

The Impact of Interactive Applications Kahoot and Quizizz in Enhancing Students' Performance in Geography

Mohd Jasmy Abd Rahman, Nor Shahila Ishak, Dan Noor
Amera Omar

Faculty of Education, National University of Malaysia (UKM)

Email: mjas@ukm.edu.my, p99162@siswa.ukm.edu.my & p121243@siswa.ukm.edu.my

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Abstract

The use of interactive applications or e-learning tools like Kahoot and Quizizz can significantly enhance students' active engagement, providing them with focused and in-depth attention during the teaching and learning process. Therefore, this study was conducted to examine whether the utilization of interactive learning applications Kahoot and Quizizz could improve the performance and interest of Form 3 students in the subject of Geography. This study was designed as an action research with a quantitative approach to observe changes in students' performance through pre-test and post-tests and their level of interest using a survey instrument. A total of 67 students were selected as the study sample from a regular daily secondary school in Kulim, Kedah, utilizing purposive sampling techniques. The data collected were statistically analyzed using IBM Statistical Package for Social Sciences (SPSS). Inferential statistical analysis was employed to assess the mean differences in student achievement scores between the pre-test and post-test using a t-test. Descriptive statistical analysis was used to examine demographic information and respondents' interest levels in interactive learning with Kahoot and Quizizz during the Geography teaching and learning process based on mean scores, frequencies, and percentages. The study's findings revealed a significant mean difference in student achievement scores between the pre-test and post-test, with a p-value ($p < 0.05$). The analysis also indicated that students' interest levels in interactive applications Kahoot and Quizizz were high, with an overall mean score ranging from ($m = 3.61 - 4.61$), and the overall mean score being ($m = 4.01$). Furthermore, the results demonstrated an increase in the percentage of student achievement between the pre-test and post-test. This study can be beneficial for various stakeholders, particularly teachers and the Ministry of Education, in designing teaching materials and policies that consider the integration of interactive elements into teachers' instructional methods to promote active learning and improve learning outcomes.

Keywords: Interactive Applications, E-Learning, Kahoot, Quizizz, Achievement, Interest, Geography Subject.

Introduction

The rapid advancements in Information and Communication Technology (ICT) in today's world have undeniably left a profound impact on human civilization. The swift changes and developments in the field of ICT and digital technology have also made their mark on the education system in Malaysia. This, in turn, has created numerous opportunities for students to explore and acquire knowledge, particularly through the Internet. This development aligns with the seventh shift in the Malaysia Education Development Plan (PPPM) 2015-2025, which underscores the necessity of leveraging ICT to enhance the quality of education in Malaysia. Therefore, in the pursuit of educational excellence in Malaysia and the cultivation of globally informed students, every learner should be provided with the opportunity to access ICT-based learning.

According to Nurul et al. (2018), their study emphasizes that teaching and learning approaches must align with the current technological advancements. Therefore, online interactive learning tools like Kahoot and Quizizz are seen as capable of fostering collaborative learning relationships and providing benefits not only to teachers but also in sparking students' interest in learning (Noriyani, 2017). In summary, interactive applications such as Kahoot and Quizizz represent a concept of online interactive learning that is used in 21st-century education (PAK21) and is gaining popularity in educational development to enrich students' classroom experiences. Previous studies have also highlighted the concept of interactive learning as a technique to enhance student engagement in the classroom (Orhan et al., 2019). Hence, teachers, especially Geography teachers, play a crucial role in holistically transforming their teaching methods to be more student-centered by incorporating PAK21 elements into the teaching and learning process in the classroom. This is because, changes in the teaching and learning process can indirectly contribute to enhancing the quality of the nation's education (Maimunah, 2017).

However, excellent performance in Geography at the school level, especially for lower secondary education, is far from satisfactory. This is seen as one of the factors contributing to the lack of popularity of this elective subject among students at the SPM level. Furthermore, in 2019, there was a slight change in the format of the Form 3 Assessment (PT3) examination, where students are required to have a good understanding of the topics studied to enable them to answer exam questions effectively. This is because the latest PT3 format has introduced and incorporated Higher-Order Thinking Skills (HOTS) questions, which demand creative thinking from students to answer. This situation differs from the previous PT3 format, where students only had to complete coursework and were not required to sit for an examination. Additionally, the current KSSM Geography syllabus, known as the *Dokumen Standard Kurikulum Pentaksiran* (DSKP), outlines that every student must take the PT3 examination and be assessed based on the mastery level set.

Gek (2017) explained that among the common problems faced by students are their weak understanding of the basic concepts of Geography in Form 1 and 2, as well as their continued struggle in mastering each learning topic. Furthermore, a decline in student performance is often attributed to teachers who fail to diversify their teaching methods in the

teaching and learning process. This situation is exacerbated by the fact that teachers often rely on highly conventional teaching methods, such as 'talk and chalk,' and focus primarily on textbooks and non-interactive teaching aids like whiteboards, topographic maps, globes, chart models, and audio-visual tools such as radios and recorders. The use of these traditional teaching methods results in passive and unengaged students who overly depend on the teacher. Consequently, students tend to lack focus and interest in the teaching and learning process (Wang & Lieberoth, 2016). Therefore, this study aims to examine the extent to which the use of interactive learning applications like Kahoot and Quizizz can have an impact on improving the academic performance and interest of Form 3 students in the subject of Geography.

The objectives of this study are as follows

1. To identify significant mean differences in student achievement scores in pre-test and post-tests.
2. To determine the level of student interest in the use of interactive applications Kahoot and Quizizz in the teaching and learning process of Geography subject.
3. To ascertain the impact of the use of interactive applications Kahoot and Quizizz in the teaching and learning process of Geography subject.

The research questions are as follow

1. Is there a significant mean difference in student achievement scores between the pre-test and post-test?
2. What is the level of student interest in the use of interactive applications Kahoot and Quizizz in the teaching and learning process of Geography subject?
3. How effective is the use of interactive applications Kahoot and Quizizz impact the teaching and learning process of Geography subject?

A null hypothesis has been formulated in this study to address the first research question.

H₀1: There is no significant mean difference in student achievement scores between the pre-test and post-test.

Literature Review

Interactive Learning

Interactive learning also known as e-learning, refers to the use of Internet technology to actively enhance knowledge and skills in the classroom (Faridah & Afham, 2019). Interactive learning emphasizes two-way interaction in the conventional teaching and computer-assisted learning processes, involving content in various forms such as images, tutorials, feedback, and more self-directed learning processes (Harlina et al., 2017 & Sharipova, 2020). In summary, interactive learning or e-learning is a contemporary teaching method that stimulates students to learn through their own experiences using various interactive online applications. Among the popular interactive learning tools embraced by educators and easily applicable in the teaching and learning process today are Kahoot and Quizizz applications.

Kahoot and Quizizz Applications

According to Mutiara et al. (2022), Kahoot is an interactive medium used to enhance student engagement in the classroom and assess students' cognitive levels through gamified learning. Kahoot is a web-based application that provides interactive services in the form of quizzes,

discussions, or surveys, which can be used as a tool to aid learning activities (Muhammad et al., 2019). On the other hand, Quizizz is one of the most popular applications among educators for assessing students' knowledge and progress (Amalia, 2020; & Suryaman et al., 2020). As noted by Orhan and Gürsoy (2019), the interactive applications Kahoot and Quizizz can be used as formative assessment tools in the classroom to evaluate academic achievements, student engagement, and enhance student motivation during the learning process. Therefore, students are more inclined to embrace the use of game-based Kahoot and Quizizz applications due to their strong desire for immediate feedback on their performance, especially in conducted assessments (Teresa et al., 2018).

Research Methodology

Research Design

This study is an action research employing a quantitative approach through surveys, pre-tests, and post-tests. A t-test was conducted to observe changes in student achievement performance through pre-tests and post-tests. Meanwhile, the survey used to assess students' interest in the Geography subject using the Kahoot and Quizizz applications was adapted from the study by Faridah & Afham (2019).

Research Sample/Participants

The study's population consists of Form 3 students from a daily secondary school in Kulim, Kedah. A purposive sampling technique was used to select respondents who align with the research objectives. The sample for the study includes 67 respondents, which encompasses all Form 3 students from a daily secondary school in Kulim, Kedah.

Data Collection Method/Instrumentation

The instruments used in this study include questionnaires, pre-tests, and post-tests (Form 3 Geography achievement tests). The pre-test is administered before the interactive learning process using the Kahoot and Quizizz applications to assess the students' initial knowledge and performance before the study is conducted. On the other hand, the post-test is administered in the sixth week after the interactive teaching activities using Kahoot and Quizizz applications are conducted. The post-test consists of the same questions as the pre-test and is given to students to determine whether there has been an improvement in achievement after using the interactive learning of Kahoot and Quizizz in the Geography subject.

As for the questionnaire, it is distributed to respondents to assess students' interest in interactive learning through Kahoot and Quizizz in the Geography teaching and learning process. The questionnaire consists of two parts, Part A and Part B. Part A contains items related to respondent demographics such as gender and ethnicity. Part B involves items related to students' interest in using the interactive Kahoot and Quizizz applications in the Geography teaching and learning process. The items are measured on a 5-point Likert scale, where 1=Strongly Disagree (SD), 2=Disagree (D), 3=Uncertain (U), 4=Agree (A), and 5=Strongly Agree (SA).

Data Analysis Method

The collected research data is analyzed using both descriptive and inferential statistical methods, employing the IBM Statistical Package for Social Sciences (SPSS) software. Inferential

statistical analysis is utilized in this study to examine mean score differences in student achievement using a t-test for both the pre-test and post-test. On the other hand, descriptive statistical analysis is applied to explore the demographics and the level of interest among respondents regarding interactive learning through Kahoot and Quizizz in the Geography teaching and learning process, based on minimum score values, frequency, and percentages. The interpretation of the minimum score levels is determined based on the recommendations of Pallant (2010).

Findings and Discussion

Demographic Analysis

Table 1

Demographic Analysis of Respondents

Background	Category	Frequency	Percentage
Gender	Male	32	47.8 %
	Female	35	52.2 %
Ethnicity	Malay	28	41.8 %
	Chinese	19	28.4 %
	Indian	20	29.9 %
	Others	-	-

Table 1 above presents the findings on respondent demographic information based on gender and ethnicity. A total of 67 respondents participated in this study, with the majority being female students, amounting to 35 individuals (52.2%), while the rest were male students, totaling 32 individuals (47.8%). In terms of ethnic distribution, the majority of respondents belonged to the Malay ethnicity, comprising 28 individuals (41.8%), followed by 19 individuals of Chinese ethnicity (28.4%), and 20 individuals of Indian ethnicity (29.9%).

Research question 1: Is there a significant mean difference in student achievement scores between the pre-test and post-test?

H₀1: There is no significant mean difference in student achievement scores between the pre-test and post-test.

Table 2

Mean Score Differences in Student Achievement Using t-Test for Pre-Test and Post-Test

Test	N	Mean	Sd	Df	t	Sig
Pre	67	43.2	7.42	66	-18.85	.000
Post	67	69.0	10.99	66	-18.85	.000

P<0.05

The t-test results in Table 2 above show $T(66) = -18.855$, and the p-value is less than 0.05 ($p < 0.05$). The pre-test had a mean score of ($m=43.2$; $sd=7.42$), while the post-test had a mean score of ($m=69.0$; $sd=10.99$), with a mean difference of 26. Based on the significant value obtained, the null hypothesis (H₀1) is rejected because it is smaller than the significance level of $p=0.05$. Therefore, the result indicates a significant mean difference in student achievement scores between the pre-test and post-test. These findings are consistent with the study by Chaiyo and Nokham (2017), which explains that there is a significant difference in attention,

engagement, enjoyment, motivation, and satisfaction in the teaching and learning process using interactive applications like Kahoot and Quizizz.

Research question 2: What is the level of student interest in the use of interactive applications Kahoot and Quizizz in the teaching and learning process of Geography subject?

Table 3

Student Interest Levels in Using Kahoot and Quizizz Applications in the Geography Teaching and Learning Process

No.	Items	Mean	Level
1	I found that the Kahoot and Quizizz applications are flexible for use in the geography teaching and learning process.	3.82	High
2	The functions of the Kahoot and Quizizz applications are clear and easy to understand in the context of Geography.	3.61	High
3	Interacting with the Kahoot and Quizizz applications does not require my much mental effort.	3.71	High
4	Overall, I believe that the online applications (Kahoot & Quizizz) are easy to use.	3.93	High
5	The user interface of the Kahoot and Quizizz applications is attractive and interactive.	3.76	High
6	I enjoy learning Geography using the Kahoot and Quizizz applications.	4.14	High
7	Using the Kahoot and Quizizz applications creates competition among students to find the correct and accurate answers.	4.61	High
8	I am interested in trying out the latest forms of learning, such as the Kahoot and Quizizz applications.	4.51	High
	Overall Mean Score:	4.01	High

Table 3 above presents the data of the analysis of the average minimum score values against students' interest in learning Geography using the interactive Kahoot and Quizizz applications. The analysis results indicate that students' interest in using the interactive Kahoot and Quizizz applications is high, with an overall range of minimum scores between (m=3.61–4.61), and the overall mean minimum score is (m=4.01). In general, it can be clearly seen that all items in the questionnaire show a positive response regarding students' interest in using the Kahoot and Quizizz interactive applications in the classroom teaching and learning process. These findings demonstrate that the majority of students are motivated and interested in learning Geography using the interactive Kahoot and Quizizz applications. These results are consistent with the study by Faridah & Afham (2019), where the findings from the questionnaire conducted in their study also found that students showed a tendency and interest in using the interactive Kahoot and Quizizz applications in the teaching and learning process. Nurul et al. (2018) in their study also found that these applications are capable of stimulating students' focus, serving as effective interactive tools in the teaching and learning process, making the classroom atmosphere more enjoyable, and fostering positive competition.

Research question 3: How effective is the use of interactive applications Kahoot and Quizizz impact the teaching and learning process of Geography subject?

Table 4

Pre-Test and Post-Test Results

Grade	Pre-Test (%)	Post Test (%)
A	22.4	59.7
B	29.8	32.8
C	32.8	7.5
D	15.0	0
Total:	100	100

Table 4 above presents the results in percentage (%) for the pre-test and post-test conducted on the respondents. Based on this analysis, it can be concluded that there is an overall improvement in student achievement in Geography after the teaching and learning process using the interactive Kahoot and Quizizz applications. The percentage of students who received an A grade increased from 22.4% to 59.7%. The percentage of students who received a B grade also increased from 29.8% to 32.8%. Meanwhile, the percentage of students who received a C grade decreased from 32.8% to 7.5%, and there were no students who received a D grade compared to the previous percentage of 15.0%. These findings clearly indicate that the use of the interactive Kahoot and Quizizz applications in the Geography teaching and learning process has a positive impact on student achievement, as evidenced by a significant improvement in the pre-test and post-test results. These findings are supported by the findings of the study by Faridah & Afham (2019), which also showed an improvement in student achievement between the pre-test and post-test for 40 first-semester International Business Diploma students at Politeknik Melaka. The same was explained by Orhan and Gursoy (2019), who noted that learning activities using the Kahoot application had a more positive effect on academic achievement and student engagement.

Conclusion

In summary, this study aimed to investigate the effects of using interactive applications Kahoot and Quizizz in the teaching and learning process to enhance academic achievement and student engagement in the subject of Geography. The primary findings of this study indicate a significant difference in student achievement scores between the pre-test and post-test. This demonstrates that the use of interactive applications like Kahoot and Quizizz in the teaching and learning process can contribute to improving students' academic performance. The study also reveals that the use of interactive applications Kahoot and Quizizz influences students' motivation and interest in studying Geography.

The implications of this study suggest that educators should consider integrating interactive elements into their teaching methods to promote active learning and enhance learning outcomes. While this study provides positive results, the relatively small sample size may limit the generalizability of the findings. Therefore, for future research, it is recommended to conduct larger-scale studies in various educational settings to explore the effects of using interactive applications like Kahoot and Quizizz in enhancing student learning outcomes. Additionally, research on the long-term effects and sustainability of the learning environment through the use of interactive applications like Kahoot and Quizizz will provide deeper insights

to the Ministry of Education (KPM) as education policymakers in Malaysia and to teachers as implementers.

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