

Increasing Vocabulary of Grade XI Students Through Crossword Puzzle at SMAN 1 Ampibabo

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ABSTRACT

This research aims to determine the effectiveness of the crossword puzzle in increasing the vocabulary of Grade XI students at SMAN 1 Ampibabo. The research employed a quantitative approach using a quasi-experimental design, involving two classes: one experimental class taught using crossword puzzles and one control class taught without using crossword puzzles. The research instrument consisted of a pre-test and post-test vocabulary assessments, each comprising 30 multiple-choice questions that focused on concrete nouns and action verbs. The data were analysed using SPSS version 25, employing descriptive statistics, normality tests, homogeneity tests, and the Mann-Whitney U test. The results showed that the experimental class achieved a significant increase in vocabulary acquisition compared to the control class. The use of the crossword puzzles effectively increased students' comprehension, spelling, and contextual use of new words. This research concludes that crossword puzzles can be an engaging and interactive medium for enriching students' vocabulary learning in senior high school.

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1. INTRODUCTION

Building a strong vocabulary is essential for learning English as a foreign language. Without an adequate vocabulary, students will struggle to understand texts, express their ideas, and participate in communication [1], [2]. At the senior high school level, vocabulary plays a crucial role in developing four key language skills: listening, speaking, reading, and writing. However, the observation at SMAN 1 Ampibabo shows that vocabulary learning is still dominated by conventional methods, such as memorising word lists and copying from textbooks. This practice often causes learning to be passive and boring, which demotivates students and prevents them from achieving optimal language skills. This makes it difficult for them to achieve optimal language skills. Consequently,

the traditional approach fails to support students' needs for meaningful, engaging, and student-centred vocabulary learning activities [3], [4], [5].

In the context of English language learning, mastering vocabulary involves more than just memorising word meanings; it also entails understanding pronunciation, spelling, and how to use words effectively in context. According to Nation [6], students will learn vocabulary more effectively if they experience repeated exposure to meaningful learning activities. However, many students do not have the opportunity to practise vocabulary in a fun, interactive way. This situation calls for an alternative method that can boost active participation and motivate students to learn. One promising approach is the use of educational games in the teaching process. Such approaches are expected to transform vocabulary learning from a teacher-centred model into an active, learner-centred experience.

Educational games offer a more engaging alternative to traditional teaching methods, as they combine entertainment with learning, stimulate critical thinking, and foster collaboration among students [7], [8], [9], [10]. One effective and enjoyable strategy is using crossword puzzles, which require students to solve word clues, understand their meanings, and remember spellings, thus encouraging cognitive engagement and active learning [11]. Through this activity, students are encouraged to think critically, collaborate, and apply vocabulary in meaningful contexts, making it easier to remember and understand. Therefore, crossword puzzles have the potential to serve as both reinforcement and practice tools that support deeper vocabulary retention.

Several previous studies have demonstrated the effectiveness of using crossword puzzles to learn English. For example, Panjaitan and Amaniarsih [12] found that using crossword puzzles can increase junior high school students' motivation and vocabulary comprehension. Similarly, Rohmah et al. [13] stated that crosswords help students understand the meaning of words, their spelling, and how they are used in sentences. However, while previous studies examined crossword puzzles in junior high school contexts, limited research has explored their effectiveness in Indonesian senior high schools, particularly in teaching concrete nouns and action verbs. This gap highlights the need for further research to determine whether crossword puzzles are equally effective for senior high school learners with higher language demands. Thus, exploring this strategy at the upper secondary level becomes crucial to understanding its pedagogical relevance in more advanced English learning environments.

This research aims to investigate whether the use of crossword puzzles enhances the vocabulary of Grade XI students at SMAN 1 Ampibabo. The research focuses on concrete nouns and action verbs, as these types of words are easier for students to understand and visualise, and are often used in their daily lives. Through the implementation of this strategy, the researcher aims to present an innovative, engaging, and effective learning medium for enhancing vocabulary and increasing students' learning motivation. The selection of these vocabulary categories is also intended to ensure the clarity of assessment and the practicality of classroom application.

This research makes a valuable contribution to English language teaching by proposing the use of crossword puzzles as a game-based learning tool in a high school

context. Theoretically, this research builds upon previous findings regarding the effectiveness of game media in enhancing vocabulary acquisition, as well as providing new empirical evidence in the context of English language learning at the high school level. Methodologically, this research also contributes through the application of a quasi-experimental design, focusing on two types of vocabulary: concrete nouns and action verbs. The novelty of this research lies in examining crossword puzzles at the senior high school level and focusing on vocabulary categories that have not been widely addressed in previous research. It is expected that this study will contribute useful insights for teachers and curriculum developers in designing vocabulary instruction that is not only effective but also enjoyable for students.

2. METHOD

2.1 Research Design

This research employed a quantitative approach with a quasi-experimental design. Quantitative research aims to analyse numerical data statistically in order to test hypotheses and determine causal relationships between variables [14]. According to Sugiyono [15], this design is suitable for educational studies that aim to evaluate the effectiveness of an intervention. The quasi-experimental design employed in this study consisted of two groups: an experimental class and a control class. Both groups were administered a pre-test and a post-test to evaluate an increase in vocabulary. The design is symbolically represented as follows:

$$\begin{aligned} K_1 &: T_1 - X - T_2 \\ K_2 &: T_1 - O - T_2 \end{aligned}$$

Where:

K_1 : Experimental class

K_2 : Control Class

T_1 : Pre-test

T_2 : Post Test

X : Treatment using a crossword puzzle

O : Conventional instruction

The structure enables the comparison of vocabulary score differences before and after the intervention, as well as a comparison between the two classes. In other words, this design allows the researcher to assess both the internal improvement within each group and the comparative effectiveness across groups.

2.2 Population and Sample

The population of this research consisted of all Grade XI students at SMAN 1 Ampibabo, totalling 310 students across nine classes. According to Sugiyono [15], a population may be defined as a group of individuals that possess specific characteristics that a researcher intends to study. The cluster random sampling technique was employed to select the sample, ensuring equal opportunity for all classes. Two classes were selected: XI IPA A as the experimental class and XI IPS C as the control class, each consisting of 34

students. This sampling technique was chosen to minimise bias and ensure that the selected classes represent the characteristics of the overall population.

2.3 Instrument of the Research

A vocabulary test was used as the main instrument to collect data. According to Brown [16], a test is a systematic method used to measure an individual's knowledge, ability, or performance. The test in this research comprised 30 multiple-choice items designed to assess students' understanding of concrete nouns and action verbs. The instrument measures vocabulary based on three indicators: spelling, meaning, and use in context. Both the pre-test and post-test applied the same indicators to maintain consistency. The test items were validated by three expert lecturers in the field of English education. They assessed the instrument based on: relevance to learning objectives, clarity of instructions, accuracy of word meaning, and appropriateness for Grade XI students. The pre-test was administered before the commencement of treatment to measure students' initial vocabulary, and the post-test was given afterwards to identify the increase in their vocabulary. The validation process ensured that the test met acceptable standards of content validity and suitability for the target group.

2.4 Teaching Procedures

The learning procedure was designed following the steps for vocabulary instruction proposed by Hatch and Brown [17], which include discovering new words, understanding word forms and meanings, reinforcing memory, and applying words in context. In the experimental class, crossword puzzles were integrated into each session as follows:

- a. The introduction of target vocabulary is facilitated through the utilisation of concise descriptive texts.
- b. The following discussion will address the issues of meaning, pronunciation, and spelling.
- c. The distribution of crossword puzzle sheets accompanied by contextual clues is a valuable resource.
- d. The students were tasked with solving puzzles, either individually or collaboratively, within a set timeframe.
- e. Class discussion, correction, and reflection on vocabulary use.
- f. The objective of these six meetings was to enhance vocabulary by combining cognitive engagement with interactive learning activities.

This structured procedure ensured that students not only memorised vocabulary but also practised it through problem-solving activities that promote deeper processing.

2.5 Data Collection and Analysis

Data were obtained from the pre-test and post-test results of the experimental and control classes. Before being analysed using SPSS version 25, all scores were first processed through Microsoft Excel to calculate the initial scores, conversion scores (0-

100), and score deviations. The maximum score of the test was 30; all raw scores were converted using the following formula:

$$\text{Final Score} = \frac{\text{Students' Score}}{30} \times 100 \quad (1)$$

Descriptive statistics were used to obtain the mean, minimum, maximum, and standard deviation.

Before the hypothesis testing, preliminary normality and homogeneity tests were conducted. The Sapiro-Wilk test was used to assess the normality of the data, given the limited sample size ($n < 50$) [18]. The data are considered to be normal if the significance value (Sig.) > 0.05 . The Levene test was employed to check for homogeneity, if Sig. > 0.05 , data are considered homogeneous.

As the data were not normally distributed, the Mann-Whitney U test was employed as a non-parametric alternative to compare the mean rank differences between groups. The hypothesis testing was conducted in accordance with the following criteria: if Sig. < 0.05 , the alternative hypothesis (H_a) is accepted, indicating a significant effect of crossword puzzles on increasing vocabulary. This analytical procedure ensured that the statistical tests used were appropriate for the distribution and characteristics of the dataset.

Ethical Permission

This research adhered to ethical standards in educational research. The principal of SMAN 1 Ampibabo granted permission to conduct the research. Students were informed about the purpose of the research, assured that participation would not affect their grades, and their data were kept confidential. No personal identifiers were reported, and all procedures complied with ethical guidelines for research involving human participation. These measures were taken to ensure that the research respected students' rights, privacy, and well-being throughout the study.

3. RESULTS AND DISCUSSION

3.1. Results

This research analysed data collected from pre-test and post-test scores of the experimental and control classes, each consisting of 34 students. The pre-test was conducted before the treatment to assess the students' initial vocabulary, while the post-test was administered after six instructional meetings. The analysis aimed to describe the students' vocabulary performance prior to and after the intervention, as well as to compare the outcomes between the two groups.

The pre-test results showed that both classes had similar vocabulary levels before the treatment. The mean score of the control class was 42.82, with scores ranging from 23 to 60, and a standard deviation of 10.96. Meanwhile, the experimental class obtained a higher pre-test mean of 56.58, with a minimum score of 45, a maximum score of 68, and a standard deviation of 6.30. Although the experimental class scored slightly higher, both classes still demonstrated moderate vocabulary proficiency before treatment. These initial

findings indicate that neither group had achieved optimal mastery of the targeted vocabulary categories prior to the implementation of instructional activities.

Table 1. The pre-test results

Class	N	Mean	Minimum	Maximum	Std. Deviation
Control	34	42.82	23	60	10.96
Experimental	34	56.58	45	68	6.3

Following treatment, there was a significant increase in vocabulary scores for the experimental class. The control class reached a post-test mean of 50.58, with scores ranging from 30 to 70, and a standard deviation of 12.82. In contrast, the experimental class achieved a significantly higher post-test mean of 76.61, with a range of 60 to 100 and a standard deviation of 11.38. This notable improvement in the experimental class suggests that the crossword puzzle strategy successfully enhanced students' vocabulary comprehension, spelling, and contextual usage.

Table 2. The post-test results

Class	N	Mean	Minimum	Maximum	Std. Deviation
Control	34	50.58	30	70	12.82
Experimental	34	76.61	60	100	11.38

To examine whether the difference between the two classes was statistically significant, the Mann-Whitney U test was applied because the data did not conform to the normality assumption. The result showed a significance value of $0.000 < 0.05$, indicating a difference between the vocabulary achievement of students in the experimental and control classes. This statistical evidence demonstrates that the intervention had a substantial effect on students' vocabulary outcomes.

Therefore, the alternative hypothesis (H_a) stating that "The use of crossword puzzles effectively increases students' vocabulary" is accepted, and the null hypothesis (H_0) is rejected. These results confirm that the crossword puzzle technique effectively increases students' vocabulary among Grade XI students at SMAN 1 Ampibabo. Overall, the findings highlight the pedagogical potential of crossword puzzles as a game-based tool for strengthening vocabulary learning in senior high school settings.

3.2. Discussion

The findings of this research indicate that the use of crossword puzzles resulted in a significant increase in students' vocabulary achievement compared to conventional teaching methods. Students in the experimental class demonstrated a higher post-test mean score than those in the control class, suggesting that crossword puzzles function as an effective instructional medium for vocabulary learning among senior high school students, supporting earlier claims regarding the pedagogical potential of crossword puzzles [19],

[20]. This improvement confirms that interactive game-based media can provide positive cognitive and motivational impacts on vocabulary learning processes.

The improvement aligns with several principles in SLA (Second Language Acquisition). According to Nation, vocabulary learning becomes more effective when learners receive repeated exposure alongside meaningful use [6]. Crossword puzzles create these learning conditions by requiring students to retrieve word meanings, analyse linguistic structures, and apply contextual clues to solve the puzzles. This also corresponds with Schmidt's Noticing Hypothesis, which suggests that learners acquire vocabulary when they consciously notice linguistic forms during meaningful tasks [21], [22]. Through puzzle-solving, students focus on identifying spelling patterns, semantic relationships, and word functions, thereby facilitating deeper cognitive processing. Such mental engagement supports durable vocabulary retention and strengthens the connection between form, meaning, and usage.

The activity further supports Vygotsky's sociocultural theory, particularly through collaborative learning. During group or pair work, students negotiate meaning, exchange knowledge, and scaffold one another's understanding, an interactional process that accelerates vocabulary internalisation [23]. Compared to traditional memorisation, this interactive environment offers richer opportunities for the social construction of knowledge. Thus, crossword puzzles promote a dialogic learning space where peer interaction enhances comprehension and confidence.

Crossword puzzles also contribute to a low anxiety and motivating learning atmosphere. Students reported higher engagement and enjoyment, consistent with Krashen's Affective Filter Hypothesis, which posits that motivation and low anxiety enhance language acquisition [24]. The entertaining game-like format helps reduce the fear of failure and encourages students to participate actively in vocabulary learning. This emotional comfort is essential, as affective factors strongly influence language performance and willingness to learn.

Crossword puzzles were also particularly effective for teaching concrete nouns and action verbs. These word categories are closely related to students' daily experiences, making them easier to visualise and recall. This finding is consistent with prior studies showing the superior learnability of concrete lexical items [6]. Earlier research at the junior high school level similarly demonstrated positive outcomes [12], [19]. However, this research provides novel evidence by examining crossword puzzles in an Indonesian senior high school context, focusing specifically on concrete nouns and action verbs within a quasi-experimental design, which has received limited attention in previous work. The present study, therefore, extends existing literature by demonstrating that the benefits of crossword puzzles remain consistent across educational levels when appropriately adapted to learners' cognitive demands.

Despite these positive findings, several limitations must be acknowledged. First, the sample size was limited to two classes in one school, restricting generalizability. Second, the duration of the six meetings was insufficient to evaluate long-term vocabulary retention. Third, the research examined only concrete nouns and action verbs, which means that the results may not apply to abstract vocabulary or more complex lexical categories.

Future research should extend the duration, include a larger and more diverse sample, and investigate a broader range of vocabulary types to provide a deeper understanding of the effectiveness of crossword puzzles. Additionally, qualitative data such as student reflections or teacher observations could offer richer insights into learners' engagement and cognitive strategies during puzzle-solving activities.

Pedagogically, the findings imply that crossword puzzles can serve as an effective supplementary technique in English classrooms. Teachers may integrate them into review sessions, reinforcement activities, or collaborative tasks to enhance students' engagement and support cognitive processing. Such interactive activities promote communication, teamwork, and meaningful use of vocabulary skills essential for senior high school learners [11], [25]. This suggests that crossword puzzles can complement existing teaching approaches and provide variation that sustains student interest.

In summary, the use of crossword puzzles provides a meaningful, motivating, and cognitively rich learning experience. The combination of repeated exposure, contextual practice, and collaborative interaction supports the use of crossword puzzles as a practical and engaging approach to enhancing vocabulary learning in Indonesian senior high school contexts. These findings reinforce the effectiveness of crossword puzzles as indicated in previous studies, while contributing new empirical evidence to vocabulary pedagogy at the upper secondary level. Overall, this study underscores the importance of integrating interactive learning strategies to foster deeper vocabulary mastery and learner motivation.

4. CONCLUSION

The purpose of this research was to examine whether the use of crossword puzzles could effectively increase the vocabulary of Grade XI students at SMAN 1 Ampibabo. Based on the findings, the use of crossword puzzles successfully enhanced students' vocabulary learning, particularly in the areas of concrete nouns and action verbs. Students in the experimental class demonstrated higher engagement, motivation, and attentiveness throughout the learning process, which contributed to a more meaningful and enjoyable learning experience. These results suggest that crossword puzzles offer an effective alternative to traditional vocabulary instruction, as they promote active participation and cognitive engagement, enabling students to learn and recall vocabulary more efficiently.

This research offers several important implications for English language teaching. The integration of simple game-based media, such as crossword puzzles, can enrich classroom activities, reduce students' anxiety, and stimulate learning environments. This highlights the importance of incorporating low-cost and practical instructional tools that can enhance learning outcomes while maintaining students' engagement.

However, this research is limited in several aspects. The sample was restricted to two classes within one school, which limits the generalizability of the findings to broader populations. The treatment duration was relatively short, making it difficult to evaluate the long-term effects of the crossword puzzle on vocabulary retention. Additionally, the focus of vocabulary instruction was limited to concrete nouns and action verbs, leaving other types of vocabulary unexplored.

For future research, it is recommended that the scope be expanded to include a broader range of vocabulary categories and involve a larger and more diverse sample. Researchers are also encouraged to investigate the long-term impact of crossword puzzles on students' vocabulary retention and explore how this technique can be combined with other interactive learning strategies. This research contributes to the field of English language education by providing empirical evidence on the effectiveness of crossword puzzles in senior high school settings, offering valuable insights for teachers, curriculum developers, and educational practitioners who aim to improve vocabulary teaching through engaging and meaningful learning activities.

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