	Good	Item_15	0.628	Good
Item_6	0.847	Good	Item_16	0.522	Good
Item_7	0.601	Good	Item_17	0.601	Good
Item_8	0.761	Good	Item_18	0.344	Fixed
Item_9	-0.180	Rejected	Item_19	0.942	Good
Item_10	0.564	Good			

Table 5. Results of Validity Test for Interest in Learning Questionnaire

No_item	Sign.	Decision	No_item	Signifikansi	Decisson
item_1	0.004	Valid	item_11	0.001	Valid
item_2	0.014	Valid	item_12	0.034	Valid
item_3	0.045	Valid	item_13	0.037	Valid
item_4	0.040	Valid	item_14	0.045	Valid
item_5	0.038	Valid	item_15	0.000	Valid
item_6	0.019	Valid	item_16	0.000	Valid
item_7	0.004	Valid	item_17	0.011	Valid
item_8	0.032	Valid	item_18	0.002	Valid
item_9	0.047	Valid	item_19	0.041	Valid
item_10	0.000	Valid	item_20	0.002	Valid

Based on the Table 5 above, it is evident that all items (20 items) meet the validity aspect in terms of the product moment validity test. This is indicated by all significance values (2-tailed) being < 0.05 at the confidence level. This means that all items can be used to assess students' mathematical learning interest levels. The analysis of the reliability of the learning interest instrument also indicates the presence of 20 items with a Cronbach's Alpha value of 0.865. Considering that the Cronbach's Alpha value exceeds 0.60, which is regarded as the minimum threshold for reliability, it can be concluded that all 20 test items can be considered reliable or consistent. Thus, the high reliability of this test provides a strong basis for its use in making evaluative decisions or further research. In this context, it is important to remember that test reliability is a critical aspect in evaluating the quality of tests and interpreting their results . With a Cronbach's Alpha value of 0.865, this test can be considered a reliable measure for assessing the desired constructs. Results of normality test for mathematical concept understanding ability test data showed in Table 6.

Table 6. Results of Normality Test for Mathematical Concept Understanding Ability Test Data

Group		Kolmogorov-Smirnova			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Concept Understanding Ability	Pre-test Experiment	0.060	76	0.200	0.983	76	0.393
	Post-test Experiment	0.074	76	0.200	0.983	76	0.424
	Pre-test Control	0.084	66	0.200	0.975	66	0.193
	Post-test Control	0.142	66	0.022	0.919	66	0.024

Based on the obtained significance values from the Kolmogorov-Smirnov test for the pretest and posttest scores of the experimental class, which are 0.20 (>0.05), and for the pretest and posttest scores of the control class, which are 0.193 (>0.05) and 0.024 (>0.05) respectively, it can be concluded that the data from both the experimental and control classes tend to follow a normal distribution as all values are greater than 0.05 at the confidence level. Therefore, the assumption of normal distribution in the data can be accepted. Results of normality test for student interest in learning questionnaire data showed in Table 7.

Table 7. Results of Normality Test for Student Interest in Learning Questionnaire Data

Group		Kolmogorov-Smirnov			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Learning Mathematics Interest	Pre-test Experiment	0.144	76	0.251	0.951	76	0.251
	Post-test Experiment	0.124	76	0.646	0.944	76	0.646
	Post-test Control	0.168	66	0.231	0.929	66	0.231

Based on the research findings presented in the provided data, it is noted that the significance values from the Kolmogorov-Smirnov test for the pretest and posttest scores of the experimental class regarding the mathematics learning interest questionnaire are 0.251 and 0.646 respectively. These significance values suggest that the data from both groups, the pretest and posttest, tend to follow a normal distribution. This indicates that the assumption of normality in the data is met for both data groups. Results of homogenity test for student interest in learning questionnaire data showed in Table 8.

Table 8. Results of Homogenity Test for Student Interest in Learning Questionnaire Data

Variance Homogeneity Test		Levene Statistic	df1	df2	Sig.
Concept Understanding Ability	Based on Mean	0.099	3	280	0.961
Learning Mathematics Interest	Based on Mean	0.596	1	280	0.441

Based on the provided output, it is observed that the significance value (Sig.) for Levene's Test for Equality of Variances is 0.816 > 0.05, indicating that the data variances between the experimental and control groups are homogeneous or equal. Independent sample t test result showed in Table 9.

Tabel 9. Independent Samples T Test Result

Levene's Test for Equality of Variances		F	Sig.	t	df	Sig. (2-tailed)	Mean Diff.	Std. Error Diff.	95% Lower	95% Upper
Concept Understanding Ability	Eva	0.055	0.816	2.891	140	0.004	2.713	0.938	0.858	4.568
	Evana			2.887	136.483	0.005	2.713	0.940	0.855	4.571
Learning Mathematics Interest	Eva	10.881	0.061	12.737	140	0.000	8.849	0.695	7.475	10.222
	Evana			13.095	131.230	0.000	8.849	0.676	7.512	10.186

Therefore, the Independent Samples t-test output relies on the values in the "Equal Variances Assumed" column. Additionally, the significance value (Sig.) for the "Independent Samples Test" under the Equal Variances Assumed section is 0.004 < 0.05. Thus, in the decision-making process for the independent sample t-test, it can be concluded that H_0 (null hypothesis) is rejected, and H_a (alternative hypothesis) is accepted. Similarly, for the data on learning interest, based on the output provided, the significance value (Sig.) for Levene's Test for Equality of Variances is 0.061 > 0.05, indicating that the data variances between the experimental and control groups are homogeneous or equal. Additionally, the significance value (Sig.) for the "Independent Samples Test" under the Equal Variances Assumed section is 0.000 < 0.05. Therefore, in the decision-making process for the independent sample t-test, it can be concluded that H_0 (null

hypothesis) is rejected, and H_a (alternative hypothesis) is accepted. Paired sample t-test for students' understanding of mathematical concepts showed in Table 10.

Table 10. Paired Sample T-Test for Students' Understanding of Mathematical Concepts

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Conf Lower	95% Conf Upper			
Pre-Test Experiment - Post-test Experiment	-6.697	3.805	0.437	-7.567	-5.828	-15.34	75	0.000
Pretest Experiment - Post Test Experiment	-6.342	4.746	0.544	-7.427	-5.258	-11.65	75	0.000

Based on the provided output from the "Paired Samples Test" table, the significance value (Sig.) is 0.000 < 0.05, indicating that H_0 (null hypothesis) is rejected and H_1 (alternative hypothesis) is accepted. Thus, it can be concluded that students' mathematical conceptual understanding abilities after the implementation of educational game-based learning "Corner" are better than students' mathematical conceptual understanding abilities before the implementation of educational game-based learning. This signifies the influence of implementing educational games in enhancing students' mathematical conceptual understanding abilities. Furthermore, the "Paired Samples Test" table also includes information about the "Mean Paired Differences," which is -6.697. This value represents the difference between the mean scores of the Pre-Test and Post-Test results. The difference range falls between -7.567 to -5.828 (95% Confidence Interval of the Difference Lower and Upper).

Based on the provided output from the "Paired Samples Test" table for the interest data, the significance value (Sig.) is 0.000 < 0.05, indicating that H_0 (null hypothesis) is rejected, and H_1 (alternative hypothesis) is accepted. Consequently, it can be concluded that students' interest in learning mathematics after the implementation of educational game-based learning is better than students' interest in learning mathematics before the implementation of educational game-based learning. This implies the influence of implementing educational games in enhancing students' interest in learning mathematics. Moreover, the "Paired Samples Test" table also provides information about the "Mean Paired Differences," which is -6.342. This value represents the difference between the mean scores of the Pre-Test and Post-Test results. The difference range falls between -7.427 to -5.258 (95% Confidence Interval of the Difference Lower and Upper).

Discussion

Based on the two tests conducted, the results of this research indicate that after implementing educational game-based learning, students' mathematical conceptual understanding abilities experienced a significant improvement. There is also a significant difference in the mathematical conceptual understanding abilities between the class using the "Corner" educational game and the control class (Conventional). This means that statistically, the "Corner" educational game has proven to be significantly effective in enhancing students' mathematical conceptual understanding abilities. The implementation of educational games in mathematics learning has been shown to improve student abilities (Martin, 2018; Zaina et al., 2019). This is because educational games provide interactive and engaging learning experiences for students, leading to their increased active involvement in the learning process. Additionally, according to the researchers' assumption, educational games provide interesting mathematical challenges and can encourage students to think critically, seek solutions, and apply mathematical concepts in various situations. This notion is supported by the views of (Adipat et al., 2021; Demuyakor, 2021).

The findings of this research also support the views of several previous studies indicating that the use of educational games can enhance learning effectiveness and have a positive impact on students' mathematical conceptual understanding abilities (Cheung & Ng, 2021; Soboleva et al., 2021). Educational games provide a fun learning environment, present challenges, and offer instant feedback, which overall can enhance students' interest and motivation in learning mathematics (Cheung & Ng, 2021; Soboleva et al., 2021; Srinivasan et al., 2017). Therefore, the results of this research provide strong empirical support that the implementation of educational games in mathematical learning has a positive impact on enhancing students' mathematical conceptual understanding abilities. The use of educational games in learning is expected to continue to be implemented and improved as part of innovative and effective learning strategies to enhance students' achievement and interest in mathematics subjects (Fathimah & Ishartiwi, 2018; Laurens et al., 2018).

Research and literature also support the view that educational games have the potential to enhance students' mathematical conceptual understanding abilities. Educational games offer interactive, enjoyable, and engaging learning experiences for students, which can motivate them to become more actively involved in learning mathematics (Barbara & Bayu, 2022; Kayan & Aydın, 2020). Through educational games, students can be presented with interesting mathematical challenges, problem-solving tasks, and real-life scenarios that require the application of mathematical concepts. This can help students better understand mathematical concepts as they are actively engaged in applied and hands-on learning. Therefore, educational games are considered effective in enhancing students' understanding of mathematical concepts because they actively involve students in the learning process, provide interesting and applicable challenges, and create a fun and motivating learning environment.

The results of this study indicate that after implementing learning using educational games, students' interest in learning mathematics experienced a significant increase. Furthermore, when compared to the control class that did not implement the "Corner" educational game, the scores of students' interest in learning mathematics were higher and significant. These findings are also consistent with several other research that research suggests that educational games can enhance students' interest in learning (Chizary & Farhangi, 2017; Rahayu et al., 2021; Salsabila, 2020). According to the researchers' assumption, the implementation of educational games in mathematical learning provides interactive and engaging learning experiences for students, which can influence their interest and motivation in mathematics subjects. Educational games offer a fun learning environment, present challenges, and provide instant feedback, which overall can enhance students' interest and motivation in learning mathematics.

Educational games offer a fun and interactive learning environment for students, encouraging them to actively participate in mathematics learning. Educational games are designed to provide challenges and enjoyment in solving mathematical problems, which can increase students' interest and enthusiasm for mathematics lessons (Qohar et al., 2021; Valverde-Berrocoso et al., 2022). By engaging in mathematics learning through educational games, students are also more likely to continue learning and increase their interest in this subject (Russo et al., 2020). In conclusion, educational games play a crucial role in enhancing students' interest in learning mathematics through interactive, enjoyable, and challenging learning approaches. The hypothesis testing results indicating the significant positive impact of the "Corner" educational game on students' understanding of mathematical concepts and their interest in learning mathematics align with previous research highlighting the benefits of educational games in enhancing learning outcomes. Educational games, through their interactive and engaging nature, facilitate active participation and exploration of mathematical concepts, leading to deeper understanding and retention.

The implications of these findings extend beyond mere educational innovation; they underscore the transformative potential of educational games in redefining the learning paradigm. By integrating educational games like "Corner" into the mathematics curriculum, educators can create dynamic learning environments that cater to diverse learning styles and preferences. In conclusion, the findings regarding the positive impact of the "Corner" educational game on students' mathematical understanding and interest underscore the significance of incorporating educational games into mathematics education. Drawing on empirical evidence from various studies, it is evident that educational games offer a multifaceted solution to the challenges of mathematics learning by promoting active engagement, fostering conceptual understanding, and sustaining interest in learning. Therefore, educational games like "Corner" should be recognized as integral components of a more effective and engaging mathematics education paradigm.

One limitation is the potential for sample bias, as the study may primarily involve students who are already predisposed to gaming or have a particular affinity for technology. This bias could affect the generalizability of the findings to a broader student population, particularly those who may not have access to or interest in video games. To address this limitation and further enhance the validity and applicability of the research findings, future studies could adopt a more diverse sampling approach. This approach could involve recruiting participants from a wider range of demographic backgrounds, educational settings, and levels of technological proficiency. Additionally, incorporating mixed-methods research designs that combine quantitative assessments of learning outcomes with qualitative insights from participant interviews or surveys could provide a more comprehensive understanding of the effects of the "Corner" video game on student learning experiences.

4. CONCLUSION

Based on the results of both independent sample t-tests and paired sample t-tests, it is evident that the educational game "Corner" effectively enhances students' comprehension of mathematical concepts and stimulates their interest in learning mathematics. These findings imply that integrating educational games into mathematics education can serve as an effective alternative for enhancing students' grasp of

mathematical concepts. Educational games can function as engaging and interactive resources to aid students in comprehending and applying mathematical concepts more effectively.

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