

The Influence of *Educaplay* on Students' English Vocabulary Mastery

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Abstract: This study examined the effect of *Educaplay*, a game-based learning platform, on the English vocabulary mastery of 11th-grade students at MAN 2 Serang City. A quasi-experimental non-equivalent control group design was used with 72 students (36 experimental and 36 control) who completed vocabulary mastery exams in meaning, form (spelling), and contextual use. The experimental group was taught through interactive games from *Educaplay*, while the control group used typical teacher-centered techniques. Results showed a significant improvement in the experimental group, with the mean scores increasing from 75.13 to 86.52 (+11.39 points), and the control group increased from 72.22 to 78.33 (+6.11 points). Results of the Mann-Whitney U test (Sig. 0.000 < 0.05) and independent t-test ($t = 5.727 > 1.994$) demonstrated statistically significant differences between groups. Effect size analysis (Cohen's $d = -1.850$) indicated a large practical effect. These findings highlight the effectiveness of *Educaplay* as an alternative to traditional approaches in improving vocabulary learning in the Islamic secondary education context.



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INTRODUCTION

Vocabulary knowledge is a key element in developing English as a language, underpinning the four basic skills of speaking, listening, reading, and writing (Nation, 2013). Many 11th-grade students at MAN 2 Serang City have limited vocabulary, even though it is essential for understanding and producing language. A preliminary survey of 334 students found that 60.8% reported learning vocabulary as their main challenge, far more than grammar (15.3%), pronunciation (13.5%), or reading comprehension (10.5%).

Modern studies have shown that digital learning through games significantly enhances vocabulary retention and engagement (Sailer & Homner, 2020). For example, implementation in Indonesia improved completion rates from 24% to 88%. Malaysian contexts showed improved knowledge through participation-based activities. *Educaplay* is a very promising web-based platform for interactive learning, including educational games and quizzes. However, most available research is pre-experimental without control groups and effect size analysis, therefore leaving gaps in the real efficacy of *Educaplay* over regular training

This quasi-experimental study addresses these shortcomings using a strict design with a comparable control group, thereby providing stronger empirical evidence. The research intends to determine whether *Educaplay* is considerably better than traditional teacher-centered methods in improving the English vocabulary knowledge of 11th-grade students.

THEORETICAL SUPPORT

Technology in language learning

Creating software and applications that support language learning is one of technology's most important contributions to the field. Learners can improve their vocabulary, grammar, and pronunciation by using interactive lessons, tests, and activities offered by well-known apps such as Duolingo, Babbel, and Memrise. To make learning more effective and interesting, these apps often use spaced repetition, customized courses, and instant feedback.(Hui et al., 2025) Mobile language-learning apps offer special affordances that support independent learning. featuring the capacity to easily incorporate learning into everyday activities, customization, and portability.

The gamification elements embedded in language learning apps significantly enhance learner engagement and motivation.(Sailer & Homner, 2020) Points, badges, levels, streaks, and leaderboards turn language study into a fun, game-like experience that promotes consistent practice and perseverance. Gamification in mobile language learning applications significantly impacts learner motivation and engagement by satisfying fundamental psychological needs, including autonomy, competence, and relatedness.(Deci & Ryan, 2000)

Vocabulary

Vocabulary is a fundamental component of language proficiency. Encompassing comprehensive knowledge and effective application of words within a linguistic framework. From an educational standpoint. "The knowledge of words and word meanings in both oral and written language and in productive and receptive forms, which serves as the foundation for literacy development and academic achievement." This definition emphasizes the importance of vocabulary in educational settings by explicitly connecting lexical knowledge to literacy development and academic achievement.(Graves et al., 2013)

Vocabulary in modern language instruction is increasingly understood to include multiword entities such as collocations, idioms, and formulaic sequences, in addition to individual words. For the development of fluency and naturalness in language use, phrasal vocabulary pieces of phrases that frequently appear together is essential.(Alali & Schmitt, 2012)

Vocabulary Mastery

In fact, Vocabulary is defined as knowledge of words that includes more than a simple list of meanings. According to Nation, knowing a word involves understanding three aspects: form (including spelling, spoken form, and morphological structure such as prefixes, suffixes, and word roots), meaning (the relationship between form and meaning, underlying concepts, and relationships with other words), and use (grammatical function and the patterns in which the word occurs). Schmitt emphasizes that learning foreign-language vocabulary requires understanding all these aspects, not just memorizing meaning, because mastering these components enables effective use of words in communication.(Br Nation, 2013)

Vocabulary Mastery is more than a list of target language words. As part of the language system, vocabulary is closely connected with grammar, pronunciation, meaning, and usage. As Penny Ur stated, vocabulary can be understood, roughly, as the words we teach in a foreign language. However, the items to be taught go beyond mere translation; they include grammatical function, pronunciation and spelling, collocation, aspects of meaning, and word formation. This perspective reinforces the idea that true

vocabulary mastery requires learners not only to know what a word means, but also how it is spelled, how it functions in a sentence, and how it is used appropriately in various contexts.(Ur, 1996).

According to Schmitt, Vocabulary mastery encompasses two primary categories: *receptive knowledge* and *productive knowledge*. Receptive knowledge is the ability to identify and comprehend word meanings when they are heard or seen, even if learners cannot actively use them. Productive knowledge, by contrast, is the ability to use words correctly and responsibly in speaking or writing. This kind of knowledge often follows receptive understanding and indicates a more advanced language competence.(Meyer & Schmitt, 2002)

Factors Affecting Vocabulary

According to I.S.P Nation, several key processes influence the effectiveness of vocabulary learning: noticing, retrieval, creative use, and affective factors such as motivation. First, students must notice and pay attention to new words (noticing), because conscious attention to a word's form, sound, and meaning is the first step in processing it in memory. Second, learning becomes more effective when students are asked to recall words they have learned (retrieval), for example, through exercises, quizzes, or use in language tasks. This process of remembering strengthens the connection between form and meaning, making words more easily accessible when needed. Third, the most effective stage is creative use, when students use words in new contexts or communication situations, because active use deepens understanding and makes vocabulary knowledge more flexible. In addition, motivation plays an important role, as highly motivated students tend to focus more on new words, repeat them more diligently, and be more confident using them in communication. Motivation also increases learning Engagement, resulting in more frequent interaction with words. Nation emphasizes that the frequency of exposure to words and spaced repetition are very important for long-term retention. Exposure to words through reading, listening, speaking, and writing strengthens.(Br Nation, 2013)

Thornbury also identifies effective factors that can influence vocabulary. The first is motivation. Thornbury argues that the desire to learn a new word does not guarantee that it will be remembered. Strong motivation makes students more likely to spend more time on practice and drills, which in turn influences memory retention. The second is arousal or attention. Thornbury explains: "The more attention you give to something, the better the memory retention." For example, words with strong emotional meaning are recalled better than words without emotional meaning. And this is why many kids can recall swear words even after hearing them a couple of times.(Thornbury, 2002)

Educaplay

Educaplay, developed by ADR Formación in Spain, is a user-friendly web platform that lets teachers design and publish interactive educational games. It is free to use, supports multiple game formats (crossword puzzles, matching games, quizzes, interactive flashcards, and more), and is HTML5 compatible for cross-device access.(Formación, 2026). *Educaplay* can be accessed for free by visiting the website and logging in. After logging in, users can start creating educational activities by selecting the New Game menu, which offers a variety of educational game templates that can be customized to suit their needs and learning objectives. With its simple, easy-to-understand interface, creating activities on *Educaplay* does not require any special technical skills. Users only need to follow the platform's instructions, list the questions and learning materials they

want to use, and then add additional questions as needed at their desired level of difficulty. Before publishing, users can check the activity's appearance and suitability using the Preview feature to ensure all content is well organized and as expected. Once the activity has been created and deemed suitable, users click the Publish button and fill in the title, description, and lesson details. After the activity has been published, teachers can easily share the material with students in various ways, such as through a direct link or an embed code that can be pasted onto a website or blog. In addition, integration with learning platforms such as Google Classroom or Microsoft Teams makes it easy for teachers to share material with students wherever they are. (tv, n.d.)

METHOD

Research Design and Participants

This study used a quantitative method with a quasi-experimental research design and a non-equivalent control group design. According to Creswell and Timothy C. Guetterman, quasi-experimental Research is used when researchers cannot randomly assign participants but still aim to examine causal relationships between an intervention and an outcome. (Creswell & C. Guetterman, 2019) This methodology was chosen as participants were not randomly assigned but were placed in pre-existing classes, and the researcher was able to assess the effectiveness of various instructional methods, Gay, L. R., and Mills, E. Geoffrey state that this design allows researchers to examine instructional effectiveness by comparing learning outcomes across different treatments. (Gay & Mills, E., 2016) The purpose of the research was to find out the effect of *Educaplay* on students' English vocabulary mastery.

The population was all 11th-grade science students of MAN 2 Serang City. According to Cohen, Manion, and Morrison in *Research Methods in Education*, A population is the aggregate of people, events, or units of analysis that share common characteristics and are the focus of a Research study. (Cohen et al., 2002) The researchers used purposive sampling to select two intact classes with similar English proficiency and learning characteristics. According to Creswell and Guetterman, purposive sampling involves selecting participants based on specific characteristics relevant to the Research objectives, making it suitable when researchers must work with intact groups. (Creswell & C. Guetterman, 2019) XI Science 2 was the experimental group (n=36), and XI Science 3 was the control group (n=36). The total sample size was 72 students. In the experimental group, vocabulary was taught using *Educaplay*, while the control group received typical teacher-centered instruction.

Instruments

To collect the data required for this study, a Vocabulary Mastery Test was developed and administered as pre- and posttests to both the experimental and control groups. According to Brown, research instruments in language studies must be valid, reliable, and aligned with the research objectives to ensure accurate measurement of students' language performance. (Brown, 2004a) The Vocabulary Mastery Test consists of 20 items, administered in 45 minutes, with 5 items for meaning, 8 items for form, and 7 items for use. The test measures students' mastery of English vocabulary across three essential aspects proposed by Nation: meaning, form (spelling), and word use in context.

The Vocabulary Mastery Test employs a combination of objective multiple-choice items and listening-based items, depending on the vocabulary aspect being assessed.

- a. Word Meaning: This section tests knowledge of the meanings of words, including definitions, synonyms and meanings in context. The items are in multiple-choice format, and students are required to select the most suitable meaning in the context.
- b. Word form: This component measures students' knowledge of the correct written forms, especially the accuracy of spelling. The questions are in multiple-choice format. Students are to choose the correctly spelled word from the choices given. The study used a written test to measure knowledge, which is appropriate for 11th-grade students in a formal classroom setting.
- c. Word Use in Context: This component assesses students' ability to select the most appropriate word to complete a sentence according to contextual meaning. These questions are multiple-choice sentence completions, and students are asked to choose the word that best fits the sentence's context and meaning. This is a matter of situational accuracy.

To ensure balanced measurement across vocabulary aspects, a test blueprint was developed as follows:

Table 1. Table of Specification

Vocabulary Aspect	Indicator	Number of Items	Test Format	Example of Item Type
Meaning	Identifying word meaning based on definition, synonym, or context	1-5	Multiple-choice	Choosing the correct meaning of a word in a sentence
Form	Identifying the correct spelling of words	6-13	Multiple-choice	Selecting a correctly spelled word
Use	Applying vocabulary appropriately in sentences	14-20	Multiple-choice	Sentence completion
Total		20		

Treatment and Data Collection

The data were collected over five weeks. Both groups were tested pre-treatment and post-treatment after the instructional sessions. The experimental group was engaged in five 90-minute learning sessions with *Educaplay*. These included interactive games such as Froggy Jumps for spelling practice, Crossword Puzzles for vocabulary meaning practice, and Matching Games for practice with word usage in context. Meanwhile, the control group was given traditional vocabulary instruction through teacher explanations, vocabulary drills, textbook exercises, and written practice. Both groups were taught the same learning materials and received the same amount of instructional time.

Data Analysis

Collected data were analyzed in SPSS version 26. Descriptive statistics were calculated to summarize the student results, including mean, standard deviation, and gain scores. Data were checked for normality using the Shapiro–Wilk test before hypothesis testing. When the data met the assumption of normality ($p > .05$), an independent-samples t-test was conducted to compare posttest results between the experimental and control groups. For the nonparametric variant, the Mann-Whitney U test was applied when the data were nonnormal. In addition, Cohen's d was calculated to assess the magnitude of the treatment effect.

RESULT AND DISCUSSION

Results

The experimental group showed a significant improvement. Mean scores went up from 75.13 (SD = 9.82) at pretest to 86.52 (SD = 6.48) at posttest, for a gain of 11.39 points. Median scores improved from 75 to 85, and the modal score from 75 to 90. Minimum and maximum scores increased from 50–90 to 75–100, showing overall progress even among students who started out with lower scores. In contrast, the control group showed modest progress. The mean increase between pretest (M = 72.22, SD = 8.47) and posttest (M = 78.33, SD = 7.21) was just 6.11 points. Median advancement was 5 points (75 to 80), mode was 75, and minimum/maximum rose from 50-85 to 55-90. This improvement is much smaller (6.11 vs. 11.39 points) and shows that teacher-centered methods, while achieving some improvement, are not as effective as game-based instruction.

Table 2. Descriptive Statistics - Experimental vs. Control Group

Statistics	Expe. Pretest	Expe. Posttest	Ctrl. Pretest	Ctrl. Posttest
Mean	75.13	86.52	72.22	78.33
Minimum	50	75	50	55
Maximum	90	100	85	90

Inferential Statistical Analysis

To evaluate the research hypotheses and determine the significant effect of using *Educaplay.com* on the English vocabulary competence of 11th-grade students at MAN 2 in Serang City, inferential statistics were utilized based on pretest and posttest data from the experimental and control groups. The analysis began with a normality test using the Shapiro-Wilk test to assess the distribution of the pretest and posttest scores, assuming the data were normal if Sig. > 0.05 and not normal if Sig. < 0.05. If the data were not completely normally distributed, the Mann-Whitney U test was used to test the hypothesis of two independent groups. The criteria are: If Sig. < 0.05, H₀ is rejected; if Sig. > 0.05, H₀ is accepted. Next, Levene's test for homogeneity of variances was performed to assess whether variances were equal between the experimental and control groups. If the Sig. > 0.05, the variances were homogeneous. Because the data were not normally distributed, an independent-samples t-test was conducted as a supplementary analysis to confirm the Mann-Whitney results. The t-test is sufficiently robust to violations of normality in large samples (n = 36 per group) with homogeneous variances, where H₀ is rejected if |calculated t| > table t at a significance level of 0.05. Finally, the magnitude of the effect of the use of *Educaplay.com* was assessed using Cohen's d. The interpretation categories were: 0.00–0.20 (weak), 0.21–0.50 (moderate), 0.51–1.00 (strong) and >1.00 (very strong).

a. Normality Test (Shapiro-Wilk)

The normality test assessed whether data from both the experimental and control classes were normally distributed. The analysis used the Shapiro-Wilk test in SPSS version 26.0 because each group had fewer than 50 participants. The Shapiro-Wilk test was applied, and the results are presented in the table.

**Table 3. Test of Normality
Tests of Normality**

Group		Shapiro-Wilk		
		Statistic	Df	Sig.
Pretest	Experimental group	.881	36	.001
	Control class	.912	36	.008
Posttest	Experimental group	.938	36	.045
	Control class	.897	36	.003
Gain	Experimental group	.863	36	.000
	Control class	.781	36	.000

The normality test was conducted to determine whether the data in this study were normally distributed, which is essential for selecting the appropriate statistical analysis. The test was applied to three types of data: pretest, post-test, and gain scores from both the experimental and control groups.

The Shapiro-Wilk test indicates that the pretest data for both groups are not normally distributed. Specifically, the experimental group had a Sig. value of 0.001, while the control group had a Sig. value of 0.008. Both values are < 0.05 , so we can conclude that the data are not normally distributed.

The same pattern was seen in the post-test data. The p-value was 0.045 for the experimental group and 0.003 for the control group (both < 0.05). This means that neither group's post-test results are normally distributed. Again, the p-value of 0.000 (both groups) was below the threshold, and the gain scores were consistent. The gain scores were also not normally distributed, as expected.

Overall, the normality test results show that the data in this study are not normally distributed. Because all variables in the two groups violated the assumption of normality, the researcher used the nonparametric Mann-Whitney test rather than the independent-samples t-test to compare them. The statistical analysis is appropriate and valid, as it uses a nonparametric test and accounts for the data distribution.

b. Homogeneity Test (Levene's Test)

After confirming the assumption of normality, the next step was to assess the homogeneity of variance, another key assumption in parametric testing. Levene's Test for Equality of Variances was used to determine whether the variances in writing scores between the control and experimental groups were statistically similar. This test was conducted using SPSS version 26.

**Table 6 Homogeneity Test
Test of Homogeneity of Variance**

		Levene Statistic	df1	df2	Sig.
Pretest	Based on the mean	.779	1	70	.380
	Based on the median	.317	1	70	.575
	Based on the median and with adjusted df	.317	1	69.883	.575
	Based on the trimmed mean	.578	1	70	.450
Posttest	Based on the mean	.030	1	70	.864
	Based on the median	.018	1	70	.893

Gain	Based on the median and with adjusted df	.018	1	67.092	.893
	Based on the trimmed mean	.018	1	70	.893
	Based on the mean	3.857	1	70	.054
	Based on the median	3.661	1	70	.060
	Based on the median and with adjusted df	3.661	1	67.176	.060
	Based on the trimmed mean	3.928	1	70	.051

For the Pretest variable. Levene's Test yielded significance values of 0.380 (based on the mean), 0.575 (based on the median), 0.575 (based on the adjusted median), and 0.450 (based on the trimmed mean). All of these values are greater than 0.05. indicating that the initial ability data had homogeneous variances across groups.

The Posttest variable also showed homogeneous variances. The significance value was 0.864 (based on the mean). 0.893 (based on the median), 0.893 (adjusted median), and 0.893 (based on the trimmed mean). Since all values exceeded 0.05, we found no significant differences in variance between the groups.

Similarly, the gain score variable demonstrated homogeneity of variance, with significance values of 0.54 (based on the mean), 0.60 (based on the median), 0.60 (based on the adjusted median), and 0.51 (based on the trimmed mean). These results confirm that gain-score variances were equal between the experimental and control groups. *Then, the Summary is the three variables are pretest, posttest, and gain score. Showed homogeneous variance.*

c. Mann-Whitney U-Test (Non-parametric)

The normality test results indicated that the data were not normally distributed, so the researcher could not apply the parametric independent-samples t-test. The researcher therefore tested the hypothesis about differences in learning outcomes between the two independent groups using the non-parametric Mann-Whitney U test. This test determines whether there is a significant difference between two groups that do not meet the assumption of normality. The analysis was conducted using SPSS version 26.

1) Pretest

This test was conducted to determine whether there were differences in the pretest between the experimental and control classes before receiving the treatment.

Table 4 Results of Independent Samples U-Test (Pretest)

		Ranks		
	Group	N	Mean Rank	Sum of Ranks
Pretest	Control group	36	32.08	1155.00
	Experimental class	36	40.92	1473.00
	Total	72		
Test Statistics				
Pretest				
	Mann-Whitney U	489.000		

Wilcoxon W	1155.000
Z	-1.851
Asymp. Sig. (2-tailed)	.064

a. Grouping Variable: Group

Based on the results above, the Asymp. Sig. (2-tailed) value was $0.64 > 0.05$. This means there was no significant difference between the initial abilities of the experimental and control classes. Thus, both groups had equivalent abilities before the treatment was administered. This matters because it shows that students in both classes started with similar abilities, so differences in final results can be attributed to the learning treatment rather than to differences in initial ability.

2) Post-test

This test was conducted to determine whether posttest performance differed between the experimental and control classes after the treatment, namely, after using *Educaplay.com* in the learning process.

Table 5 Results of Independent Samples U-Test (Posttest)

		Ranks		
Posttest	Group	N	Mean Rank	Sum of Ranks
	Control class	36	25.19	907.00
	Experimental group	36	47.81	1721.00
	Total	72		

Test Statistics Posttest

Mann-Whitney U	241.000
Wilcoxon W	907.000
Z	-4.683
Asymp. Sig. (2-tailed)	.000

a. Grouping Variable: Group

Based on the table above, the Asymp. Sig. (2-tailed) value was $0.000 < 0.05$. This indicates a significant difference between the post-test results of the experimental and control classes. The mean rank indicated that the experimental class had an average score of 47.81, while the control class had 25.19, indicating that students in the experimental class scored higher after the treatment. Thus, using *Educaplay.com* positively affected students' vocabulary.

Based on the results of the two tests above, it can be concluded that:

1. The pre-test results (Sig. $0.64 > 0.05$) indicated no significant difference between the experimental and control classes before the treatment.
2. The post-test results (Sig. $0.000 < 0.05$) indicate a significant difference between the two classes after the treatment. Thus, it can be concluded that "Using *Educaplay.com*

significantly improves students' vocabulary compared to Teacher-centered learning methods.

Discussion

The substantial performance differential between groups aligns with gamification theory.(Sailer & Homner, 2020). *Educaplay*'s interactive game elements probably enhanced learner motivation and engagement due to several psychological pathways: (1) instant feedback reinforced correct responses; (2) game progress and achievement badges satisfied competence needs; (3) diverse game formats reduced cognitive monotony; (4) spaced repetition through multiple game sessions supported vocabulary retention. While conventional approaches usually focused on meaning translation, *Educaplay*'s multimodal approach addressed all three vocabulary dimensions simultaneously (form through spelling-focused Froggy Jumps, meaning through definitional Crossword Puzzles, and use through contextual Matching Pairs Games). The small gains in the control group are likely due to limited engagement with older approaches. Direct education is necessary but neither interesting nor motivating by itself. Written drilling exercises are good for reinforcement but do not give immediate interactive feedback. Notably, the experimental group's lowest posttest score (75) was lower than the control group's mean (78.33), indicating that *Educaplay* was positively effective even for students with lower academic performance. Context-specific considerations are worth noting. MAN 2 is an Islamic secondary school institution that serves various socioeconomic communities. The free web-based platform and cross-device portability of *Educaplay* addressed technology access hurdles. The culturally neutral vocabulary material (cause-effect connectors) exhibited universal applicability.

CONCLUSION

This quasi-experimental study presents robust empirical evidence that the use of *Educaplay* significantly increases 11th-grade students' understanding of English vocabulary compared with traditional teacher-centered training. The practical and statistical significance was demonstrated by the huge performance differential (11.39-point gain vs. 6.11-point gain), statistically significant posttest differences, and the large effect size ($d = -1.850$). *Educaplay*'s gamification methodology, with its instant feedback, diverse interactive forms, accomplishment recognition, and full coverage of language dimensions, successfully overcomes the lack of engagement and retention in traditional approaches. Further studies should examine *Educaplay*'s impact across grade levels, beyond vocabulary, and over longer intervention periods. In addition, exploring learners' views of gamification and identifying the ideal sequences of game types for various vocabulary domains would enrich guidance for implementation. *Educaplay* is an empirically supported, cost-accessible intervention that educators looking for evidence-based alternatives to traditional vocabulary instruction should consider.

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