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The Effect of Kahoot Gamification on Students' Active Participation in Informatics Learning: A Pre-Experimental Study at an Indonesian Madrasah

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ABSTRACT

Low student active participation in Informatics learning remains a persistent challenge in madrasah settings, where conventional and less-interactive teaching methods are still predominantly used. Preliminary observations at MA Sarji Ar-Rasyid revealed that class X students showed minimal engagement during Informatics lessons, characterized by passive learning behaviours and limited responsiveness. While previous studies have demonstrated the effectiveness of Kahoot in improving motivation and learning outcomes, research specifically examining its impact on the construct of active participation within Informatics learning at the madrasah level remains limited. This study aims to determine the influence of Kahoot-based interactive media on students' active participation in Informatics learning. A quantitative approach with a pre-experimental one-group pretest-posttest design was employed. The subjects were all 26 students of class X at MA Sarji Ar-Rasyid, selected through saturated sampling. The instruments, validated through expert judgment, demonstrated good reliability (Cronbach's Alpha = 0.722). Data were collected during the odd semester of the 2025–2026 academic year. The paired sample t-test revealed a significant difference between pretest and posttest scores ($t = -8.677$, $p < .001$), with the mean active participation score increasing by 14.788 points from pretest to posttest. These findings indicate that Kahoot-based interactive media significantly enhances students' active participation and can serve as an effective pedagogical strategy for creating more engaging and participatory Informatics learning environments in madrasah settings.

INTRODUCTION

Active participation is a key component of effective learning, as students who actively engage in the learning process tend to achieve better understanding and retention (Prince, 2004; Freeman et al., 2014). The low level of active student participation in computer science learning is a problem that needs serious attention. Based on initial observations conducted in class X at MA Sarji Ar-Rasyid, it was found that most students

tended to be passive during the learning process, as indicated by their lack of response to teachers' questions, low involvement in discussions, and lack of initiative in exploring the material independently. This condition indicates that the learning methods applied have not been able to encourage optimal student involvement. In this context, the use of information and communication technology as an interactive learning medium is seen as a potential solution, because the use of technology in the learning process can increase the effectiveness and efficiency of learning activities and help students understand the material more deeply (Wang & Tahir, 2020). Furthermore, technology-based learning can encourage students to actively engage in various learning activities and increase their motivation (Azharuddin, 2024), so that the integration of appropriate technology has the potential to address the challenge of low student participation found in the field.

One technological-based learning innovation that is considered capable of addressing the challenge of low student participation is Kahoot. Unlike conventional methods that tend to place students in a passive role as recipients of information, Kahoot offers a more interactive and enjoyable learning approach. Kahoot is an interactive game-based (quiz) online application that can be accessed through various devices such as tablets, mobile phones, laptops, and computers, allowing all students involved in the learning process to immediately see their scores after points are awarded and find out the correct answers (Janattaka & Tiyana, 2022). One of the advantages of Kahoot lies in the time limit system applied to each question presented. With this time limit, students are trained to think quickly and accurately in answering each question (Sinaga et al., 2022). With these characteristics, Kahoot has the potential to be a strategic solution for creating a more dynamic learning atmosphere and encouraging active student involvement in Informatics learning. As highlighted in a systematic review by Nascimento et al. (2025), gamification in education has consistently shown positive effects on student engagement and learning outcomes across various disciplines.

Based on the author's observations at MA Sarji Ar-Rasyid, it was found that there are still a number of students who do not pay attention to the teacher during the learning process. This can be seen from the large number of students who prefer to look down, busy with themselves, chatting with their classmates, or playing with stationery rather than paying attention to the teacher's explanations. When given the opportunity to ask or

answer questions, most of them tend to be silent and passive, waiting for instructions without trying to understand the material independently. Even when given assignments, some students are reluctant to complete them, procrastinate, or even rely on their friends' answers. This condition is in line with the findings of various previous studies which show that less interactive learning methods tend to result in low levels of active student participation, where students rarely ask questions, are reluctant to answer, and show minimal mental presence during the learning process (Ali, 2025; Saputro et al., 2024). Therefore, alternative learning media are needed that can support direct interaction between students and learning materials, so that the learning process becomes more interesting, enjoyable, and not boring. One potential solution is the use of the Kahoot application, which is expected to increase interactivity in the learning process (Permana, 2021).

Previous studies have shown that the Kahoot interactive learning platform is effective in increasing student engagement and learning experiences. Husnayain, Roza, and Raisal (2025) found that the use of Kahoot allows students to receive immediate feedback from teachers, participate in interactive quizzes, and experience a more enjoyable learning atmosphere. However, this research focused more on general engagement and student learning experiences, so it did not specifically examine how active student participation was formed during the learning process. In line with this, Zarijah and Asdarina (2025) reported that the application of a game-based learning model using Kahoot increased the percentage of student learning completeness by 69% compared to the conditions before using Kahoot. However, this study emphasized learning outcomes and academic success, so it did not explain in depth how Kahoot encourages active student participation as part of the learning process. Licorish et al. (2018) found that students positively perceived Kahoot!'s influence on their teaching and learning experience, particularly in terms of engagement, motivation, and classroom dynamics. Furthermore, Rayan and Watted (2024) demonstrated that gamified learning using Kahoot significantly improved students' self-efficacy, interest, and enjoyment in learning, all of which are closely related to active participation. Thus, although these studies show the effectiveness of Kahoot in supporting learning, they still leave gaps in the study of student active participation. Therefore, this study aims to complement these

gaps by focusing the analysis on the aspect of student active participation in the learning process using Kahoot.

This research is important because the use of information and communication technology in learning activities has become a primary need in creating a more interactive, effective, and efficient learning process. However, observations at MA Sarji Ar-Rasyid indicate that the level of students' active participation in learning is still relatively low. This condition is reflected in students' limited focus on the teacher's explanations, their minimal involvement in asking or answering questions, and their low initiative in completing assignments, both individually and in groups. These behaviors are closely related to the indicators of active participation that will be examined in this study, namely students' attentiveness, responsiveness, willingness to ask and answer questions, and initiative in carrying out learning tasks. Therefore, MA Sarji Ar-Rasyid was chosen as the research site because these observed conditions clearly represent the dimensions of active participation that are central to this study.

Meanwhile, various previous studies have shown that the use of Kahoot-based interactive learning media can increase student engagement, enrich the learning experience, and improve learning outcomes. Tandiono (2024) specifically evaluated Kahoot's effectiveness in promoting student engagement in online learning environments, finding that gamified platforms significantly foster active participation. Additionally, Gómez-Carrasco et al. (2019) demonstrated that gamification programs positively affect motivation and learning perception among students. However, to the best of the researcher's knowledge, no study has specifically investigated the effect of Kahoot-based interactive media on students' active participation in the context of Informatics learning at the madrasah level. This gap highlights the novelty and significance of the present study, particularly in examining how Kahoot can support active participation in Informatics subjects.

The purpose of this study is to determine the influence of Kahoot-based interactive media on students' active participation in Informatics learning at MA Sarji Ar-Rasyid. In particular, this study seeks to identify the level of students' active participation before and after the implementation of Kahoot in the learning process. This research is expected to provide empirical evidence on the effectiveness of Kahoot as an interactive learning

medium, as well as to offer practical insights for Informatics teachers at the madrasah level in adopting more interactive and technology-based pedagogical strategies to enhance students' active participation.

METHOD

This study employed a quantitative approach with a pre-experimental one-group pretest-posttest design. This design was selected to identify differences in students' active participation before and after the implementation of Kahoot-based learning media within the same group. Before conducting hypothesis testing, a prerequisite test was performed to ensure the appropriateness of the statistical analysis technique. Because this study involved only one group, the assumption of homogeneity of variance was not required. In line with the requirements of the paired sample t-test, normality testing was conducted on the difference scores between the pretest and posttest results using the Shapiro–Wilk test. After the normality assumption was met, hypothesis testing was carried out using a paired sample t-test to compare students' active participation before and after the implementation of Kahoot-based interactive media. The research design is presented in Table 1 below.

Table 1
Research Design

O 1	⟶ x ⟶	O 2

O1 is the pre-implementation test value obtained before the implementation of Kahoot-based interactive media, and X is the treatment given, namely the application of Kahoot interactive media.

O2 is a post-implementation test value obtained after the application of Kahoot-based interactive media.

This research was conducted during the odd semester of the July–November 2025–2026 academic year at MA Sarji Ar-Rasyid. The population of this study comprised all tenth-grade students at MA Sarji Ar-Rasyid, consisting of one class with a total of 26 students. Because the population was relatively small, this study used a saturated sampling technique, meaning that all members of the population were included as the research sample (Lavrakas, 2008; De Vaus, 2001). Data were collected using a Likert-scale questionnaire to measure students' active participation in Informatics learning. The

questionnaire consisted of 12 statements developed based on indicators of students' active participation in the learning process.

The validity of the instrument was determined through an assessment process by two experts in the field of Informatics education. These validators reviewed the instrument based on the relevance of the content, the clarity of the statements, and their alignment with the formulated Informatics learning indicators. The assessment results showed that all instrument items were in accordance with the established indicators and were appropriate for measuring students' active participation. In addition to validity testing, the reliability of the instrument was also analyzed to ensure the level of internal consistency among the statement items. Reliability testing was conducted using the Cronbach's Alpha coefficient. The analysis yielded a Cronbach's Alpha value of .722, indicating acceptable internal consistency of the instrument. In general, an instrument is considered to have an acceptable level of internal reliability and consistency if the Cronbach's Alpha coefficient is at least 0.70 (Azizah & Chalimatusadiah, 2025). The results of the reliability tests are presented in Table 2.

Table 2
Instrument Reliability Analysis

Scale reliability statistics

	Cronbach is a
Scale	0, 722

Students' active participation in this study is operationally defined as the level of students' involvement, both verbally and non-verbally, during the Informatics learning process. This involvement includes activities such as asking questions, answering questions, expressing opinions, and participating in interactive discussions and quizzes using Kahoot. The indicators of active participation consist of: (1) students' ability to ask questions related to the learning material, (2) students' involvement in answering questions or quizzes, and (3) students' contributions in presenting ideas or responses during class discussions. To measure these indicators, this study used a Likert-scale questionnaire designed to assess students' active participation. Each statement item was scored based on the respondents' level of agreement. The total score represented each student's level of active participation, with a higher score indicating a higher level of engagement. The same questionnaire instrument was administered at the pretest and

posttest stages to identify changes in students' active participation before and after the implementation of Kahoot-based interactive media.

RESULT AND DISCUSSION

Results

The following are the pretest and posttest scores, which are the results of learning using Kahoot-based interactive media in informatics learning, and have been tested for normality using the Shapiro-Wilk formula. Normality testing was conducted using the Shapiro–Wilk test because the sample size in this study was less than 50. The results showed significance values of .091 for the pretest and .107 for the posttest, indicating that both datasets were normally distributed.

Table 3
Normality Test Results

Normality Test						
	Kolmogorov-Smirnova			Shapiro-Wilk		
	Statistics	Df	Sig.	Statistics	df	Sig.
Prates	.152	26	.125	.933	26	.091
Post-tests	.165	26	.069	.936	26	.107

a. Lilliefors Significance Correction

The normality test in this study was conducted using the Shapiro–Wilk method. The results showed significance values of 0.091 for the pretest data and 0.107 for the posttest data. Since both values were greater than 0.05, it can be concluded that the pretest and posttest data were normally distributed. If you want, I can also help revise this into a more formal academic style or make it consistent with the paired-sample t-test method section by focusing on the difference scores instead of pretest and posttest separately.

Table 4
Pairing Differences

Pairing Differences							
			95% Confidence Interval of Differences				
Means	Standard Deviation	Standard Error	Lower	Top	T	df	Sig. (2 tails)

Couple 1	-14.788	8.690	1.704	-18.298	-11.278	-8.677	25	.000
Prates								
Post-tests								

The results of the t-test of paired samples showed an average difference between pretest and posttest scores of -14,788, indicating that the posttest score was higher than the pretest score. The obtained t-value was -8.677 with 25 degrees of freedom (df = 25), and the significance value was $p < .001$, indicating a statistically significant difference between the pretest and posttest scores. These findings show a statistically significant difference between students' pretest and posttest scores after the application of Kahoot-based interactive media. Therefore, it can be concluded that the use of Kahoot-based interactive media significantly increases students' active participation in informatics learning.

Based on the paired sample t-test results, there was a significant difference between students' active participation scores before and after the implementation of Kahoot-based interactive media in Informatics learning at MA Sarji Ar-Rasyid. This finding indicates that the use of Kahoot contributed to an increase in students' active participation during the learning process.

Discussion

The results of this study showed that the use of Kahoot-based interactive learning media influenced the level of students' active participation in Informatics learning. Kahoot made the learning process more engaging, enjoyable, and interactive because it encouraged students to participate more actively during class activities. Through its game-based system, time limits, attractive visual features, and competitive atmosphere, students were not only passive listeners but were also encouraged to answer questions, express opinions, and become more involved in the learning process. This finding is in line with Bicen and Kocakoyun (2018), who found that students' understanding of and response to the Kahoot game contributed positively to their learning motivation. The concept of active learning itself is a multifaceted construct that encompasses not only behavioral engagement but also cognitive and affective dimensions (Lombardi et al.,

2021), all of which were addressed through the Kahoot intervention in this study. This supports the present study because increased motivation can encourage students to become more active during classroom learning activities. Likewise, Astuti et al. (2025) stated that the Kahoot application can maintain students' motivation and make learning more interesting, enjoyable, and less monotonous. This is relevant to the findings of this study, as a more enjoyable learning atmosphere can foster greater student participation during lessons. Although Sidqi et al. (2025) focused more on learning outcomes than on active participation, their findings still support this study indirectly. Improved learning outcomes are often associated with higher student motivation, engagement, and participation during the learning process. Therefore, the positive effect of Kahoot on learning outcomes found by Sidqi et al. (2025) can be understood as a possible consequence of the increased active participation that was also identified in this study.

The results of this study are also in line with the research of Malik et al. (2025), which states that the use of Kahoot in Islamic Cultural History lessons increases student engagement. The study found that Kahoot interactive media significantly increased student participation in lessons. Similarly, research by Nadhila et al. (2025) shows that Kahoot increases the desire to learn and makes the learning environment fun and engaging. During the study, students laughed, cheered, and enthusiastically answered quiz questions. They competed to answer questions quickly. According to a study by Sanoin et al. (2024), the results also show that Kahoot can increase students' activeness and creativity in the classroom and is useful for creating engaging learning experiences. The effectiveness of gamification in education has been systematically documented, with Zainuddin et al. (2020) demonstrating that gamified e-quizzes significantly enhance student learning and engagement through interactive formative assessment. Furthermore, a systematic review by Nascimento et al. (2025) confirmed that gamification strategies consistently produce positive outcomes across various educational contexts.

Kahoot, as an interactive learning medium, can encourage students' active participation by creating a learning environment that requires them to be present, respond promptly, and stay engaged throughout the activity. In this study, attendance and punctual involvement can be seen as supporting aspects of participation because students need to join the session on time in order to take part in the quiz and obtain scores. Students also

appeared enthusiastic and motivated because the scores were displayed directly on the screen, which created a sense of excitement and healthy competition during the lesson. This finding is consistent with Fadly and Sari (2022), who found that the use of Kahoot can create a more conducive and enjoyable learning environment while increasing the attractiveness of the learning process for students. Similarly, Fotaris et al. (2016) explained that gamification techniques using Kahoot can increase student engagement and create a more active learning environment. In addition, Khairunnisah and Rasyidah (2024) stated that the application of the Problem-Based Learning model assisted by Kahoot can encourage students to actively connect their knowledge through questioning and play-based learning activities. This supports the present study because asking questions, responding to tasks, and engaging in learning activities are important indicators of active participation. Furthermore, Alkadri and Ramadhianto (2025) emphasized that Kahoot has the advantage of creating an active and competitive learning atmosphere, which is relevant to the findings of this study showing increased student participation during Informatics learning. Tandiono (2024) specifically evaluated Kahoot's effectiveness in promoting student engagement and found that gamified online learning platforms significantly foster active participation, reinforcing the conclusions of the present study.

The findings of this study support that the use of technology-based learning media contributes to increasing student motivation and learning outcomes in higher education (Latuny et al., 2024). Thus, Kahoot has been proven to be able to overcome the problem of students who are less engaged in learning. Students are typically passive, ask fewer questions, and engage less in learning activities, but by implementing Kahoot-based interactive media, students' active participation increases significantly. In addition, other research also states that Kahoot makes learning more interactive and fun, encourages students to use technology as a learning medium, and improves their motor skills (Al Aziz et al., 2024). Rayan and Watted (2024) found that gamified learning using Kahoot significantly improved students' self-efficacy, interest, and enjoyment in learning, which are essential precursors to active participation. Gómez-Carrasco et al. (2019) also demonstrated that gamification programs positively affect motivation and learning perception, further validating the effectiveness of Kahoot as a pedagogical tool.

The results of this study also show that Kahoot not only functions as an evaluation tool but also functions effectively to improve interaction between teachers and students. Kahoot deserves to be recommended as an alternative interactive learning media tool that can increase students' active participation, especially in computer science learning.

However, this study has several limitations that should be acknowledged. First, the number of participants was relatively small, as the study involved only 26 students from one class. Second, this study used a pre-experimental one-group pretest-posttest design, which did not include a control group. As a result, the findings should be interpreted carefully, because the increase in students' active participation cannot be attributed exclusively to the use of Kahoot without comparison to another group. Third, this study was conducted in only one madrasah, so the findings may not be fully generalizable to other educational settings, subjects, or student characteristics. Therefore, future research is recommended to involve larger samples, include control or comparison groups, and be conducted across different schools or educational levels. Further studies may also examine whether the increase in active participation through Kahoot contributes to other important outcomes, such as learning motivation, academic achievement, critical thinking skills, or long-term retention.

CONCLUSION

The findings of this study indicate that game-based learning media such as Kahoot can help transform a relatively passive learning environment into a more interactive and participatory one, particularly in the context of Informatics learning at the madrasah level. The use of Kahoot significantly increased students' active participation by encouraging them to answer questions, engage in discussions, and take part enthusiastically in classroom activities. In addition, Kahoot helped reduce passive behavior and improved students' motivation and focus during the learning process. These findings align with the broader literature on active learning (Freeman et al., 2014; Lombardi et al., 2021) and gamification (Zainuddin et al., 2020; Nascimento et al., 2025), which consistently demonstrate the positive impact of interactive and game-based approaches on student engagement and learning outcomes.

The findings of this study suggest that the integration of game-based technology such as Kahoot can serve as a practical pedagogical alternative for addressing low student active participation in the classroom, particularly in Informatics learning at the madrasah level. By creating a more interactive, enjoyable, and competitive learning atmosphere, Kahoot encourages students to participate more actively in answering questions, engaging in discussions, and maintaining focus during classroom activities. For this reason, Kahoot is recommended as an interactive learning medium for teachers who aim to create more student-centered learning environments. However, since this study used a one-group pre-experimental design, the findings should be interpreted with caution in terms of causal inference. Therefore, future studies are recommended to employ more rigorous experimental designs, including control groups, in order to provide stronger evidence of the effectiveness of Kahoot. In addition, further research could examine whether the increase in active participation generated by Kahoot also contributes to other important educational outcomes, such as students' learning motivation, learning achievement, and critical thinking skills.

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