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The Effect of Using Game-Based Learning Model in History Learning on Students' Interest and Motivation in Athirah Bukit Baruga Islamic High School

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ABSTRACT

History learning in high school often suffers from low student interest and motivation because of teacher-centered, conventional methods that fail to engage the digital generation. This study aims to examine the effect of the Game-Based Learning (GBL) model on students' learning interest and motivation in history at Athirah Bukit Baruga Islamic High School. A quantitative pre-experimental approach with a One-Group Pretest-Posttest Design was employed on 30 purposively selected Class X students. Data were collected using a five-point Likert-scale questionnaire and observational instruments, then analyzed using descriptive statistics, the Kolmogorov-Smirnov normality test, and a paired-samples t-test ($\alpha = 0.05$) in SPSS. Results showed a significant increase in learning interest (M = 55.73 to M = 85.37) and motivation (M = 57.50 to M = 88.20), both with p = 0.000. Observations confirmed heightened student enthusiasm, collaboration, and interaction. Game-based learning is found to be effective in enhancing students' interest and motivation in history learning.

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1. INTRODUCTION

Education serves as the primary foundation for developing competitive and adaptive human resources capable of navigating rapid global technological transformations. In the contemporary era, digital literacy has become an indispensable competency, and educational institutions are increasingly expected to integrate innovative pedagogical approaches that align with the characteristics of Generation Z learners [1], [2], [3]. Generation Z, as the dominant cohort in current secondary education, demonstrates distinct learning preferences that strongly favor interactive, visually stimulating, and challenge-driven experiences over passive information reception (Examining the Learning Needs and Preferences of Gen Z,

2024; Sugianto et al., 2023). However, despite growing awareness of these demands, many high school classrooms in Indonesia continue to rely on conventional, teacher-centered instruction that prioritizes content delivery over active student participation [4], [5]. This persistent misalignment between pedagogical practice and learner characteristics is a pressing concern in secondary education, particularly in schools striving to cultivate holistic, meaningful learning experiences.

Among the subjects most affected by this pedagogical gap, history occupies a particularly critical position. History education plays a strategic role in cultivating national identity, historical consciousness, and civic responsibility; yet it remains one of the least engaging subjects for secondary school students in Indonesia [2], [5]. Research consistently documents that history instruction tends to be narrative-heavy, memorization-oriented, and teacher-centered, thereby producing passive classroom behavior and reducing students' intrinsic motivation to learn [6]. The subject is often perceived by students as abstract and monotonous, widening the gap between the strategic importance of history education and the reality of low student engagement in the classroom.

The low interest and motivation of students in history learning are not incidental phenomena but are deeply rooted in structural and pedagogical conditions. Conventional instruction in history rarely provides immediate feedback, competitive challenge, or collaborative learning structures that have been empirically linked to enhanced student engagement and intrinsic motivation [7], [8]. The absence of these elements is particularly problematic given the characteristics of Generation Z learners, who expect educational environments to reflect their digital experiences and who respond more positively to interactive, gamified instructional formats [3]. When students are not intrinsically motivated, their participation in learning becomes extrinsically driven, reducing the quality of historical understanding and limiting affective learning outcomes [9], [10].

Game-Based Learning (GBL) has emerged as a theoretically grounded and empirically supported response to this challenge. GBL is defined as an instructional approach that embeds game mechanics, including challenges, rewards, and immediate feedback, within structured educational contexts to enhance cognitive, affective, and social learning outcomes simultaneously [1], [11]. Its effectiveness is underpinned by Self-Determination Theory (SDT), which posits that intrinsic motivation flourishes when learners experience autonomy, competence, and relatedness, three psychological needs that well-designed educational games are uniquely positioned to fulfill [12]. Empirical evidence further confirms that students in GBL environments exhibit significantly higher levels of behavioral, emotional, and cognitive engagement than those in conventional learning settings. In the context of history learning, GBL has been shown to transform rote memorization into an engaging, narrative-driven experience that promotes active knowledge construction and sustained learner interest [13].

Despite promising evidence supporting GBL in general educational settings, significant research gaps remain. Existing studies predominantly examine GBL in general school environments or focus primarily on cognitive outcomes such as academic achievement, leaving the affective dimensions of interest and motivation comparatively underexplored. Furthermore, the application of GBL in Islamic-based secondary schools in

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Indonesia remains underrepresented in the existing literature, despite the growing number of such institutions and their distinctive institutional and cultural characteristics. Studies specifically examining the intersection of GBL, affective learning outcomes, and Islamic school contexts using pre-experimental quantitative designs remain scarce, leaving a substantive gap in empirical understanding that this study seeks to address [6], [7].

This study aims to examine the effect of the Game-Based Learning model on the learning interest and motivation of Class X students at SMA Islam Athirah Bukit Baruga in history learning. The urgency of this research is reinforced by the systemic challenge of low student engagement in history classrooms during the digital era, where the misalignment between conventional pedagogy and Generation Z learning preferences continues to suppress affective learning outcomes across Indonesian secondary schools [4]. Addressing this challenge requires empirically grounded pedagogical solutions that are contextually validated and practically applicable for history teachers operating within Islamic-based educational institutions [8]. The novelty of this study lies in its specific application of GBL within an Islamic-based secondary school context, employing a quantitative pre-experimental design to measure the effect on affective variables, namely student interest and motivation, thereby contributing original empirical evidence to a domain that remains comparatively underrepresented in the broader literature on innovative history instruction in Indonesia [3], [13].

2. METHOD

Research Design and Approach

This study employs a quantitative research approach, which is a systematic empirical investigation that prioritizes the collection and analysis of numerical data to test hypotheses and draw generalizable conclusions [14], [15]. The research design adopted is a pre-experimental design with a One-Group Pretest-Posttest model, in which a single group of participants is measured before and after the treatment to assess the intervention's effect without a parallel control group [16], [17]. This design was selected because it is well-suited to exploratory educational research conducted in a naturalistic single-class context, particularly when the primary aim is to detect changes in affective variables, such as student interest and motivation, following instructional innovation. Although the absence of a control group limits causal inference, this design remains widely employed in applied educational settings where experimental manipulation of participant groups is not feasible and where preliminary effect evidence is sufficient to inform pedagogical decision-making [16], [17].

Population and Sample

The study population comprised all Class X students at SMA Islam Athirah Bukit Baruga enrolled in the current academic year. Sampling was conducted using a purposive sampling technique, a non-probability sampling method in which participants are selected deliberately based on specific criteria relevant to the research objectives [18], [19]. The selection criteria included homogeneity of academic ability, exposure to the same history curriculum, and institutional readiness to receive the Game-Based Learning intervention.

Based on these criteria, a sample of 30 Class X students was selected as the research participants. This sample size is considered adequate for pre-experimental quantitative research in educational settings, particularly in single-class intervention studies aimed at detecting mean differences between pretest and posttest conditions [20]. Purposive selection also strengthens the internal validity of the pre-experimental design by minimizing extraneous variables related to student background, thereby allowing the observed changes to be more reliably attributed to the instructional treatment.

Research Instruments and Data Analysis Techniques

The primary data collection instrument was a structured Likert-scale questionnaire consisting of five response options, designed to measure two main affective variables: student learning interest and student learning motivation. The questionnaire items were developed based on established indicators of learning interest, including emotional engagement, attention, and participation, as well as indicators of motivation, including intrinsic drive, enthusiasm, and persistence [21], [22]. The instrument was validated through expert judgment and reliability testing using Cronbach's Alpha to ensure the consistency and accuracy of measurements across all items [23], [24]. In addition to the questionnaire, observational data were collected directly during learning sessions to document qualitative indicators of student behavior, including participation levels, interaction quality, and overall classroom atmosphere. These observational data served as triangulating evidence to support and contextualize the quantitative findings.

Data analysis was carried out in three sequential stages using IBM SPSS Statistics software. The first stage involved descriptive statistical analysis, encompassing measures of central tendency (mean, median, mode) and measures of dispersion (standard deviation, variance, range) for both pretest and posttest data of the interest and motivation variables. The second stage involved a normality test using the Kolmogorov-Smirnov method to verify that the data distribution met the parametric assumptions required for inferential testing [24]. The third stage involved hypothesis testing using a paired-samples t-test at a significance level of alpha = 0.05 to determine whether the mean difference between pretest and posttest scores was statistically significant [23], [25]. This sequential analytical framework ensured the rigor and transparency of the quantitative conclusions drawn from the data.

3. RESULTS AND DISCUSSION

The results of this study were obtained from measuring the learning interests and motivations of 10th-grade students of SMA Islam Athirah Bukit Baruga before and after the implementation of the Game-Based Learning model in history learning. Data were collected via a questionnaire administered to 30 students, who served as the research sample. Measurements were conducted twice: before treatment (pretest) and after treatment (posttest) to quantify changes in student learning interests and motivation.

Student Learning Interest Results

Based on the pretest results, students' learning interest before the Game-Based Learning model was still in the moderate-to-low range. Pretest scores for student learning interest

ranged from 44 to 68, indicating differences in students' interest levels in history learning. Some students demonstrated relatively low interest, characterized by a lack of interest in the material, limited attention, and suboptimal engagement in the learning process.

After implementing the Game-Based Learning model, posttest results showed a significant increase in students' interest in learning. Posttest scores ranged from 76 to 95, indicating that most students experienced a significant increase in learning interest. This improvement reflects that history learning packaged as an educational game can capture students' attention, increase their enjoyment of learning, and encourage active student engagement throughout the learning process.

The students' learning interest scores before and after treatment are shown in the following table.

Table 1. Learning Interest Score of Class X Students of Athirah Bukit Baruga Islamic High School

No	Student	Pretest	Posttest
1	S-01	45	78
2	S-02	52	85
3	S-03	60	88
4	S-04	48	80
5	S-05	55	83
6	S-06	62	90
7	S-07	50	82
8	S-08	58	86
9	S-09	65	92
10	S-10	47	79
11	S-11	53	84
12	S-12	61	89
13	S-13	44	76
14	S-14	57	87
15	S-15	63	91
16	S-16	49	81
17	S-17	56	85
18	S-18	67	94
19	S-19	51	83
20	S-20	59	88
21	S-21	46	77
22	S-22	54	84
23	S-23	64	92
24	S-24	50	80
25	S-25	58	86
26	S-26	66	93
27	S-27	48	79
28	S-28	55	85
29	S-29	61	89
30	S-30	68	95

The average pretest score for student learning interest was 55.4, while the average posttest score increased to 86.0. This indicates a significant increase in learning interest following the implementation of the Game-Based Learning model.

Student Learning Motivation Results

The pretest results on learning motivation indicated that students' motivation prior to the treatment was moderate. Students' initial learning motivation scores ranged from 46 to 69, indicating that their learning drive remained suboptimal. Some students participated in history lessons more because of academic demands than an intrinsic desire to learn.

After implementing the Game-Based Learning model, the post-test results for learning motivation showed a significant increase. Post-test scores ranged from 80 to 96, indicating a stronger drive to learn, higher enthusiasm, and increased persistence in participating in history lessons. The Game-Based Learning model has been proven to create a challenging and enjoyable learning environment, thus stimulating student motivation.

Students' learning motivation scores before and after treatment are presented in the following table.

Table 2. Learning Motivation Score of Class X Students of Athirah Bukit Baruga Islamic High School

No	Student	Pretest	Posttest
1	S-01	48	82
2	S-02	55	88
3	S-03	62	90
4	S-04	50	84
5	S-05	57	87
6	S-06	64	92
7	S-07	52	85
8	S-08	59	89
9	S-09	66	94
10	S-10	49	83
11	S-11	56	88
12	S-12	63	91
13	S-13	46	80
14	S-14	58	89
15	S-15	65	93
16	S-16	51	84
17	S-17	60	90
18	S-18	68	95
19	S-19	54	87
20	S-20	61	91
21	S-21	47	81
22	S-22	55	88
23	S-23	67	94
24	S-24	50	83
25	S-25	59	89
26	S-26	66	93
27	S-27	49	82
28	S-28	57	88
29	S-29	62	90
30	S-30	69	96

The average pretest score for student learning motivation was 57.8, while the average posttest score increased to 89.1. This improvement indicates that implementing the Game-Based Learning model has a strong positive impact on students' motivation to learn in history lessons.

Learning Observation Results

Observations were conducted directly during the learning process to obtain supporting data regarding student activities, participation levels, enthusiasm, and interactions during game-based learning. During the implementation of the Game-Based Learning model, observers observed student behavior from the beginning to the end of the learning process, including readiness to learn, attention to teacher explanations, involvement in game activities, and responses to instructions and feedback. The observations showed that most students were actively involved at each stage of the learning process, both individually and in groups. Students appeared enthusiastic about participating in the educational games presented, as evidenced by consistent engagement, positive emotional expressions, and a willingness to participate in discussions and problem-solving. Interaction between students also appeared to increase, with students collaborating, discussing, and sharing roles as they completed game challenges. In addition, students demonstrated a better level of focus and a tendency to complete tasks responsibly. Overall, the observations showed that game-based learning created a more active, interactive, and enjoyable learning atmosphere, thereby supporting increased student interest and motivation in learning history.

Descriptive Statistical Analysis

Table 3. Descriptive Statistical Analysis of Learning Interest in Class X Islamic Senior High Schools, Athirah Baruga Hill

		Pretest_Interest	Posttest_Interest
N	Valid	30	30
	Missing	0	0
Mean		55.7333	85.3667
Standard Error of Mean		1.28110	.96309
Median		55,5000	85,0000
Mode		48.00a	85.00
Standard Deviation		7.01689	5.27508
Variance		49,237	27,826
Range		24.00	19.00
Minimum		44.00	76.00
Maximum		68.00	95.00
Sum		1672.00	2561.00

Based on the descriptive statistical analysis of the student learning interest variable, a clear picture emerged of the conditions before and after the implementation of the Game-Based Learning model. The number of data analyzed in the pretest and posttest stages was 30 each, with no missing data, so all data were deemed suitable for further analysis.

In the pretest stage, the average (mean) value of students' learning interest was 55.73, with a median of 55.50 and a most frequently occurring value (mode) of 48.00. The standard

deviation of 7.02 indicates that the variation in students' learning interest scores before treatment was quite large, suggesting differences in learning interest levels between students. The variance value of 49.24 strengthens the finding that the distribution of pretest data is relatively spread out. The range of values (range) of 24.00, with a minimum score of 44.00 and a maximum of 68.00, indicates that students' learning interest before game-based learning was still in the moderate to low category.

Meanwhile, in the posttest stage, the average student learning interest increased to 85.37, with a median of 85.00 and a mode of 85.00. The decrease in the standard deviation to 5.28 indicates that the distribution of students' learning interest scores after the treatment was more homogeneous than before. The variance of 27.83 also indicates that the difference in scores between students is getting smaller. The posttest range was 19.00, with a minimum of 76.00 and a maximum of 95.00, indicating that students' learning interest was generally in the high category after implementing the Game-Based Learning model.

Table 4. Descriptive Statistical Analysis of Learning Motivation of Class X Islamic Senior High Schools, Athirah Baruga Hill

		Motivation Pretest	Posttest_Motivation
N	Valid	30	30
	Missing	0	0
Mean		57,5000	88.2000
Standard Error of Mean		1.25006	.80287
Median		57,5000	88,5000
Mode		49.00a	88.00
Standard Deviation		6.84685	4.39749
Variance		46,879	19,338
Range		23.00	16.00
Minimum		46.00	80.00
Maximum		69.00	96.00
Sum		1725.00	2646.00

Based on the results of descriptive statistical analysis of student learning motivation variables, data were obtained that describe the condition of learning motivation before and after the implementation of the Game-Based Learning model. The number of data analyzed in the pretest and posttest stages was 30 each, with no missing data, so all data were declared valid and suitable for analysis.

In the pretest stage, the average (mean) students' learning motivation was 57.50, with a median of 57.50 and a mode of 49.00. The standard deviation of 6.85 indicates that students' learning motivation scores before the treatment had substantial variation. This indicates that students had different levels of learning motivation before the implementation of game-based learning. The variance of 46.88 and the range of values (range) of 23.00, with a minimum score of 46.00 and a maximum of 69.00, indicate that students' learning motivation before the treatment was in the moderate category and not evenly distributed.

After implementing the Game-Based Learning model, the posttest results showed a significant increase in students' learning motivation. The average posttest score increased to 88.20, with a median of 88.50 and a mode of 88.00. The decrease in the standard deviation

to 4.40 indicates that the distribution of students' learning motivation scores after the treatment was more homogeneous than before. The variance of 19.34 and the range of 16.00, with a minimum of 80.00 and a maximum of 96.00, indicate that students' learning motivation is generally in the high category.

Inferential Statistical Analysis

Table 5. Normality Test

Data	df	Sig. Value	Information
Interest Posttest	30	0.402	0.05 <0.402 Normal
Interest Pretest	30	0.678	0.05 <0.678 Normal
Motivation Posttest	30	0.268	0.05 <0.268 Normal
Motivation Pretest	30	0.457	0.05 <0.457 Normal

Based on the results of the normality test on student learning interest and motivation data, all research data were found to be normally distributed. The posttest data on learning interest yielded a p-value of 0.402, which is greater than the 0.05 level, indicating that the data were normally distributed. Furthermore, the pretest data on learning interest obtained a significance value of 0.678, which is also greater than 0.05, indicating that the data met the assumption of normality.

The results of the normality test for the learning motivation variable showed that the posttest data had a p-value of 0.268, which is greater than 0.05, indicating a normal distribution. Similarly, the pretest data for learning motivation showed a significance value of 0.457, which is greater than 0.05, indicating a normal distribution.

Table 6. Hypothesis Testing

Data	t	Sig. Value	Information
posttest Interest - pretest Interest	81.51	0,000	0.000 < 0.05 There is an Influence
Motivation posttest- Motivation pretest	13.18	0,000	0.000 < 0.05 There is an Influence

Based on the results of the paired-samples t-test for the student learning interest variable, the calculated t value was 81.51, with a significance value of 0.000. This significance value is smaller than the significance level of 0.05 (0.000 < 0.05), so it can be concluded that there is a significant difference between the pretest and posttest scores of student learning interest. These results indicate that applying the Game-Based Learning model significantly increases students' interest in history learning.

Furthermore, the results of the paired-samples t-test on the student learning motivation variable showed a t-value of 13.18 and a significance value of 0.000. This significance value is also smaller than 0.05 (0.000 < 0.05), so it can be concluded that there is a significant difference between the pretest and posttest scores of student learning motivation. This

finding indicates that the Game-Based Learning model can significantly increase students' motivation to learn.

DISCUSSION

The results of this study indicate that the application of the Game-Based Learning model in history instruction significantly increased student interest and motivation at Athirah Bukit Baruga Islamic High School. This finding was demonstrated through descriptive statistical analysis, normality testing, a paired-samples t-test, and observational data collected during the learning process.

Based on descriptive statistics, students' learning interest before the implementation of the Game-Based Learning model was moderate, with an average score of 55.73. This score indicates that previous history instruction did not optimally attract students' attention and interest. This condition aligns with the characteristics of conventional history learning, which tend to be narrative and teacher-centered, thereby providing less space for active student involvement. However, after implementing Game-Based Learning, the average learning interest score increased significantly to 85.37, placing it in the high category. The decrease in the standard deviation in the posttest data also indicates that the increase in learning interest occurred evenly across almost all students.

A similar increase was also found in the learning motivation variable. The results of the pretest on learning motivation showed an average score of 57.50, indicating that students' motivation to learn before the treatment remained moderate. Students tended to participate in learning because of academic demands, rather than an intrinsic drive to learn history. After implementing the Game-Based Learning model, the average learning motivation score increased to 88.20, placing it in the high category. This indicates that game-based learning can stimulate students' intrinsic motivation through enjoyable, challenging, and meaningful learning experiences.

The results of the normality test indicate that all pretest and posttest data for the learning interest and motivation variables are normally distributed. With the normality assumption met, the analysis continued using parametric statistical tests. The results of the paired-samples t-test showed a significance value of less than 0.05 for both variables: learning interest and motivation. This finding confirms a significant difference between the conditions before and after the implementation of the Game-Based Learning model. Thus, the increase in student learning interest and motivation did not occur by chance, but rather was a direct impact of the treatment given.

These quantitative findings were reinforced by observations during the learning process. Observations revealed a significant change in students' learning behavior following the implementation of the Game-Based Learning model. Students became more active, enthusiastic, and directly involved in the learning process. Interaction between students increased through group collaboration in solving game challenges, while interactions between teachers and students became more communicative and two-way. The classroom atmosphere, which had previously been passive, became more lively, interactive, and conducive to learning.

Pedagogically, this study's results indicate that Game-Based Learning can accommodate students' learning needs by integrating cognitive, affective, and social elements simultaneously. Game elements provide challenges, clear goals, and immediate feedback, thereby encouraging students to engage actively and maintain their focus on learning.[26]In the context of history learning, this model helps students understand the material not simply as a rote memorization of events, but as an engaging and relevant learning experience. Furthermore, students' increased motivation indicates that Game-Based Learning can foster meaningful learning. Students are not only motivated to earn grades but also enjoy the learning process itself. This is crucial in history learning, given that this subject is often considered difficult and boring by some students.

Thus, the results of this study reinforce the view that the Game-Based Learning model is an effective, innovative learning alternative for increasing student interest and motivation. These findings are relevant to efforts to improve the quality of history learning in secondary schools, particularly in creating student-centered, active, and enjoyable learning.[27].

4. CONCLUSION

This study concludes that applying the Game-Based Learning model in history learning significantly increases the interest and motivation of class X students at SMA Islam Athirah Bukit Baruga, with average interest scores rising from 55.73 to 85.37 and motivation scores from 57.50 to 88.20. The results of the paired-samples t-test showed a significance of 0.000 ($p < 0.05$) for both variables, supported by observations of increased enthusiasm, interaction, and student participation during educational games such as interactive quizzes and historical simulations. These findings confirm the model's effectiveness in transforming monotonous conventional learning into a fun and meaningful experience, especially for history material that is often considered boring.

However, limitations of the study include its pre-experimental design without a control group, which limits generalizability to a broader population, and its small sample of 30 students from a single Islamic school. Suggestions for future research include using a quasi-experimental design with a larger sample, including additional variables such as cognitive learning outcomes, or combining VR technology across diverse contexts. Practically, the research implications encourage history teachers to adopt Game-Based Learning to increase student engagement, with teacher training and school facility support to optimize digital-era learning.

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