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Evaluating the Effectiveness of Kahoot as an Interactive Assessment Tool in Teaching Islamic Cultural History

Zulkifli [1], **Muhammad Muzakki[2]**
Universitas Pendidikan Muhammadiyah Sorong, Indonesia[1,2]
Email correspondence: zulkifli@unimudasorong.ac.id

Abstract

Research Objective – This study evaluates the effectiveness of Kahoot!, a game-based learning platform, as an interactive assessment tool in Islamic Cultural History (Sejarah Kebudayaan Islam, SKI) for fifth-grade students at MI Al-Kautsar, Sorong.

Methodology – A quasi-experimental, non-randomized pretest–posttest control design was applied over four weeks (N = 53; experimental n = 27; control n = 26). Both groups received the same pretest and posttest aligned to the SKI curriculum. Descriptive statistics and paired and independent-samples t-tests were employed to examine learning gains.

Findings – Both groups improved, but the experimental group achieved a larger mean gain (+20.67) than the control (+10.31), a statistically significant difference. The pattern of results suggests that Kahoot!'s real-time feedback, low-stakes competition, rapid pacing, and student-centered interface increased motivation and engagement, thereby accelerating content mastery in a text- and history-oriented subject. Effectiveness was consistent across baseline levels, indicating robustness of the observed treatment effect in typical classroom conditions. Results were educationally meaningful overall.

Research Implications/Limitations – For PAI teachers, Kahoot! is suitable for formative assessment to activate prior knowledge, monitor in-lesson understanding, and consolidate learning. Effective use entails alignment with SKI objectives, a mix of recall and higher-order items, team modes, item-level analytics, and brief reflective tasks. Limitations include a single site, modest sample, short duration, and absence of qualitative data.

Originality/Value – This study offers context-specific evidence from an Indonesian madrasah that technology-mediated assessment can modernize Islamic elementary education without compromising religious values, meeting the needs of digital-native learners while delivering measurable gains.

INTRODUCTION

Education in the digital era is undergoing a significant transformation, particularly in the integration of information technology to enhance the effectiveness of the teaching and learning process.[1, 2, 3] This digital revolution requires educators not only to deliver content conventionally but also to create interactive, engaging learning experiences aligned with the characteristics of today's learners, often referred to as digital natives.[4, 5] This generation has grown up immersed in technology, resulting in distinct learning preferences compared to previous generations, favoring visual, multimodal, and participatory approaches.[6]

In the context of Islamic education (PAI), this demand becomes increasingly urgent, especially in the teaching of Islamic cultural history (SKI).[7] This subject is often delivered through one-directional narrative methods dominated by lectures, rote memorization, and minimal interaction. Such traditional approaches are deemed less effective in engaging students, particularly at the elementary level, such as *Madrasah Ibtidaiyah* (MI), where students are in a developmental stage that requires concrete, contextual, and enjoyable learning experiences.[2]

Research by Azizah and Ritonga indicates that most SKI teachers at the MI level still heavily rely on lecture-based methods, resulting in low student participation and enthusiasm during learning.[8] Conversely, other studies have shown that the use of digital technologies—such as interactive media, historical animations, and digital learning platforms—can

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[1] S Yadav, "Enhancing Digital Competencies of Teachers: A Roadmap for Modern Educators in the Digital Era," in *Fostering Teacher Skills and Critical Thinking in Modern Education*, ed. T. Aldosemani M. Lytras, P. Ordóñez de Pablos (IGI Global Scientific Publishing, 2025), 109–34, https://doi.org/10.4018/979-8-3373-1692-5.ch005.

[2] S. Wahid, A., Huda, M., Asrori, A., Abidin, R., Puspitasari, I., Hidayat, M. C., & Anwar, "Digital Technology for Indigenous People's Knowledge Acquisition Process: Insights from Empirical Literature Analysis," in *International Conference on Information and Communication Technology for Competitive Strategies*, ed. V.S. Kaiser, M.S., Xie, J., Rathore (Singapore: Springer Nature Singapore, 2023), 41–57, https://doi.org/10.1007/978-981-97-1260-1_5.

[3] N. M Wahyuni, S., Putri, R. S., & Sari, "Digital Literacy and Teacher Professional Development in Indonesia: The Case of Islamic Education Teachers," *Indonesian Journal of Educational Technology* 3, no. 1 (2024): 50–67, https://doi.org/https://doi.org/10.31002/ijet.v3i1.3500.

[4] S Shamsudinova, I., Karimov, N., Umarova, M., Mustafaqulova, D., Almuratova, G., Qodirov, S., Istamova, D., & Matniyoz, "Educational Disparities in the Digital Era and the Impact of Information Access on Learning Achievements," *Indian Journal of Information Sources and Services* 15, no. 1 (2025): 6–11, https://doi.org/10.51983/ijiss-2025.IJISS.15.1.02.

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[6] Marc Prensky, "Digital Natives, Digital Immigrants," *On the Horizon* 9, no. 5 (2001): 1–6.

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[8] S. Hulkin, M., & Santosa, "Integration of Information Technology in the Transformation of Religious Education: Fostering Learning Quality in Elementary Islamic Schools," *Sunan Kalijaga International Journal on Islamic Educational Research* 7, no. 1 (2023), https://doi.org/https://doi.org/10.14421/skijier.2023.71.02.

significantly enhance student motivation and deepen their understanding of Islamic historical concepts.[9]

Transforming SKI learning through technology integration is not only a pedagogical necessity but also a strategic effort to increase the relevance of Islamic education in the digital era.[10] This aligns with the Technology-Enhanced Learning (TEL) approach, which emphasizes using technology to enrich the teaching and learning process.[11] The Islamic cultural history subject (SKI) at the *Madrasah Ibtidaiyah* level plays a strategic role in shaping students' character, as it encompasses fundamental values related to Islamic history, civilization, and exemplary narratives of prominent Islamic figures.[12] These elements are highly relevant for fostering students' religious identity, national awareness, and moral integrity from an early age. These values are not only integral to religious education but also serve as a foundation for the broader implementation of character education within the national education system.[13],

However, in practice, SKI instruction at the MI level is still largely conducted through conventional approaches dominated by narrative lectures and text-based delivery. This approach prioritizes content transmission while providing limited opportunities for students to engage critically and reflectively with the material. As a result, student participation tends to be low, and their comprehension remains suboptimal[3]. Ideally, history education should stimulate students' critical, interpretive, and evaluative thinking by enabling them to connect past events with contemporary life[7].

There is a growing mismatch between traditional instructional methods and the learning needs of today's digitally native generation. Contemporary learners grow up in a technology-rich environment and tend to prefer visual, interactive, and experiential learning modalities. The discrepancy between students' digital learning preferences and outdated pedagogical practices can lead to disengagement, low motivation, and diminished learning outcomes[8].

Therefore, integrating technology-based learning media has become a necessary and relevant solution for SKI instruction. The use of digital tools—such as interactive media, historical animations, educational videos, and e-learning platforms—can bridge students' digital tendencies with the demands of a 21st-century curriculum, which emphasizes digital literacy, critical thinking, collaboration, and creativity[9]. Moreover, technology can enrich the visual and narrative representation of historical material, which is often abstract and difficult to conceptualize for young elementary learners.

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[12] F. A. Thoyibah, "Analisis Materi Pembelajaran Sejarah Kebudayaan Islam Di Madrasah," *Al-Ihda' : Jurnal Pendidikan Dan Pemikiran* 19, no. 1 (2025): 1427–1440, https://doi.org/https://doi.org/10.55558/alihda.v19i1.197.

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Empirical studies have demonstrated that Kahoot!, a game-based digital quiz platform, significantly improves learning outcomes, student motivation, and engagement. A meta-analysis conducted by Özdemir across more than 30 studies found that Kahoot! positively impacts knowledge retention and active learning across educational levels[10]. Similarly, research by Sartono, Sukowati, and Soleha in Islamic elementary schools revealed that integrating Kahoot! with local wisdom enhanced student creativity and nurtured a sense of nationalism[11].

However, there remains a scarcity of research specifically evaluating the effectiveness of Kahoot! in teaching SKI at the MI level, especially in 3T regions (disadvantaged, frontier, and outermost areas) such as Sorong, Southwest Papua. In such contexts, using digital tools as assessment media is a strategic step toward improving the quality of Islamic education while remaining sensitive to local socio-cultural dynamics.

Based on these considerations, this study aims to evaluate the effectiveness of Kahoot! as an interactive assessment tool in teaching Islamic Cultural History at MI Al-Kautsar, Kota Sorong. The findings are expected to empirically contribute to the development of digital-based assessment strategies in madrasahs and offer a relevant, applicable, and innovative approach to strengthening Islamic education at the elementary level.

METHOD
Research design

This study employed a quantitative quasi-experimental design using a non-randomized pretest–posttest control group structure, an approach well suited to authentic classroom settings where random assignment is impractical.[14] The design permits cautious causal inference by estimating change attributable to the intervention while preserving regular school operations. Specifically, we compared achievement gains in Islamic Cultural History (SKI) between an experimental class receiving Kahoot!-integrated formative assessment and a control class taught via lecture and oral questioning. To enhance comparability, classes were selected on the basis of similar prior achievement and identical instructional schedules. Both groups sat an equivalent pretest prior to instruction and a matched posttest after a four-week instructional window chosen to balance feasibility with internal validity. The experimental condition embedded brief, end-of-lesson Kahoot! quizzes to provide immediate, low-stakes feedback, whereas the control condition followed routine textbook-based practice. Lesson objectives, pacing guides, and core materials were aligned across groups to minimize curricular heterogeneity.

Threats to validity were addressed through multiple safeguards typical in quasi-experiments: baseline equivalence checks on pretest scores, standardized administration protocols, and consistency of teaching personnel across sessions.[15] The principal contrast of interest was the gain score difference (posttest–pretest) between groups, which isolates growth over time and reduces selection bias linked to initial status. This configuration of

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[14] J. C Campbell, D. T., & Stanley, *Experimental and Quasi-Experimental Designs for Research* (Chicago: Rand McNally & Company, 1963), https://www.jameslindlibrary.org/campbell-dt-stanley-jc-1963/.

[15] D. T Shadish, W. R., Cook, T. D., & Campbell, *Experimental and Quasi-Experimental Designs for Generalized Causal Inference* (Boston: Houghton Mifflin, 2002), https://iaes.cgiar.org/sites/default/files/pdf/147.pdf.

design features provides a defensible test of the proposition that Kahoot!-based assessment improves SKI outcomes relative to conventional practice within real-world classroom constraints.

Setting and participants

The study took place at MI Al-Kautsar, Sorong during the 2024/2025 academic year. Using purposive sampling, two fifth-grade classes with comparable prior achievement and identical SKI timetables were selected to participate. The classes were assigned to the experimental condition (n = 27), which integrated Kahoot!-based formative assessment into SKI lessons, and the control condition (n = 26), which followed lecture and oral questioning. Selection criteria emphasized teacher consistency, equivalent instructional time, and prior exposure to SKI topics to mitigate selection and history threats to validity.[16] No personally identifying information was collected; only class-level characteristics were used to establish baseline equivalence prior to the intervention.

Instruments

Cognitive achievement. Learning outcomes were measured with a 25-item multiple-choice test aligned to the SKI curriculum (Islamic historical narratives, civilization, exemplary figures). Content validity was established through expert review (two subject-matter experts, one assessment specialist). Item analysis (difficulty and discrimination indices) followed classical test theory procedures.[17] Reliability was acceptable (Cronbach's α = .81), exceeding common thresholds for early-stage instruments.[18]

Student engagement. To complement cognitive outcomes, engagement was monitored with structured classroom observation sheets adapted from Technology-Enhanced Learning (TEL) frameworks—combining Laurillard's Conversational Framework to map teacher–learner interactions[19] and the ICAP taxonomy of cognitive engagement (Interactive–Constructive–Active–Passive) to classify observable behaviors.[20] The rubric operationalized behavioral (on-task behavior, voluntary responses), cognitive (questioning, elaboration beyond recall), and affective (enthusiasm, persistence) indicators.[21] Two trained observers rated behaviors on a five-point scale at fixed intervals following a calibration session to enhance scoring consistency.

Procedure and fidelity

Over four consecutive weeks, both classes covered the same SKI objectives with aligned lesson plans, materials, and pacing to maintain instructional equivalence. The experimental class completed a Kahoot! quiz at the end of each session for low-stakes

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[16] Shadish, W. R., Cook, T. D., & Campbell.

[17] J Crocker, L., & Algina, *Introduction to Classical and Modern Test Theory* (USA: Cengage Learning, 2008), https://archive.org/details/introductiontoclassicalandmoderntesttheory/page/n1/mode/2up.

[18] I. H. Nunnally, J. C., & Bernstein, *Psychometric Theory*, 3rd ed. (New York: McGraw-Hill, 1994).

[19] D Laurillard, *Teaching as a Design Science: Building Pedagogical Patterns for Learning and Technology* (New York & London: Routledge, 2012), https://www.book2look.com/embed/9781136448195.

[20] R Chi, M. T. H., & Wylie, "The ICAP Framework: Linking Cognitive Engagement to Active Learning Outcomes," *Educational Psychologist* 49, no. 4 (2014): 219–243, https://doi.org/10.1080/00461520.2014.965823.

[21] A. H Fredricks, J. A., Blumenfeld, P. C., & Paris, "School Engagement: Potential of the Concept, State of the Evidence," *Review of Educational Research* 74, no. 1 (2024): 59–109, https://doi.org/10.3102/00346543074001059.

formative assessment with immediate, item-level feedback and competitive reinforcement—an approach shown to raise motivation and attention in prior work.[22, 23] The control class used textbook-based instruction and teacher-led oral questioning. An identical pretest was administered prior to instruction and a posttest after the fourth session. Observers conducted engagement ratings during live lessons according to the TEL-informed rubric.

Data analysis

Analyses were performed in IBM SPSS Statistics 26. Descriptive statistics (M, SD) summarized performance. Paired-samples t-tests evaluated within-group gains (pretest → posttest). Independent-samples t-tests compared gain scores between groups. Statistical significance was set at $\alpha = .05$. Assumptions were checked using Kolmogorov–Smirnov (normality) and Levene's tests (homogeneity of variance), with inspection of distributions and residuals as recommended for small educational samples.[24] Engagement ratings were aggregated to session-level indices to describe patterns concurrent with achievement gains.

RESULTS AND DISCUSSION

Results

The primary objective of this study was to assess the effectiveness of Kahoot!—a game-based learning platform—as an interactive assessment tool in the delivery of Islamic Cultural History (*Sejarah Kebudayaan Islam* or SKI) to fifth-grade students at MI Al-Kautsar, Sorong, Southwest Papua. To achieve this, a quasi-experimental design with a non-randomized pretest–posttest control group approach was employed. This design allowed for a structured comparison between a group of students who received instruction with Kahoot! (experimental group) and a group taught using conventional assessment techniques (control group).

A total of 53 students participated in the study, with 27 students assigned to the experimental group and 26 to the control group. Both groups were given the same pretest prior to the intervention to assess baseline knowledge of the SKI curriculum, followed by a posttest at the end of a four-week instructional cycle. The goal was to observe and quantify any learning gains attributable to the use of Kahoot! as a digital assessment tool.

Descriptive statistical analysis was performed to examine the differences in students' achievement scores between the pretest and posttest in both groups. The results are presented in Table 1 below:

Table 1. Descriptive Statistics of Pretest and Posttest Scores

Group	N	Pretest Mean (SD)	Posttest Mean (SD)	Gain Score
Experimental	27	64.22 (6.83)	84.89 (5.94)	+20.67
Control	26	63.88 (6.91)	74.19 (6.71)	+10.31

[22] J Plump, C. M., & LaRosa, "Using Kahoot! In the Classroom to Create Engagement and Active Learning: A Game-Based Technology Solution for ELearning Novices," *Management Teaching Review* 2, no. 2 (2017): 151–58, https://doi.org/10.1177/2379298116689783.

[23] R Wang, A. I., & Tahir, "The Effect of Using Kahoot! For Learning – A Literature Review," *Computers & Education* 149 (2020), https://doi.org/10.1016/j.compedu.2020.103818.

[24] A.P. Field, *Discovering Statistics Using IBM SPSS Statistics*, 5th ed. (Newbury Park: Sage, 2018).

The findings clearly indicate that both groups experienced an increase in posttest scores, suggesting that instructional engagement—regardless of method—led to some degree of learning. However, the magnitude of improvement in the experimental group was significantly higher than in the control group. The experimental group showed a mean gain score of +20.67 points, compared to +10.31 points in the control group. This represents nearly double the learning gain, implying that the integration of Kahoot! not only supported content acquisition but also enhanced the rate and depth of learning.

These results were further analyzed using inferential statistics, specifically paired and independent sample *t*-tests. The paired sample *t*-test showed a significant increase from pretest to posttest within both groups:

Experimental group: $t(26) = 10.12$, $p < 0.001$
Control group: $t(25) = 6.24$, $p < 0.001$

However, when comparing the mean gain scores between the two groups using an independent sample *t*-test, a statistically significant difference was also found:

$t(51) = 5.38$, $p < 0.001$

This statistical evidence confirms that the experimental group benefited more substantially from the learning experience, with the Kahoot!-based assessment model contributing meaningfully to the enhancement of student achievement in SKI.

To visualize the magnitude of these differences, a comparative bar chart was generated (see Figure 1). The figure clearly illustrates the parallel trajectory of learning improvement in both groups, while also highlighting the steeper increase among students exposed to Kahoot!.
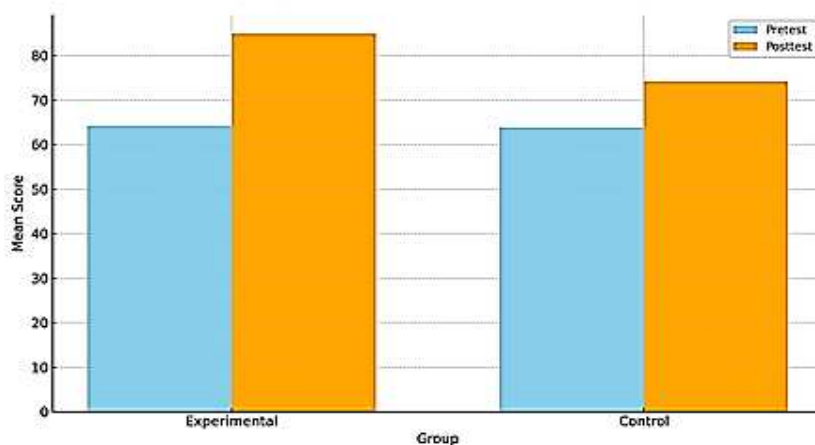

Figure 1. Comparison of Pretest and Posttest Scores between Experimental and Control Groups

This upward trend in the experimental group confirms the effectiveness of using interactive digital platforms in Islamic elementary education. The impact observed is likely linked to several key affordances of Kahoot!, including its real-time feedback mechanism, competitive dynamics, and student-centered interface, which collectively stimulate both cognitive engagement and motivation to learn.

In summary, the quantitative data from this study strongly support the conclusion that Kahoot! is an effective pedagogical tool for improving student learning outcomes in SKI. The clear and significant difference in achievement gains between groups suggests that integrating technology-based assessments not only modernizes traditional Islamic education but also meets the evolving learning needs of digital-native students in 21st-century classrooms.

Discussion

The findings of this study indicate that the use of Kahoot! as a game-based assessment tool has a significant impact on improving student learning outcomes in the subject of Islamic Cultural History (Sejarah Kebudayaan Islam, SKI) at MI Al-Kautsar, Sorong, Southwest Papua. Descriptive analysis revealed an increase in posttest scores for both groups, experimental and control; however, the experimental group achieved nearly double the average gain compared to the control group (+20.67 vs. +10.31). Inferentially, t-test results confirmed that this difference in gain scores was statistically significant, thereby affirming the effectiveness of Kahoot! in enhancing student achievement.

The Role of Kahoot! in Enhancing Motivation and Engagement

One of the key findings of this research is the observed increase in students' motivation and engagement when using Kahoot! during the learning process. This result is consistent with previous studies that have emphasized how gamification in education can stimulate intrinsic motivation while strengthening student engagement. Wang and Tahir (2020), in a systematic review of 93 articles, found that Kahoot! consistently contributes to improvements in attention, motivation, and academic performance across diverse educational contexts. Kahoot!'s features—such as real-time feedback, score-based competition, and interactive design—create a more vibrant and stimulating learning environment.

Moreover, the presence of a healthy competitive atmosphere encourages students to participate actively, both individually and collaboratively. This differs significantly from conventional assessments, which often feel monotonous. Consequently, Kahoot! reduces learning fatigue and facilitates more dynamic interaction between teachers and students. Bicen and Kocakoyun supported these findings by demonstrating that Kahoot! not only enhances students' emotional engagement but also fosters active, student-centered learning.[25] Similarly, Licorish et al., highlighted that interactive quiz-based learning platforms can stimulate cognitive engagement while strengthening classroom collaboration.[26]

In the context of SKI, this dynamic is particularly important, as text- and history-based subjects are often perceived as less engaging. By incorporating a digital platform such as Kahoot!, students become involved not only cognitively but also affectively, experiencing enjoyment, a spirit of competition, and satisfaction when answering correctly. Thus, Kahoot! functions not merely as an assessment tool but also as an effective pedagogical instrument to

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[25] S Bicen, H., & Kocakoyun, "Perceptions of Students for Gamification Approach: Kahoot as a Case Study," *International Journal of Emerging Technologies in Learning (IJET)* 13, no. 2 (2018): 72–93, https://doi.org/10.3991/ijet.v13i02.7467.

[26] J. L Licorish, S. A., Owen, H. E., Daniel, B., & George, "Students' Perception of Kahoot!'s Influence on Teaching and Learning," *Research and Practice in Technology Enhanced Learning* 13, no. 1 (2018): 9, https://doi.org/10.1186/s41039-018-0078-8.

create an interactive, motivating, and student-relevant learning atmosphere for the digital generation.

Effectiveness in the Context of Primary and Islamic Education

The integration of game-based educational technology into the madrasah ibtidaiyah (MI) curriculum is highly relevant to the needs of digital-native learners, who are generally more responsive to interactive, technology-driven approaches. Within this framework, Kahoot! provides teachers with an innovative alternative for delivering instruction and assessing student understanding in ways that are engaging and compatible with 21st-century learning preferences.

Plump and LaRosa reported that Kahoot! not only improves test performance but also helps build a collaborative and enjoyable classroom environment.[27] Similarly, Ismail and Mohammad confirmed that game-based learning can promote active participation among elementary school students through interactive quiz mechanisms.[28] In the context of Islamic education, the use of digital platforms such as Kahoot! is strategically valuable because it bridges the gap between historical-religious content, which is often perceived as monotonous, and modern learning preferences characterized by visual, rapid, and interactive approaches.

As a result, SKI, often associated with rote memorization, can be taught in a more contextualized and enjoyable way. This aligns with Huda argument that digital transformation in Islamic education is not merely a necessity but also an opportunity to deliver learning experiences that are adaptive, innovative, and aligned with the needs of students in the digital age.[29] Thus, the effectiveness of Kahoot! in primary Islamic education lies not only in its ability to enhance cognitive outcomes but also in its contribution to creating a more inclusive, interactive, and meaningful learning environment.

Cognitive and Affective Aspects

The improvement in the experimental group reflects not only cognitive gains in terms of subject mastery but also affective development, including increased interest, self-confidence, and a sense of ownership toward learning. Kahoot! serves as more than an assessment tool; it is also a medium that generates positive emotions during the learning process, motivating students to be more enthusiastic and committed to achieving success.

Bicen and Kocakoyun found that Kahoot! enhances students' emotional engagement and supports active, student-centered learning.[30] Balaskas et al., further demonstrated that game-based learning can activate intrinsic motivation by combining enjoyment, challenge, and achievement.[31] Similarly, Özdemir, in their gamification theory, explained that elements such

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[27] Plump, C. M., & LaRosa, "Using Kahoot! In the Classroom to Create Engagement and Active Learning: A Game-Based Technology Solution for ELearning Novices."

[28] J. A.-M Ismail, M. A.-A., & Mohammad, "Kahoot: A Promising Tool for Formative Assessment in Medical Education," *Education in Medicine Journal* 9, no. 2 (2017): 19–26, https://doi.org/10.21315/eimj2017.9.2.2.

[29] Huda, M., Borham, A. H., & Dewantara, "Opportunities and Challenges of Islamic Education in the Digital Era."

[30] Bicen, H., & Kocakoyun, "Perceptions of Students for Gamification Approach: Kahoot as a Case Study."

[31] M Balaskas, S., Zotos, C., Koutroumani, M., & Rigou, "Effectiveness of GBL in the Engagement, Motivation, and Satisfaction of 6th Grade Pupils: A Kahoot! Approach," *Education Sciences* 13, no. 12 (2023): 1214, https://doi.org/10.3390/educsci13121214.

as competition, symbolic rewards, and social interaction in games can stimulate both cognitive and affective domains of learners.[32]

These findings carry important implications for madrasahs. By adopting tools like Kahoot!, Islamic schools can develop a more holistic assessment model, one that evaluates not only factual knowledge but also affective qualities such as motivation, character formation, and positive attitudes toward religious learning. This is consistent with the goals of Islamic education, which emphasize the integration of cognitive, affective, and psychomotor dimensions.

Implications for Islamic Education

The use of Kahoot! in SKI demonstrates that digital technology can be integrated without diminishing religious values in Islamic education. On the contrary, interactive media enrich learning experiences by stimulating students' enthusiasm, participation, and retention. This shows that religious education does not need to remain confined to rigid traditional approaches; rather, it can be innovatively packaged to meet the learning styles of the digital generation.

Abubakari stressed that digital transformation in Islamic education is a necessity for addressing the challenges of the 21st century.[33] By leveraging platforms such as Kahoot!, madrasahs and other Islamic educational institutions can create learning environments that are adaptive, inclusive, and enjoyable, while maintaining their spiritual foundations. Ismail et al., also found that digital technology in Islamic education fosters literacy, strengthens value comprehension, and facilitates the integration of cognitive, affective, and spiritual dimensions of student development.[34] Hence, adopting digital media such as Kahoot! represents not only a methodological innovation but also a vital step in the modernization of Islamic education rooted in religious values.

Limitations and Directions for Future Research

While this study provides empirical evidence of Kahoot!'s effectiveness in SKI instruction, several limitations must be acknowledged. First, the sample size was relatively small (53 students), limiting the generalizability of the findings. Second, the four-week intervention period may not adequately capture long-term impacts of Kahoot! on academic achievement or learning attitudes. Third, the measurement of learning outcomes relied exclusively on quantitative instruments (pretest and posttest), without qualitative data such as interviews, observations, or student reflections that could provide deeper insights into the learning experience.

Therefore, future research should adopt longitudinal designs with larger and more diverse samples, potentially across different schools or regions. In addition, mixed-methods

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[32] O Özdemir, "Kahoot! Game-Based Digital Learning Platform: A Comprehensive Meta-Analysis," *Journal of Computer Assisted Learning* 41, no. 1 (2025), https://doi.org/10.1111/jcal.13084.

[33] M. S Abubakari, "Digital Technologies Adoption in Islamic Education for Fostering Lifelong Learning Culture: Pilot Survey Preliminary Insights," in *Multi-Industry Digitalization and Technological Governance in the AI Era*, ed. Pablos M. Anshari, M. N. Almunawar, & P. Ordóñez de (IGI Global, 2025), 103–25, https://doi.org/10.4018/979-8-3373-1681-9.ch005.

[34] F. P. Ismail, I., Parinduri, M. A., & Ibarra, "Strengthening the Ideology of Islamic Religious Education in the Era of Technological Disruption," *Jurnal Ilmiah Ilmu Terapan Universitas Jambi* 9, no. 2 (2025): 465–473, https://doi.org/10.22437/jiituj.v9i2.41841.

approaches would be valuable to explore qualitative dimensions such as student perceptions, teacher strategies, and classroom implementation challenges. This aligns with the recommendation of Wang and Tahir, who emphasized the need for further research on the integration of game-based learning across varied educational settings to ensure the external validity of findings.[35] Such efforts would enable a more comprehensive and applicable understanding of Kahoot!'s effectiveness in Islamic educational contexts.

CONCLUSION

This quasi-experimental study (non-randomized pretest–posttest control design) provides clear evidence that Kahoot!, used as a game-based assessment tool, significantly improves learning outcomes in Islamic Cultural History (SKI) for fifth-grade students at MI Al-Kautsar, Sorong. Across four instructional weeks (N = 53; experimental n = 27, control n = 26), both groups improved on posttests; however, the experimental group achieved a mean gain of +20.67, nearly double the control group's +10.31. Paired and independent-samples t-tests corroborated that these differences were statistically significant, indicating an advantage of Kahoot! over conventional assessment. Pedagogically, the benefits appear to be mediated by mechanisms intrinsic to game-based learning—real-time feedback, low-stakes competition, rapid pacing, and a student-centered interface—which jointly heighten motivation and engagement in a text- and history-oriented subject often perceived as less attractive.

Practical implications for PAI teachers: Integrate Kahoot! as a formative assessment routine to (i) activate prior knowledge, (ii) monitor understanding during instruction, and (iii) consolidate learning at closure. Align items with SKI objectives, blend factual and higher-order prompts, use team modes to broaden participation, examine item-level analytics to address misconceptions, and pair sessions with brief reflections (e.g., exit tickets) to support transfer and retention. Limitations and future work: Findings are bounded by a single site, modest sample (N = 53), short duration (4 weeks), and the absence of qualitative data. Future research should adopt multi-site, longer-term, mixed-methods designs, compare alternative digital assessment tools, and track downstream outcomes (delayed retention, character/value internalization, and equity of access). Overall, technology-mediated assessment can modernize Islamic elementary education without compromising religious values, offering a scalable pathway to more interactive, inclusive, and meaningful SKI learning for digital-native students.

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