

The Influence of Digital Game-Based Learning on Student Vocabulary Enrichment: Baamboozle and Wordwall Implementation Apps

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Abstract

Baamboozle can be an effective learning medium for teaching vocabulary in vocational English classes. Learning English in vocational contexts, such as hospitality, requires engaging methods that suit students' needs. This research aims to investigate whether there is a significant effect of using Baamboozle and Wordwall as digital game-based learning media, and whether there are significant differences between the two in enriching students' vocabulary mastery on Front Office topics, especially Check-In service. The researcher used a quasi-experimental design with pre-test and post-test given to both experimental and control groups. The experimental group was treated with Baamboozle, while the control group used Wordwall. The results of the paired sample t-test showed a significant improvement in both groups. However, the independent t-test revealed a significant difference in favor of the experimental group, indicating that Baamboozle was more effective in enriching vocabulary. The combination of Baamboozle's collaborative game-based features and role-play activities contributed to students' better vocabulary comprehension and engagement. Based on the result, it is recommended that teachers consider using interactive digital games like Baamboozle to make vocabulary learning more effective, contextual, and enjoyable, especially in vocational schools where practical communication is essential.

Keywords: Baamboozle, Digital Game-Based Learning, Vocabulary Enrichment, Vocational English, Front Office

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Introduction

English is an international language spoken in almost all parts of the world. Many students need it to express their thoughts and interact in various situations. Regarding teaching and learning English, English language skills require a series of words called vocabulary. Cahyani et al. (2024) state vocabulary is central to language competence and provides much of the basis for speaking, reading, and writing skills. Vocabulary is among the most critical aspects of a language to be taught or learned, and it is right at the heart of any language acquisition process, especially the initiation process.

Vocabulary is all the words used in a language; it is the basic foundation of the language. Knowing and having enough vocabulary is necessary to understand other language skills such as



speaking, reading, writing, and listening. The first thing that students must master in learning English is vocabulary since nobody can communicate it with a limited stock of vocabulary. However, a prevalent phenomenon among students is the lack of vocabulary. It may occur because the student has limited exposure to English outside the classroom, is reliable in their native language, and traditional teaching methods emphasize rote memorization rather than contextual learning (Lestari & Pratiwi, 2021). These factors can hinder effective vocabulary acquisition, making it difficult for students to communicate and engage with the language meaningfully (Hassan & Alshahrani, 2022). Integrating innovative learning media such as digital game-based learning significantly enriches vocabulary learning to tackle these issues.

Digital game-based learning is an excellent strategy to help students understand English vocabulary for junior high school students. Cahyani et al. (2024) said, "digital games can make students happy and interested in learning vocabulary." Playing digital games in the classroom greatly enhances the student's ability to use language because the students can use language with a purpose in the situations provided.

Moreover, digital games facilitate quicker and more effective recall among students by fostering an interactive and comfortable educational atmosphere (Uberman 2019). Incorporating digital games in vocabulary acquisition for seventh-grade learners established an emotional bond with the language that transcended mere cognitive engagement. Employing digital game-based learning like Baamboozle and Wordwall for vocabulary proves efficient and enjoyable, increasing students' motivation toward the learning process.

Specific tools, like Baamboozle and Wordwall, have effectively increased students' vocabulary through game-based activities. Bamboozle is one of the most popular game-based websites that allow students to practice their vocabulary in a highly interactive and collaborative manner in a non-threatening yet competitive environment. Li et al. (2023) found that Baamboozle increased students' motivation to learn new words through instant rewards and feedback, which helped reinforce vocabulary retention. In like manner, educators will be able to use Wordwall to develop their customized vocabulary games that will adapt to the needs of the students. Chen and Yang (2022) have mentioned that during the process of vocabulary instruction, the use of Wordwall brought about enhancement in vocabulary recall and application because the exposure to new words was repeatedly employed by the students in many game formats, enhancing their comprehension and retention.

The research conducted by Cahyani et al. (2024) proves that digital game-based learning effectively enhances students' vocabulary mastery. However, various limitations could be considered for future research. There was no mention of anything long-term. The retention of vocabulary or any quantitative level of engagement from the students. Moreover, it deals only with vocabulary and does not include other aspects of languages, such as grammar or speaking. Also, it does not consider different learning styles or compare the effectiveness of other games with the digital game-based ones that the researchers use.

Research Method

The researcher utilizes a quantitative research approach with a Quasi-Experimental method, specifically a Nonequivalent Pre-Test and Post-Test Control Group Design. Moreover, this research applies a quasi-experimental design to investigate the influence of using Baamboozle on students' vocabulary enrichment in the experimental group. There are two groups involved in this research. The experimental group will use Baamboozle, and the control group will use Wordwall, where both groups will given pre-tests, treatments, and a post-test to find out whether there is an influence on student vocabulary enrichment. The population of this research is the 11th-grade students of SMK Negeri 1 Puncak, located at Puncak Bogor, for the academic year 2023/2024. To have samples, the researchers use a simple random sampling technique which involves using a lottery system to choose the sampling data. The samples for this research will be taken from 11th grade classes randomly selected using a simple random sampling technique. The researchers opted for simple random sampling to ensure that every student had an equal opportunity to be included as a sample from the population. There are two tests to collect the data, such as a pre-test and a post-test for both groups. The researcher will also use a lesson plan as an instrument such as pretest, post-test, and lesson plan. In analysing the data, the data will be scoring the students pre-test and and post-test, calculating the variant, calculating the mean, standard deviation, t-test, and degree of freedom. Homogeneity and normality test will used to know the data were homogenous and normal or not.

Results and Discussion

In this findings section, the researcher offers results from the data acquired throughout the research. The research was carried out at SMKN 1 Puncak Cisarua from April 28 to May 23, 2025. This research utilized two classes: 10 Hospitality 2, with 36 students as the experimental group, and 10 Hospitality 1, also with 36 students, serving as the control group. At the first meeting, the researcher gave a pre-test to the students in the form of a vocabulary test. Additionally, throughout three sessions, the researcher administered two different treatments to both groups: Wordwall for the control group and Baamboozle for the experimental group.

From the first meeting to the last treatment, students are still given the same materials about front office, but in difference text and audio. At the last meeting, the researcher gave a post-test in the form of a paper test containing 16 questions consisting of 4 multiple choice questions, 6 questions in the form of matching tasks and 6 questions in the form of cloze tasks regarding vocabulary. The researcher took the data from the pre-test and the post-test scores. After the data is collected, the results will be calculated using the t-test formula to find out whether there is an influence of using Baamboozle and Wordwall as digital game-based learning on student's vocabulary enrichment. Here are the results of the research:

Result of Pre-test and Post-test of Experimental Group

Table 4.1 The Result of the pre-test and post-test of Experimental Group

The Result of Pre-Test and Post-Test of Experimental Group				
Experimental Group	Mean Score	Minimum Score	Maximum Score	Standard Deviation
Pre-Test	55.72	16	68	12.223
Post-Test	81.83	68	93	8.927

Based on the Table 4.1, the pre-test result of the experimental group showed that the mean score was 55.72, the highest score on the pre-test was 68 and the lowest score in the pre-test was 16. The standard deviation was 12.223. Since the minimum score required by the school regulation was 75, students comprehension level in the pre-test was still low.

Post-test scores were obtained after given the treatment using Baamboozle. Students were given treatment in three times. Based on the result of the study, the average value in the post-test was 93 the lowest value was 68, and the standard deviation was 8.927. From the experimental group results, there is a difference between the pre-test and the post-test.

Result of Pre-test and Post-test of Control Group

Table 4.2 The Result of the pre-test and post-test of Control Group

The Result of Pre-Test and Post-Test of Control Group				
Experimental Group	Mean Score	Minimum Score	Maximum Score	Standard Deviation
Pre-Test	60.72	33	75	10.994
Post-Test	75.86	56	93	9.027

Based on the table 4.2, the data shows that the mean value of the pre-test in the control group is 60.72. In addition, the highest score was 75 and the lowest score was 33. The standard deviation was 10.994. The pre-test score in the control group is still relatively low because the school regulation sets a minimum score of 75.

The post-test was given after the students received treatment using Wordwall. Based on the table, the average of the post-test also increased. The average value of the post-test 75.86, the highest value is 93 and the lowest value is 33, and the standard deviation is 9.027. Based on these results, there is a difference between the pre-test and post-test in the control group.

Normality Test

Table 4.3 The Result of Normality Test

One-Sample Kolmogorov-Smirnov Test		
		Unstandardized Residual
N		36
Normal Parameters ^{a,b}	Mean	.0000000
	Std. Deviation	8.92099109
Most Extreme Differences	Absolute	.183
	Positive	.183
	Negative	-.103
Kolmogorov-Smirnov Z		1.101
Asymp. Sig. (2-tailed)		.177

a. Test distribution is Normal.

b. Calculated from data.

The results showed that the significance levels for the experimental and control groups were higher than the degree of significance 0.05, $\text{sig} > 0.05$, it can be concluded that the data from experimental and control group was distributed normally.

Homogeneity Test

Table 4.4 The Result of Homogeneity Test

Test of Homogeneity of Variances			
Nilai			
Levene Statistic	df1	df2	Sig.
1.140	1	70	.289

The results showed that the significance level from both the experimental and control groups was 0.289. Since the data showed that the significance level was higher than 0.05 ($\text{sig} > 0.05$), so it can be concluded that the data in this research was homogeneous.

Calculating Variant

Calculating Variant Experimental Group

$$\begin{aligned}
 S_i'' &= \frac{\sum x'' - \frac{(\sum x'')^2}{n}}{n - 1} \\
 &= \frac{8.678.916 - \frac{2946^2}{36}}{36 - 1} \\
 &= \frac{8.678.916 - \frac{8.678.916}{36}}{35} \\
 &= \frac{8.678.916 - 241.081}{35} \\
 &= \frac{8.437.835}{35}
 \end{aligned}$$

$$= 241.081$$

From the calculation, the sum of squared scores was 8.678.916, the total score was 2.946, and the number of participants was 36. Substituting these values into the formula, the resulting variance was 241.081. This value indicates a moderate distribution of scores, showing that although students' performance varied, it was not highly inconsistent. This result will be used for comparison with the control group in the subsequent analysis.

Calculating Variant Control Group

$$\begin{aligned}
 S^2 &= \frac{\sum x^2 - \frac{(\sum x)^2}{n}}{n - 1} \\
 &= \frac{7.458.361 - \frac{2.731^2}{36}}{36 - 1} \\
 &= \frac{7.458.361 - \frac{7.458.361}{36}}{35} \\
 &= \frac{7.458.361 - 207.176}{35} \\
 &= \frac{7.251.185}{35} \\
 &= 207.176
 \end{aligned}$$

Based on the calculation, the squared scores was 7.458.361, the total score was 2.731, and the number of students was 36. The resulted of the variance is 207.17. This value indicates a moderate level of score dispersion in the control group, meaning the students' performance was neither entirely homogeneous nor highly varied. This result will be used in another analyses to compare the control group with the experimental group.

Calculating Mean

Mean Experimental Group

$$\begin{aligned}
 \bar{x} &= \frac{\sum x}{n} \\
 &= \frac{2946}{36} \\
 &= 81.83
 \end{aligned}$$

Based on the data, the total score in the experimental group was 2,946 and the number of students (n) was 36. Therefore, the mean score was 81.83. This value reflects the general achievement of students after the treatment and will be compared with the control group to evaluate the effectiveness of the intervention.

Mean Control Group

$$\begin{aligned} \bar{x} &= \frac{\sum x_{\#}}{n} \\ &= \frac{2731}{36} \\ &= 75.86 \end{aligned}$$

Based on the data, the total score in the control group was 2,731, with a total of 36 students. This result indicates that the average score of students in the control group was 75.86. This score will serve as a baseline to compare with the experimental group in order to evaluate the effectiveness of the treatment given.

Calculating Standard Deviation

$$\begin{aligned} S_{\&a} &= \sqrt{\frac{(n_1 - 1)S_1^2 + (n_2 - 1)S_2^2}{n_1 + n_2 - 2}} \\ &= \sqrt{\frac{(36 - 1)241.081 + (36 - 1)207.176}{36 + 36 - 2}} \\ &= \sqrt{\frac{(35)241.081 + (35)207.176}{72 - 2}} \\ &= \sqrt{\frac{8.437.835 + 7.251.160}{70}} \\ &= \sqrt{\frac{15.688.95}{70}} \\ &= 14.97 \end{aligned}$$

In this research, the calculated score of standard deviation is 14.97, indicating a moderate level of variability within the combined data sets. This suggests that the score distribution across both groups is relatively consistent and suitable for further statistical testing.

Calculating T-test

Paired t-test

Table 4.5 The Results of Paired Sample t-test

Paired Samples Test									
		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	PreExperiment - PostExperiment	-26.111	11.301	1.883	-29.935	-22.288	-13.864	35	.000
Pair 2	PreControl - PostControl	-15.111	6.567	1.095	-17.333	-12.889	-13.806	35	.000

Based on the results of the Paired Sample T-Test, it was found that the mean value of the difference between the pre-test and post-test in the experimental group was -26.111 with a standard deviation of 11.301 and a standard error of 1.883. The calculated t value is -13.864 with 35 degrees of freedom (df), and a significance value (Sig. 2-tailed) of 0.000. Since the significance value is smaller than 0.05, it can be concluded that there is a significant difference between the pre-test and post-test scores in the experimental group. This shows that the use of Baamboozle as Digital Game-Based Learning has a significant effect on improving students' vocabulary mastery. Thus, the first alternative hypothesis (H_{a1}) which states "There is any significant influence of using Baamboozle as Digital Game-Based Learning on student vocabulary enrichment" can be accepted.

Meanwhile, in the control group that used Wordwall media, the mean value of the difference between pre-test and post-test was -15.111 with a standard deviation of 6.567 and a standard error of 1.095. The calculated t value is -13.806 with df 35, and the significance value is also 0.000. This result shows that the use of Wordwall as Digital Game-Based Learning also has a significant effect on improving students' vocabulary enrichment, although the increase is not as great as the experimental group. Therefore, the second alternative hypothesis (H_{a2}) which states "There is any significant influence of using Wordwall as Digital Game-Based Learning on student vocabulary enrichment" can also be accepted. Both results support that the application of digital game-based learning media is generally effective in improving students' vocabulary enrichment.

Independent t-test

$$\begin{aligned}
 t &= \frac{\bar{x}_j - \bar{x}_*}{S + \frac{1}{n_j} + \frac{1}{n_*}} \\
 &= \frac{75.86 - 81.83}{14.97 \frac{1}{36} + \frac{1}{36}} \\
 &= \frac{5.97}{14.97 \sqrt{0.027 + 0.027}} \\
 &= \frac{5.97}{14.97 \sqrt{0.054}} \\
 &= \frac{5.97}{14.97 \times 0.23} \\
 &= 3.443
 \end{aligned}$$

Based on the calculation, the t-count value is 3.433 and the t-table value is 1.994. The results of the t-test showed that there is a significant difference between the experimental and control group. The t-value 3.4431 is higher than the t-table value 1.994, at a significance level of 0.05 and degrees of freedom 70. Therefore, the null hypothesis (H_0) is rejected and the alternative hypothesis (H_{a3}) is accepted. Hypothesis 3, which states that "There is any difference result gained by the experimental and the control classes," is supported by the data. This indicates that there is a significant difference between the

two groups, suggesting that the implementation of the treatment in the experimental class had a positive impact on students' learning outcomes compared to the control class.

Determining The Degree of Freedom

$$\begin{aligned} d. f &= n_{\#} + n_{\#} \\ &= 36 + 36 - 2 \\ &= 72 - 2 \\ &= 70 \end{aligned}$$

Based on the research data, both groups consist of 36 participants each, resulting in a degrees of freedom value of $df = 36 + 36 - 2 = 70$. This value is used to determine the critical t-value at a significance level of 0.05 in the t-distribution table.

Discussion

Is there any significant influence of using Baamboozle as Digital Game-Based Learning on students' vocabulary enrichment?

The findings of this study indicate a significant improvement in students' vocabulary enrichment after the implementation of Baamboozle as a digital game-based learning (DGBL) tool. The mean score in the experimental group increased substantially from 55.72 in the pre-test to 81.83 in the post-test, demonstrating a notable gain in vocabulary proficiency.

The use of Baamboozle in the classroom did not involve individual gameplay alone. Rather, students participated in collaborative group-based gameplay, which is a key feature of Baamboozle's interactive structure. When working in teams, students were encouraged to discuss, strategize, and support each other in answering vocabulary questions. This collaborative approach provided social interaction and peer-assisted learning, which played a crucial role in reinforcing students' understanding of new vocabulary. This aligns with the theory presented by Chen and Lee (2019), who assert that Baamboozle promotes team-based learning environments where students collaboratively strengthen their knowledge through interactive challenges.

Furthermore, Pasaribu et al. (2019) emphasize that collaborative digital games foster increased motivation and language practice, enabling learners to internalize vocabulary through active engagement and meaningful peer interaction. Such gamified collaboration allows learners to construct knowledge socially, leading to deeper vocabulary retention.

In addition to collaborative gaming, students also engaged in role-play activities that required them to utilize the vocabulary items introduced through Baamboozle. These role plays were contextualized within Front Office Check-In scenarios, providing students with opportunities to practice authentic communication as hotel receptionists and guests. This activity was designed not only to assess their vocabulary acquisition but also to encourage the practical use of language in real-life professional contexts. The theoretical foundation for this practice is supported by Nation (2020),

who states that vocabulary learning is most effective when words are encountered and used within meaningful contexts. Therefore, roleplay serves as a bridge between vocabulary recognition and productive usage, allowing learners to activate and apply their knowledge in functional interactions.

In conclusion, the integration of Baamboozle through collaborative gameplay and contextualized role-play significantly contributed to the improvement of students' vocabulary skills. This multimodal approach not only increased motivation and participation but also ensured deeper cognitive processing and practical application of newly acquired vocabulary. As such, Baamboozle proves to be an effective tool for vocabulary enrichment in vocational English language learning contexts.

Is there any significant influence of using Wordwall as Digital Game-Based Learning on students' vocabulary enrichment?

The results of this study indicate that the use of Wordwall as a Digital Game-Based Learning (DGBL) tool has a significant positive influence on students' vocabulary enrichment. In the control group, the mean score increased from 60.72 in the pre-test to 75.86 in the post-test, demonstrating that Wordwall contributed to students' vocabulary improvement over the course of the treatment.

Wordwall, primarily emphasizes individualized and structured practice. It allows students to engage with various game formats such as matching, fill-in-the-blank, and categorization games, which expose them to new vocabulary through repetition and visual reinforcement. This form of exposure is essential for promoting vocabulary retention and recognition.

According to Susilaningrum and Asri (2023), Wordwall significantly improves vocabulary enrichment because of its interactive and adaptable content, which can be customized by teachers to students' levels and needs. These formats provide immediate feedback that helps learners internalize word meanings and usage through practice and reinforcement.

Additionally, Wordwall contributes to increased learner confidence in vocabulary application. As Bueno et al. (2022) stated, when students interact with digital vocabulary tools in group settings, such as when working in pairs or participating in class-wide games, they are more likely to engage in discussions and apply the words meaningfully. While Wordwall does not necessarily focus on team competition, it allows for independent mastery, which supports personalized learning and self-paced vocabulary development.

While Wordwall plays an important role in helping students enrich their vocabulary through structured and individualized activities, it provides a less collaborative and immersive experience compared to Baamboozle. Wordwall is useful for reinforcing vocabulary and improving recall, especially in more traditional or independent learning settings. However, its format may not offer the same level of emotional engagement, motivation, or opportunities for real communication. In contrast, Baamboozle encourages group interaction and creates a more dynamic learning atmosphere, which can lead to better contextual understanding and use of vocabulary. Therefore, while Wordwall contributes

positively to vocabulary learning, its impact is not as strong or engaging as Baamboozle's more interactive approach.

Is there any different result gained by the experimental and the control classes?

Based on the result of the independent *t*-test, there is a significant difference between the vocabulary achievement of the experimental class (using Baamboozle) and the control class (using Wordwall). The *t*-count value (3.4331) is higher than the *t*-table (1.99444) at a 0.05 significance level. This result confirms that the students in the experimental group performed significantly better than those in the control group, supporting the third hypothesis of this study.

The mean post-test score of the experimental class was 81.83, while the control class achieved 75.86. Both classes showed improvement, but the experimental group showed a greater increase in vocabulary mastery. One key reason is that the experimental class did not only play Baamboozle games but also engaged in role-play activities using the vocabulary learned from the game.

The role-play helped students apply the new vocabulary in real communication, such as in a hotel check-in simulation. This made the learning process more meaningful, moving vocabulary from passive recognition to active use. According to Nation (2020) and Qian (2019), vocabulary is better retained when students practice using it in real and meaningful contexts.

In addition, the vocabulary enrichment in the experimental group improved more because Baamboozle provided students with interactive and enjoyable practice. The game allowed students to see, hear, and use new words repeatedly, which strengthened their memory. The team-based format of Baamboozle and its competitive elements also increased student motivation and participation during learning. As supported by Pineda et al. (2023) and Pasaribu et al. (2019), learning vocabulary through digital games improves student focus and retention because the process is fun, social, and emotionally engaging.

In conclusion, the better results in the experimental group happened because the students had more opportunities to engage with vocabulary actively and meaningfully. The combination of Baamboozle and role-play created a supportive and motivating environment that not only introduced new words but also encouraged students to use them in real communication. This approach led to deeper vocabulary enrichment compared to the control group.

Conclusion

The influence of Baamboozle may be due to its collaborative and competitive features, which actively involve students in the learning process. In addition, the use of role-play activities in the experimental group allowed students to apply the vocabulary they had learned in real communicative situations. This kind of contextual practice helped deepen their understanding and retention of new words.

This research supports the findings of Nabila (2023), who stated that Baamboozle increases

students' motivation and encourages active vocabulary learning. It also aligns with Alimova (2023), who emphasized the game's role in creating a dynamic and engaging classroom environment. Moreover, the findings are allign with Susilaningrum and Asri (2023), who noted that Wordwall contributes to vocabulary enrichment, especially through its repetitive and visually appealing activities, although it tends to be more effective for reinforcement than for active usage.

In conclusion, using digital games in learning really helps with building vocabulary, it can give students repeated practice, quick feedback, and make learning more fun and engaging. When activities like role-plays are added, students don't just memorize new words—they actually get to use them in real-life situations. Based on this study, Baamboozle turns out to be more effective than Wordwall when it comes to helping students enrich their vocabulary, especially in vocational English settings like hospitality and front office communication.

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