

THE USE OF KAHOOT! IN INCREASING THE MOTIVATION OF PUPILS WITH SPECIAL EDUCATIONAL NEEDS IN ENGLISH LANGUAGE LEARNING

Komathi Elangovan*¹, Mohd Hanafi Mohd Yasin¹

¹Faculty of Education, Universiti Kebangsaan Malaysia,
43600 UKM Bangi, Selangor Darul Ehsan, Malaysia.

*Corresponding author: Komathi Elangovan (komathikt@yahoo.com)

ABSTRACT

The Malaysian Ministry of Education has ensured equality of education for pupils with special educational needs (SEN) in learning English in schools. Despite the passing years and a significant investment in teaching the English language, there are still several pupils who have not yet reached a high level of language proficiency. The purpose of this study is to explore the extent of the use of the Kahoot! application! contribute to motivating SEN in learning English. The study used a quasi-experimental design. Plus, quantitative and qualitative methods are used in the study. Fourteen SEN pupils from Sekolah Kebangsaan Paya Rumpit, Melaka were selected as sample studies through purposeful sampling techniques. Data collection procedures are implemented with the permission of the Education Policy Planning and Research Division (eRAS) and study schools. Next, pre-test and post-test as well as teaching using the Kahoot! module conducted after a pilot study was conducted at the study site. In the data analysis, the data obtained from the post-test is compared with the results of the pre-test to identify the level of SEN achievement. Followed, the qualitative feedback was analyzed thematically to determine the level of motivation of the treatment group in learning English. Therefore, the results of the pre-test and post-test are used to identify the level of SEN's motivation in learning English. The results show that the motivation level of SEN is high with the use of Kahoot! in learning. This study implies that learning English using Kahoot! requires teachers who have skills in handling the application. Therefore, special education teachers should be prepared in terms of skills in handling the Kahoot! application for the smoothness of the SEN learning process.

Keywords: SEN, Kahoot! application, pre-test, post-test, Kahoot! module, SEN motivation

1. INTRODUCTION

In 2003, the policy of Teaching and Learning Science and Mathematics in English (PPSMI) established English as the medium of instruction for science and mathematics subjects (Othman et al. 2021). However, after almost eight years of implementing PPSMI, the government decided to scrap this policy in 2009 and replace it with the policy of Enhance the Malaysian Language, Strengthening the English Language (MBMMBI). The PPSMI policy was introduced to provide Malaysian pupils with the skills they need to succeed in a globalized world. However, it was later

replaced by the MBMMBI policy. Overall, the language policy in Malaysia is evolving in response to the changing needs and conditions of the country.

In addition, the Government of Malaysia through the Malaysian Education Development Plan 2013-2025 has prioritized providing equal educational opportunities to all pupils in Malaysia. To meet the educational needs of pupils with special education needs (SEN), special education services have been established (Ministry of Education Malaysia 2013). These services include the School of Special Education and the Integration Special Education Program which aims to integrate SEN into the mainstream. In addition, an inclusive approach has been implemented to ensure that SEN's needs are met. As a result, the Ministry of Education Malaysia has ensured equality of education for SEN in learning English in schools.

Despite the passing of the year and significant efforts in teaching English, there are still a small number of pupils who have not yet achieved a high level of language proficiency (Jazuli et al. 2019). This issue has gained the attention of the Ministry of Education Malaysia, prompting them to examine the situation and implement measures to improve the efficiency of English users. Fostering a culture of speaking English in the classroom requires the implementation of a well-designed and gradual strategy. Especially in the context of English as a Second Language (ESL) and Foreign Languages (EFL), a systematic and progressive approach is important, where learning and facilitation practices that use chalk-and-talk and the use of printed materials, such as handouts and textbooks are ineffective at motivating SEN to actively engage in classes (Ibrahim & Adnan 2019).

In other words, conventional methods of learning English are no longer an effective way to use in ESL classrooms. English teachers in schools are aware of this to enable them to design their lessons that maximize the potential of pupils, especially SEN in mastering different language skills. Therefore, English teachers in primary classrooms should pay attention to the motivation of SEN in mastering English by integrating technology, such as Kahoot! application in learning and facilitation. This is in line with the opinion of Anandha et al. (2021), who found that SEN is eager to use Kahoot! and its use increases their motivation as well as their English vocabulary.

Based on studies conducted by Tysmbal (2019) and Campado (2023), SEN tends to get bored easily, and lose interest and focus in learning. It is necessary to increase their motivation to complete their tasks, especially in the eyes of English subjects. According to Vanitha Subramaniam and Norshidah Mohd Salleh (2020), SEN feels motivated, fun, and actively involved in learning English subjects with Kahoot! quiz. Meanwhile, the level of achievement of SEN in English subjects increased with the integration of technology into their learning (Siti Sabariah Mat Isa and Norshidah Mohamad Salleh 2021). According to Tan Shih Min et al. (2022), there was a significant impact on the experimental group using Kahoot! application! in English class versus the control group that does not use Kahoot! application. So, Kahoot! application-based learning can improve the achievement of SEN by making it easier for pupils to memorize and master vocabulary.

In addition, the positive feedback shown by SEN in Mohd Shakir Azfar Abdul Halim et al. (2020) study reflects their motivation, perception, and positive acceptance of English learning with the

integration of Kahoot! quiz. It is because the element of fun and competition in the game can make pupils more motivated to learn English. Anandha et al. (2021) also proved in their study that Kahoot! attracts interest, motivation, and pupils' participation to learn and achieve more. Given this thought in mind, this study was carried out to explore the extent to which the use of the Kahoot! application contributes to motivating SEN to learn English. Therefore, English teachers should play a role in creating a classroom learning environment that uses a variety of approaches and strategies where SEN is keen to continue their learning.

2. KAHOOT! APPLICATION

Kahoot! is a game-based pupil feedback system (GSRS) where classrooms are temporarily converted to a game program where teachers host games and pupils are competitors. Hence the purpose of the Kahoot! application is to increase interest, participation, motivation, excitement, and focus to improve learning performance and classroom dynamics (Money & Tahir 2020). According to Tsymbal (2019), Kahoot! is a tool that uses technology to administer quizzes, discussions, or polls. Kahoot! also provides an opportunity to not only evaluate the understanding of pupils' concepts but also contribute to the development of new knowledge and understanding through additional descriptions during or after play (Oktaria et al. 2021). Therefore, game-based activities are always exciting and fun for learning languages.

Moreover, according to Ahmed et al. (2022), Kahoot! is a game-based learning platform and it was launched in August 2013 in Norway. Kahoot! Includes multi-choice quizzes and can be viewed with a web browser. Kahoot! can also be used to survey pupils' knowledge and track their answers and scores to measure progress. Compared to other technologies, digital game design that combines a combination of images, pictures, and sounds is a factor that stimulates pupils to undergo good learning (Law Yiing Yiing & Zamri Mahamod 2021).

Annasai Jamar and Mohd Aderi Che Noh (2020), found that the educational game known as "Kahoot!" is very versatile, similar to complex puzzles, and caters to users of different ages. One of the main advantages of the game is its ability to access through a web browser, making it easy for individuals to engage regardless of their location. To take advantage of the benefits offered by Kahoot! in full, both teachers and pupils are required to create their accounts on the official website of the game, which can be accessed at <https://getKahoot!.Com>. Teachers should plan and prepare games for learning English in the form of quizzes. After registering, access the Kahoot! page, the pupil logs in using the <https://Kahoot!.IT/>. The pupil then registers through the URL, <https://Kahoot!.IT/> in the address bar of any web browser. Furthermore, if the pupils have their account in Kahoot! they have the opportunity to play a lot of games available in Kahoot! in a face-to-face session.

Teachers should create a variety of quizzes related to the subject being evaluated, especially English, and give pupils a unique PIN of quizzes for them to join. The home screen in front of the classroom will showcase questions, while pupils use their devices to select their answers from the various options provided. Moreover, the teacher can set time limits for questions and allocate appropriate periods for pupils to answer. After all the pupils are "logged in", the teacher clicks the "Get Started" link to launch the quiz. Pupils will have the freedom to name themselves. The teacher

can choose the "form" of the game individually or even in a group. The teacher then projects the question on the projector display or Liquid Crystal Display (LCD), and the pupil answers it via a computer, mobile phone, or tablet that enables the application.

Subsequently, English played an important role in the development of Malaysia as it is the main medium of instruction and trade in the country. However, English in Malaysia is often learned as a second or foreign language (Ang et al. 2020). Thus, schools and teachers use different approaches to improve English learning and facilitation. Here, Information and Communication Technology (ICT) is the choice for teachers to increase the involvement and motivation of pupils as well as accelerate learning as pupils are currently involved with their digital tools (Oktaria 2021). So, the Kahoot! application used as a solution to overcome this case.

Tan et al. (2022) have stated that Kahoot! offers the opportunity to improve learning English in this country of Malaysia significantly. In addition, Pavitra Sinnivasagam and Tan Kim Hua (2023) studied the perception of pupils and teachers on the effects, characteristics, functions, and demographic factors of satisfaction with the use of Kahoot! in learning English. The findings of the research reveal that the features, functions, and use of Kahoot! had positive feedback and perceptions from both participants. Teachers also believe Kahoot! to be a very useful tool in increasing passive pupil engagement and promoting competitive learning. Meanwhile, pupils can build motivation and support and strengthen their learning by using Kahoot! application.

Following that, Yunus and Mohd Azmanuddin (2019) proved that the use of the Kahoot! assists the pupil in maintaining irregular verbs in English. The performance of pupils in post-tests improved with the use of Kahoot! application. Hence, Kahoot! help pupils to achieve language proficiency, while also making knowledge strengthening more interactive. Next, Ananda et al. (2021) conducted a study to improve SEN's ability to learn English vocabulary through Kahoot! application. The use of online learning media is now indispensable, especially in distance learning where online learning is the only option during the pandemic era. Use of Kahoot! meet the requirements of online teaching-learning activities. The results showed an increase in the ability of English to obtain new vocabulary. Therefore, the results are satisfactory and SEN is highly motivated in using Kahoot! because they can see first-hand the winner's podium.

Pahamzah et al. (2022) explain the investigation or observe the effects of Kahoot! application on vocabulary understanding, with a study subject of seven SEN in sixth grade with special educational needs aged between eleven and twelve. As a result, Kahoot! improve the reading and vocabulary skills of the pupils. Next, Wang and Tahir (2020) discuss the learning outcomes of using Kahoot! application in education. It shows better academic results for the non-traditional teaching approach where Kahoot! used as a teaching aid for SEN. Hence, there are positive effects of non-traditional teaching methods, including better class attendance, fewer late arrivals, more course materials downloaded, good motivation, and higher overall scores.

Huseyin Bicen et al. (2022) discuss the use of the Kahoot! application for SEN creates healthy competitive opportunities between pupils, learning becomes more fun, and positively increases their engagement levels and motivation levels. Teachers who conduct learning activities using the application also have a highly positive attitude in encouraging the use of the application in the

future. Thus, SEN shows passion and deep interest in learning to use the Kahoot! application. In this regard, Nur Ain Mat Nasir et al. (2021) discuss the use of mobile technology, such as Kahoot! among pupils with hearing impairment (HI) in the English language learning session. The findings suggest the majority of pupils believe that mobile technology, such as Kahoot! help them in learning, while increasing their motivation and engagement.

In addition, Anandha et al. (2021) conducted a research titled Utilizing Kahoot! In Vocabulary Teaching for pupils with special educational needs. The results show that SEN is highly motivated to use Kahoot! because the pupil's feedback in answering questions shows the effectiveness of Kahoot! in teaching English to pupils. Adnyani et al. (2020) studied the perceptions of teachers and pupils in a study. Thus, find that Kahoot! is an application that is far more advantageous than detrimental and has a positive impact in terms of interest, attractiveness, novelty, stimulation, dependency, efficiency, and transparency. In the meantime, Rajabpour (2021) reveals that teachers consider increased pupil engagement, increased classroom dynamics, higher motivation, instant feedback, and higher energy levels during the use of Kahoot! application in learning.

The same goes for Pavitra Sinnivasagam and Tan Kim Hua (2023) who discuss that Kahoot! works well in building motivation, interest, supporting and strengthening pupils' learning. Plus, teachers also believe that the Kahoot! application to be a highly successful tool to increase passive pupil engagement, while promoting competitive learning. Meanwhile, Sukowati and Sartono (2020) found that learning motivation will encourage pupils to engage in learning activities actively. Thus, studies were carried out to solve the problems found using Kahoot! application. The results showed that there was an increase in the motivation of pupils' learning with the implementation of Kahoot! activities.

3. METHODOLOGY

Quasi-experimental designs are used in this research. The design type is pre-test and post-test for non-equivalent groups. Next, the research used qualitative and quantitative methods to assess the effectiveness of this study. In quasi-experimental studies, there is no need to change the grouping of the subjects under investigation (Ahmad et al. 2021). To provide a comprehensive overview of the quasi-experimental research design implemented in this study, the following table, as outlined by McMillan (2008) presents a summary.

Table 1.1: Quasi-experimental design.

Group	Pre-Test (T1)	Teaching Approach	Post Test (T2)
Treatment Group	O_1	X_1	O_2
Control Group	O_3	X_2	O_4
Petunjuk			
$O_1 O_3$ = Pre-Test		X_1 = Teaching and learning with using the Kahoot!	
$O_2 O_4$ = Post-Test		X_2 = Teaching and learning by traditional teaching methods	

Source: McMillan 2008.

3.1. Population and sampling

In this study, the population refers to pupils at PPKI SKPR. To obtain a representative sample, the researcher used a method called purposeful sampling, where 14 SEN from Year 2 pupils were selected from a large population. This sample was carefully selected from two special education classes at the school. The researcher has set a set of criteria for selecting samples for this study. One of the criteria is that both classes, namely A and B need to be selected from the same school. The level of mastery of the pupils consisted of low, medium, and high for SEN from both classes.

Next, only 14 pupils from special education classes were included in the study. This decision was made to save time, as the study was scheduled to last only 8 weeks. In this study, a group of 7 pupils from the Beta class, namely Group A, was designated as a control group. The control group conducted teaching and learning through traditional methods. Meanwhile, 7 pupils from the Sigma class who are Group B are known as the treatment group. Pupils in this group conducted learning sessions using Kahoot! learning module built by the researcher.

3.2. Study Instruments

The instruments developed for this pre-test and post-test test are 10 test questions related to the title True or False. Followed by a learning module produced using Kahoot! application to teach the title for 6 weeks to identify the motivation level of SEN. Both instruments are developed by the researcher.

i. Pre-tests and post-tests

Based on the title of the second-year learning standard of the English Learning Content Standard Document, the researchers developed a test question for SEN. This instrument was formed to measure the academic achievement of pupils from the post-test for the treatment group by Kahoot! application and control groups after being taught using traditional methods. In addition, the Standard Primary School Curriculum training manual and the Year 2 English syllabus were used as the main reference in developing test questions in this study.

In the aspect of determining the validity of the test content, the instruments are checked by experienced special education teachers. In addition, test items are made based on the Test Specification Table, for True or False topics to increase the validity of the content of the approved test. Finally, the control group and the treatment group were given the same set of tests, answering at the same time and in the same place to improve the accuracy of the study findings.

ii. True or False Learning Module

The treatment group implemented learning sessions in English using Kahoot! application for 6 weeks using the True or False Module. There are six sub-headings in the module that are divided into each for each week for 6 weeks. At the end of each sub-heading, a feedback form is given to SEN to collect information on the level of motivation of SEN in English subjects. Following this, Table 1.2 shows the modified items based on their sources for the study and certified by experts, namely special education teachers.

Table 1.2: Items and their Sources

No	Items	Sources
1	Kahoot! motivates me to learn	Modified from Rubio-Arraez, S. (2021)
2	The time frame found when answering questions in Kahoot's activities increased my excitement	Modified from Basuki & Hidayati (2019)
3	Kahoot! helps me focus on learning	Modified from Basuki & Hidayati (2019)
4	Kahoot! makes it easy for me to remember something learning	Modified from Rubio-Arraez, S. (2021)
5	Every activity in Kahoot! helped improve my understanding of the title	Modified from Basuki & Hidayati (2019)
6	When I can answer correctly, I feel good	Modified from Rubio-Arraez, S. (2021)
7	Learning is more permanent with Kahoot! activities as opposed to learning in a traditional environment	Modified from Basuki & Hidayati (2019)
8	Motivation for me increases every time the teacher uses the Kahoot! application to teach	Modified from Basuki & Hidayati (2019)
9	Upon completion of doing activities in the Kahoot! application, I get complete satisfaction	Modified from Basuki & Hidayati (2019)
10	I like to solve questions in the Kahoot! application	Modified from Rubio-Arraez, S. (2021)
11	I understand what the teacher is saying through the Kahoot! application	Modified from Basuki & Hidayati (2019)
12	My motivation to learn increased when I was involved with classmates in Kahoot! activities	Modified from Basuki & Hidayati (2019)

3.3. Data Collection Procedure

The data of the study was obtained through the use of mixed methods. Before collecting the data, the researchers obtained approval from the Education Policy Planning and Research Division (eRAS) as well as the school. In addition, participants involved in the study were informed orally and gave their consent before signing the authorization letter. The data collection process lasted 8 weeks. To begin the learning session process, a discussion session was conducted involving researchers, senior assistant teachers, and special education teachers. During this session, the researcher described how the experimental and control classes will work. Following the discussion and explanation of the procedure for the implementation of treatment and control classes.

Table 1.3: The duration of the implementation of the study

Month/Year	Weeks	Items
August 2023	1	Observation
	2	Pre-Test & Teaching application-assisted

September 2023	3	Kahoot! module Teaching application-assisted module	Kahoot!
	4	Teaching application-assisted module	Kahoot!
	5	Teaching application-assisted module	Kahoot!
	6	Teaching application-assisted module	Kahoot!
October 2023	7	Teaching application-assisted module	Kahoot!
	8	Post-test	

The study was conducted for 8 weeks at the study site from August to October, as shown in Table 1.3. In the first week, the researcher made only preliminary observations, while in the remaining 7 weeks, the researchers conducted learning based on the Kahoot! module for the treatment group and post-test.

3.4. Data Analysis

The study focuses on qualitative data analysis and is supplemented with quantitative analysis. In the analysis of questions in pre-test and post-tests, the original score data obtained is analyzed and stored in the form of tables and graphs based on the scoring grade from the school exam analysis system (Anamalai & Mohamad Yatim 2022). Thus, the data obtained from the post-test were compared with the results of the pre-test to identify the level of achievement of SEN. Next, qualitative feedback is analyzed thematically to determine the level of motivation of the treatment group in learning English with the use of Kahoot! application. Thus, the findings from the pre and post-tests are used to identify the level of motivation of SEN in learning English. By the way, SEN motivation in learning English with the use of the Kahoot! application investigated.

4. FINDINGS

This section presents the findings obtained from the test questions and feedback forms for the study question which is to explore the extent to which the use of Kahoot! application contributes to motivating SEN to learn English. The studies were conducted during the end of the school session and the researchers divided the samples into treatment groups and control groups.

4.1. Findings from pre-tests and post-tests.

In the analysis of questions in pre-tests and post-tests, the original score data obtained is analyzed and stored in the form of tables and graphs based on the score grade as shown in Table 1.4. This scoring grade range is plucked from the school exam analysis system.

Table 1.4: Scoring grade from the school exam analysis system.

Scores (%)	Gred	Items
80 – 100	A	Excellent
65 – 79	B	Very Good
50 – 64	C	Good
40 – 49	D	Satisfactory
0 - 39	E	Poor

Source: Anamalai & Mohamad Yatim 2022.

Researchers have ensured the validity of the test by enacting the Test Specification Schedule (TSS). TSS plays an important role in formulating the Year 2 English lesson test questions. Things to take into account during the drafting of the TSS are the form of the test item, the skills tested, the type of item, the measured content, the division of marks, the number of items, and the level of difficulty (Nor Aisyah Seconds 2020). With TSS, the consideration of the number of questions for the test can be determined. The validity of the syllabus can also be guaranteed.

Figure 1.2 shows a comparison of the percentage scores for pre-tests and post-tests obtained by the control group. The number of pupils sitting for both tests is 7. Based on Table 1.5, the findings of both tests showed that the mean score of the control group for the pre-test was 65.47% and the mean score for the post-test was 79.76%. The mean difference in scores for both tests was 14.29%. Meanwhile, Figure 1.3 shows a comparison of the percentage scores for pre-tests and post-tests obtained by the treatment group. The findings of both tests showed that the mean pre-test score for the treatment group was 67.85% and the mean score for the post-test was 94.05%. The mean difference in scores for pre and post-treatment tests was 26.20%. In general, there was a difference in mean scores between the treatment groups and the control groups, where the difference in the mean score of the treatment group was greater than the control group.

Based on the findings obtained, it can be seen that SEN in the control group increased their scores moderately. On the other hand, SEN in the treatment group significantly improved their scores with the use of Kahoot! application in their learning English. Thus, there was a mean difference in post-test scores between the treatment and control groups of 14.29% compared to the mean difference in pre-test scores between the two groups of 2.38%, and the overall mean difference for pre-test and post-test tests was 11.91%. This suggests that the development and improvement of the English vocabulary of the treatment group was more pronounced than the control group. Here, it can be concluded that there is a positive change in the academic achievement of SEN in the classroom upon the application of Kahoot! used in the process of learning English.

Figure 1.1: Pre-test and post-test control group test scores

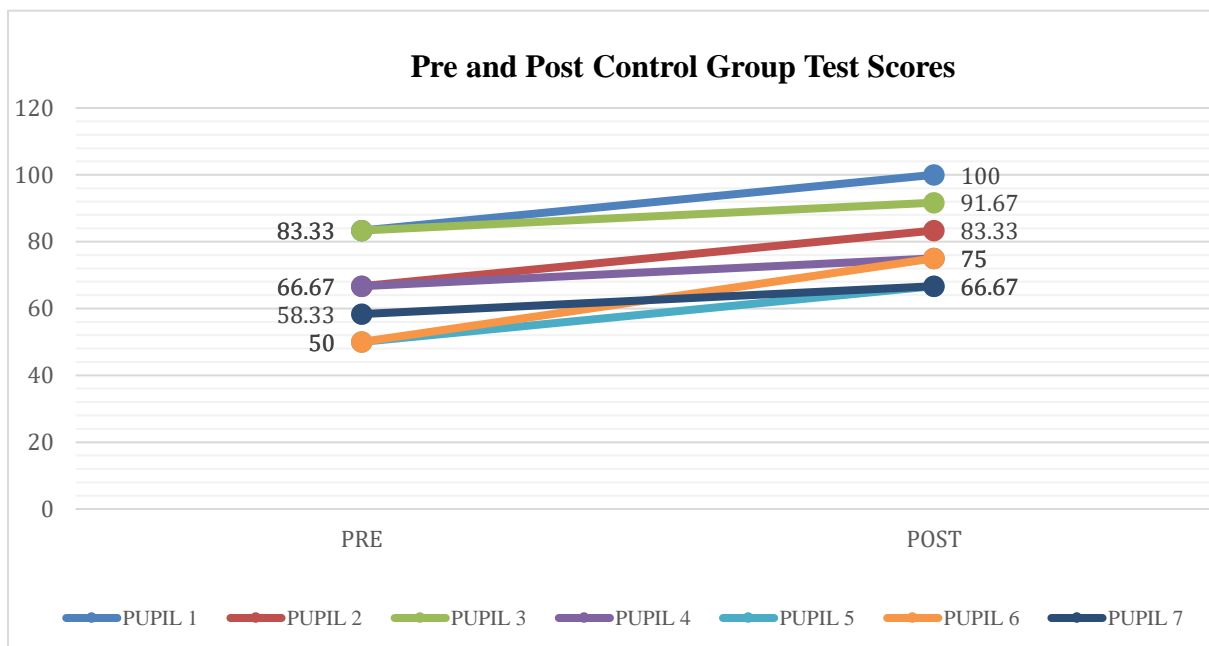


Figure 1.2: Pre-test and post-test treatment group test scores

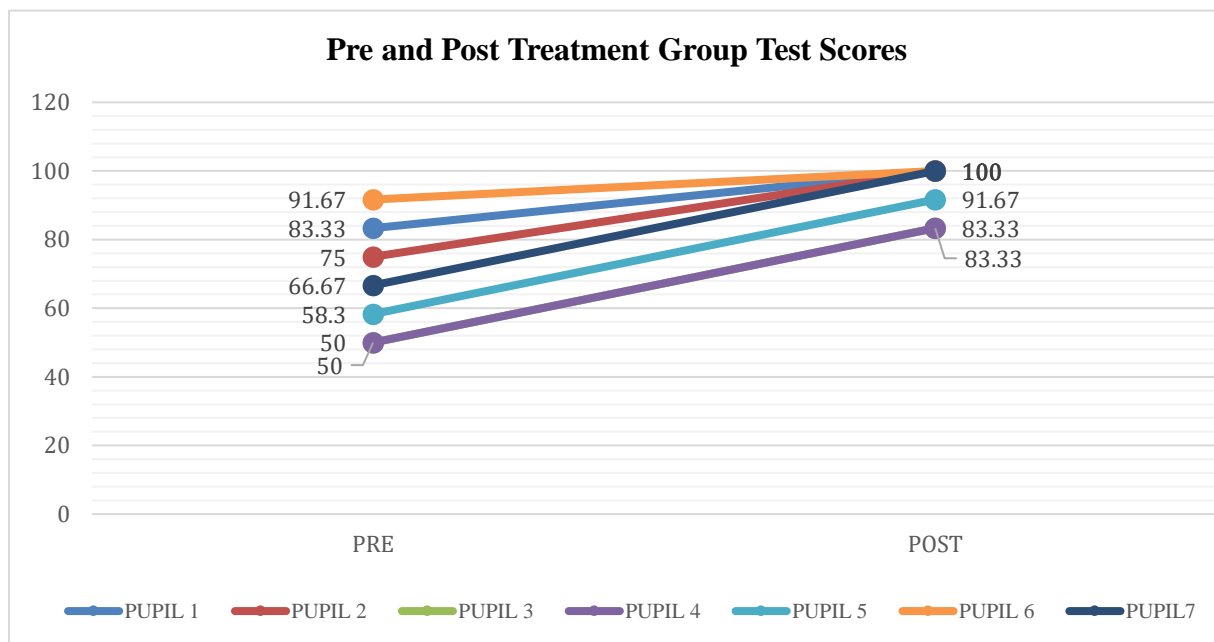


Table 1.5: Mean Comparison of Pre & Post Tests for Control Groups & Treatment Groups

No	Group	Mean Test Score (%)	
		Pre-test	Post-test
1	Treatment Group	67.85	94.05
2	Control Group	65.47	79.76
	Mean difference	2.38	14.29
	Overall mean difference	11.91	

4.2. Findings from the feedback form

Table 1.6 shows the frequency and percentage of answers answered by respondents through the feedback form on their motivation in learning English by using Kahoot! application. Based on such data, the level of motivation of pupils in English subjects is at a high level. A total of 7 respondents (100%) stated that the Kahoot! application motivates them to learn English lessons. This shows that SEN feels motivated and willing to take the time to learn when they find learning interesting and enjoyable. SEN is also motivated to face the challenges of Kahoot's activities.

Table 1.6: Percentage of Pupil Feedback for Motivation

No	Item Statement (n=7)	Frequency & Percent	
		Yes/ Positive (%)	No/ Negative (%)
1	Kahoot! motivates me to learn	7 (100)	-
2	The time frame found when answering questions in Kahoot's activities increased my excitement	7 (100)	-
3	Kahoot! helps me focus on learning	7 (100)	-
4	Kahoot! makes it easy for me to remember something learning	5 (71.4)	2 (28.6)
5	Every activity in Kahoot! helped improve my understanding of the title	7 (100)	-
6	When I can answer correctly, I feel good	7 (100)	-
7	Learning is more permanent with Kahoot! activities as opposed to learning in a traditional environment	6 (85.71)	1 (14.29)
8	Motivation for me increases every time the teacher uses the Kahoot! application to teach	7 (100)	-
9	Upon completion of doing activities in the Kahoot! application, I get complete satisfaction	7 (100)	-
10	I like to solve questions in the Kahoot! application	7 (100)	-
11	I understand what the teacher is saying through the Kahoot! application	7 (100)	-
12	My motivation to learn increased when I was involved with classmates in Kahoot! activities	7 (100)	-

Next, all respondents (100%) agreed that the time frame available when answering questions in Kahoot's activities raised their spirits to give answers. Here, is the competition that exists when answering questions in the Kahoot! application with time limitations increases the excitement of SEN. The application also helps pupils to effectively manage their time and learn difficult topics by having fun. Following this, a total of 7 respondents (100%) stated that the use of the Kahoot! application helps them focus on learning English. Kahoot! used in class by allowing SEN to enter their preferred name or remain anonymous in the system each time they participate. Anonymous allows pupils to feel safer when answering questions and allows them to focus better on Kahoot content. This shows the learning process implemented using Kahoot! application makes SEN focus and pay more attention during English learning sessions.

Out of 7 respondents, 5 respondents (71.4%) agreed that the Kahoot! application helps them to easily remember learning in English and only 2 respondents (28.6%) said no to the statement. Engage in Kahoot! activities while learning English have helped most SENs to remember the material that was discussed earlier. Pupils also focus on one topic during the period allocated for Kahoot!, and a competitive learning environment using this application helps pupils remember learning in the English language. Although 2 respondents had difficulty remembering learning, all respondents (100%) agreed that every activity implemented in the Kahoot! application helps to improve their understanding of the topic. Here, the understanding of SEN is enhanced by repeating the English learning content and also with discussions between pupils after the implementation of Kahoot!

All respondents (100%) feel good when they can answer correctly using Kahoot! application. This shows SEN likes the use of the Kahoot! application in learning English due to Kahoot! activities motivate pupils to engage more actively while creating interaction in the classroom. In addition, a total of 6 respondents (85.71%) agreed that the process of learning English is implemented using Kahoot! application. Their learning was more permanent than learning in the traditional environment, while only one respondent (14.29%) said no. The results are displayed at the end of Kahoot's activities together with the overall analysis of achievement together with feedback for each question can be known by SEN. Based on these results, SEN feels that their learning is more permanent than learning in the traditional environment.

In addition, 7 respondents (100%) stated that the motivation to learn increases when teachers use Kahoot! application to teach. Implementation of English learning using the Kahoot! application able to increase the motivation of SEN to master the learning that teachers want to teach. Pupils also try to solve questions in Kahoot's activities correctly to compete with their classmates. This application is also seen to be able to provide satisfaction to SEN as shown in table 1.6. Here, the satisfaction expressed by SEN is related to the competitive aspect found in the Kahoot! application. It is seen as a motivating factor for pupils to participate, encouraging them to think critically, increasing their energy levels to participate in activities as well as creating a lively classroom dynamic.

Based on Table 1.6, all respondents (100%) like to solve English questions in the Kahoot! application. This shows SEN concentrates more during the teaching of the Kahoot! module so that they can use that knowledge at the end of the class to compete with their classmates. A total of 7

respondents (100%) stated that they understood the content of the lesson delivered by the teacher using the application. Accordingly, the use of the Kahoot! application in learning English allows SEN to repeat, and revise the past subjects during the Kahoot! activity session to ensure that SEN learning is always sustainable. In addition, all respondents (100%) also agreed that their motivation to learn also increased when engaging with their classmates. This shows that the Kahoot! application gives SEN more opportunities to interact and engage with classmates as well as lesson content by providing a fun platform. Thus, learning to use the Kahoot! showed significant progress in SEN learning outcomes.

Based on the findings, it can be concluded that the use of the Kahoot! application among SENs in learning English received a positive response. Thus, the learning module is guided by the Kahoot! application can be highlighted and used as a teaching aid to increase SEN motivation in learning English. This is further strengthened by the findings from the mean difference in SEN pre-test and post-test scores.

5. DISCUSSION

The discussion in this section is in line with the purpose of the study which is to explore the extent to which the use of Kahoot! application contributes to motivating SEN to learn English. Thus, learning English using the Kahoot! application for SEN proved positive in improving their achievement in the classroom. This is in parallel with Ares et al. (2018) which proves that there has been a significant increase in pupil scores or in the number of pupils who passed the exam concerning the previous year in which the Kahoot! application used. In addition, SEN who received the treatment received high achievement in the tests. This shows the positive effect of the Kahoot application! in learning English among SEN for academic purposes. This finding is in line with Goksun and Gursoy (2019), where activities combined with the Kahoot! application has a more positive impact on academic achievement and pupil engagement.

Next, the Kahoot! application has helped SEN in expanding their English vocabulary. The increase in post-treatment scores due to SEN shows a spirit of cooperation with each other to complete the test in the allotted time. This is in line with the results of Omar's study (2017), where interactions between pupils and rivals from friends motivate them to give their best on the test. In the traditional form of learning, learning English faces difficulties and obstacles in creating an interactive environment between SEN and teachers with direct and immediate feedback. This is discussed by Iwamoto et al. (2017), where SEN in the control group does not have access to Kahoot! application has difficulty listing the need for visual and hearing aids on the list of their selection of preparation tools. Thus, found pedagogy aided by the Kahoot! application impact in creating a more friendly and interactive pedagogical environment than the traditional method.

Other than that, the findings from the feedback form show that SEN feels motivated to learn English when the Kahoot! application used. This is in line with Bicen and Kocakoyun (2018), where the Kahoot! application is used can increase the motivation of pupils in learning thus making it easier for them to understand the material provided by the teacher. The application is also one of the appropriate technology-based media as it is easy to use and can increase the motivation of pupils' learning (Ratnaningsih et al. 2021). Kahoot! is also able to maintain the constant motivation

of pupils to learn so that a more interesting, fun, and non-boring learning atmosphere can be created (Licorish et al. 2018). In addition, improving their learning outcomes (Quadir, Chen, and Zhang 2018). Plus, Kahoot! also had a significant positive effect on the motivation of pupils to actively participate in classes (Wichadee & Pattanapichet 2018).

Next, SEN can focus, easily remember, and improve their understanding with the use of the Kahoot! application in learning English. This is in line with Anandha, Anggraheni, and Yogatama (2020), where SEN is more focused on conducting learning activities and improving learning outcomes by using the Kahoot! application. Thus, leading to improvements in the understanding of their concepts (Balaskas et al. 2023). Kahoot! activities also provide them with meaningful interaction (Ali and Abdalgane 2022), in addition to providing an opportunity to remember the content of the lesson (Balaskas et al. 2023). Plus, pupils' motivation increases when there is a chance to win or gain something. Because of this, the teacher add, amends, or shortens the complex linguistic content to improve the understanding of the pupils. Similarly, the application can significantly improve pupil's engagement and performance (Zainuddin et al. 2020).

In addition, SEN feels good to be able to answer correctly by using the Kahoot! application and the learning remains as opposed to learning in the traditional environment. Castro et al. (2019) explain that the implementation of educational games that consider the correct response times and answers favors the competitiveness of pupils while motivating them to actively participate in their learning process. Thus, transforming pupils into active participants in the learning process is key to improving their learning outcomes (Yesildag and Bostan 2023). Furthermore, Limniou and Mansfield (2019) explain that the use of technology plays an important role in creating a fun learning environment for them. This is in line with Hartt et al. (2020), where pupils prefer and are more involved in game-based learning. Norah Almusharraf (2021) also revealed that the dynamics of pupils' classrooms are observed in game-based sessions compared to traditional sessions. It has been noted that Kahoot! giving SEN more opportunities to participate with teachers, peers, and learning content.

Apart from that, SEN's motivation to learn increases when teachers use Kahoot! application in teaching and they also get satisfaction through it. At the same time, SEN can gain knowledge from playing Kahoot!, and significantly increase participation, motivation, attention, as well as satisfaction (Dolezal et al. 2018). Here, the app stimulates and enhances pupils' commitment to their educational activities and has a positive impact on learning as well as success (Chans and Portuguese Castro 2021). Plus, using the Kahoot! application in face-to-face classes increases pupils' satisfaction with the class (Garza et al. 2023). It was approved by Bakoush (2022) who explained that when pupils are more satisfied, their role will be more active in the learning process, and the better the academic performance they will achieve. In other words, learning using the Kahoot! application can increase motivation, participation, and even pupil attitudes as well as create a more entertaining learning environment that helps improve pupils' understanding and as a way to provide immediate feedback (Mesquida & Mas 2018 and Yu et al. 2021).

SEN also enjoys solving questions and understanding the content of the lessons their teachers want to convey by using Kahoot! application during English learning. This is in line with Woodard and Mabry (2018), where Kahoot! uses help teachers guide by reviewing material based on existing

knowledge, thus helping to further enhance the thinking of pupils. Zhang and Yu (2021) discussed that the interaction provided by Kahoot! has all the necessary elements to contribute positively to learning outcomes. Donkin and Rasmussen (2021) also explain that innovative techniques in learning encourage pupils to attend classes and actively engage. Pupils are usually excited and motivated to experiment with technology while studying because they have skills in handling mobile technology and love to use mobile apps or games. Hence, the Kahoot! application plays an important role in improving the ability of pupils as it stimulates pleasure, engagement, motivation, and utility for learning (Ismail et al. 2019). Considering Kahoot! accurately describing reality, the selection of this application for pupils is very efficient (Mdlalose et al. 2021).

In addition, the motivation of SEN to study increases when engaging with their classmates in Kahoot! activities. Here, knowledge is built through social communication and pupils tend to develop understanding through collaboration and group work among their peers and teachers (Vygotsky 1986). According to Almusharraf et al. (2023), gamification enhances communicative learning in pupils and encourages pupils to use their collaborative skills in acquiring knowledge. Plus, Kahoot! games allow pupils to answer anonymous questions while increasing motivation, increasing confidence, being safe and comfortable with classmates in the classroom-friendly setting created by this application (Youhasan and Raheem 2019). In addition, the competitive element is especially effective in the acquisition of vocabulary with higher motivation of pupils (Klimova and Kacetl 2018). So, competitive interactivity in Kahoot! contributes to the efficiency of the acquisition of English vocabulary (Zhang and Yu (2021).

In conclusion, the use of the Kahoot! application able to increase the level of SEN motivation in learning English and it is supported by findings obtained from pre-tests, post-tests, and feedback forms. Wherein, the majority of SEN support that this study was successful in increasing their motivation level in learning English by using Kahoot! application. Therefore, the suggestion for future researchers is to suggest that educators use Kahoot! application to increase SEN's motivation towards other, more potential subjects. In addition, the study took a sample of 14 SEN. It is suggested that future studies could involve more samples, even involving samples from other schools.

6. CONCLUSION

Current studies have successfully increased SEN's motivation to learn English by using Kahoot! application. These results also agree with the Sabandar et al. (2018) study, in which SEN is always ready to participate in new learning situations, especially when Kahoot! applications used as a teaching and learning tool. Bicen and Kocakoyun (2018) also explained that the use of Kahoot! games can increase the motivation of pupils to learn thus making it easier for them to understand the material provided by the teacher. Teachers are also constantly looking for new approaches to using technology in their classrooms to benefit pupils. Next, the implications are aimed at English teachers who teach SEN. Learning English using this learning module requires teachers who have the skills to handle the Kahoot! application. In addition, this study contributes in terms of identifying key aspects of the Kahoot! learning module, which includes learning topics, mobile technology hardware, media materials, learning activities, and pupil feedback forms. In addition,

the Standard Primary School Curriculum training manual and the Year 2 English syllabus are used as the main reference in developing questions. Last but not least, an easily accessible, attractive, and game-like appearance, is an attraction found in the Kahoot! application to increase the motivation of SEN to learn English. Nevertheless, keep in mind that Kahoot! only acts as a complement, alternative, and teaching aid to the teacher in conveying information to pupils in a more interesting, clear, and up-to-date manner.

REFERENCE

- Adnyani, K. E. K., Adnyana, I. W., & Murniasih, N. N. (2020). Teacher and students' perception on using Kahoot! for english learning. *3rd International Conference on Innovative Research across Disciplines (ICIRAD 2019)*. 62-67.
- Ahmad, R., Amzah, F., & Samsudin, M. A. (2021). Kesan Modul Pendekatan Pemikiran reka bentuk Kelab Stem Kepada kemahiran Berfikir Aras Tinggi (KBAT) (impact of STEM Club Design Thinking Approach Module on higher order thinking skills (HOTS). *Jurnal Pendidikan Malaysia*, 46(01SI).
- Ahmed, A. A., Sayed, B. T., Wekke, I. S., Widodo, M., Rostikawati, D., Ali, M. H., Abdul Hussein, H. A., & Azizian, M. (2022). An empirical study on the effects of using Kahoot! as a game-based learning tool on EFL learners' vocabulary recall and retention. *Education Research International*, 1–10.
- Ali, R., & Abdalgane, M. (2022). The impact of gamification “Kahoot! app” in teaching English for academic purposes. *World Journal of English Language*, 12(7), 18.
- Almusharraf, N., Aljasser, M., Dalbani, H., & Alsheikh, D. (2023). Gender differences in utilizing a game-based approach within the EFL online classrooms. *Heliyon*, 9(2).
- Anamalai, T. R., & Mohamad Yatim, M. H. (2022). Keberkesanan m-pembelajaran berasaskan aplikasi Kahoot! terhadap pencapaian murid dalam topik operasi asas matematik. *Jurnal Penyelidikan Dedikasi*, 20(2), 180–203.
- Anamalai, T. R., & Mohamad Yatim, M. H. (2022). Keberkesanan m-pembelajaran berasaskan aplikasi Kahoot! terhadap pencapaian murid dalam topik operasi asas matematik. *Jurnal Penyelidikan Dedikasi*, 20(2), 180–203.
- Anandha, A., Anggraheni, D., & Yogatama, A. (2020). Online English vocabulary teaching using Kahoot! for students with special needs. *Scripta : English Department Journal*, 7(2), 35–41.
- Anandha, A., Anggraheni, D., & Yogatama, A. 2021. Utilizing Kahoot! in vocabulary teaching for students with special needs. *In Proceedings of the English Language and Literature International Conference*, 213-219.
- Ang, L. H., Tan, K. H., & Lye, G. Y. (2020). Error types in Malaysian lower secondary school student writing: A corpus-informed analysis of subject-verb agreement and copula be. *3L: The Southeast Asian Journal of English Language Studies*, 2, 127-140.
- Annasaii Jamar & Mohd Aderi Che Noh. (2020). Gamifikasi aplikasi Kahoot! dalam pembelajaran dan pemudahcaraan (Learning and facilitation) pendidikan Islam. *Seminar Antarabangsa Isu-Isu Pendidikan (ISPEN 2020)*.
- Ares, A. M., Bernal, J., Nozal, M. J., Sanchez, F. J., & Bernal, J. (2018). Results of the use of Kahoot! gamification tool in the course of Chemistry. *4th international conference on higher education advances (HEAD'18)*. 1215-1222.

- Bakoush, M. (2022). Evaluating the role of simulation-based experiential learning in improving satisfaction of finance students. *International Journal of Management in Education*, 20(3).
- Balaskas, S., Zotos, C., Koutroumani, M., & Rigou, M. (2023). Effectiveness of GBL in the engagement, motivation, and satisfaction of 6th grade pupils: A Kahoot! approach. *Education Sciences*, 13(12), 1214.
- Basuki, Y., & Hidayati, Y. N. (2019). Kahoot! or Quizizz: The students' perspectives. *Proceedings of the 3rd English Language and Literature International Conference, ELLiC*
- Bicen, H., & Kocakoyun, S. (2018). Perceptions of students for gamification approach: Kahoot! as a case study. *International Journal of Emerging Technologies in Learning*, 13(2).
- Bicen, H., Demir, B., & Serttas, Z. (2022). The Attitudes of Teacher Candidates towards the Gamification Process in Education. *BRAIN: Broad Research in Artificial Intelligence and Neuroscience*, 13(2). 39-50.
- Bukari, H., & Awang Kechik, N. (2022). Pengaruh bahasa ibunda terhadap kemahiran bertutur dalam kalangan murid india di sebuah sekolah rendah. *Jurnal Pendidikan Bahasa Melayu*.
- Campado, R. J., Toquero, C. M., & Ulanday, D. M. (2023). Integration of assistive technology in teaching learners with special educational needs and disabilities in the Philippines. *International Journal of Professional Development, Learners and Learning*, 5(1).
- Castro, M.-J.; López, M.; Cao, M.-J.; Fernández-Castro, M.; García, S.; Frutos, M.; Jiménez, J.-M. (2019). Impact of educational games on academic outcomes of students in the Degree in Nursing. *PLoS ONE*, 14.
- Chans, G. M., & Portuguese Castro, M. (2021). Gamification as a strategy to increase motivation and engagement in higher education chemistry students. *Computers*, 10, 132.
- Dolezal, D., Posekany, A., Motschnig, R., Kirchweiger, T., & Pucher, R. (2018). Impact of game-based student response systems on factors of learning in a person-centered flipped classroom on C programming. *EdMedia+ Innovate Learning*, 1143-1153.
- Donkin, R. & Rasmussen, R. (2021). Student perception and the effectiveness of Kahoot!: A scoping review in histology, anatomy, and medical education. *Anat. Sci. Educ.*, 14, 572–585
- Garza, M., Oliván, S., Monleón, E., Cisneros, A. I., García-Barrios, A., Ochoa, I., Whyte, J., & Lamiquiz-Moneo, I. (2023). Performance in Kahoot! activities as predictive of exam performance. *BMC Medical Education*, 23(1).
- Goksün, D. O., & Gürsoy, G. (2019). Comparing success and engagement in gamified learning experiences via Kahoot! and Quizizz. *Computers & Education*. 135. 15-29.
- Hartt, M., Hosseini, H., & M. M. (2020). Game on: Exploring the effectiveness of game-based learning. *Taylor & Francis.*, 5. 589–604.
- Ibrahim, I. S., & Adnan, N. H. (2019). Student teams-achievement divisions (STAD) in enhancing speaking performance among English as second language (ESL) learners: A critical review. *Creative Education*, 10(12), 2840–2849.
- Isa, S. S. M., & Salleh, N. M. (2021). Penggunaan kaedah pengajaran realiti tambahan dalam pengajaran Bahasa Inggeris untuk murid berkeperluan khas. *Conference Proceeding*. 409-417
- Ismail, M. A. A., Ahmad, A., Mohammad, J. A. M., Fakri, N. M. R. M., Nor, M. Z. M., & Pa, M. N. M. (2019). Using Kahoot! as a formative assessment tool in medical education: A phenomenological study. *BMC Medical Education*, 19(1), 1–8.

- Iwamoto, D. H., Hargis, J., Taitano, E. J., & Vuong, K. (2017). Analyzing the Efficacy of the Testing Effect Using Kahoot!™ on Student Performance. *Turkish Online Journal of Distance Education*, 18(2), 80-93.
- Jazuli, A. J. M., Din, F. F. M., & Yunus, M. M. (2019). Using pictures in vocabulary teaching for low proficiency primary pupils via PI-VOC. *International Journal of Academic Research in Business and Social Sciences*, 9(1), 311–319.
- Kementerian Pendidikan Malaysia. (2013). *Malaysia Education Blueprint 2013–2025*. Kuala Lumpur: Percetakan Nasional Berhad (PNB).
- Klimova, B., & Kacetl, J. 2018. Computer game-based Foreign Language Learning: Its benefits and limitations. *Communications in Computer and Information Science*, 26–34.
- Law Yiing Yiing & Zamri Mahamod. (2021). Keberkesanan Kahoot! terhadap pencapaian murid sekolah rendah dalam pembelajaran kosa kata Bahasa Melayu. *Jurnal Dunia Pendidikan*, 3(1). 90-101.
- Licorish, S. A., Owen, H. E., Daniel, B., & George, J. L. (2018). Students' perception of Kahoot!'s influence on teaching and learning. *Research and Practice in Technology Enhanced Learning*, 13(1), 1–23.
- Mat Nasir, N. A., Hashim, H., Mohd Rashid, S. M., & Md Yunus, M. (2021). Exploring the potential usage of mobile technologies among the hearing-impaired students in learning English as a Second language (ESL). *International Journal of Interactive Mobile Technologies (IJIM)*, 15(19). 48.
- McMillan, J.H. (2008). *Educational Research: Fundamentals for the Consumer*. Boston: Allyin and Bacon.
- Mdlalose, N., Ramaila, S., & Ramnarain, U. 2021. Using Kahoot! As A Formative Assessment Tool in Science Teacher Education. *International Journal of Higher Education*, 11(2), 43.
- Mesquida, AL. & Mas, A. (2018). Experiences on the use of a game for improving learning and assessing knowledge. *Computer Applications in Engineering Education*, 26(6), 2058–70.
- Oktaria, A. A., Rohmayadevi, L., & Murwantono, D. (2021). Online game quiz “Kahoot!” in teaching English for students of SMP Muhammadiyah Yogyakarta. *PROJECT (Professional Journal of English Education)*, 4(2), 290.
- Omar, N. N., (2017). The effectiveness of Kahoot! application towards students' good feedback practice. *PEOPLE: International Journal of Social Sciences*, 3(2).
- Othman, I. W., Esa, M. S., Ationg, R., & Muda, N. (2021). Visibility and dignity of Malay language as the language of knowledge in the National Education Sector with relevance to the Education Act 1996. *International Journal of Education, Psychology and Counseling*, 6(41), 137–159.
- Pahamzah, J., Syafrizal, S., & Nurbaeti, N. (2022). The effects of EFL course enriched with Kahoot! on students' vocabulary mastery and reading comprehension skills. *Journal of Language and Linguistic Studies*, 18(1), 643-652.
- Quadir, B., Chen, N.-S., & Zhang, J. (2018). Learner satisfaction toward using IRS in synchronous sessions of an online course. *Proceedings of the 4th international conference on frontiers of educational technologies*, 10–15.
- Rajabpour, A. (2021). Teachers' perception of advantages and disadvantages of Kahoot! *English Linguistics Research*, 10(4), 49.
- Ramli, Z. (2019). Pendidikan dwibahasa di Malaysia: Upaya Bahasa Melayu. *Jurnal Peradaban Melayu*, 14, 12–21.

- Ratnaningsih, S., Wafiqni, N., Masyithoh, S., Suryaningsih, T., & Rahayani, Y. (2021). The effectiveness of “Kahoot!” in English teaching for elementary school students during the pandemic. *Emerging Trends in Technology for Education in an Uncertain World*, 169–174.
- Rubio-Arraez, S. (2021). Game-based learning I. an experience in the classroom on the use of Kahoot! as a learning and assessment tool in A master’s degree. *ICERI2021 Proceedings*.
- Saat, N. A. (2020). Summative test items analysis using classical test theory (CTT)/ analisis item Kertas Peperiksaan Sumatif Menggunakan teori Ujian Klasik (TUK). *Sains Humanika*, 12(2–2).
- Sabandar, G., Supit, N., & Suryana, E. (2018). Kahoot!: Bring the fun into the classroom! *Indonesian Journal of Informatics Education*, 2(2), 127–134.
- Serrano, K. (2019). The effect of digital game-based learning on student learning: A The effect of digital game-based learning on student learning: A literature review literature review. *Graduate Research Papers*, 943.
- Shakir Azfar Abdul Halim, M., Hashim, H., & Md Yunus, M. (2020). Pupils’ motivation and perceptions on ESL lessons through online quiz-games. *Journal of Education and e-Learning Research*, 7(3), 229–234.
- Sinnivasagam, P., & Hua, T. K. (2023). Gamification functionality and features of Kahoot! in learning—ESL teachers and students’ perceptions. *Open Journal of Social Sciences*, 11, 404–421.
- Subramaniam, V., & Mohd Salleh, N. (2022). Persepsi murid ketidakupayaan pendengaran terhadap kuiz dalam mata pelajaran Bahasa Inggeris semasa pelaksanaan PDPR. *Jurnal Dunia Pendidikan*, 4(1), 501–511.
- Sukowati, & Sartono, E. K. (2020). The implementation of Kahoot!. *Proceedings of the 2020 11th International Conference on E-Education, E-Business, E-Management, and E-Learning*.
- Tan Shih Min, Mohd Rameli, M. R., Ahmad Alhassora, N. S., Abdullah, H., & Faheem, I. (2022). Effectiveness of using Kahoot! application in the teaching of vocabulary on perception and achievement of low achiever students. *Journal of Positive School Psychology*, 6(3), 2241–2251.
- Tan Shih Min, Mohd Rameli, M. R., Ahmad Alhassora, N. S., Abdullah, H., & Faheem, I. (2022). Effectiveness of using Kahoot! application in the teaching of vocabulary on perception and achievement of low achiever students. *Journal of Positive School Psychology*, 6(3), 2241–2251.
- Tsymbal, S. V. (2019). Enhancing students’ confidence and motivation in learning English with the use of online game training sessions. *Information Technologies and Learning Tools*, 71(3). 227.
- Vygotsky, L. (1986). *Thought and language*. MIT Press; Cambridge, MA.
- Wang, A. I., & Tahir, R. 2020. The effect of using Kahoot! for learning – A literature review. *Computers & Education*, 149, 103818.
- Wichadee, S., & Pattanapichet, F. (2018). Enhancement of performance and motivation through application of digital games in an English language class. *Teaching English with Technology*, 18(1), 77–92.
- Woodard, R. & Mabry, J. (2018). Give and receive immediate feedback and kickstart discussions with Kahoot! A successful classroom teaching tactic that can be replicated by other instructors. *Teaching Theology & Religion*, 21(4), 303.

- Yesildag, A. Y., & Bostan, S. (2023). Movie analysis as an active learning method: A study with health management student. *International Journal of Management in Education*, 21(1).
- Youhasan, P., & Raheem, S. (2019). Technology enabled formative assessment in medical education: a pilot study through Kahoot!. *Education in Medicine Journal*, 11(3), 23–29.
- Yu, Z., Gao, M. & Wang, L. (2021). The effect of educational games on learning outcomes, student motivation, engagement and satisfaction. *Journal of Educational Computing Research*, 59(3), 522–46.
- Yunus, M. M. (2018). Innovation in education and language learning in 21st century. *Journal of Sustainable Development Education and Research*, 2, 33-34.
- Zainuddin Z, Chu SKW, Shujahat M, et al. (2020). The impact of gamification on learning and instruction: A systematic review of empirical evidence. *Review of Educational Research*, 30, 100326.
- Zhang, Q. & Yu. Z. (2021). A literature review on the influence of Kahoot! On learning outcomes, interaction, and collaboration. *Education and Information Technologies*, 26, 4507–35.
- Zhang, Q., & Yu, Z. (2021). A literature review on the influence of Kahoot! on learning outcomes, interaction, and collaboration. *Education and Information Technologies*, 26(4), 4507–4535.