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SMART GAME AND QUR'ANIC LEARNING: AN EFFORT TO ENHANCE STUDENTS' LEARNING INTEREST AT SDN PATAONAN 03 BANGKALAN

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Abstract
Qur'anic learning at the elementary school level plays a crucial role in developing students' religious literacy, moral growth, and foundational reading skills. However, many primary schools still implement conventional approaches that emphasize repetition and teacher-centered instruction, which often fail to sustain students' learning interest, particularly among digitally oriented young learners. This study aimed to examine the effect of smart game–based Qur'anic learning on students' learning interest at SDN Pataonan 03 Bangkalan. A quantitative approach with a quasi-experimental, non-equivalent control group design was employed, involving 45 students from grades IVa and IVb. The experimental group participated in smart game–based Qur'anic learning, while the control group received conventional instruction. Students' learning interest was measured using a validated Likert-scale questionnaire and analyzed through descriptive statistics and the Mann–Whitney–Wilcoxon test. The results revealed a significant increase in learning interest for the experimental group (M = 78.26) compared to the control group (M = 65.14), with Z = -4.22 and p = 0.000. These findings indicate that smart game–based Qur'anic learning effectively enhances students' learning interest, transforming situational interest into more enduring individual interest and providing an engaging, interactive, and motivating learning experience.
Keywords: Smart game, Qur'anic learning, learning interest, elementary school

Abstrak
Pembelajaran Al-Qur'an di tingkat sekolah dasar memegang peranan penting dalam mengembangkan literasi keagamaan, pertumbuhan moral, dan keterampilan dasar membaca siswa. Namun, banyak sekolah dasar masih menerapkan pendekatan konvensional yang menekankan pada pengulangan dan pembelajaran yang berpusat pada guru, yang sering kali gagal mempertahankan minat belajar siswa, khususnya di kalangan peserta didik muda yang akrab dengan dunia digital. Penelitian ini bertujuan untuk mengkaji pengaruh pembelajaran Al-Qur'an berbasis smart game terhadap minat belajar siswa di SDN Pataonan 03 Bangkalan. Pendekatan kuantitatif dengan desain eksperimen semu (quasi-experimental) dan kelompok kontrol non-ekuivalen digunakan dalam penelitian ini, yang melibatkan 45 siswa dari kelas IVa dan IVb. Kelompok eksperimen mengikuti pembelajaran Al-Qur'an berbasis smart game, sedangkan kelompok kontrol menerima pembelajaran konvensional. Minat belajar siswa diukur menggunakan kuesioner skala Likert yang telah divalidasi dan dianalisis melalui statistik deskriptif serta uji Mann–Whitney–Wilcoxon. Hasil penelitian menunjukkan adanya peningkatan signifikan pada minat belajar kelompok eksperimen (M = 78,26) dibandingkan dengan kelompok kontrol (M = 65,14), dengan nilai Z = -4,22 dan p = 0,000. Temuan ini mengindikasikan bahwa pembelajaran Al-Qur'an berbasis smart game secara efektif meningkatkan minat belajar siswa, mengubah minat situasional menjadi minat individual yang lebih menetap, serta memberikan pengalaman belajar yang menarik, interaktif, dan memotivasi.
Kata kunci: Smart game, pembelajaran Al-Qur'an, minat belajar, sekolah dasar

INTRODUCTION

Qur'anic learning at the elementary school level plays a crucial role in shaping students' religious literacy, moral development, and foundational reading skills. Nevertheless, many Qur'anic learning practices in primary schools continue to rely on conventional instructional approaches that emphasize repetition and teacher-centered instruction. Such approaches often fail to sustain students' learning interest, particularly in the context of digitally oriented young learners. Educational psychology literature consistently demonstrates that learning interest is a decisive factor influencing students' engagement, persistence, and achievement.[1] Consequently, innovative pedagogical strategies that align with students' cognitive and motivational characteristics are increasingly required in Qur'anic education.

Previous studies in Qur'anic pedagogy have primarily focused on improving technical reading and memorization skills through structured methods such as Qiroati, Wafa, and Cooperative Integrated Reading and Composition (CIRC), as well as reward-based strategies to enhance motivation.[2] Other research has explored activity-based Qur'anic instruction and teacher communication strategies, particularly for students with special educational needs.[3] While these studies contribute valuable insights into pedagogical effectiveness, they largely remain within traditional or semi-digital instructional paradigms and pay limited attention to the systematic cultivation of students' learning interest in mainstream elementary school contexts.

Alongside these developments, the rapid advancement of educational technology has positioned digital and game-based learning as promising approaches to enhance student engagement. Serious games, in particular, are designed to integrate learning objectives with game

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[1] J. M. Harackiewicz et al., "Interest Matters," *Policy Insights from the Behavioral and Brain Sciences* 3, no. 2 (2016): 220–27, https://doi.org/10.1177/2372732216655542; K. A. Renninger and S. Hidi, "Interest Development, Self-Related Information Processing, and Practice," *Theory Into Practice* 61, no. 1 (2022): 23–34, https://doi.org/10.1080/00405841.2021.1932159; J. I. Rotgans and H. G. Schmidt, "How Individual Interest Influences Situational Interest and How Both Are Related to Knowledge Acquisition: A Microanalytical Investigation," *The Journal of Educational Research* 111, no. 5 (2018): 530–40, https://doi.org/10.1080/00220671.2017.1310710.

[2] D. F. P. Rohim et al., *Model Pembelajaran Cooperative Integrated Reading and Composition (CIRC) Untuk Meningkatkan Pemahaman Siswa Dalam Membaca Dan Menulis Al-Qur'an* (Zamron Presindo, 2024); W. Firmansyah et al., "Utilization of Qiroati Learning Method to Improve the Ability to Read the Quran at TPQ Al Mubarok Surabaya," *Al Qalam: Jurnal Ilmiah Keagamaan Dan Kemasyarakatan* 19, no. 3 (2025): 1718–29, https://doi.org/10.35931/aq.v19i3.5007; I. A. Muzaiyanah et al., "Implementasi Metode Wafa Dengan Pemberian Reward Dalam Meningkatkan Motivasi Menghafal Al-Qur'an Siswa Di SMP Mujahidin Surabaya," *JIIP: Jurnal Ilmiah Ilmu Pendidikan* 6, no. 4 (2023): 2292–99, https://doi.org/10.54371/jiip.v6i4.1589.

[3] I. Dzulkifli et al., "Teacher Communication in Teaching Al-Quran to Special Needs Pupils with Hearing Disabilities," *Universal Journal of Educational Research* 8, no. 1A (2020): 36–43, https://doi.org/10.13189/ujer.2020.081306; I. Dzulkifli et al., "Activity-Based Teaching of Quran for Deaf Students in the Special Education Integration Program," *Pertanika Journal of Social Sciences and Humanities* 29, no. 1 (2021), https://doi.org/10.47836/pjssh.29.1.05; H. Zulkifli et al., "Challenges and Elements Needed for Children with Learning Disabilities in Teaching and Learning the Quran," *Children* 9, no. 10 (2022): 1469, https://doi.org/10.3390/children9101469.

mechanics, feedback systems, and meaningful user interaction to foster motivation and sustained engagement.[4] Empirical evidence also indicates that digital learning systems and data-driven instructional technologies can support learning materials and improve instructional effectiveness when appropriately designed.[5] In Qur'anic education, digital innovations such as memorization applications and visual-based learning media have demonstrated positive effects on students' motivation and learning experiences.[6] However, these studies tend to emphasize technological functionality or learning outcomes rather than examining how interactive game-based designs influence students' learning interest as a core psychological construct.

Furthermore, research on learning interest underscores that interest develops dynamically through interaction between individual predispositions and situational learning environments. The interest loop theory suggests that well-designed learning tasks can transform situational interest into more enduring individual interest, thereby enhancing long-term engagement and knowledge acquisition.[7] Despite its relevance, this theoretical perspective has rarely been applied in studies of Qur'anic learning, particularly those employing interactive digital or game-based approaches at the elementary school level. Methodologically, many existing studies also rely on descriptive or pre-experimental designs, leaving a need for more rigorous quasi-experimental approaches to examine causal relationships between instructional interventions and student interest.[8]

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[4] Z. A. Al-Awadai, "A Conceptual Framework for Designing Effective Serious Games for Learning," 2025, 1–8, https://doi.org/10.1109/SeGAH65397.2025.11168438; A. Alee et al., "The Impact of Minecraft-Based Gamification on Islamic Education Learning Outcomes: Evidence from a Santichon Islamic School (SIS) Bangkok Thailand," *Ar-Fachruddin: Journal of Islamic Education* 2, no. 1 (2025): 1–9, https://doi.org/10.7401/2q4s5135; A. Pujosakti and A. Asrori, "Pengembangan Media Pembelajaran Interaktif Berbasis Game Android Untuk Meningkatkan Partisipasi Dan Hasil Belajar Siswa Pada Materi Asmaul Husna Di MI Muhammadiyah 1 Jombang," *Jurnal Staika: Jurnal Penelitian Dan Pendidikan* 9, no. 1 (2024): 79–86, https://doi.org/10.62750/nj5sxg78.

[5] M. Huda, "Big Data Emerging Technology for Instruction: Insights into Learning Material Support," in *Research Perspectives on Software Engineering and Systems Design*, vol. 1491, ed. R. Silhavy and P. Silhavy, Lecture Notes in Networks and Systems (Springer, 2025), https://doi.org/10.1007/978-3-031-96380-3_28; A. Hehsan, "Digital Muhadathah: Framework Model Development for Digital Arabic Language Learning," in *ICT: Cyber Security and Applications*, vol. 916, ed. A. Joshi et al., Lecture Notes in Networks and Systems (Springer Singapore, 2024), https://doi.org/10.1007/978-981-97-0744-7_2; A. Wahid, "Digital Technology for Indigenous People's Knowledge Acquisition Process: Insights from Empirical Literature Analysis," in *Intelligent Strategies for ICT*, vol. 941, ed. M. S. Kaiser et al., Lecture Notes in Networks and Systems (Springer Singapore, 2024), https://doi.org/10.1007/978-981-97-1260-1_5.

[6] N. M. Mustafa et al., "Development and Alpha Testing of EzHifz Application: Al-Quran Memorization Tool," *Advances in Human-Computer Interaction* 2021 (2021): 1–10, https://doi.org/10.1155/2021/5567001; M. Iqbal et al., "Development Learning to Recognize Hijaiyah Letters in Reading and Writing the Qur'an Based on Canva Application to Improve Learning Motivation," *Al Qalam: Jurnal Ilmiah Keagamaan Dan Kemasyarakatan* 19, no. 3 (2025): 1579–93, https://doi.org/10.35931/aq.v19i3.4425.

[7] L. H. Wong et al., "IDC Theory: Interest and the Interest Loop," *Research and Practice in Technology Enhanced Learning* 15, no. 1 (2020): 3, https://doi.org/10.1186/s41039-020-0123-2; Renninger and Hidi, "Interest Development, Self-Related Information Processing, and Practice."

[8] P. Krishnan, "A Review of the Non-Equivalent Control Group Post-Test-Only Design," *Nurse Researcher* 26, no. 2 (2019): 37–40, https://doi.org/10.7748/nr.2018.e1582; H. Cham et al., "Quasi-

In response to these gaps, this study investigates the implementation of smart game–based Qur'anic learning as an effort to enhance students' learning interest at SDN Pataonan 03 Bangkalan. By integrating principles of serious game design with theories of interest development, this research offers a novel empirical contribution to Qur'anic pedagogy in primary education. The findings are expected to provide both theoretical insights into interest-oriented Qur'anic learning and practical implications for teachers seeking to design more engaging, learner-centered instructional strategies in elementary schools.

RESEARCH METHODS

This study employed a quantitative approach with a quasi-experimental design to examine the effect of smart game–based Qur'anic learning on elementary school students' learning interest. This approach was selected because it allows for the analysis of causal relationships within the naturally occurring classroom context, while also accommodating the practical limitations of full randomization, which is often not feasible in educational research.[9]

The research design applied was a non-equivalent control group design with pre-test and post-test measurements, in which the experimental and control groups were formed from intact classes. This approach is commonly used in educational research as it enables comparisons of treatment effectiveness even without full randomization.[10]

The study was conducted at SDN Pataonan 03 Bangkalan, involving 45 students from grades IVa and IVb, divided into an experimental group and a control group based on existing class arrangements. The experimental group participated in smart game–based Qur'anic learning, which integrated interactive digital games and immediate feedback to enhance learning interest, while the control group followed conventional teacher-centered instruction focusing on repetition and rote memorization. This setup allowed the researchers to examine the effect of innovative, technology-enhanced learning on students' engagement and interest within a natural classroom environment, providing practical insights for implementing interactive Qur'anic learning in primary schools.

The independent variable in this study was smart game–based Qur'anic learning, while the dependent variable was students' learning interest. Students' learning interest was measured using a Likert-scale questionnaire that had been tested for validity and reliability, ensuring that the

Experimental Designs for Causal Inference: An Overview," *Asia Pacific Education Review* 25, no. 3 (2024): 611–27, https://doi.org/10.1007/s12564-024-09981-2.

[9] N. Levine, "CrimeStat IV," in *The Encyclopedia of Research Methods in Criminology and Criminal Justice* (Wiley, 2021), https://doi.org/10.1002/9781119111931.ch6; Cham et al., "Quasi-Experimental Designs for Causal Inference: An Overview."

[10] Krishnan, "A Review of the Non-Equivalent Control Group Post-Test-Only Design."

instrument accurately captured the research variable and allowed for meaningful comparisons between groups.[11]

The research procedure included administering a pre-test, conducting smart game–based learning in the experimental group, and providing a post-test for both groups. This procedure supports the drawing of causal inferences within a quasi-experimental design.[12]

Data analysis was performed using descriptive statistics and an independent-samples t-test with a significance level of 0.05. Prior to hypothesis testing, data normality was assessed using the Shapiro–Wilk test. The results indicated that students' learning interest scores for both pre-test and post-test in both groups were not normally distributed. Given that normality tests are highly sensitive to sample size and data distribution shape, these results were interpreted with caution.[13] Consequently, inferential analysis was conducted using the non-parametric Mann–Whitney–Wilcoxon test, which is more appropriate and reliable for comparing two independent groups with non-normally distributed data.[14] The choice of the Mann–Whitney–Wilcoxon test also aligns with recent methodological developments in non-parametric analysis emphasizing statistical accuracy and efficiency.[15]

By adhering to ethical principles in educational research and implementing interactive game–based learning supported by previous empirical findings Wordofa et al., and Wasilkiewicz et al.,[16] this study provides an in-depth examination of the effect of smart game–based Qur'anic learning on elementary school students' learning interest.

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[11] M. R. Mack et al., "Metrics and Methods Used to Compare Student Performance Data in Chemistry Education Research Articles," *Journal of Chemical Education* 96, no. 3 (2019): 401–13, https://doi.org/10.1021/acs.jchemed.8b00713.

[12] S. Fu et al., "Difference-in-Difference Techniques and Causal Inference," in *Hot Topics in Acute Care Surgery and Trauma* (Springer, 2022), https://doi.org/10.1007/978-3-031-13818-8_11.

[13] R. D. Gosselin, "Testing for Normality: A User's (Cautionary) Guide," *Laboratory Animals* 58, no. 5 (2024): 433–37, https://doi.org/10.1177/00236772241276808; M. Vaclavik et al., "Skewness in Applied Analysis of Normality," in *Advances in Intelligent Systems and Computing* (Springer, 2020), https://doi.org/10.1007/978-3-030-63319-6_86; D. K. Wijekularathna et al., "Power Analysis of Several Normality Tests: A Monte Carlo Simulation Study," *Communications in Statistics – Simulation and Computation* 51, no. 3 (2022): 757–73, https://doi.org/10.1080/03610918.2019.1658780.

[14] R. Treister et al., "Experimental Comparison of Parametric versus Nonparametric Analyses of Data from the Cold Pressor Test," *The Journal of Pain* 16, no. 6 (2015): 537–48, https://doi.org/10.1016/j.jpain.2015.03.001.

[15] Y. Park, "Optimal Two-Stage Group Sequential Designs Based on Mann–Whitney–Wilcoxon Test," *PLOS ONE* 20, no. 2 (2025): e0318211, https://doi.org/10.1371/journal.pone.0318211; A. Marx et al., "EDISON-WMW: Exact Dynamic Programming Solution of the Wilcoxon–Mann–Whitney Test," *Genomics, Proteomics & Bioinformatics* 14, no. 1 (2016): 55–61, https://doi.org/10.1016/j.gpb.2015.11.004.

[16] Y. J. Wordofa et al., "Transforming Reading Self-Efficacy in EFL Classrooms: The Role of Task-Based Instruction," *Ampersand* 15 (2025): 100236, https://doi.org/10.1016/j.amper.2025.100236; K. Wasilkiewicz Edwin et al., "An Analysis of the Relationship between Project Management and Safety Management in the Norwegian Construction Industry," *Safety Science* 180 (2024): 106654, https://doi.org/10.1016/j.ssci.2024.106654.

RESULTS AND DISCUSSION

Results

This section presents the empirical findings derived from the quantitative data analysis to examine the effect of smart game–based Qur'anic learning on the learning interest of students at SDN Pataonan 03 Bangkalan. The data analysis was conducted in stages, beginning with descriptive statistics to illustrate the initial and final conditions of students' learning interest, followed by a normality test as the basis for selecting the appropriate inferential analysis technique, and concluding with a difference test using the Mann–Whitney–Wilcoxon test to determine the significance of differences in learning interest between the experimental and control groups. The presentation of results is systematically organized, and each finding is referenced against the relevant statistical table.

Descriptive Statistics of Students' Learning Interest

A descriptive statistical analysis was conducted to provide an overview of the students' learning interest scores in both the experimental and control groups, measured before (pre-test) and after (post-test) the learning intervention. The purpose of this analysis was to identify general trends and patterns in students' interest levels and to compare the initial equivalence and subsequent changes between groups. The results of this descriptive analysis are presented in table 1.

Table 1. Descriptive Statistics of Students' Learning Interest Scores

Group	Test Stage	N	M	SD	Min	Max
Experimental	Pre-test	23	61.87	6.45	50	74
Experimental	Post-test	23	78.26	5.38	67	88
Control	Pre-test	22	60.91	6.12	49	72
Control	Post-test	22	65.14	5.97	54	76

Based on table 1, the pre-test mean scores show that both the experimental group (M = 61.87) and the control group (M = 60.91) were initially at relatively similar levels, indicating that the two groups were comparable in terms of learning interest prior to the intervention. After the implementation of the smart game–based Qur'anic learning, the post-test results revealed a notable increase in the experimental group's mean score, rising to 78.26, compared to a more modest increase in the control group, which reached 65.14. This pattern suggests that the learning intervention had a positive effect on students' learning interest, particularly in the experimental group. The range of scores (Min–Max) also indicates that students in the experimental group experienced a greater overall improvement and consistency in higher scores compared to the control group.

Normality Test of Data

Before conducting inferential statistical analyses to compare group differences, the normality of the students' learning interest scores was assessed using the Shapiro–Wilk test. This test evaluates whether the data are normally distributed, which is a prerequisite for parametric tests. The results of the normality test are presented in table 2.

Table 2. Shapiro–Wilk Normality Test Results

Group	Test Stage	W	p
Experimental	Pre-test	0.912	0.028
Experimental	Post-test	0.894	0.015
Control	Pre-test	0.918	0.031
Control	Post-test	0.907	0.022

As shown in table 2, the p-values for all test stages in both groups were below the threshold of 0.05 ($p < 0.05$), indicating that the data were not normally distributed. This finding necessitated the use of non-parametric statistical methods to analyze the differences between groups.

Difference Test of Students' Learning Interest

To examine the difference in learning interest between the experimental and control groups after the intervention, the Mann–Whitney–Wilcoxon test was employed. This non-parametric test is suitable for comparing two independent groups when the assumption of normality is not met. The post-test rank scores of the students' learning interest are presented in table 3.

Table 3. Post-test Rank Scores of Students' Learning Interest

Group	N	Mean Rank	Sum of Ranks
Experimental	23	30.74	707.00
Control	22	14.95	328.90

As observed in table 3, the experimental group exhibited a higher mean rank (30.74) than the control group (14.95), indicating that students who received smart game–based Qur'anic learning demonstrated greater learning interest overall compared to those who followed conventional learning methods. The sum of ranks further confirms that the majority of higher scores were concentrated in the experimental group.

Summary of Mann–Whitney–Wilcoxon Test Statistics

The Mann–Whitney–Wilcoxon test results are summarized in table 4. The statistical analysis revealed a significant difference between the experimental and control groups in terms of learning interest after the intervention.

Table 4. Summary of Mann–Whitney–Wilcoxon Test Statistics

Statistic	Value
U	75.00
Z	-4.22
p (2-tailed)	0.000

As indicated by table 4, the significance value (p = 0.000) is below 0.05, demonstrating that the difference in post-test learning interest scores between the two groups is statistically significant. This finding provides strong evidence that the smart game–based Qur'anic learning intervention had a positive and meaningful impact on students' interest in learning. Taken together, the descriptive statistics (table 1) and the inferential analyses (tables 3 and 4) indicate that smart game–based Qur'anic learning is more effective in enhancing elementary school students' learning interest compared to conventional teaching methods. The substantial increase in scores observed in the experimental group highlights the potential of gamified and interactive learning approaches to foster student motivation, engagement, and sustained interest in Qur'anic education. These results underscore the educational value of integrating technology-driven, game-based learning tools into primary school curricula.

Discussion

The results of this study indicate that the implementation of smart game–based Qur'anic learning significantly enhances students' learning interest in elementary school, as evidenced by both descriptive and inferential statistical analyses. The descriptive statistics showed that students in the experimental group experienced a substantial increase in learning interest scores from a pre-test mean of 61.87 to a post-test mean of 78.26. In contrast, the control group, which received conventional learning, only showed a modest increase from 60.91 to 65.14 (table 1). These findings suggest that the integration of interactive, game-based elements into Qur'anic learning fosters a more engaging and motivating learning environment, consistent with prior research highlighting the positive effects of gamified learning on student engagement and motivation.[17]

The substantial improvement in the experimental group aligns with the theoretical framework of interest development, which posits that learning activities that actively engage students and provide meaningful, enjoyable experiences can enhance situational and individual

[17] Al-Awadai, "A Conceptual Framework for Designing Effective Serious Games for Learning"; Alee et al., "The Impact of Minecraft-Based Gamification on Islamic Education Learning Outcomes: Evidence from a Santichon Islamic School (SIS) Bangkok Thailand"; Pujosakti and Asrori, "Pengembangan Media Pembelajaran Interaktif Berbasis Game Android Untuk Meningkatkan Partisipasi Dan Hasil Belajar Siswa Pada Materi Asmaul Husna Di MI Muhammadiyah 1 Jombang."

interest.[18] The smart game–based learning method appears to have successfully transformed situational interest into more sustained individual interest, as evidenced by the higher post-test scores. This is particularly relevant in Qur'anic education, where maintaining student motivation can be challenging due to the repetitive and complex nature of memorization and recitation tasks.[19]

The normality test results (table 2) indicated that the learning interest scores for both groups were not normally distributed, necessitating the use of the Mann–Whitney–Wilcoxon test for between-group comparisons. The post-test rank scores (table 3) showed that the experimental group had a mean rank of 30.74, considerably higher than the control group's mean rank of 14.95. The Mann–Whitney–Wilcoxon test further confirmed that this difference was statistically significant ($U = 75.00$, $Z = -4.22$, $p < 0.001$; Table 4), demonstrating that smart game–based Qur'anic learning had a clear and measurable positive effect on students' learning interest. These findings corroborate previous studies that have demonstrated the effectiveness of digital and gamified interventions in improving learning outcomes and engagement in Islamic education.[20]

From an instructional perspective, the findings suggest that smart game–based Qur'anic learning provides several pedagogical advantages. First, it facilitates active participation, as students are required to interact with game elements, solve challenges, and receive immediate feedback, which enhances both motivation and cognitive engagement.[21] Second, gamified learning can reduce the monotony and cognitive load often associated with traditional Qur'anic teaching methods, enabling students to sustain attention and maintain interest over time.[22] Third, integrating

[18] Harackiewicz et al., "Interest Matters"; Renninger and Hidi, "Interest Development, Self-Related Information Processing, and Practice"; Wong et al., "IDC Theory: Interest and the Interest Loop."

[19] I. Dzulkifli et al., "Teacher Communication in Teaching Al-Quran to Special Needs Pupils with Hearing Disabilities"; Dzulkifli et al., "Activity-Based Teaching of Quran for Deaf Students in the Special Education Integration Program"; Firmansyah et al., "Utilization of Qiroati Learning Method to Improve the Ability to Read the Quran at TPQ Al Mubarok Surabaya"; Iqbal et al., "Development Learning to Recognize Hijaiyah Letters in Reading and Writing the Qur'an Based on Canva Application to Improve Learning Motivation."

[20] M. Hendawi and S. Qadhi, "Digital Literacy-Based Learning in Islamic Education," *Ar-Fachruddin: Journal of Islamic Education* 1, no. 1 (2024): 45–58, https://doi.org/10.7401/j19t2q81; G. A. N. Zakaria and S. Mahalle, "The Urgency of Educational Technology in Islamic Education," *Ar-Fachruddin: Journal of Islamic Education* 1, no. 1 (2024): 12–19, https://doi.org/10.7401/s5bc5h23; Mustafa et al., "Development and Alpha Testing of EzHifz Application: Al-Quran Memorization Tool."

[21] Al-Awadai, "A Conceptual Framework for Designing Effective Serious Games for Learning"; Huda, "Big Data Emerging Technology for Instruction: Insights into Learning Material Support"; M. Huda, "Digital Technology System Adaptation and Adoption: Insights into Administrative Management Framework System," in *Research Perspectives on Software Engineering and Systems Design*, vol. 1492, ed. R. Silhavy and P. Silhavy, Lecture Notes in Networks and Systems (Springer, 2025), https://doi.org/10.1007/978-3-031-96775-7_28; M. Huda, "Trust for Communication System: Insights into Digital-Oriented Organizational Sustainability," in *Research Perspectives on Software Engineering and Systems Design*, vol. 1491, ed. R. Silhavy and P. Silhavy, Lecture Notes in Networks and Systems (Springer, 2025), https://doi.org/10.1007/978-3-031-96380-3_29.

[22] N. Parveen, "Evidence-Based Practices of Cognitive Load Management to Enhance Learning," *Psychological Studies* 70, no. 2 (2025): 374–86, https://doi.org/10.1007/s12646-025-00841-6; Fu et al., "Difference-in-Difference Techniques and Causal Inference."

digital technology in religious education aligns with contemporary demands for ICT literacy, allowing students to develop digital competencies alongside religious knowledge.[23]

Moreover, the interactive and reward-based nature of smart games appears to cater to diverse learner needs and preferences, providing scaffolding that supports both high-achieving and struggling students. This is consistent with the findings of Muzaiyanah, Hayumuti, and Asrori, who reported that incorporating reward systems and interactive strategies significantly improves student motivation and learning persistence in Islamic educational contexts. Similarly, the results align with studies on Minecraft-based gamification in Islamic education, which have demonstrated that gamified environments can enhance engagement, retention, and overall learning satisfaction.[24]

The results also highlight the importance of adapting instructional methods to the developmental and motivational needs of young learners. Traditional Qur'anic teaching approaches, often characterized by rote memorization and repetitive recitation, may not adequately stimulate interest or intrinsic motivation, particularly among elementary students.[25] By contrast, smart game–based learning provides a dynamic, interactive, and contextually meaningful learning environment that actively engages learners and fosters positive attitudes toward Qur'anic study. This supports prior research emphasizing the role of pedagogical innovation and technology integration in improving student-centered learning outcomes in religious education.[26]

In summary, the discussion of the results demonstrates that smart game–based Qur'anic learning is not only effective in improving learning interest but also contributes to the broader objectives of modern Islamic education by integrating motivational, cognitive, and technological dimensions. The findings provide strong empirical support for incorporating gamified digital learning tools into primary school Qur'anic curricula, highlighting the potential for enhancing student engagement, fostering positive learning attitudes, and promoting sustained interest in religious learning.[27]

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[23] Hendawi and Qadhi, "Digital Literacy-Based Learning in Islamic Education"; Huda, "Big Data Emerging Technology for Instruction: Insights into Learning Material Support."

[24] Alee et al., "The Impact of Minecraft-Based Gamification on Islamic Education Learning Outcomes: Evidence from a Santichon Islamic School (SIS) Bangkok Thailand."

[25] I. Dzulkifli et al., "Teacher Communication in Teaching Al-Quran to Special Needs Pupils with Hearing Disabilities"; Dzulkifli et al., "Activity-Based Teaching of Quran for Deaf Students in the Special Education Integration Program"; Firmansyah et al., "Utilization of Qiroati Learning Method to Improve the Ability to Read the Quran at TPQ Al Mubarok Surabaya."

[26] Hendawi and Qadhi, "Digital Literacy-Based Learning in Islamic Education"; Pujosakti and Asrori, "Pengembangan Media Pembelajaran Interaktif Berbasis Game Android Untuk Meningkatkan Partisipasi Dan Hasil Belajar Siswa Pada Materi Asmaul Husna Di MI Muhammadiyah 1 Jombang"; Iqbal et al., "Development Learning to Recognize Hijaiyah Letters in Reading and Writing the Qur'an Based on Canva Application to Improve Learning Motivation."

[27] Al-Awadai, "A Conceptual Framework for Designing Effective Serious Games for Learning"; Alee et al., "The Impact of Minecraft-Based Gamification on Islamic Education Learning Outcomes: Evidence from a Santichon Islamic School (SIS) Bangkok Thailand"; Zakaria and Mahalle, "The Urgency of Educational Technology in Islamic Education."

CONCLUSION

This study demonstrates that smart game–based Qur'anic learning has a significant positive effect on elementary school students' learning interest. The experimental group showed a substantial increase in mean learning interest scores from 61.87 at the pre-test stage to 78.26 at the post-test stage, whereas the control group increased only from 60.91 to 65.14. These results indicate that integrating interactive game elements into Qur'anic instruction provides a more engaging learning environment than conventional teacher-centered approaches based predominantly on repetition and memorization.

The inferential analysis further strengthens this conclusion. Because the learning interest data were not normally distributed, the Mann–Whitney–Wilcoxon test was employed to compare post-test outcomes between the experimental and control groups. The experimental group obtained a considerably higher mean rank of 30.74 compared with 14.95 in the control group, with a statistically significant difference ($U = 75.00$; $Z = -4.22$; $p < 0.001$). These findings provide empirical evidence that the observed improvement in learning interest is associated with the implementation of smart game–based Qur'anic learning.

From a pedagogical perspective, the effectiveness of this approach can be understood through its capacity to create active, interactive, and enjoyable learning experiences. Game-based activities encourage students to participate directly in instructional tasks, respond to challenges, and receive immediate feedback. These features reduce the monotony frequently associated with repetitive Qur'anic learning practices and provide students with greater opportunities to experience learning as an engaging process. Consequently, digital game elements function not merely as technological additions but as pedagogical mechanisms that strengthen attention, participation, and motivation.

The findings also reinforce the theoretical proposition that learning interest can develop through the interaction between students and stimulating situational learning environments. Smart game–based learning appears to create conditions capable of activating situational interest and supporting its development toward more sustained engagement with Qur'anic learning. In this regard, the study expands the application of interest development theory into the context of elementary Qur'anic education and demonstrates that religious learning can be effectively integrated with contemporary digital pedagogy without reducing its educational substance.

Overall, smart game–based Qur'anic learning represents a promising instructional alternative for strengthening students' interest in religious learning while simultaneously responding to the characteristics of digitally oriented learners. Nevertheless, the study was conducted at a single elementary school with a relatively limited sample of 45 students, which restricts the broader generalization of the findings. Future studies should involve larger and more

diverse samples, longer intervention periods, and additional outcome variables such as Qur'anic reading competence, learning retention, motivation, and digital literacy to determine the sustainability and broader educational effects of smart game–based Qur'anic learning.

Research Novelty

The novelty of this study lies in shifting the focus of digital Qur'anic learning research from predominantly technical learning outcomes toward students' learning interest as a central psychological construct. Previous studies on Qur'anic pedagogy have largely concentrated on reading proficiency, memorization, reward strategies, or the functional use of digital media. This study extends the existing literature by examining how an interactive smart game–based learning environment influences students' interest in Qur'anic learning through a quasi-experimental comparison between technology-enhanced and conventional instructional approaches.

A further novelty is the integration of serious game principles with the theoretical framework of interest development in the context of elementary Qur'anic education. Rather than conceptualizing games merely as entertaining instructional media, this study positions interactivity, immediate feedback, challenges, and active participation as situational stimuli that can foster stronger learning interest. This perspective establishes a conceptual link between digital instructional design and the psychological process through which situational interest may develop into more sustained individual engagement with Qur'anic learning.

Methodologically, the study also contributes by employing a non-equivalent control group design supported by pre-test and post-test measurements and appropriate non-parametric inferential analysis. This approach provides stronger empirical evidence than purely descriptive or pre-experimental studies commonly found in similar educational contexts. Accordingly, the study contributes an empirically supported framework in which smart game technology, interest-oriented pedagogy, and Qur'anic education are integrated to address both motivational and instructional challenges among elementary school learners.

Research Implications

Theoretically, the findings imply that theories of learning interest can be productively extended into Qur'anic education. Students' interest in religious learning should not be regarded as a fixed personal characteristic but as a dynamic psychological condition that can be stimulated by instructional environments. Interactive challenges, immediate feedback, meaningful participation, and enjoyable experiences generated through smart game–based learning can act as situational triggers that strengthen students' engagement. This provides a theoretical basis for developing

Qur'anic pedagogy that combines religious learning objectives with motivational principles derived from contemporary educational psychology.

Pedagogically, the findings suggest that elementary school teachers should move beyond predominantly repetitive and teacher-centered Qur'anic instruction by incorporating appropriately designed interactive learning activities. Smart games can be used to complement recitation, memorization, and comprehension activities through structured challenges, feedback, and active student participation. Their implementation should remain aligned with Qur'anic learning objectives so that technological innovation functions as a pedagogical instrument rather than as entertainment detached from educational purposes. Teachers therefore require adequate competence in selecting, designing, and integrating digital game elements according to students' developmental characteristics and learning needs.

At the institutional level, schools may consider supporting digital infrastructure, teacher professional development, and the systematic development of interactive Qur'anic learning resources. The findings also imply that educational technology policies in Islamic and general elementary education should address not only academic achievement but also affective outcomes such as learning interest, engagement, and persistence. However, broader implementation should be accompanied by continuous evaluation of accessibility, instructional suitability, and students' learning responses. Through such measures, smart game–based Qur'anic learning can contribute to a more learner-centered model of religious education that combines technological literacy, active participation, and sustained interest in learning the Qur'an.

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