



The Effect of Kahoot-Based Interactive Learning on Students' Learning Outcomes in Qur'an-Hadith Education

Qurrota A'yun*, Imam Mashuri, Rifqi Firdaus, Kholilurrahman

Universitas Islam Ibrahimy Banyuwangi, Indonesia

Email : qurrotaayun2116@gmail.com

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ABSTRACT

Keywords:

Kahoot; Interactive Learning; Learning Outcomes; Qur'an-Hadith Education

*Corresponding Author

This study aimed to examine the effect of Kahoot-based interactive learning on students' learning outcomes in Qur'an-Hadith Education. A quantitative approach was employed using a One-Group Pretest-Posttest Design to evaluate changes in students' cognitive achievement before and after the implementation of Kahoot-based learning. The study involved 33 students, and data were collected through pretest and posttest assessments. Prior to hypothesis testing, the research instrument was confirmed to be reliable, with a Cronbach's Alpha coefficient of 0.826. The collected data were analyzed using normality, homogeneity, and paired-sample t-tests. The findings indicated that the data were normally distributed ($p = 0.200 > 0.05$) and homogeneous ($p = 0.599 > 0.05$). Furthermore, the paired-sample t-test revealed a statistically significant difference between the pretest and posttest scores ($p < 0.001$). Students' mean scores increased from 77.79 on the pretest to 85.30 on the posttest, demonstrating a significant improvement in learning outcomes following the intervention. These findings suggest that Kahoot-based interactive learning is an effective instructional strategy for enhancing students' cognitive achievement while fostering more engaging and student-centered learning experiences in Qur'an-Hadith Education. The study provides practical implications for integrating game-based digital learning into Islamic Religious Education to support more effective classroom instruction.

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INTRODUCTION

Digital transformation has become a significant phenomenon influencing various sectors of society, including education. The integration of digital technology into learning environments is increasingly important because students require learning experiences that are adaptive, interactive, and relevant to contemporary technological developments. In Islamic education, digital innovation provides opportunities to improve learning quality by creating more

engaging instructional practices while maintaining religious values. The increasing use of educational technologies such as e-learning platforms, mobile learning, and interactive digital media demonstrates that technology can support more meaningful learning experiences. Previous studies indicate that digital integration in Islamic Religious Education (PAI) can enhance instructional effectiveness by improving teachers' pedagogical practices and expanding students' access to learning resources (Mintasih et al., 2024; Diana & Azani, 2024; Ahmed et al., 2022). Therefore, developing technology-supported learning strategies is essential to prepare students for digital learning environments while strengthening the quality of Islamic education.

The importance of technology-based learning is also related to students' changing learning characteristics in the digital era. Contemporary learners tend to engage more effectively with instructional approaches that provide interaction, immediate feedback, and active participation rather than relying solely on conventional teacher-centered methods. In this context, gamification has emerged as an innovative approach that combines educational objectives with game elements to increase students' motivation and achievement. Research evidence shows that digital game-based learning contributes positively to cognitive, affective, and motivational outcomes by encouraging engagement and active involvement during learning activities (Barz et al., 2024; Özdemir, 2025; Alluhaybi, 2026). Similarly, Kahoot-based learning has been found to improve classroom interaction, learning motivation, and students' academic performance through competitive quizzes and instant feedback mechanisms (Lashari et al., 2024; Tandiono, 2024). Thus, implementing gamified digital learning in Islamic education is important because it provides an alternative strategy to address students' learning needs in a rapidly changing educational landscape.

Theoretically, this study is grounded in the perspective of Game-Based Learning (GBL), which explains that learning activities incorporating game elements can facilitate knowledge construction through active engagement, feedback, challenge, and motivation. Within this framework, Kahoot functions as a digital learning medium that integrates competition, immediate response, and formative assessment to create an interactive learning environment. The effectiveness of gamification is also supported by digital learning perspectives emphasizing that technology adoption should be accompanied by meaningful pedagogical design rather than merely the use of digital tools. In Islamic education contexts, technology acceptance and digital pedagogy have become important factors influencing successful technology integration because teachers and students must perceive technology as useful and relevant to learning objectives (Abubakari et al., 2023; Siregar, 2023; Baissane, 2026). Therefore, the present study applies the game-based learning perspective to examine whether Kahoot-based interactive instruction can improve students' learning outcomes in Qur'an-Hadith Education.

Despite the rapid development of educational technology, several problems remain in Islamic Religious Education classrooms. Qur'an-Hadith learning is often perceived as requiring memorization and conceptual understanding, which may lead to passive learning experiences when instructional strategies are dominated by lectures and textbook-based approaches. Such conditions can reduce students' motivation, participation, and opportunities to actively construct knowledge. Although digital learning facilities are increasingly available, their implementation in Islamic education is still challenged by teachers' digital competence, limited pedagogical adaptation, and the lack of innovative instructional models specifically designed for Islamic subjects. Previous studies highlight that digital transformation in Islamic education requires not only technological infrastructure but also appropriate teaching strategies that align technology with learning objectives (Hoerudin et al., 2023; Norman et al., 2025). Consequently, there is a need to explore interactive digital approaches that can transform Qur'an-Hadith learning into a more engaging and effective educational experience.

Previous studies have extensively investigated the implementation of digital technology in Islamic education, particularly regarding e-learning adoption, mobile learning, and teachers' digital competencies. Research has shown that digital platforms can enhance Islamic learning by expanding access to resources and supporting innovative teaching practices (Adinda et al., 2024; Ahmad et al., 2024). Other studies have examined digital media integration and technological innovation in Islamic Religious Education, emphasizing the importance of digital adaptation in improving instructional quality (Asril et al., 2023; Ramli, 2023). However, these studies have generally focused on descriptive analyses, implementation models, or teacher perspectives rather than measuring the direct impact of specific digital learning interventions on students' academic achievement. Furthermore, although Kahoot has been widely examined in various educational fields, most empirical studies have been conducted in language learning, science, engineering, and higher education contexts (Anane, 2024; Rayan & Watted, 2024). This indicates a research gap regarding the effectiveness of Kahoot specifically in Qur'an-Hadith Education.

Existing literature demonstrates that gamification provides promising results in improving engagement, motivation, and learning achievement; however, empirical evidence within Islamic Religious Education remains limited. Several studies have confirmed that Kahoot enhances students' participation, reduces learning anxiety, and supports better learning experiences through interactive assessment mechanisms (Alsswey et al., 2024; Anane, 2024). Nevertheless, previous research has rarely examined whether Kahoot-based learning can significantly improve students' cognitive learning outcomes in

Qur'an-Hadith subjects at the secondary Islamic education level. In addition, studies on Islamic educational technology have predominantly explored technology acceptance, digital transformation, or conceptual integration rather than experimental evaluation of specific digital tools (Abubakari et al., 2023; Pebriana et al., 2025, Kim et al., 2024). Therefore, investigating the effectiveness of Kahoot through empirical measurement of students' learning outcomes is important to provide stronger evidence regarding the role of gamification in Islamic education.

The novelty of this study lies in positioning Kahoot not merely as a digital assessment platform but as an interactive instructional strategy integrated into Qur'an-Hadith Education. Unlike previous studies that primarily examined Kahoot effectiveness in general education settings, this research focuses on the specific characteristics of Islamic religious learning where cognitive understanding, interpretation, and engagement with religious content are essential components. This study provides a new perspective by demonstrating how gamified learning can be adapted to Islamic education while maintaining alignment with subject objectives and pedagogical values. Furthermore, the research contributes to the development of digital Islamic education by presenting classroom-based empirical evidence regarding the effectiveness of technology-enhanced learning. The findings are expected to strengthen discussions on innovative Islamic pedagogy and provide practical insights for educators seeking effective approaches to improve students' learning experiences in the digital era.

Based on these considerations, this study addresses the research problem of whether Kahoot-based interactive learning significantly influences students' learning outcomes in Qur'an-Hadith Education. The argument underlying this research is that the integration of Kahoot can create a more interactive, motivating, and student-centered learning environment, which subsequently contributes to improved cognitive achievement. By employing a quantitative pre-experimental approach, this study seeks to provide empirical evidence regarding the effectiveness of Kahoot implementation in Islamic Religious Education classrooms. The contribution of this research is twofold: academically, it expands the limited literature on gamification in Islamic education by connecting digital game-based learning with Qur'an-Hadith instruction; practically, it offers teachers and educational institutions an evidence-based strategy for improving learning quality through innovative digital media. Therefore, this study aims to examine the effect of Kahoot-based interactive learning on students' learning outcomes in Qur'an-Hadith Education.

RESEARCH METHODS

This study employed a quantitative approach using a pre-experimental One-Group Pretest–Posttest Design to examine the effect of Kahoot-based interactive learning on students' learning outcomes in Qur'an-Hadith Education. This design was selected because it enables researchers to compare students' cognitive achievement before and after the intervention within the same group, making it appropriate for evaluating the effectiveness of an educational treatment in a natural classroom setting. The intervention consisted of integrating Kahoot into Qur'an-Hadith instruction over a one-month period, including instrument preparation, pretest administration, implementation of Kahoot-based learning activities, posttest administration, and data collection. This design is widely used to evaluate digital learning innovations and game-based learning interventions because it provides direct evidence of changes in students' learning outcomes following technology-enhanced instruction (Barz et al., 2024; Özdemir, 2025).

The study was conducted at MAN 1 Banyuwangi, Indonesia, in the Qur'an-Hadith subject for Grade X students. The school was selected because it has implemented digital learning facilities that support interactive instructional media and actively encourages the integration of educational technology into Islamic Religious Education classrooms. The population consisted of 400 Grade X students, while the sample comprised 32 students selected using cluster sampling, in which one intact classroom was chosen as the experimental group. Cluster sampling was considered appropriate because classroom grouping had already been established by the school, allowing the intervention to be implemented without disrupting the existing instructional process. Data were collected using pretests and posttests to measure students' cognitive learning outcomes, while classroom observations were conducted to document students' participation and engagement during Kahoot-based learning sessions. The use of interactive digital media and classroom observation is recommended to capture both academic achievement and student engagement in technology-supported Islamic education (Mintasih et al., 2024; Norman et al., 2025).

The collected data were analyzed quantitatively using IBM SPSS. Prior to hypothesis testing, the research instrument was examined through validity and reliability tests to ensure that it accurately measured the intended constructs and produced consistent results. Subsequently, normality and homogeneity tests were conducted to verify the assumptions required for parametric statistical analysis. The research hypothesis was then tested using a paired-sample t-test, which is appropriate for comparing pretest and posttest scores obtained from the

same participants in a one-group experimental design. Statistical significance was determined at the 0.05 level, where a *p*-value below 0.05 indicated a significant improvement in students' learning outcomes after the implementation of Kahoot-based interactive learning. This analytical procedure has been widely adopted in studies evaluating the effectiveness of game-based digital learning on students' achievement and engagement across various educational contexts (Lashari et al., 2024; Tandiono, 2024).

RESULTS AND DISCUSSION

Results

Instrument Validity Test

The validity test was conducted to determine whether each test item was appropriate for measuring students' learning outcomes in Qur'an-Hadith Education. A total of 25 multiple-choice items were administered to 33 students, and each item's validity was evaluated by comparing the calculated correlation coefficient (*r*count) with the critical correlation value (*r*table). Items with *r*count greater than *r*table were considered valid and retained for further analysis.

Table 1. Instrument Validity Test

Description	Item Numbers	Total
Valid	1, 2, 6, 7, 8, 9, 11, 12, 13, 15, 16, 17, 18, 19, 20, 22, 23, 24	18
Invalid	3, 4, 5, 10, 14, 21, 25	7
Total	1–25	25

As presented in Table 1, 18 of the 25 test items satisfied the validity criterion and were therefore retained for measuring students' cognitive learning outcomes. These valid items represented approximately 72% of the total instrument, indicating that most of the developed questions adequately measured the intended construct. In contrast, 7 items (28%) did not meet the required validity criterion and were excluded from subsequent analyses. Consequently, only the 18 valid items were used in the pretest and posttest analyses.

Instrument Reliability Test

After the validity test, the reliability of the instrument was examined using Cronbach's Alpha to determine the internal consistency of the test items.

Table 2. Instrument Reliability Test

Variable	Number of Items	Cronbach's Alpha	Criterion	Conclusion
Test Instrument	25	0.826	>0.70	Reliable

As shown in Table 2, the instrument obtained a Cronbach's Alpha coefficient of 0.826, which exceeded the minimum acceptable threshold of 0.70. This result indicates that the instrument demonstrated a high level of internal consistency, suggesting that the test items measured the same construct consistently. Therefore, the instrument was considered sufficiently reliable for collecting research data and was suitable for further statistical analysis.

Normality Test

A normality test was conducted using the One-Sample Kolmogorov-Smirnov Test to determine whether the research data followed a normal distribution, which is one of the assumptions required for parametric statistical analysis.

Table 3. Normality Test

Variable	N	K-S Statistic	Sig.	Description
Residual	33	0.113	0.200	Normally Distributed

As presented in Table 3, the residual data produced a Kolmogorov-Smirnov statistic of 0.113 with a significance value of 0.200. Since the significance value exceeded the predetermined significance level of 0.05, the null hypothesis of normal distribution was accepted. These findings indicate that the residual scores were normally distributed, confirming that the normality assumption for parametric analysis was fulfilled.

Homogeneity Test

The homogeneity test was performed using Levene's Test to determine whether the variance of the research data was homogeneous before conducting hypothesis testing.

Table 4. Homogeneity Test

Levene Statistic	df1	df2	Sig.	Conclusion
0.279	1	64	0.599	Homogeneous

As shown in Table 4, Levene's Test generated a statistic of 0.279 with a significance value of 0.599. Because the obtained significance value was greater than 0.05, the assumption of homogeneity of variance was satisfied. This result indicates that the data exhibited relatively equal variances, supporting the use of parametric statistical procedures in the subsequent hypothesis testing.

Paired-Sample *t*-Test

To examine the effectiveness of Kahoot-based interactive learning, descriptive statistics of the pretest and posttest scores were first analyzed to identify changes in students' learning outcomes before and after the intervention.

Table 5. Descriptive Statistics of Pretest and Posttest Scores

Variable	N	Mean	Standard Deviation
Pretest	33	77.7879	4.41416
Posttest	33	85.3030	4.73342

As presented in Table 5, both the pretest and posttest involved 33 students. The mean pretest score was 77.7879 with a standard deviation of 4.41416, whereas the mean posttest score increased to 85.3030 with a standard deviation of 4.73342. This represents an increase of approximately 7.52 points in the average score following the implementation of Kahoot-based interactive learning. Furthermore, the relatively similar standard deviations indicate that the variability of students' scores remained stable before and after the intervention, while the higher posttest mean suggests an overall improvement in students' cognitive achievement.

To determine whether this increase was statistically significant, a paired-sample *t*-test was conducted. The results are presented in Table 6.

Table 6. Paired-Sample *t*-Test Results

Mean Difference	t	df	Sig. (2-tailed)	Decision
-7.51515	-39.491	32	0.000	Reject H_0

As shown in Table 6, the paired-sample *t*-test produced a mean difference of -7.51515, indicating that students' posttest scores were, on average, 7.52 points higher than their pretest scores. The analysis yielded a *t*-value of -39.491 with 32 degrees of freedom and a significance value of 0.000, which was well below the significance threshold of 0.05. Accordingly, the null hypothesis was rejected, confirming a statistically significant difference between students' pretest and posttest scores. These findings demonstrate that students achieved significantly higher learning outcomes after participating in Kahoot-based interactive learning.

Discussion

The findings of this study demonstrate that Kahoot-based interactive learning significantly improved students' learning outcomes in Qur'an-Hadith Education, as evidenced by the statistically significant increase between the pretest and posttest scores. The higher posttest mean indicates that integrating gamified digital media into classroom instruction can facilitate more effective learning experiences than conventional approaches. These findings reinforce the growing consensus that game-based learning environments improve cognitive achievement by encouraging active participation, immediate feedback, and repeated knowledge reinforcement throughout the learning process (Özdemir,

2025; Barz et al., 2024). Similarly, research has shown that Kahoot enhances students' academic performance by increasing engagement and motivation while creating an enjoyable learning environment that supports meaningful knowledge acquisition (Lashari et al., 2024; Tandiono, 2024).

The improvement in students' learning outcomes can be explained by the instructional characteristics of Kahoot, which combine formative assessment with game mechanics such as instant feedback, time-limited responses, competition, and visual stimulation. These features encourage students to concentrate more actively during learning activities and provide opportunities for immediate self-evaluation. Consequently, students become more responsive to instructional content and are motivated to correct misconceptions directly after receiving feedback. Previous studies similarly reported that Kahoot effectively promotes learning engagement, reduces learning anxiety, and increases intrinsic motivation, all of which contribute positively to students' academic achievement (Alsswey et al., 2024; Anane, 2024). Meta-analytic evidence further confirms that digital game-based learning positively affects cognitive, motivational, and affective learning outcomes across different educational settings (Barz et al., 2024; Özdemir, 2025).

From the perspective of Islamic Religious Education, the present findings indicate that Kahoot is not merely a technological innovation but also an effective pedagogical tool for facilitating Qur'an-Hadith learning. Digital interactive media enable teachers to transform traditionally teacher-centered instruction into more student-centered learning while maintaining the educational objectives of Islamic studies. This finding supports previous research emphasizing that the integration of educational technology into Islamic Religious Education enhances instructional quality and promotes more meaningful learning experiences without diminishing religious values (Mintasih et al., 2024; Diana & Azani, 2024). Likewise, studies on digital transformation in Islamic education highlight that the effective integration of educational technology depends on pedagogical adaptation rather than technology adoption alone (Norman et al., 2025; Pebriana et al., 2025).

Another important finding is that Kahoot appears to strengthen students' active participation during classroom learning. Although the primary outcome measured in this study was cognitive achievement, classroom observations indicated greater student involvement throughout the learning process. Interactive quizzes encouraged students to participate more confidently, respond quickly, and maintain attention during instruction. These classroom dynamics are consistent with previous findings showing that Kahoot increases classroom interaction, participation, and learning engagement across different educational contexts (Rayan & Watted, 2024; Lashari et al., 2024). Similar evidence has also

been reported in studies conducted within Islamic education, where gamified digital media successfully enhanced students' participation while supporting more interactive instructional practices (Anwar & Inayati, 2025; Ma'munah, 2025).

This study also contributes to the expanding body of literature on digital learning in Islamic Religious Education by providing empirical evidence from the specific context of Qur'an-Hadith instruction at the senior high school level. While many previous studies have investigated Kahoot in science, engineering, language learning, and higher education, empirical evidence within Qur'an-Hadith Education remains relatively limited. Existing research in Islamic education has predominantly focused on technology acceptance, digital pedagogy, e-learning implementation, and teachers' digital competencies rather than evaluating the direct instructional effectiveness of gamified learning media on students' cognitive achievement (Abubakari et al., 2023; Hoerudin et al., 2023). Recent reviews likewise emphasize the need for more experimental research examining interactive digital learning media within Islamic Religious Education classrooms (Adinda et al., 2024; Ahmad et al., 2024).

The novelty of this research lies in integrating Kahoot-based interactive learning into Qur'an-Hadith Education, a subject in which empirical experimental studies remain scarce despite the rapid digital transformation of Islamic education. Unlike previous studies that generally examined Kahoot in general education or investigated digital technology in Islamic education descriptively, this study provides direct quantitative evidence demonstrating the effectiveness of Kahoot through a pre-experimental design in improving students' learning outcomes in Qur'an-Hadith learning. Therefore, this research extends previous findings by bridging the gap between digital game-based learning and Islamic Religious Education, while providing practical evidence that gamification can be implemented effectively without compromising the instructional objectives and religious values embedded in Qur'an-Hadith education (Asril et al., 2023; Azman et al., 2025). The findings also complement recent discussions on AI, gamification, and digital pedagogical transformation in Islamic education by presenting classroom-based empirical evidence rather than conceptual analyses (Norman et al., 2025; Siliwangi, 2026).

The practical contribution of this study is that it provides evidence-based recommendations for Islamic Religious Education teachers to integrate Kahoot as an interactive formative assessment and instructional strategy rather than merely as an evaluation tool. The findings suggest that digital gamification can enhance learning effectiveness while fostering active classroom participation in Qur'an-Hadith Education. Furthermore, this study offers empirical support for school administrators and curriculum developers seeking to strengthen digital

transformation initiatives in madrasahs through technology-enhanced pedagogical practices. Future studies are encouraged to employ more rigorous experimental designs involving control groups, larger and more diverse samples, and additional variables such as learning motivation, engagement, self-regulated learning, or digital literacy to further explain the mechanisms through which Kahoot influences students' learning outcomes in Islamic Religious Education.

CONCLUSION

This study demonstrates that Kahoot-based interactive learning significantly improves students' learning outcomes in Qur'an-Hadith Education, as evidenced by the substantial increase in posttest scores following the intervention. The findings highlight that integrating game-based interactive media into Islamic Religious Education creates a more engaging, student-centered learning environment that facilitates active participation and strengthens students' cognitive achievement. From an academic perspective, this study contributes to the growing body of literature on digital pedagogy in Islamic education by providing empirical evidence regarding the effectiveness of Kahoot in Qur'an-Hadith instruction, an area that has received limited attention compared with general education subjects. Nevertheless, this study is limited by its pre-experimental one-group design, relatively small sample size, and focus on a single madrasah, which may restrict the generalizability of the findings. Future research is therefore recommended to employ quasi-experimental or randomized controlled designs involving larger and more diverse samples, while incorporating additional variables such as learning motivation, engagement, digital literacy, self-regulated learning, or long-term knowledge retention to provide a more comprehensive understanding of the educational impact of Kahoot in Islamic Religious Education.

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