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**Minat Belajar: Bagaimana
Eksperimentasi Model Pembelajaran
Game-Based Learning?**

**Learning Interest: How Does The
Experimentation of The Game-Based
Learning Models?**

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51

Kata Kunci:

*Game Based Learning, Minat
Belajar, Pendidikan Agama
Islam.*

Abstrak: Pendidikan Agama Islam menaruh peran penting dalam menumbuhkan pengetahuan dan meningkatkan kualitas pribadi peserta didik. Namun dalam penerapannya mengalami beberapa permasalahan utama yakni rendahnya minat dan berpartisipasi aktif siswa dalam mata pelajaran Pendidikan Agama Islam, khususnya dalam aspek keterlibatan siswa yang hanya mencapai 21% berdasarkan hasil angket pra-penelitian. Tujuan penelitian ini adalah untuk menilai efektivitas penerapan model pembelajaran *Game-Based Learning* (GBL) dalam meningkatkan minat belajar siswa pada mata pelajaran PAI di SMP Meri 23 Bandar Lampung. Untuk menjawab permasalahan tersebut, penelitian ini menggunakan pendekatan kualitatif dengan desain *quasi-eksperimen* dan teknik analisis data berupa uji normalitas, uji homogenitas, serta uji hipotesis menggunakan *Independent Samples t-Test* dan uji nonparametrik *Mann-Whitney U*. Hasil penelitian menunjukkan bahwa model GBL secara signifikan mampu meningkatkan minat belajar siswa. Penerapan model *Game-Based Learning* (GBL) terbukti efektif dalam meningkatkan minat belajar siswa dalam mata

pelajaran Pendidikan Agama Islam (PAI) di SMP Negeri 23 Bandar Lampung, menciptakan proses belajar yang menyenangkan dan partisipatif. Temuan ini mengimplikasikan ²⁹ perlunya integrasi pendekatan berbasis permainan dalam strategi pembelajaran PAI untuk meningkatkan keikutsertaan dan motivasi siswa secara berkelanjutan.

Keywords:

*Game-Based Learning,
Learning Interest, Islamic
Education.*

Abstract: Islamic Religious Education (IRE) plays a pivotal role in fostering knowledge and enhancing students' personal development. However, its implementation faces several major challenges, notably the low level of student interest and active participation in IRE subjects. This is particularly evident in the aspect of student engagement, which reached only 21% based on the results of a preliminary survey. The purpose of this study is to evaluate the effectiveness of implementing the Game-Based Learning (GBL) model in increasing students' learning interest in IRE at SMP Negeri 23 Bandar Lampung. To address this issue, the study ²⁴ employed a quantitative approach with a quasi-experimental design. Data analysis techniques included normality testing, homogeneity testing, and ⁵⁴ thesis testing using both the Independent Samples t-Test and the non-parametric Mann-Whitney U test. The research findings indicate that the GBL model ⁵ significantly enhances students' learning interest. The application of Game-Based Learning (GBL) has proven effective in improving students' enthusiasm for learning IRE at SMP Negeri 23 Bandar Lampung, fostering a learning environment that is both enjoyable and participatory. These findings imply the necessity of integrating game-based approaches into IRE instructional strategies to sustainably boost student engagement and motivation.

INTRODUCTION

Education is a crucial pillar for a nation's progress, as it aims to enhance the quality of its people (Rohmah et al. 2024). Education should be structured holistically and interconnected with various other disciplines. To accomplish this, the educational system must be thoroughly integrated with all dimensions of human life. Moreover, education serves as a deliberate means of transmitting culture from one generation to the next (BP et al. 2022; Nada et al. 2024). One of the most crucial components of education is the learning process, as it serves as the primary means to shape students' knowledge, skills, and attitudes, and plays a significant role in determining their academic success (Putri et al. 2022; Hidayati et al. 2024; Pratiwi et al. 2025). Learning is a fundamental activity, and an individual's success in achieving educational goals is greatly influenced by the effectiveness of the learning process (Prastawati and Mulyono 2023). Thus, it is capable of shaping the competencies, character, and skills required for life.

Learning interest is an internal willingness of an individual to engage in learning activities, which greatly influences student success and can be affected by the teacher's method of instruction (J. N. Sari et al. 2025; Karisma, Setiawan, and Oktavianti 2022; Zulfikar et al. 2025). Students' enthusiasm for learning is a crucial determinant of their academic performance. This interest is shaped by various factors. Internally, it stems from the learners' own motivations and attitudes. Externally, influences such as family support and the surrounding environment significantly contribute as well (Rakhmah and Pradikto 2025). Learning interest is an essential part of the learning process. It can influence other aspects such as motivation, academic achievement, and the outcomes students attain (Harefa, Tafonao, and Hidar 2020). Learning interest can be observed through students' curiosity, their attitude during lessons, their enjoyment of the subject, and their active participation in the learning process. (S. N. Hidayah, Zulaihati, and Sumiati 2023). This interest aims to foster students' enthusiasm for learning (Sinaga et al. 2024).

Education in Indonesia continues to face numerous challenges, including a complex curriculum, unequal access, low teacher quality, and high educational costs (N. Hidayah 2022). One of the primary obstacles in the education sector is the disparity in access and the unequal distribution of learning opportunities, especially in rural and isolated regions (Siwitomo et al. 2023). Meanwhile, at a smaller scale, educational issues include monotonous teaching. At a more localized level, the education sector still faces various problems, including uninspired teaching methods, limited educational infrastructure and resources, as well as students' low academic performance (Yusuf et al. 2024).

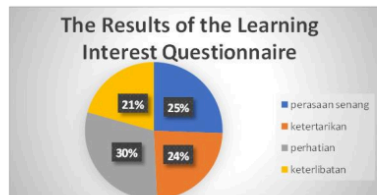


Figure 1.

Summary of the Pre-Research Learning Interest Questionnaire

Based on the pie chart summarizing the questionnaire results on students' learning interest during the pre-research phase, it can be concluded that the indicator

with the lowest percentage is student engagement, which stands at only 21%. In fact, each aspect of students' learning interest remains below 50%, indicating that students' engagement in learning is relatively low. This suggests that low engagement is a contributing factor to the overall lack of learning interest among students. Low engagement has become a major issue, as student involvement is a crucial factor in the success of the learning process. Without active engagement, students tend to be passive, unenthusiastic, and less involved in discussions or learning tasks. These findings are further reinforced by observations and interview results, which highlighted several concerns, such as the limited student engagement in classroom activities suggesting a lack of active involvement in the learning process. This lack of engagement poses a significant barrier to increasing overall learning interest, as engagement is the key to fostering student enthusiasm and motivation in learning.

Game Based Learning (GBL) is an instructional approach that incorporates games to create a more engaging and enjoyable learning experience. Within this framework, games function as instruments to improve both the effectiveness and retention of educational content. The games used may contain various educational content, each with its own set of rules and gameplay mechanics. This approach is typically applied in specific sessions, whether conducted online or in person. The model integrates game elements into learning activities. (Mona, 2023; Prananda et al. 2024; Winatha and Setiawan 2020; Novitriani et al. 2024). Game-Based Learning is an educational approach that employs games to create a more enjoyable and interactive learning experience, while simultaneously promoting collaboration, improving memory retention, increasing engagement and motivation, and enhancing students' confidence in grasping the material (Oktavia 2022; Wahyuning 2022; Azizah et al. 2025; Byusa, Kampire, and Mwesigye 2022).

Several studies have been conducted by Nur Hidayah and Santika Lya Diah Pramesti (2023). The findings suggest that implementing this method can effectively boost students' enthusiasm for learning. This finding contrasts with the results of the study conducted by Amaludin Nur Lestari (2024). This study aims to help students focus better on learning Islamic Religious Education (IRE) by using a game-based learning model. This study was carried out using the Classroom Action Research (CAR) approach. The findings demonstrate that game-based learning effectively enhances students' focus during the learning process (IRE). Meanwhile, according to Aisyah Cinta Putri Wibawa (Wibawa et al. 2020). This study seeks to present game-based learning as an innovative approach and solution to assist both students and teachers in adapting more swiftly to learning during the new normal period. The research employs a descriptive analysis based on a preliminary study. Findings indicate that game-based learning enhances the effectiveness of the teaching and learning process.

This study introduces an innovative approach by applying a game-based learning model through the Wordwall application as an interactive platform, integrating educational activities with engaging games. It is expected that students will actively participate in Islamic Religious Education and be able to learn independently, thereby fostering their learning interest. While numerous studies have examined the game-based learning model, its application within Islamic Religious Education remains underexplored. Consequently, this research aims to investigate how blending face-to-face instruction with the use of the Wordwall application can increase students' interest in learning.

This study is significant as it has the potential to motivate students to participate more actively in the learning process, including asking questions, providing answers, and demonstrating enthusiasm throughout the lessons. This is achieved through activities they enjoy, such as quizzes and games provided by the teacher (Wulandar and Safitri

2024). This helps achieve learning objectives more effectively and also enhances learning motivation, making students feel happier, more enthusiastic, challenged, and capable of collaborating with their peers, thereby making the learning experience more meaningful for them (Ansori 2024; Aoliyah 2023).

Moreover, Game-Based Learning (GBL) supports the cultivation of essential 21st-century skills, including critical reflection, teamwork, and problem-solving abilities. Through challenges presented in games, students learn to think creatively and adapt to different situations, making them better prepared to face real-life changes. A study by Ita Fitriati (2021) found that digital games are more effective than non-game applications in increasing student engagement. This is because elements within games, such as challenges, achievements, and immediate feedback, provide additional motivational boosts. Overall, GBL not only makes learning more engaging but also helps improve students' thinking skills and academic performance. Hence, incorporating Game Based Learning (GBL) in education can serve as an effective approach to improve the overall quality of the teaching and learning experience (Minisa et al. 2025).

The Game Based Learning model fosters the enhancement of students' cognitive abilities, promotes academic success, and offers opportunities for active learning, experience sharing, and practicing skills applicable to real-life situations (Karakoc et al. 2020; Oktavia 2022). Games can enhance students' interest and motivation to learn, whether through online games, activities with physical objects, or group-based games (Septiani 2025). This necessitates that every counselor become proficient in a variety of games pertinent to guidance and counseling services, particularly within the scope of Islamic Religious Education (Hariyadi et al. 2022).

METHOD

This research applied a quantitative method with a quasi-experimental design, which is an experimental method that is not entirely random. This study uses a post-test only design with two groups: one group gets the treatment, and the other group does not.

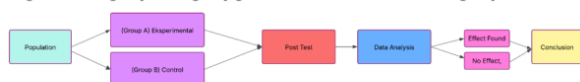


Figure 2.

Quasi-Experimental Design

After the treatment is administered, both groups are given a final test to determine the difference in outcomes. The population of this study included all eighth-grade students at SMP Negeri 23 Bandar Lampung in the 2024/2025 school year, with a total of 250 students from seven classes. The sample of 60 students includes class VIII F as the experimental group and class VIII H as the control group. Sampling was conducted using simple random sampling with the assistance of the Spin the Wheel application.

In the data collection process, this study utilized a learning interest questionnaire as its instrument. The questionnaire was developed based on the theoretical framework proposed by Slameto (as cited in Apriyani), encompassing four indicators of learning interest: enjoyment, engagement, curiosity, and attention (Apriyani, Nugraha, and Yulianan 2022). It consists of 15 statements formatted using a five-point Likert scale. Prior to implementation, the instrument was validated by experts and piloted in a class that had not been exposed to the Game-Based Learning (GBL) model. It consisted of 15 statements presented in a Likert scale format with five response options. Prior to its use, the questionnaire was validated by experts and tested in a class that had not implemented

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the Game-Based Learning (GBL) model. The validity test results, conducted using SPSS 26, showed that 9 statements were deemed valid, because the calculated r-value is greater than the critical r-value from the table. The reliability test produced a score of 0.696, indicating that the questionnaire was reasonably reliable. Following validation, the questionnaire was distributed to two experimental groups and one control group. The gathered data were processed using SPSS version 26, following several steps: conducting a normality assessment with the Mann-Whitney U test, performing a homogeneity test to evaluate variance consistency, and carrying out hypothesis testing through the Independent Samples t-Test.

The Game-Based Learning model has the following syntax: (1) Selecting the game, where the teacher chooses a game that aligns with the lesson material; (2) Explaining the concept, where the teacher explains the concepts to be learned through the game; (3) Delivering the game rules, where the teacher communicates the rules so that students can play correctly; (4) Conducting the game, where the teacher guides and observes the gameplay and assists students who face difficulties; (5) Summarizing knowledge, where the teacher directs students to summarize the learning outcomes; and (6) Reflecting, where the teacher leads a reflection session to evaluate the learning process and results (Santoso and Masfuh 2022).

RESULT AND DISCUSSION

Result

This study focused on the topic of Trustworthy and Honest Behavior for eighth-grade students. The aim was to investigate the difference in learning achievements between two groups: one applying the game-based learning strategy and the other using a traditional teaching approach. This subject was deemed appropriate for the game-based learning model due to its broad relevance and the ability for students to engage with it anytime and anywhere, beyond just classroom hours. The research spanned four sessions: three sessions were allocated for implementing each teaching method in the respective classes, The last session is used for a post-test to evaluate what students have learned after the lessons.

This study employs a non-test instrument in the form of a questionnaire to measure students' learning interest. Before distributing the questionnaire, the researcher first tested whether the items were valid and reliable. The validity test was conducted to ensure that the questionnaire content accurately measures what it intends to measure, while the reliability test was carried out to determine whether the results are consistent and stable over different times. Out of 15 statements in the questionnaire, only 9 were deemed valid. The data from these 9 validated statements were then distributed to a trial class. The questionnaire's validity and reliability were tested again based on this trial. After the questionnaire was proven to be valid and reliable, it was given to both the control and experimental groups. More details about the results of the validity and reliability tests are shown in the table below.

Table 1. Explanation of the Reliability Test Results

Reliability Statistics	
Cronbach's Alpha	N of Items
.696	15

The results of the validity and reliability tests indicate that out of 15 statements in the questionnaire, 9 statements were deemed accurate, stable, and consistent. The reliability coefficient was 0.696 according to Cronbach's Alpha formula, which is above

Commented [A3]: Apa kriteria validnya? Bagaimana cara menentukannya

48 minimum threshold of 0.60. Therefore, the data are considered valid and reliable since the calculated r-value exceeds the critical r-value from the table.

7 prerequisite Test Result

1) Normality Test

The normality test was performed to assess whether the data followed a normal distribution. This step is crucial to verify the suitability of using parametric statistical methods (A. P. Sari, 13 Asanah, and Nursalman 2024). The data are considered normally distributed if the significance value (Sig) is greater than 0.05. If the Sig value is less than 0.05, the data are not normally distributed. In this study, the Shapiro-Wilk test was used to check if the post-test scores were normally distributed because the sample had more than 50 participants. The results are considered normal if the Sig value is more than 0.05, and not normal if it is less than 0.05. The results of the normality test for both the experimental and control groups are shown below.

Table 2. Explanation of the Normality Test Results

Kelompok	Tests of Normality				Shapiro-Wilk		
	Statistic	Kolmogorov-Smirnov ^a		Statistic	df	Sig.	
		df	Sig.				
Minat Belajar							
Eksperimen	.113	30	.200 [*]	.967	30	.457	
Kontrol	.184	30	.011	.906	30	.012	

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Based on the data shown in the table above, the significance value for the experimental group is 0.2457, which is higher than 0.05. This implies that the post-test scores of the experimental group are normally distributed based on the Shapiro-Wilk test, considering the sample size is below 100. Conversely, the control group has a significance value of 0.012, falling under 0.05, indicating that its post-test data do not follow a normal distribution.

Due to the non-normal distribution of data in the control group, the researcher opted to use a non-parametric test, specifically the Mann-Whitney U test. This test was used to determine whether there is a difference in learning interest between the experimental and control classes after they were subjected to different instructional treatments.

2) Homogeneity Test

The homogeneity test checks if the data variance is the same across different groups in a study. In this research, Bartlett's test was used to test homogeneity. If the significance value is more than 0.05, the data is considered homogeneous. If it is less than 0.05, the data is not homogeneous. The results were analyzed using SPSS 26 for Windows, and the distribution is shown below.

Table 3. Explanation of the Homogeneity Test Result

Minat Belajar	Based on Mean	Levene Statistic		df1	df2	Sig.
		Statistic	df			
	Based on Mean	.043	1	58	.836	
	Based on Median	.088	1	58	.768	
	Based on Median and with adjusted df	.088	1	50.614	.768	
	Based on trimmed mean	.089	1	58	.767	

The result of the homogeneity test showed a significance value of 0.836, which is higher than the 0.05 limit. This means the data is homogeneous, or in other words,

the variances are equal. Therefore, it can be concluded that the post-test data comes from a population with similar or homogeneous traits because the significance value is above 0.05.

Hypothesis Test

Hypothesis testing is a part of statistical science used to examine whether a statement is true or false, and to determine whether the statement should be accepted or rejected (Anuraga, Indra, Mingsih, and Athoillah 2021). This study employed hypothesis testing using the Independent Samples t-Test method. This test was used to determine whether there was a significant difference in the final outcomes between two classes: one that received a specific treatment and another that did not receive any treatment.

Table 4. Independent Samples t-Test Result

		Independent Samples Test					95% Confidence Interval of the Difference			
		Levene's Test for Equality of Variances			t-Test for Equality of Means					
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Minat Belajar	Equal variances assumed	.043	.830	5.574	58	.000	5.2000	.8329	3.3326	7.0674
	Equal variances not assumed			5.574	57.368	.000	5.2000	.8329	3.3322	7.0678

Based on the data analysis, Levene's Test for Equality of Variances gave a Sig. (2-tailed) value of 0.000, which is lower than the 0.05 limit. In the Independent Samples t-Test, the null hypothesis (H_0) is accepted if the calculated t-value is smaller than the t-table value; if it is larger, the null hypothesis is rejected. In this case, the result of $0.000 < 0.05$ indicates a statistically significant outcome, meaning the t-test result is valid since it falls below the 0.05 threshold. Subsequently, the Mann-Whitney U test was applied as a non-parametric alternative. The following section presents the results of the Mann-Whitney test.

Table 5. The Mann-Whitney U test results

Test Statistics ^a	
Minat Belajar	
Mann-Whitney U	131.000
Wilcoxon W	596.000
Z	-4.736
Asymp. Sig. (2-tailed)	.000

a. Grouping Variable: Kelompok

The Mann-Whitney U test results revealed a two-tailed p-value of 0.000, falling below the 0.05 threshold. This suggests a statistically significant difference between the group that applied the Game-Based Learning approach and the group that underwent traditional teaching methods.

Discussion

Game-Based Learning is a learning model that utilizes digital or electronic games to engage students more actively, boost their motivation, enhance their skills and literacy, and support their learning through problem-solving in an enjoyable context (Cahyaningrum et al. 2023; Silka et al. 2023; Vankus 2021). Wordwall is a web-based digital platform that allows teachers to create engaging lessons so that students remain interested and enthusiastic during the learning process (Aeni et al. 2022). This platform enables teachers to customize activities with their own content, images, questions, allowing users to tailor learning activities accordingly (Putra et al. 2024). Wordwall can also be used to design and assess learning outcomes. By using Wordwall, learning assessment efforts are centered on the games played by students in the classroom (Aidah and Nurafni 2022).

Commented [A4]: Uji hipotesis menggunakan uji mann whitney karena data tidak normal, jadi tidak perlu menggunakan uji Independent Samples t-Test, ganti dengan uji mann whitney

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Based on the post-test results from both the experimental and control groups, nine questionnaire items were used to measure students' interest in learning after the teaching process. The total number of participants was 91 students. Questionnaires were used to collect the data, and the results showed differences in students' interest in Islamic Religious Education. The Independent Sample T-Test was used to analyze the post-test data. The results were then explained after the statistical test was completed. The normality test indicated that the data from the experimental group were normally distributed, as shown by the Kolmogorov-Smirnov test result exceeding 0.05. In contrast, the control group's data did not meet the normality assumption, with the Kolmogorov-Smirnov value falling below 0.05. Consequently, the Mann-Whitney U test was applied to compare both groups. The homogeneity test showed that the data were uniform with a significance value of 0.836, which is higher than 0.05. However, the T-Test showed a significance value (Levene's Test, sig. 2-tailed) of 0.000, which is less than 0.05. These results lead to the conclusion that the implementation of the Game-Based Learning (GBL) model is effective in enhancing students' interest in learning.

Game-based learning is not merely about providing students with games, but about designing clear and comprehensible learning steps that support them in achieving their educational goals (Mawan 2024). The continuous increase in students' learning interest indicates that Game-Based Learning (GBL) can be an effective approach to address the lack of engagement in Islamic Religious Education (Ansyori 2025). In other words, the GBL model has proven to enhance student involvement in learning Islamic Religious Education. Students who learn through this method tend to be more focused, active, and demonstrate improved learning outcomes (Paulina, Rokmanah, and Syachruraji 2023).

Several prior studies have highlighted the relevance of the Game-Based Learning (GBL) approach. For instance, research by Siti Kurniati (Kurniati, Khasanah, & Mufid, 2023), titled *The Implementation of the Game-Based Learning Model on Elementary School Students' Learning Interest During the Pandemic*, and a study by Rio Tri Haranto (Hartanto, Hamidah, & Kusuma, 2024), entitled *The Application of the Game-Based Learning Model Using the Bamboozle Quiz Game to Enhance Junior High School Students' Critical Thinking in Mathematics*, both support the educational value of GBL. Additionally, findings from I Wayan Widiana (Widiana, 2022) revealed that students experienced increased enjoyment when learning through games, which positively impacted their comprehension and learning motivation. These studies collectively underscore the strong potential of GBL in classroom instruction and affirm its effectiveness in fostering student engagement and interest. What sets the present research apart from previous work is the specific medium and participants involved. In this case, Wordwall is utilized as a digital tool that effectively supports the principles of GBL, aligning seamlessly with the foundational idea of learning through play.

This research seeks to explore how the application of the Game-Based Learning (GBL) approach influences students' academic performance, as well as to compare its effectiveness with conventional learning models. It also aims to find out if there is a meaningful difference in learning achievement between students taught using the GBL method and those taught with traditional methods. The T-test results show a significance value from Levene's Test (sig. 2-tailed) of 0.000, which is below 0.05. Thus, it can be concluded that the GBL model is effective in increasing students' learning interest. Several supporting factors contributed to the success of this study, including a positive and conducive learning environment, support from families and teachers in implementing GBL, the use of innovative and effective learning models, as well as sufficient and supportive facilities and infrastructure.

Although the Game-Based Learning (GBL) model has the potential to enhance students' motivation and academic achievement, its implementation in the classroom is not without challenges. Some of these challenges include limited access to supporting facilities and infrastructure, teachers' readiness in designing and integrating educational games aligned with the learning material, and the risk of students becoming distracted and focusing more on the gameplay rather than the learning objectives. Based on the research findings and identified challenges, it is recommended that teachers receive proper training in designing and utilizing educational game media that align with the subject matter. Schools should also provide adequate facilities and infrastructure to support game-based learning. Moreover, it is essential for teachers to guide students to remain focused on the learning objectives when using the GBL model so that the learning process remains effective and does not become merely a form of entertainment.

Furthermore, observations during the study revealed that some students experienced confusion in understanding the flow of the game during the initial implementation of the Game-Based Learning model. This was primarily due to limited technological literacy and a lack of prior experience in using digital learning media such as the Wordwall application. In addition, inadequate supporting infrastructure—such as limited device availability and unstable internet access—posed further challenges during the learning process. Another obstacle faced by teachers was maintaining students' focus so that they would not become overly absorbed in the gameplay at the expense of grasping the learning material. Therefore, intensive guidance and supervision from teachers are essential to ensure that the instructional objectives were achieved effectively. These findings indicate that although the Game-Based Learning model has significant potential to enhance student engagement, its success still requires careful technical and pedagogical preparation.

Consequently, this research contributes to the development of educational theory, particularly in the context of Islamic Religious Education, by offering a new perspective: the integration of game elements in the learning process does not diminish the religious value of the subject matter but instead strengthens students' comprehension and interest. The Game-Based Learning model has proven to be effective in creating an interactive and enjoyable classroom atmosphere while encouraging students to be more active and attentive during lessons. The practical implication of these findings highlights the need for professional development among teachers in designing educationally meaningful digital learning tools, as well as the importance of adequate infrastructure support from schools. Therefore, it is recommended that educators carefully consider student readiness and the availability of resources before fully implementing a creative instructional approach that incorporates technology into the learning process.

CONCLUSION

The study's findings reveal that applying the Game-Based Learning model via the Wordwall application substantially increases students' interest in learning. This effectiveness is corroborated by the T-test analysis results, which showed a significance value (Sig. 2-tailed) of 0.000, well below the 0.05 threshold, confirming the successful implementation of the model. Based on the hypothesis test outcomes, it can be concluded that the Game-Based Learning model effectively enhances students' learning interest at SMP Negeri 23 Bandar Lampung.

Future research needs to explore more deeply the development of technology-based learning models by integrating various additional applications that can encourage active student participation. Instructional designs should also be adapted to accommodate diverse learning styles in order to increase students' interest in the learning process. Furthermore, strengthening students' technological skills is essential, along with paying attention to external factors such as motivation and the availability of

adequate resources. Exploring the integration of technology with other teaching methods is also important. Moreover, replicating this study across different schools or student populations is necessary to assess whether the findings are specific to certain contexts or applicable more broadly.

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