



NELSON BALISAR PANJAITAN

Universitas Advent Indonesia

Indonesian author and educator Nelson Balisar Panjaitan holds a Bachelor's in English education from Universitas Advent Indonesia and a master's from Adventist University of the Philippines. He's mentoring prospective English educators at his alma mater, profoundly shaping their academic journeys through guidance and inspiration in writing.

Enhancing Students Vocabulary: A Comparative Study between Blended Learning through WhatsApp and TGT through Kahoot

Nelson Balisar Panjaitan, Mickhael Tommy Raynaldo

*Universitas Advent Indonesia
Perguruan Advent Cimindi
sonnelunai@yahoo.co.id*

In an educational landscape increasingly shaped by technology, understanding which method yields better results has implications for teaching practices and curriculum development. This research addresses a significant gap in the existing literature by comparing the efficacy of blended learning and team game tournaments (TGT) in enhancing students' vocabulary. Specifically, this study examines the effectiveness of two distinct teaching methods, blended learning via WhatsApp and team games tournaments using Kahoot, on vocabulary enhancement among 10th-grade students at SMAN 1 Parongpong, Bandung Barat. The research utilized a quantitative approach with pre-tests, post-tests, and a questionnaire to assess the effectiveness of these instructional strategies. The relatively small sample size of 62 students from a single school may restrict the generalizability of the findings. The analysis results reveal that both instructional methods led to improvements in vocabulary skills, with no statistically significant difference between the two methods. Responses from the questionnaire further indicate positive feedback for both approaches, confirming their effectiveness to give a boost to students' vocabulary. Future researchers can draw upon these findings as additional resources for exploring vocabulary development within diverse educational settings, potentially incorporating the technology and methodologies applied in this study into their own research endeavors.

Keywords: *blended learning, team games, tournaments, vocabulary enhancement*

Vocabulary development is a critical component of language acquisition, particularly in the context of English language mastery among Indonesian students (Fauzi, 2018). Mastering vocabulary is foundational to English proficiency and is often considered one of the most challenging aspects for foreign learners (Virocky & Simanjuntak, 2018). Indonesian students, in particular, have been observed to struggle with English vocabulary, which hinders their reading, writing, speaking, and translation skills (Inayatul, 2015; Wakana, 2012).

In the global education landscape, information and communication technology (ICT) has emerged as a transformative force in reshaping teaching and learning experiences (Kopinska, 2013). Blended learning, a method that combines digital media with traditional classroom settings, has garnered attention for its potential to address student engagement and learning outcomes (Friesen, 2012). Additionally, innovative approaches like Team Games Tournaments (TGT) have been recognized as effective means to diversify learning experiences and capture students' interest (Setiawan, 2017).

Several studies support the use of blended learning in language education. Albiladi and Alshareef (2019) explained that blended learning involves the teaching of listening, reading, writing, and speaking skills in English. Banditvilai (2016) highlighted its positive impact on language skills, autonomy, and motivation among language learners. Vasbieva et al. (2016) observed a positive effect on ESL learners' vocabulary development. Ono and Ishihara (2012) explored a pedagogical model of blended learning and reported improved vocabulary development and learner engagement. These studies collectively demonstrate the potential of blended learning approaches for enhancing language skills, including vocabulary acquisition.

On the other hand, TGT is a learning model based on cooperative learning that shows positive interdependence, face-to-face interaction, individual responsibility, communication between members of the group, and process evaluation in

the group (Ristanto, Zubaidah, Amin, & Rohman, 2018), as cited in (Pradhita Yudhi Astri et al. (2018). The results of the study by Rihanah and Sudiyono (2020) implied that TGT increases motivation for learning and improves vocabulary as well.

This study compared the efficacy of blended learning and team game tournaments (TGT) in enhancing students' vocabulary. In this study, blended learning was delivered using WhatsApp, while TGT was facilitated in Kahoot. Specifically, this study aimed to address the following research questions: 1. How does vocabulary ability differ between students taught through blended learning via WhatsApp and those taught through team game tournaments via Kahoot? 2. Is there a statistically significant difference in vocabulary enhancement between students instructed via blended learning through WhatsApp and those taught using Team Games Tournament via Kahoot? 3. What are students' perceptions towards instruction through blended learning via WhatsApp and Team Games Tournament via Kahoot?

Methodology

Research Design

This research adopts a quantitative, comparative research design. This design involves comparing the vocabulary achievement of students before treatment, as measured by a pre-test, and after treatment, as measured by a post-test, for both Class A and Class B of Grade X students.

Population and Sampling Technique

This research focuses on students enrolled in Grade X at SMAN 1 Parongpong. The study's sample comprises two different classes in Grade X: X Mia 1, with 32 students, and X Mia 2, with 30 students. It is noteworthy that X Mia 1 received instruction through blended learning via WhatsApp, while X Mia 2 was instructed using the Team Games Tournament approach through Kahoot.

The selection of samples was accomplished through a random sampling technique. This sampling

approach ensures a balanced representation of students subjected to different teaching methods, facilitating a comparative analysis of vocabulary enhancement outcomes.

Data Gathering Tools and Procedures

The research process began with a pilot test, featuring a 50-question multiple-choice vocabulary assessment sourced from various references and student textbooks. The pre-test with the remaining 25 multiple-choice vocabulary questions was administered to establish baseline achievement levels before the implementation of the interventions.

During the intervention and treatment phase, Class X Mia 1 engaged in learning activities via

blended learning through WhatsApp, while Class X Mia 2 followed a curriculum centered around team games and tournaments through Kahoot. Comprehensive lesson plans guided researchers through the step-by-step execution of these teaching methods.

At the conclusion of the program, a post-test was administered to assess the impact of both teaching approaches on vocabulary enhancement. Similar to the pre-test, the post-test included 25 multiple-choice vocabulary questions. These research instruments collectively facilitated data collection, allowing for the evaluation of teaching effectiveness and the measurement of vocabulary achievement before and after the instructional interventions.

Table 1
Procedures of the Treatment

Class A (Blended Learning)	Class B (Team Games Tournament)
The researcher begins the class by learning the program file in accordance with the school guidebook of the 1st grade senior high school.	The researcher begins the class by learning the program file that is in accordance with the school guidebook of the 1st grade junior high school.
<p>Pre-Activity:</p> <ul style="list-style-type: none"> • The students will be given a certain topic to discuss. • The researcher starts the activity by presenting the material, which is in accordance with the guidebook. 	<p>Pre-Activity</p> <ul style="list-style-type: none"> • The students will be given • A certain topic to discuss. • The researcher starts the activity by presenting the material, which is • According to the guide book.
<p>Whilst-Activity:</p> <ul style="list-style-type: none"> • The students watch a video or pictures that relate to the material. • The students are asked to discuss the video or pictures given. • The students learn the meaning of the word. • The students should understand the function of words (verb, noun, and adjective) and use the word in the sentence. 	<p>Whilst-Activity</p> <ul style="list-style-type: none"> • The students watch a video or pictures that relate to the material. • The students are asked to discuss the video or pictures given. • The students learn the meaning of the word. • The students should understand the function of words (verb, noun, and adjective) and use the word in the sentence. • The students learn how to choose the appropriate vocabulary to complete the sentences.

[table continues on the next page]

- The students learn how to choose the appropriate vocabulary to complete the sentences.
- The students learn the antonym and synonym of the word.

- The students learn the antonym and synonym of the word.
- The researcher activates the students' vocabulary by giving them a quiz using the Kahoot application.
- The questions will be made by the researcher according to the material that was taught before in the class.
- To play Kahoot, the students should go to Kahoot.com.

Post-Activity:

- The students are evaluated by the teacher about the material.
- The researcher asked the students to join a group discussion on WhatsApp.
- The researcher provides assistance by providing the material to the students.
- All the assignments should be sent to the group.
- If there is something that the students want to ask about the material, it can be asked in the group.

Post-Activity:

- The students are being evaluated by the teacher about the material.

Modified from Wirayuda (2019)

Analysis of Data

In this study, data analysis was conducted using the Statistical Package for the Social Sciences (SPSS), a widely recognized computer program for statistical computation. SPSS was employed to perform comprehensive data analysis, including the examination of pre-test and post-test scores to determine the significance of the results. The chosen level of significance for this analysis was set at $\alpha = 0.05$, which is a common threshold in statistical research for assessing the statistical significance of findings.

Normalized Gain Analysis

In evaluating participants' vocabulary improvement, the researcher conducted an assessment by examining the results of the pre-test and post-test. This analysis utilized the normalized gain method (Hake, 2007), a well-established approach for quantifying the extent of enhancement in a measurable variable, specifically in this context, vocabulary proficiency.

$$\% \text{ posttest} - \% \text{ pretest} \frac{\% \text{ posttest} - \% \text{ pretest}}{100\% \text{ pre-test } g =}$$

Where:

- g : Average normalized gain
- % pretest : Percentage of pre-test scores
- % posttest : Percentage of post-test scores

Hake (2007) figured out the criteria for normalized gain, which is shown in Table 3.8.

Table 2
The Criteria of Normalized Gain

Gain (g)	Category
$0.71 < g \leq 1.00$	High
$0.31 < g \leq 0.70$	Moderate
$0.00 \leq g \leq 0.30$	Low

Normality Assessment

To ascertain the normality of the data collected for the pre-test, post-test, and gain, the study employed the Shapiro-Wilk method, a widely accepted technique for evaluating population

normality. This method helps determine whether the data follows a normal distribution, which is essential for many statistical analyses.

The formula utilized in this assessment is as follows:

$$W = \frac{(\sum a_1 x_1)^2}{\sum (x_1 - \bar{x})^2}$$

(Ruseffendi, 1998)

Where,

- W : Test statistic
- X_i : statistic order $X_1, X_2, X_3, \dots, X_n$
- A_i : constant generated from the average value (mean), variance, and covariance structure of the sample distribution of and from a normal distribution.
- X : The mean of sample data

The hypothesis was the following:

- H_0 : The data population is normally distributed
- H_a : The data population is not normally distributed

The criteria for the normality test if the data is analyzed with SPSS are:

- a. The population variances are homogeneous if sig. value $\geq \alpha$ (0.05), then H_0 is not rejected.
- b. The population variances are homogeneous if sig. value $< \alpha$ (0.05), then H_0 is rejected.

Homogeneity Test

The researcher used the homogeneity test based on the results of the normality test to determine pre, post, and gain to see whether the population variances are homogeneous or not, which means having the same basic qualities (Uyanto, 2009).

The formula:

$$F = \frac{S_1^2}{S_2^2}$$

Where,

- F : value (variance variable data)
- S_1^2 : the larger variance
- S_2^2 : the smaller variance

The hypotheses that will be used are:

- H_0 : The population variances are homogeneous.
- H_a : The population variances are not homogeneous.

The criteria for the homogeneity test if the data is analyzed with SPSS are:

- a. The population variances are homogeneous if sig. Value $\geq \alpha$ (0.05), then H_0 is not rejected.
- b. The population variances are not homogeneous if sig. Value $< \alpha$ (0.05), then H_0 is rejected.

Mean Difference Test

To address the second statement of the problem and determine whether there is a significant difference between the pre-test, post-test, and gain scores, either a T-test or a U-test was employed, depending on the conditions of the data. This phase of the analysis focuses on assessing differences in means between the two datasets.

In situations where the two populations are found to be homogeneous, a sample T-test will be applied using the appropriate formula (Supranto, 2009). This test is instrumental in evaluating whether the observed differences in means are statistically significant.

$$t = \frac{\bar{x}_1 - \bar{x}_2}{SD \sqrt{\frac{1}{n_1} + \frac{1}{n_2}}} \quad SD = \sqrt{\frac{(n_1 - 1)s_1^2 + (n_2 - 2)s_2^2}{n_1 + n_2 - 2}}$$

Explanation:

- x_1 : Mean score (Blended Learning through WhatsApp)
- x_2 : Mean score (Team Games Tournament through Kahoot)
- n_1 : Number of students (Blended Learning through WhatsApp)

- n_2 : Number of students in the Team Games Tournament through Kahoot
- s1: Standard Deviation score (Blended Learning through WhatsApp)
- s2: Standard Deviation score (Team Games Tournament through Kahoot)

However, if the data is not homogeneous, then the two-different test average used is a non-parametric test, or Mann-Whitney, with the formula below.

$$U = n_1 n_2 + \frac{n_2(n_2+1)}{2} - \sum_{i=n_2+1}^{n_2} R_i$$

(Supranto, 2009)

Where:

U: Mann-Whitney U test

n1: sample size one

n2: sample size two

R2: Rank of the sample size

The hypothesis of a different mean was written as follows:

Ho: There is no significant difference in the improvement of vocabulary knowledge between blended learning through WhatsApp and team games tournaments through Kahoot.

Ha: There is a significant difference in the improvement of vocabulary knowledge between blended learning through WhatsApp and the team games tournament through Kahoot.

The criteria for the Different Mean Test if the data is analyzed with SPSS are:

- a. *Ho* is not rejected if the signature. value $\geq \alpha$ (0.05) means that there is no significant difference in the improvement of students' vocabulary knowledge.
- b. *Ho* is rejected if the signature. value $< \alpha$ (0.05) means that there is a significant difference in the improvement of students' vocabulary knowledge.

Ethical Considerations

Prior to participating in the study, both students and their guardians were provided with clear and

comprehensive information about the research objectives, procedures, and potential risks. Informed consent was obtained from all participants, ensuring that their involvement in the study was voluntary and based on a thorough understanding of its purpose.

The privacy and confidentiality of all participants were rigorously maintained throughout the study. Any information or data collected from students was treated with the utmost discretion, and no personally identifiable information was disclosed in the research findings.

Student participation in the study was entirely voluntary, and they were given the option to withdraw from the research at any time without facing any repercussions. It was emphasized that their academic standing and future prospects would not be affected by their decision to participate or not.

The research ensured equitable treatment for all participants. Both Class X Mia 1 and Class X Mia 2 were provided with equal opportunities and support during the study to prevent any bias or unfair advantage in the teaching interventions.

The study prioritized the well-being and interests of the students. The teaching methods were carefully designed to enhance their vocabulary skills while minimizing any potential harm or discomfort. The interventions were aimed at providing educational benefits.

All collected data, including test scores and responses, were securely stored and accessible only to authorized personnel involved in the study. Measures were taken to prevent data breaches and protect sensitive information.

The research process, including data collection, analysis, and reporting, was conducted transparently. The methodology and findings were presented accurately and objectively, without any manipulation or misrepresentation.

After the study, participants were offered the opportunity to receive feedback on their individual performance and to gain insights into their vocabulary development. Additionally, they were

debriefed about the study’s overall objectives and outcomes. These ethical considerations were integral to the research process, ensuring that the study was conducted with integrity, respect for participants’ rights, and a commitment to ethical research practices.

During the data analysis process, the researcher computed the pre-test, post-test, and normalized gain values for each class, as detailed in Table 1 below:

Results and Discussion

Levels of Vocabulary in the Pretest, Posttest and Normalized Gain

Table 1 presents the mean scores of the pretest, posttest, and normalized gain. The standard deviations are also shown.

Table 1
Pre-Test, Post-Test, Standard Deviation, and Normalized Gain

	Blended Learning through WhatsApp		Team Games Tournament through Kahoot	
	Mean	St. Deviation	Mean	St. Deviation
Pre-Test	78.59	15.339	58.90	19.982
Post-Test	94.88	6.042	94.87	3.598
Normalized Gain	.782396	.2401044	.862556	.1426425

According to Table 1 above, the initial knowledge of students in the group who were taught using Team Games Tournament through Kahoot is lower than that of students in the group who were taught using blended learning through WhatsApp. But after the treatment, the achievement of students in the group who were taught using Team Games Tournament through Kahoot was higher than that of students in the group who were taught using blended learning through WhatsApp.

Both standard deviations of the two classes who were taught using blended learning through WhatsApp and team games tournaments through Kahoot decreased from pretest to post-test, from 15.339 to 6.042 and from 19.982 to 3.598. The scores of both post-tests in the two classes increased. The gain scores for blended learning through WhatsApp are .782396 and for the team games tournament through Kahoot are .862556, and it can be concluded that the knowledge of both classes was enhanced in vocabulary knowledge.

Test Normality of Pre-test

The normality test was performed in order to know whether the pre-test data population was normally distributed or not. The researcher did the homogeneity test after knowing the normality in order to see whether the populations were homogenous or not. The result of normality can be seen in Table 2:

Table 2
The Normality Test Result of Pre-Test

Group	Shapiro-Wilk			
	Statistic	df	Sig.	
Pre-Test	Blended Learning through WhatsApp	.878	32	.002
	Team Games Tournament through Kahoot	.948	30	.145

Based on the data, it appears that the population of one class is not normally distributed, since the significant value of group 1 is $0.002 < \alpha (0.05)$ and the significant value of group 2 is $0.145 > \alpha (0.05)$.

Comparison of Pretest

The Mann-Whitney test was performed to determine if the difference in the pretest scores was significant. The results are presented in Table 3.

Table 3
The Mann-Whitney Test Result for Pre-Test Score

Pre-Test	Mann-Whitney	Wilcoxon	Z	Sig. (2-tailed)
	U	W		
	224.500	689.500	-3.613	.000

Based on the result of Table 3 above, the significant value is $0.00 < \alpha (0.05)$, which means H_0 is rejected. Therefore, there is a significant difference in the results of the pretest score between students who were taught using blended learning through WhatsApp and students who were taught using team games and tournaments through Kahoot.

Test Normality of Post-Test

The researcher conducted the normality test for the result of the post-score. The result can be seen in Table 4.

Table 4
The Normality Test result for Post-Score

Group	Shapiro-Wilk			
	Statistic	df	Sig.	
Pre-Test	Blended Learning through WhatsApp	.761	32	.002
	Team Games Tournament through Kahoot	.795	30	.000

The data analysis reveals that the data distribution in both classes does not follow a normal pattern. This is evident from the statistical results, where the significance value for Group 1 is 0.000, which is less than the alpha level (α) of 0.05, and similarly, the significance value for Group 2 is 0.000, also below the alpha level of 0.05.

Comparison of Post-Test

Another Mann-Whitney test was performed to determine if the difference in the posttest scores was significant. The results are presented in Table 5.

Table 5
The Mann-Whitney Test Result on Post-Test Score

Pre-Test	Mann-Whitney	Wilcoxon	Z	Sig. (2-tailed)
	U	W		
	411.500	876.500	-1.021	307

According to the data presented in Table 5 above, the significance value is calculated as 0.37, which exceeds the predetermined alpha level (α) of 0.05. Consequently, the null hypothesis (H_0) is not rejected. This finding suggests that there is no statistically significant difference in post-test scores between students who were taught using blended learning through WhatsApp and those who were instructed using Team Games Tournament through Kahoot in terms of vocabulary enhancement.

Test Normality of Normalized Gain

The researcher conducted the normality test for the result of the gain score. The result can be seen in Table 6 below:

Table 6
The Normality Test Result for Normalized Gain Score

	Group	Shapiro-Wilk		
		Statistic	df	Sig.
Gain	Blended Learning through WhatsApp	.847	32	.000
	Team Games Tournament through Kahoot	.776	30	.000

Upon examination, it becomes evident that neither of the data populations follows a normal distribution, as indicated by the significance values of 0.00, which are less than the predetermined alpha level (α) of 0.05. Given that both datasets deviate from normal distribution, it is advisable to conduct the homogeneity test based on the median row of the data.

Comparison of Normalized Gain

As indicated by the data presented in Table 7 above, the calculated significance value is 0.330, which is greater than the predetermined alpha level (α) of 0.05. This result leads to the acceptance of the null hypothesis (H_0).

Table 7
The Mann-Whitney Test Result for Normalized Gain Score

	Mann-Whitney U	Wilcoxon W	Z	Sig. (2-tailed)
Pre-Test	412.000	940.000	-.975	.330

Consequently, it can be concluded that there is no statistically significant difference between students who were instructed using Blended Learning through WhatsApp and those who received instruction through Team Games Tournament via Kahoot.

Based on the findings above, the pretest knowledge of the students who were taught using blended learning through WhatsApp and the students who were taught TCT through Kahoot was different. Although the initial knowledge of both groups was different, after the students were taught using the methods of blended learning through WhatsApp and Team Games Tournament through Kahoot, the researcher found that the achievement between the two groups was significantly increased, and there is no significant difference in the post-achievement score of both groups. It can be said that the enhancement of the two groups in learning vocabulary was improved. Furthermore, although the difference is not significant, it is notable that students in the TGT group had higher mean scores.

Students' Responses

Table 8

Percentage of Students' Response

Criteria of Response	Percentage of Students' Response (Blended Learning through WhatsApp)	Percentage of Students' Response (Team Games Tournament through Kahoot)	Average of Students' Response
Positive	6.2%	43.3%	24%
Moderate	91%	57%	74%
Negative	3.1%	-	2%

Based on the data presented in Table 8, the following conclusions can be drawn:

- 6.2% of the participants in the Blended Learning through WhatsApp group exhibited positive responses.
- In contrast, 43.3% of the participants in the Team Games Tournament through Kahoot group showed positive responses.
- Furthermore, 91% of the students in the Blended Learning through WhatsApp group displayed moderate responses, while 57% of those in the Team Games Tournament through Kahoot group had moderate responses.

In the case of negative responses, 3.1% of the students in the blended learning through WhatsApp group expressed negativity toward this teaching method.

Notably, there were no negative responses from the participants in the Team Games Tournament through the Kahoot group.

These findings indicate varying levels of enthusiasm and satisfaction among students in both groups, with the Team Games Tournament through Kahoot group generally showing higher positive responses and lower negative responses compared to the Blended Learning through WhatsApp group.

The students were enthusiastic to compete with others, which motivated them to be more active in learning vocabulary and strive to be winners in the competition. Especially since the TGT method used Kahoot as the platform, it's leveraged reputation as

an engaging game accessible via smartphones. In this century, the implementation of games can attract students to be active in learning a lesson. That is why the Team Games Tournament through the Kahoot method was more effective for students in learning vocabulary. However, despite the Team Games Tournament through the Kahoot method being more effective in enhancing students' vocabulary, blended learning also demonstrated its eligibility in improving students' vocabulary enhancement.

The survey results indicated that 43% of students in the Team Games Tournament through the Kahoot group had a positive response, while 57% had a moderate response. In contrast, 6.2% of students in the blended learning through WhatsApp group had a positive response, with 91% expressing a moderate response. Notably, there were no negative responses from the Team Games Tournament through the Kahoot group. These findings suggest that the majority of students agreed that both blended learning through WhatsApp and team games through Kahoot enhanced their vocabulary learning.

Conclusion and Recommendation

In conclusion, the study finds that the Team Games Tournament through the Kahoot method is more effective in enhancing students' vocabulary. This is attributed to the competitive classroom environment created by the Team Games Tournament approach and the engaging nature of Kahoot games as a vocabulary learning tool.

However, it is important to acknowledge that the blended learning method also contributed positively to students' vocabulary enhancement.

The researcher recommends that all English teachers implement the use of blended learning methods through WhatsApp and team games and tournaments through Kahoot. Since it has been proven by the researcher and provides positive results in improving vocabulary enhancement, English teachers are also expected to facilitate the students with a variety of materials so that students do not find boredom in learning English, especially in learning vocabulary.

The researcher suggests that all students learn more about English by using these two methods in the classroom. By using these methods, the students will not find boredom because they are based on technology and games, which will reduce boredom in learning English, especially in learning vocabulary.

It is suggested that the institution provide SMAN 1 Parongpong is suggested to provide a Wi-Fi network in the classroom so that the students find it easier to access lessons from the internet and can explore even more about lessons, especially learning English. 4. For future researchers: The researcher hopes that the result of this study can be used as an additional reference in conducting a study, especially in vocabulary knowledge in different levels and contexts. The researcher suggests that the implementation of these two methods, which are blended learning through WhatsApp and team games tournaments through Kahoot, is not always used only to enhance vocabulary but can also be used to enhance the reading skills of the students. Along with the researcher conducting this study, in spite of the fact that vocabulary skills can enhance each material taught by using these methods, the researcher also sees that the reading skills of the students are also enhanced.

References

- Albiladi, W.S. & Alshareef, K.K. (2019). Blended learning in English teaching and learning: A review of the current literature. *Journal of Language Teaching and Research*, 10(2), 232-238. [DOI](<http://dx.doi.org/10.17507/jltr.1002.03>)
- Banditvilai, C. (2016). Enhancing students' language skills through blended learning. *Electronic Journal of e-Learning*, 14(3), 220-229.
- Fauzi, A.R. (2018). The effectiveness of Duolingo in improving vocabulary ability at the sixth grade of Madrasah Ibtidaiyah Darul Ilmi Banjarbaru school year 2017/2018. Skripsi, Tarbiyah, dan Keguruan.
- Friesen, N. (2012). Defining blended learning. Available: [<http://learningspaces.org>] (<http://learningspaces.org>)
- Hake, R. R. (2007). Design-based research in physics education: A review in A. E. Kelly, R.A. Lesh, & J. Y. Back, eds., *Handbook of Design Research Methods in Mathematics, Science, and Technology Education*. Erlbaum. www.physics.indiana.edu/~hake/DBR-Physics3.pdf (www.physics.indiana.edu/~hake/DBR-Physics3.pdf)
- Inayatul, F. (2015). Peningkatan penguasaan kosakata bahasa Inggris melalui penggunaan Media Kartu gambar pada siswa kelas II SD Muhammadiyah Purwodiningratan 2 Yogyakarta. Skripsi, Fakultas Ilmu Pendidikan, Universitas Negeri Yogyakarta: Yogyakarta.
- Kopinska., M. (2013). New technologies in the foreign language classroom: The role of attitudes. *The 6th edition of the ICT for Language Learning Conference*.

- Ono Y. & Ishihara M. (2012) Integrating mobile-based individual activities into the Japanese EFL classroom. *International Journal of Mobile Learning and Organisation*, 6(2), 116-137.
- Pradhita Yudhi Astri, T., Gunarhadi, G., & Riyadi, R. (2018). Numbered-board quiz with TGT to Improve students' science achievement based on learning motivation. *International Journal of Educational Research Review*, 3(4), 68–76. <https://doi.org/10.24331/ijere.452982>
- Rihanna, H., & Sudiyono, S. (2020). Improving vocabulary using the TGT (team games tournament) method. *Project (Professional Journal of English Education)*, 3(5), 582. <https://doi.org/10.22460/project.v3i5.p582-587>
- Russefendi, E.T. (1998). *Statistika Dasar untuk Penelitian Pendidikan*. Bandung: IKIP Bandung Press.
- Setiawan, M.A. (2017). Penerapan metode pembelajaran Team Games Tournament (TGT) untuk meningkatkan keaktifan dan hasil belajar pada kompetensi alat ukur pada program keahlian teknik kendaraan ringan SMK Negeri 1 Sedayu Bantul. Skripsi, Fakultas Teknik Universitas Negeri Yogyakarta: Yogyakarta.
- Supranto, J. (2009). *Statistik Teori dan Aplikasi Edisi Ketujuh*. Jakarta: Erlangga.
- Uyanto, S. S. (2009). *Pedoman Analisis Data dengan SPSS*. Yogyakarta: Graha Ilmu.
- Vasbieva, D.G., Iriana, L., Klimova., Agibalova, E.L., Karzhanova, N.F., & Bírováe, J. (2016). Enhancement of students' vocabulary learning through a blended learning approach. *Comenius University in Bratislava, Slovakia*, 11(5), 1195-1203.
- Virocky, O., & Simanjuntak, D. C. (2018). Student's vocabulary knowledge: comparative study enhancing between semantic mapping and diglot weave techniques. *Acuity: Journal of English Language Pedagogy, Literature, and Culture*, 3(2). [DOI](<https://doi.org/10.35974/acuity.v3i2.671>)
- Wakana, J. (2012). Meningkatkan penguasaan kosakata bahasa Inggris dengan menggunakan alphabet game pada siswa kelas IV di Madrasah Ibtidaiyah Azzahidin Pekanbaru. *Doctoral dissertation, Universitas Islam Negeri Sultan Syarif Kasim Riau*.
- Wirayuda, A. (2019). Improving students' vocabulary through group chat discussion on WhatsApp in learning English third-grade students at SMP Negeri 1 Bukit Kemuning. *Skripsi, Fakultas Ilmu Pendidikan, Universitas*