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The impact of kahoot-based formative assessment on student learning outcomes at a Junior High School in Samarinda

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ABSTRACT

This study explores the impact of using Kahoot! as a formative assessment tool on student learning outcomes in English at SMPN 22 Samarinda. The research utilized a quasi-experimental design with pre- and post-test measures on Class VII-7 B. Findings revealed that Kahoot! significantly improved students' understanding of English grammar, particularly tenses. Data analysis was conducted using SPSS software, showing a notable increase in student achievement post-intervention. The study emphasizes the importance of integrating technology like Kahoot! in the classroom to enhance learning. Recommendations for future research and teacher strategies are also provided.

1. Introduction

Over the years, the use of digital technologies and applications in education has been a significant development. This approach offers many benefits in the learning process, such as increased accessibility and flexibility. Utilizing digital technologies and applications creates wider access to educational resources. Students can access various learning resources, videos, interactive simulations and other subject matter from different locations and times by using electronic devices such as computers, tablets or smartphones (Hanafiah et al., 2023). Utilizing digital technologies and applications in

education also provides benefits in terms of increasing student engagement, accessibility and receptivity during the learning process. Nonetheless, it is important to note that the use of these technologies remains relevant, meets the learning objectives, and is well integrated within the broader learning context, as is the case with the Kahoot!.

Kahoot! is a game application that can make junior high school students more enthusiastic about learning through playing, actively participating, and competing with classmates (Ayu et al., 2021). The use of Kahoot! in English learning can keep students active and enjoy. Features such as multiple-choice questions, games, challenges and interesting visual elements can increase student engagement and reinforce understanding of the concepts being taught. Digital technology and applications give students access to multimedia content such as images, audio, and video, which helps them understand the material better. Visualization of concepts, narratives that explain the material, and interactive demonstrations can enrich the learning experience. This encourages students for deeper exploration and understanding of the English language being learned, with the hope of developing a better understanding of the language. Thus, it is expected that students will be more motivated and realize the importance of English in daily life. Kahoot! has proven to be useful in various educational environments, including adult education, colleges, and high schools, based on the data collected (Lestari & Hadiwinarto, 2022). What makes it so effective is its adaptability to different learning environments (Plump 2017). Kahoot! is a useful teaching tool that has been used by many high schools and even college instructors to increase student engagement. Although throughout the text, the term "junior high school students" is used frequently, this research will concentrate on that level of education. However, it is very important to remember that Kahoot! can be very beneficial in a variety of learning situations and not just for those of a certain age or educational background.

The increasing prevalence of mobile phones has facilitated the effective integration of gamified student response systems, such as Kahoot!, into classroom assessments by teachers. These assessment technologies, readily available and often free, incorporate gaming elements such as leaderboards, badges, competitive scoring systems, and time limits to enhance student engagement during classroom tests. Previous research consistently demonstrates the positive response of students to the utilization of these gamified systems in educational settings. Studies by Aljalou et al. (2016), Beatty & Gerace (2009), and Burnstein & Lederman (2001) highlight benefits such as increased participation and attendance rates. Additionally, these systems have been found to sustain student attention, support individualized learning, and foster opportunities for interaction, as noted by Sánchez-Mena & Martí-Parreño (2017). Furthermore, it opens opportunities for assessment tool, either formative or summative.

Formative assessment, referred to as learning assessment, is the process of collecting data to gauge how well pupils understand how to interpret it. Its goal is to provide guidance for choosing learning activities that maximize students' mastery of the relevant material competencies. Formative evaluation is intended to track students' development while providing direction and attending to their needs (Rodrigues & Oliveira, 2014). It is a regular component of teachers' and students' everyday practices and is an essential component of the teaching and learning activities in the classroom. Formative assessment helps teachers make instant improvements to the learning process by acting as a comprehensive record. But rather than only recording grades, it also evaluates how well pupils are understanding the subject matter and gives teachers feedback to improve

According to the findings of a study conducted by Fatima Batool et al (2023)., using Kahoot effectively increased students' attention spans and improved their comprehension of the material. The vast majority of participants said that using Kahoot was fun and educational. Additionally, they believed that Kahoot improved their comprehension of the subject matter and inspired them to learn. A qualitative research design was employed, in which the investigator solicited participant input through questionnaires. These queries may be open-ended, allowing participants to provide their own answers, or closed, with predefined response alternatives. The researcher's conclusions demonstrate the degree to which Kahoot-based online tournaments successfully grab medical students' interest. This is visible from the ground.

The findings of Maxine Minton and Brett Bligh's research (2021) highlight the need of understanding contextual dampening and democratizing in relation to the effectiveness of digital learning games like Kahoot. This study indicates that the literature covering this topic is still lacking, especially in the context of education. In addition, the study highlights that although the goal of education is to improve IPK and pass in math, students' motivation when using Kahoot as a formative assessment tool is not always reflected in their work. This indicates the need for a deeper understanding of the factors influencing students' motivation to learn when using Kahoot. The research methodology used is a case study approach based on case studies in the insular education environment at the United Arab Emirates University. This emphasizes how important it is for students to understand the assumptions behind learning resources like Kahoot, especially when it comes to applying.

Previous studies have not provided direct comparisons before and after the use of Kahoot, and none have examined at the junior high school level, so there is not enough data to illustrate the differences in student learning achievement before and after the use of Kahoot. By conducting further research, the researcher can generate scientific evidence supporting Kahoot's effectiveness in increasing student motivation and comprehension, as well as identify improvements or adjustments needed to maximize the benefits and effectiveness of Kahoot in the learning environment. This research aims to develop a more comprehensive understanding of the real effects of Kahoot integration in daily learning practices, so that it can make a valuable contribution in the development of innovative and effective learning methods.

Students' achievements in learning were primarily assessed through traditional methods such as written tests, assignments, and class participation. These conventional methods often lacked engagement and interactive elements, which sometimes led to students feeling less motivated and struggling to retain information effectively. However, after Kahoot! was introduced, students began to show noticeable improvements in their learning outcomes. The interactive and gamified nature of Kahoot! made learning more enjoyable and engaging, which led to increased participation and motivation among students. They were more likely to retain information and understand complex concepts due to the competitive and fun environment Kahoot! provided. As a result, there is a significant difference in students' learning outcomes before and after the introduction of Kahoot! The platform not only increased student engagement but also improved their understanding and retention of the material, leading to better overall academic performance.

Studies examining how Kahoot! formative assessment affects student learning outcomes have made a significant addition to our understanding of instructional strategies. This study expands on

previous research by tying together theories of gamification, technology-enhanced learning, and formative evaluation. The research establishes a theoretical framework, which highlighted the benefits of gamification tools on students' academic performance and the role that technology plays in enhancing learning experiences.

It is expected that the use of Kahoot! in formative assessment can increase student participation due to the element of games and interactivity, creating a more interesting and dynamic learning environment. Through a more enjoyable learning experience, students are likely to be more motivated to be actively involved in the learning process, strengthening their engagement in classroom activities. In addition, the research results are expected to provide teachers with valuable information on the effectiveness of this Kahoot! based teaching method. With a deeper understanding of its impact, teachers can use this information as a guide to adjust their teaching strategies, ensuring that the approach taken is better suited to the individual needs of students, and in turn, improving the overall effectiveness of the learning process.

Furthermore, the research results obtained from the implementation of Kahoot! are expected to open up opportunities for teachers to identify trends or patterns of student participation that can be used as a basis for more specific adjustments to teaching methods. Teachers can more effectively tailor their teaching strategies to meet the unique needs of each student, creating a more personalized and responsive learning experience. All in all the use of Kahoot! not only enriches the learning process through the elements of play and interactivity, but also provides an in-depth view of the dynamics of student and teacher interaction in a technology-based learning context.

Kahoot, a digital game-based learning platform, has been recognized as an effective tool for formative assessments, motivating students to learn, facilitating knowledge acquisition, and stimulating their desire to study (Bicen & Kocakoyun, 2018; Ismail & Mohammad, 2017). It fosters engagement, collaboration, and interaction in classrooms, thereby promoting deep learning practices. Despite its benefits, recent systematic reviews have indicated mixed results regarding Kahoot's impact on student performance and anxiety levels (Wang & Tahir, 2020). Gender differences in students' appreciation of Kahoot have also been observed (Ismail & Mohammad, 2017).

Formative assessment, particularly when utilizing electronic tools such as e-assessments, has been suggested to enhance and support learners more effectively compared to traditional paper-based assessments (Bahati et al., 2019; Pachler et al., 2010). E-assessments offer immediate grading and feedback mechanisms, aiding in the rapid correction of misconceptions (Shieh & Cefai, 2017). However, recent studies in the UAE have shown that students taking e-assessments, both formative and summative, experienced increased levels of test anxiety due to concerns about internet connectivity and system failures (Patronis et al., 2019).

As a game-based response system for the classroom, Kahoot encourages students to participate actively by projecting multiple-choice questions onto the screen, which they then use their laptops, tablets, or cellphones to complete. According to Parra-Santos et al. (2018), this interactive learning strategy is commended for its capacity to foster a dynamic and cooperative learning atmosphere in the classroom where students feel empowered to contribute to and learn from one another. Furthermore, Kahoot's gamification features, including challenges and leaderboards, not only make learning

enjoyable but also foster healthy rivalry among students, which inspires them to do better (Nkhoma et al., 2018).

Notwithstanding its advantages, Kahoot's efficacy could be affected by a number of contextual elements, such as educational environments and cultural disparities (Ismail & Mohammad, 2017). Although some research has linked Kahoot to favorable results, other studies have revealed inconsistent or limited impacts, indicating that the program's influence on student learning and engagement may differ based on the particular environment and implementation techniques (Wang & Tahir, 2020). For educators and legislators to maximize the use of Kahoot and other digital learning technologies in a variety of school situations, they must comprehend these contextual nuances.

Previous research conducted by Iaremenko (2017) has shown that online games, such as those used in gamification, can enhance intrinsic motivation and promote student engagement in educational activities. For instance, platforms like Kahoot offer meaningful experiences and reward students for their efforts, fostering high energy levels and motivation through enjoyable competition. This has been particularly evident in the context of ESL instruction, where the allure of winning or receiving prizes has been found to boost intrinsic motivation. Consequently, teachers can effectively introduce, review, or reinforce complex linguistic subjects by leveraging such gamification components. Survey results have indicated that students value having clear goals to pursue, further highlighting the efficacy of gamified approaches in education.

Moreover, Wang and Lieberoth (2016) conducted research that demonstrated a statistically significant difference in the impact of audio and points on motivation, engagement, enjoyment, and concentration in educational settings. Specifically, their findings revealed that audio and music not only enhance classroom dynamics but also contribute positively to student engagement and enjoyment. While points also play a role in increasing classroom dynamics, their influence is comparatively less pronounced. Further analysis of the dataset, through deeper factorial analyses, may elucidate more intricate relationships within the data, including potential moderating factors such as gender, as observed in other research examining the effects of points and music. In this initial treatment, our focus has been primarily on conducting a broad analysis of positive and negative single-item responses.

Susilowati, E. (2016) has highlighted the utility of Kahoot in supporting grammar teaching, demonstrating its ability to enhance students' motivation in mastering grammar concepts. The findings indicate that Kahoot has effectively heightened students' interest and drive to learn, serving as a valuable tool in sustaining their engagement during lessons. Moreover, the majority of students perceive Kahoot as entertaining, contributing to a more enjoyable classroom environment where students eagerly participate in activities. However, despite the positive outcomes observed in Susilowati (2016) study, there remains a gap in understanding the long-term effects of Kahoot on students' grammar proficiency and retention of knowledge. While the immediate impact on motivation and engagement is evident, further research is needed to investigate whether the use of Kahoot leads to sustained improvement in grammar skills over time. Additionally, exploring variations in student performance and attitudes towards Kahoot across different proficiency levels and learning contexts could provide valuable insights for optimizing its implementation in grammar instruction. Such re-

search endeavors would contribute to a more comprehensive understanding of Kahoot's effectiveness as a pedagogical tool in grammar teaching and inform educators' instructional practices accordingly.

Kahoot stands out as a dynamic and engaging game-based response system that encourages active participation among students through its interactive features and gamification elements. The ability to project multiple-choice questions and allow students to respond using their own devices creates a cooperative learning environment where students feel empowered to contribute and learn collaboratively (Parra-Santos et al., 2018). Furthermore, the gamification features of Kahoot, such as challenges and leaderboards, not only make learning enjoyable but also foster healthy competition among students, inspiring them to strive for improvement (Nkhoma et al., 2018). However, it is important to acknowledge that Kahoot's effectiveness may vary depending on contextual factors such as educational environments and cultural disparities (Ismail & Mohammad, 2017). While some studies have demonstrated favorable outcomes associated with Kahoot, others have reported inconsistent or limited impacts, underscoring the need for educators and policymakers to understand these contextual nuances for maximizing the potential of digital learning technologies like Kahoot in diverse school settings (Wang & Tahir, 2020). Additionally, research has shown that gamified approaches, exemplified by platforms like Kahoot, have the potential to enhance intrinsic motivation and student engagement in educational activities, particularly in the context of ESL instruction (Iaremenko, 2017). Teachers can provide meaningful learning experiences that promote high energy levels and motivation among students to improved learning outcomes. Conducting research on the impact of Kahoot!-based formative assessment on student learning outcomes at SMP 4 Samarinda is crucial as it allows teachers and policymakers to gain insights into how this specific digital learning tool influences student performance in a distinct educational setting.

2. Method

At SMPN 22 Samarinda, this study combined pre- and post-test measurements in a quasi-experimental manner. This school is well-positioned and has sufficient facilities to support the successful implementation of this project. Pre-test and post-test measurements were integrated in a quasi-experimental research design to analyze the effect of Kahoot-based formative assessment on student learning outcomes (Nadeem & Al Falig, 2011). Before the Kahoot-based formative assessment technique is put into practice, a pre-test will be given to participating students to gauge their initial comprehension. The purpose of this preliminary evaluation is to create a baseline for comparison with the post-test, which will be administered following the incorporation of Kahoot into the classroom.

Pre- and post-test measurements are used in accordance with accepted practices in educational research. This methodology offers insightful information on how well Kahoot functions as a formative assessment tool (Bullón et al., 2018). This research design's quasi-experimental feature guarantees a controlled, but realistic, environment for assessing how Kahoot-based formative assessment affects students' comprehension, recall, and application of knowledge. In order to fully comprehend the transformative potential of Kahoot in enhancing learning outcomes, pre- and post-test assessments were especially crucial in documenting the changes in student performance.

Class VII-7 B is the experimental group in this study. A formative assessment based on the Kahoot platform will be given to them and included into their class sessions. Class VII B used to take a pre-test in the first hour to gauge their basic comprehension and knowledge. They will use the Kahoot platform to administer a post-test in the second hour following the intervention to assess how well the use of Kahoot has affected the achievement of learning objectives. This strategy was used to guarantee that data within a single class may be directly compared before and after the intervention.

Samples/Participants

The sample of participants for this study was drawn from SMPN 22 Samarinda, a school located on Jalan Pahlawan with 1,230 students in the 2023/2024 academic year. Specifically, participants were selected from grades VII-7, with grade VII-B chosen due to the school's proximity to home and high level of student engagement. A total of 37 students actively participated in the study, with an even distribution among them. Before the study began, each participant was given a thorough explanation of the purpose and procedures of the study, and they were asked to give informed consent. Emphasis was placed on understanding the ethical issues and the importance of respecting students' autonomy in this process. A rigorous selection procedure was designed to ensure that the sample of volunteers taken was representative of the student population of SMPN 22 Samarinda. These steps were taken to increase the dependability of the research results and ensure the ethical integrity of the entire research process.

Instruments

The main instrument used for data collection was a pre-test assessment designed to assess students' baseline knowledge before the intervention. In addition, Kahoot quizzes were designed and administered as formative assessments during the intervention period. These quizzes were tailored to the curriculum of grade VII-B, covering key topics. The material on Tenses (My school activities) is a topic taught directly by teachers at SMP 22 Samarinda using the Merdeka curriculum.

Data collection was conducted in two stages: before the intervention (pre-test) and after the intervention (post-test). The pre-test was administered to students in class VII-B to determine baseline scores, while the post-test aimed to measure the impact of Kahoot-based formative assessment on student learning outcomes. Questionnaires and Kahoot quiz scores were used as quantitative measures of student performance.

The Statistical Package for the Social Sciences (SPSS) program will be used to assist the statistical analysis of data in the Kahoot! Investigative Case Study at SMPN 22 Samarinda. The mean and standard deviation of the descriptive statistics will be calculated for the pre-test and post-test results. To determine whether there is a significant difference between the mean scores before and after the intervention, an independent sample t-test will be conducted. Data collection methods, including surveys, pre-test and post-test, and observation, will be used to collect information from all students at SMP 22 Samarinda, with samples taken from grades VII-B. Data analysis will be conducted by

looking at the characteristics of the respondents, the number of students who participated, the distribution of students based on class.Top of Form

3. Results and discussion

3.1. Findings

This chapter presents the research results, paying particular attention to the finding on the increase in student scores both before and after utilizing Kahoot! The researcher contrasted the increase in student scores between the control class, which did not use the app, and the experimental class, which used Kahoot!. The figures provided provide an overview of how effective Kahoot! is in the learning process and show significant differences in student grades between the two classes.

3.1.1. How did student achieve in learning before using Kahoot!?

Table 1. Student's score on pre-test

No	Name	Score
1	Subject 1	50
2	Subject 2	67
3	Subject 3	70
4	Subject 4	54
5	Subject 5	66
6	Subject 6	54
7	Subject 7	57
8	Subject 8	51
9	Subject 9	64
10	Subject 10	60
11	Subject 11	55
12	Subject 12	56
13	Subject 13	63
14	Subject 14	61
15	Subject 15	64
16	Subject 16	66
17	Subject 17	58
18	Subject 18	55
19	Subject 19	68
20	Subject 20	54
21	Subject 21	58

22	Subject 22	52
23	Subject 23	68
24	Subject 24	62
25	Subject 25	68
26	Subject 26	50
27	Subject 27	54
28	Subject 28	65
29	Subject 29	57
30	Subject 30	54
31	Subject 31	58
32	Subject 32	66
33	Subject 33	51
34	Subject 34	52
35	Subject 35	70
36	Subject 36	67
37	Subject 37	60
	Average	60

The pre-test results shown in table 1. above, indicate that the average score obtained by students at SMP 22 Samarinda was quite poor 60. This score was the result of traditional learning, a widely used learning approach, many students still scored below the average of 50. These low pre-test results suggest that to help students obtain better and satisfactory results, innovative new modifications in teaching approaches are needed.

3.1.2. How did student achieve after the introduction of Kahoot!?

Table 2. Student's score on post-test

No	Name	Score
1	Subject 1	79
2	Subject 2	83
3	Subject 3	72
4	Subject 4	88
5	Subject 5	78
6	Subject 6	70
7	Subject 7	74

8	Subject 8	78
9	Subject 9	89
10	Subject 10	74
11	Subject 11	75
12	Subject 12	74
13	Subject 13	79
14	Subject 14	73
15	Subject 15	74
16	Subject 16	89
17	Subject 17	82
18	Subject 18	77
19	Subject 19	80
20	Subject 20	90
21	Subject 21	73
22	Subject 22	90
23	Subject 23	75
24	Subject 24	73
25	Subject 25	81
26	Subject 26	77
27	Subject 27	86
28	Subject 28	84
29	Subject 29	78
30	Subject 30	87
31	Subject 31	74
32	Subject 32	86
33	Subject 33	72
34	Subject 34	79
35	Subject 35	81
36	Subject 36	86
37	Subject 37	73
	Average	79

Based on the table above, it is clear that the use of the Kahoot! app has improved students' learning scores and enthusiasm at SMP 22 Samarinda. Post-test scores showed satisfactory results with many students scoring above average.Kahoot! as an interactive learning tool helps students to be

more focused and interested in the material. The fun and competitive approach increases students' participation in learning. The features of Kahoot! make the learning process more interesting and effective. The use of Kahoot! in the classroom has a positive impact on students' motivation and academic achievement. With this app, students are more eager to learn and achieve better results. This proves that innovative learning methods such as Kahoot! are effective in improving the quality of education.

3.1.3. Students' average score

Table 3. Students' average score

	N	Minimum	Maximum	Mean	Std. Deviation
Pre	37	50	70	59.59	6.300
Post	37	70	90	79.27	5.966
Valid N (listwise)	37				

The table below displays the full results of the statistical description of the research data relating to the students' pre-test and post-test scores. A thorough summary of several statistical measures, such as mean, variance, standard deviation, confidence interval, average, as well as the distribution of minimum and maximum scores, is given in this table. This table shows important variations in students' results before and after using the Kahoot! app which is the main subject of this study.

Based on the descriptive test displayed in the table above, the data obtained by the researcher shows that in the pre-test variable, students obtained a minimum score of 50 and a maximum score of 70, with an average value of 59.59 and a standard deviation of 6.300. The average value of 59.59 indicates that before the use of Kahoot!, most students obtained scores that tended to be close to 60, which could indicate a moderate or sufficient understanding of the material.

In contrast, on the post-test variable, there was a significant increase in student achievement with the minimum score increasing to 70 and the maximum score reaching 90. The mean value of the post-test was 79.27 with a standard deviation of 5.966. This mean score of 79.27 indicates that after the use of Kahoot! as a learning tool, most students were able to achieve higher scores, close to 80, which indicates a good or very good understanding of the material. The increase from an average of 59.59 in the pre-test to 79.27 in the post-test shows that the use of Kahoot! effectively improved students' academic performance. So, after recognizing and using Kahoot! students experienced an increase in average score of about 33.03%. This shows that Kahoot! has a significant positive impact on students' academic performance.

3.1.4. Test of normality

The results of the Normality Test using Kolmogorov-Smirnov show that this data is normally distributed with a significance value of more than 0.05. The significance value was above 0.05 spe-

cifically 0.200 in the pre-test and 0.060 in the post-test in using Kahoot! In addition, the normality test data shows that the distribution of pre-test and post-test scores is normal, which means that the results obtained are reliable and valid for further analysis.

Table 4. Tests of Normality

	Kolmogorov-Smirnov[a]		
	Statistic	**Df**	**Sig.**
PRETEST	.118	37	.200*
POSTEST	.141	37	.060

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

3.1.5. Is there a significant difference in students' learning outcomes before and after the introduction of Kahoot!?

Table 5. Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
					95% Confidence Interval of the Difference				
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper			
Pair 1	PRETEST – POSTEST	-19.676	8.423	1.385	-22.484	-16.867	-14.209	36	.000

The significance value (2-tailed) <0.05 is 000, indicating a significant difference between the initial variable and the final variable. This shows that there is a significant effect on the difference before and after the treatment is given. The T-test results show that the use of Kahoot! is effective in significantly improving test scores.

3.2. Discussion

The aim of this study was to determine the extent to which Kahoot! has improved learning achievement at SMP 22 Samarinda and whether using it was significantly helpful in raising students' learning scores and enthusiasm. The relationship between the findings and earlier studies is discussed in this section. Learning using Kahoot! application (experimental class) and traditional learning (control class) were conducted for 2 meetings in the same class, namely class VIIB with a total of 37 students. The significant result of the pre-test value (control class) is 0.200 while the post-test value (experimental class) is 0.060.

From the data description, based on the researcher's findings, it proves that learning using Kahoot! media can increase students' enthusiasm for learning, not only that students' grades also have a good effect in English language learning classes. This has been proven by the results of students' pre-test and post-test scores, students' scores after using the Kahoot! application in learning English are better than before. The average pre-test score was 59.59 and the average post-test score was 79.27. The results of the normality test using Kolmogorov-Smirnov show that the pre-test data from the control class and post-test data from the experimental class are normally distributed with a significance value of more than 0.05. The significance value of 0.200 in the control class pre-test shows that the data is normally distributed. Meanwhile, the significance value of 0.060 in the post-test of the experimental class also showed a normal distribution, although it was close to the significance limit of 0.05.

The results of this study support the use of interactive learning media such as Kahoot! as an effective tool in improving student learning outcomes. This research is in line with several previous studies by Holbrey (2020), and Ruiz (2021). As mentioned by Kohnke and Moorhouse (2021), students are highly motivated in learning English with the use of Kahoot in the teaching and learning process. Motivation is one of the most important things to build among students because it directly affects students' academic performance and achievement. Baszuk & Heath (2020), Piskorz (2016) and Yunus et al. (2019) concluded that Kahoot is an appropriate teaching tool to support student learning, especially in writing. This finding relates to previous research which found that game-based student response systems can increase students' motivation, engagement and classroom dynamics. As for the quote that says that Students are excited to play Kahoot! in class. Ryan (2015) Kahoot! is a digital game that can be used in the classroom to engage students in content in a fun way. Kahoot! not only fosters a fun learning environment, but also challenges students in the learning process, and (Woo, 2014). The learning benefits, increased student input and instant feedback, outweigh any challenges that may arise in the program. All the feedback about Kahoot! The feedback I get from my students is very positive.

In addition, Baszuk and Heath (2020), Piskorz (2016), and Yunus et al. (2019) emphasized the role of Kahoot! in supporting student learning, especially in writing. Moreover, Kahoot!'s interactive and gamified approach has been shown to increase student motivation and engagement, contributing to a dynamic and collaborative learning environment (Parra-Santos et al., 2018; Nkhoma et al., 2018). Despite its advantages, the impact of Kahoot! can vary based on contextual factors such as educational background and cultural differences (Ismail & Mohammad, 2017; Wang & Tahir, 2020). These variations underscore the importance of understanding the specific context in which Kahoot! is implemented to maximize its effectiveness.

Research by Iaremenko (2017) supports the idea that game-based learning platforms such as Kahoot! can increase intrinsic motivation and student engagement, especially in ESL teaching. Similarly, Wang and Lieberoth (2016) showed that audio and points in a gamified learning environment can significantly increase student motivation and enjoyment. Susilowati (2016) further highlighted the usefulness of Kahoot! in grammar teaching, noting increased student motivation and engagement. However, the long-term effects of Kahoot! on students' academic achievement and knowledge retention still need to be further explored. Although improvements in student motivation and en-

gagement were evident, further research is needed to assess the ongoing impact of Kahoot! on learning outcomes across different proficiency levels and educational contexts. In conclusion, this study supports the use of Kahoot! as an effective tool to improve student learning outcomes and motivation. The integration of game-based interactive learning platforms such as Kahoot! into the educational process can foster a more engaging and dynamic classroom environment, which can ultimately improve students' academic performance. Future research should continue to explore the long-term benefits and potential contextual factors that influence the effectiveness of such digital learning technologies.

3. Conclusion

This study was to evaluate the effectiveness of using the Kahoot! application as a formative assessment tool in improving student learning outcomes at SMP 22 Samarinda. The results showed that the use of Kahoot! in the learning process had a significant positive impact on student learning outcomes. Before the application of Kahoot!, students' understanding of the subject matter tended to be less than optimal, as reflected in the pre-test results. However, after the use of Kahoot! as a tool in learning, there was a clear improvement in students' understanding and knowledge of the material taught. The statistical analysis conducted showed that the difference between the pre-test and post-test scores was highly significant. This indicates that the use of Kahoot! plays an important role in improving student learning outcomes. Kahoot! as a formative assessment tool offers a more interactive and fun approach to learning. The gamification feature in Kahoot! makes the learning process more interesting and motivates students to be more actively involved in learning activities.

This research also emphasizes the importance of technology integration in education. The use of apps like Kahoot! helps make learning more dynamic and engaging, so students are more motivated to learn and understand the material better. Kahoot! not only improves students' academic results but also provides a more enjoyable and meaningful learning experience.The results of this study suggest that Kahoot! is a highly effective tool in improving student learning outcomes and can be used as a formative assessment strategy in schools to improve the quality of education.

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Appendix (optional)

This section is for your Appendix