

Using Crossword Puzzle to Increase Students' Vocabulary Mastery in Junior High School

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Abstract. This study aims to improve students' vocabulary mastery through the use of crossword puzzles in a classroom action research setting conducted in two cycles. The participants were 25 seventh-grade students at SMP Negeri 2 Karau Kuala, whose initial vocabulary proficiency was identified as low based on the pre-test, with the majority scoring within the fair and poor categories. The intervention involved implementing crossword puzzles as a learning medium designed to enhance students' engagement, motivation, and retention of vocabulary through active learning strategies. Data were collected through pre-tests, formative tests, post-tests, questionnaires, observations, and field notes. The results of Cycle 1 showed a moderate improvement, with students beginning to demonstrate higher levels of participation and vocabulary recall, although some still struggled with understanding instructions. After revising the lesson plan and improving instructional clarity in Cycle 2, students' vocabulary mastery increased significantly, as evidenced by the rise in students who achieved ratings of 3 and 4 and the absence of students in the lowest category. Qualitative findings also revealed enhanced confidence, reduced learning anxiety, and more collaborative classroom interactions during the learning process. Overall, the study concludes that crossword puzzles are an effective and engaging medium for improving vocabulary mastery among junior high school students. These findings suggest the need for further exploration of digital crossword tools, long-term retention effects, and the application of similar strategies to other language competencies.

Keywords: Active learning, Classroom action research, Crossword puzzle, English vocabulary mastery, Game based learning

1 Introduction

Learning English in Indonesia faces considerable challenges, especially because this language has the status of a foreign language that is not used in daily communication. In this context, vocabulary mastery is the main foundation for students to be able to understand and use English effectively. [1] emphasizes that vocabulary is the most basic element in second language acquisition because it is the basis of reading, writing, listening, and speaking skills. When students do not have enough vocabulary, it will be difficult for all other language skills to develop optimally. This is reinforced [2] which states that there is a need to focus heavily on vocabulary mastery because language cannot be produced without knowing its lexical units. Therefore, vocabulary is an essential component in the structure of English learning in junior high school. This discussion about vocabulary mastery is relevant because there are still many students who have not reached the minimum vocabulary mastery standards needed.

The introduction should show more convincingly that low vocabulary mastery is not just a class problem being studied, but a systemic problem that has been going on for a long time at SMP Negeri 2 Karau Kuala. This can be strengthened by presenting data such as: the results of daily test scores in recent years, reports from teachers of other subjects, or academic supervision findings that show similar patterns. Add information that school conditions, such as lack of exposure to English, limited learning resources, and a strong literacy culture, contribute to this problem. Thus, the urgency of research increases because problems do not only occur in one class, but are recurring phenomena at various levels and school years.

Many junior high school students in Indonesia have difficulty mastering English vocabulary, especially in schools with low student input such as SMP Negeri 2 Karau Kuala. These difficulties can be seen from the low ability of students to understand texts, recognize the meaning of words, and produce sentences orally and in writing. According to [3] Weak vocabulary mastery causes students to be unable to process linguistic information adequately. This problem is exacerbated by the lack of exposure to English in the student environment, so that the vocabulary learned in class is not stored in long-term memory. In addition, conventional learning methods such as memorizing word lists cause students to get bored quickly and be less actively involved in the learning process. As a result, the development of students' vocabulary mastery is slow and does not show significant improvement. This issue requires special attention through a more creative approach to learning and actively engaging students.

Although vocabulary mastery is essential, learning practices in many schools are still limited to lecture methods, assignments, and passive use of dictionaries. This shows a gap between vocabulary acquisition theories that emphasize active practice and meaningful learning with the monotonous reality of learning. According to [4] Vocabulary learning ideally places students as active participants who constantly interact with different language contexts. However, at SMP Negeri 2 Karau Kuala, interactive learning activities such as language games, visual media, and problem-solving activities are still rarely implemented. This gap has an impact on students' lack of opportunities to remember, repeat, and relate new vocabulary to previous learning experiences. Thus, learning media innovations are needed that are able to close this gap and present more constructive learning strategies. The identification of the gap is an important basis for the formulation of alternative solutions in this study.

One alternative solution that can be used to improve students' vocabulary mastery is the use of game-based learning media. Crossword puzzles are considered suitable because they are able to combine elements of game, challenges, and memory exercises simultaneously. According to [5] crossword puzzles increase memory retention because they ask students to do active recall, which is an attempt to extract information from memory without assistance. This game also provides context through clues, pictures, and word associations that help strengthen students' understanding. In addition, according to the theory [6] students learn more easily when they actively build knowledge through experience. Through crossword puzzles, students are encouraged to think analytically, work together, and solve linguistic problems. Therefore, this media is believed to be an effective solution to improve vocabulary skills at the junior high school level.

A number of previous studies have shown that crossword puzzles are effectively used in vocabulary learning. [7] found that crossword puzzles significantly improve students'

vocabulary abilities because they are fun and challenging. Research [8] it also proves that the application of crossword puzzles in learning makes students more active, motivated, and challenged to find the meaning of words. [9] reported that the digital version of the crossword puzzle was able to increase student participation while improving the quality of learning. The results of previous research show that this media consistently produces an increase in understanding and use of vocabulary at various levels of education. The findings support the potential of crossword puzzles as an alternative learning medium. However, such research is generally conducted in different contexts of schools, classrooms, and learning designs. Therefore, the need for more specific research remains relevant.

The manuscript must transform the previous research section from a summary to a *synthesis*, showing similarities, differences, and gaps that have not been researched. For example: study A shows the effectiveness of crossword puzzles to improve mastery of basic vocabulary. Research B emphasized its benefits in *retrieval practice*, but the subject was a high school student. Research C uses digital-based crosswords, different from the conditions at SMP Negeri 2 Karau Kuala which does not have access to digital devices.

The novelty of this research lies in the application of crossword puzzles specifically in grade VII C students of SMP Negeri 2 Karau Kuala with the Classroom Action Research (CAR) approach. Unlike previous studies that used a lot of quasi-experimental design or single-cycle learning, this study adopts the Kemmis & McTaggart model which is spiral and adaptive. This model allows for continuous identification of problems and adjustments of strategies until optimal results are achieved. In addition, this study integrates vocabulary material from the 2013 curriculum on the theme "This is My World", thus providing contextual contributions that have not been raised much in previous studies. The application of crossword puzzles in rural school environments with limited facilities is also a novelty in itself. Thus, this research offers innovations in terms of context, approach, and implementation of learning. The novelty of this study can be clarified by emphasizing three main aspects: the contextual focus on SMP Negeri 2 Karau Kuala, schools with characteristics of low student motivation, limited learning resources, and lack of digital media. This context is different from previous research which was mostly conducted in schools with adequate facilities. The use of Classroom Action Research (CAR) as a systematic approach to improve vocabulary learning directly in authentic classroom situations. Many previous studies have used quasi experiments instead of CAR. The integration of the 2013 Curriculum theme "This is My World", which makes the vocabulary material more contextual and relevant to students' life experiences. The combination of curriculum themes with game strategies (crossword puzzles) is a combination that is rarely studied.

In the latest scientific map, vocabulary learning is directed to methods that emphasize active learning, retrieval practice, and multimodal learning. [10] Vocabulary is easier to learn when students engage in activities that combine visual, verbal, and cognitive elements simultaneously. Crossword puzzles are a form of media that is in line with the development of the state of the art because it provides an interactive experience and stimulates students' analytical skills. In addition, game-based learning theory emphasizes that educational games are able to increase students' intrinsic motivation [11]. Thus, the use of crossword puzzles can be categorized as a modern learning medium that is in line with the development of contemporary pedagogy. This research

strengthens the direction of development by providing empirical evidence at the junior high school level. This confirms the position of this research in the development of game-based vocabulary learning methods.

The manuscript needs to provide a stronger theoretical and empirical justification for the choice of crossword puzzles as a learning strategy. The justification can be explained through: *Cognitive reinforcement*: crossword stimulates semantic activation and long-term memory. *Retrieval practice*: students recall vocabulary through clues. *Motivation & engagement*: simple games like crossword puzzles have been shown to increase the motivation of junior high school students, especially in schools with limited resources. Previous research has shown that crossword puzzles are effective in improving *spelling*, *word recognition*, and *meaning recall*.

Manuscripts need to clarify the concept of *vocabulary mastery* by distinguishing two main components: receptive vocabulary (words that students can recognize and understand while reading or listening) and productive vocabulary (words that students can actively use in speaking and writing). In the context of junior high school EFL learners, receptive vocabulary mastery usually develops faster than productive because students receive input more often than produce language. Therefore, the interventions used must be explained for their contribution to both types of vocabulary: crossword supports receptive vocabulary through the recognition of word forms and meanings, but can also strengthen productive vocabulary through the process of *retrieval* and rewriting of words in the context of the problem.

Research needs to strengthen the relationship between vocabulary learning difficulties and second language acquisition (SLA) theory. Theories such as *input hypothesis* must be explained for their contribution to student problems. For example: Students lack *exposure* to authentic vocabulary so language input is inadequate, low memory retention occurs because vocabulary is not often repeated or used, causes weak phonological and semantic relationships, lack of *active use* makes vocabulary not move from short-term to long-term memory. Connecting the three aspects of exposure, retention, and active use of the manuscript can explain the structural causes of students' weak vocabulary within a strong theoretical framework.

The urgency of this research lies in the need to improve the quality of vocabulary learning in schools that are still facing obstacles of low motivation and student learning outcomes. If not addressed, weaknesses in vocabulary mastery will have an impact on the low quality of communication and overall academic ability of students. According to [12] vocabulary is the core of communication so its lack will hinder the entire process of using language. In addition, the use of innovative media such as crossword puzzles is urgently applied to respond to the low interest in learning due to monotonous traditional methods. Schools also need empirical evidence that can be used as a basis for choosing more effective learning strategies. Thus, this research has a strong urgency both pedagogically and institutionally. Learning interesting and meaningful vocabulary is an absolute necessity in the modern education system. The introduction needs to clarify the pedagogical urgency of research, especially for schools with low learning motivation and limited resources. The manuscript can show that vocabulary learning in such schools is not only academically weak, but also has an impact on students' low confidence when using English. The use of media that is simple, cheap, and does not require technology (crossword puzzle) is a practical solution for schools with limited facilities. The expected benefits of increasing student interest in learning, student activeness, and

improving vocabulary mastery must be explicitly written so that the urgency of the study is clearly visible. Manuscripts can strengthen *state-of-the-art positioning* by linking this research to three modern trends: retrieval practice: crossword puzzles encourage students to recall vocabulary through *clue-based recall*, strengthening long-term memory. Multimodal learning: although print-based, crossword puzzles present a combination of text, instructions, and motor activities (box filling), supporting multimodal learning. Game-based pedagogy: crossword puzzles are a simple form of educational game that is independent of technology, suitable for schools with low resources.

Based on these problems and urgency, this study aims to improve students' vocabulary mastery through the use of crossword puzzle media. Another goal is to identify changes in learning behavior, increased motivation, and the effectiveness of the use of game media in the classroom context. As stated by [13] classroom action research aims to improve learning practices through cycles of planning, implementation, observation, and reflection. Through the use of crossword puzzles, this study aims to prove that game-based media can significantly improve vocabulary mastery. In addition, this study aims to find out students' responses to the learning carried out. Overall, this research is expected to make a theoretical and practical contribution to the development of vocabulary learning strategies. Thus, this research is relevant and feasible to improve the quality of English language learning.

2 Method

This study uses a Classroom Action Research (CAR) design which aims to improve the quality of the learning process and outcomes systematically in the classroom. According to [14] CAR is a spiral approach that consists of four iterative stages, namely planning, implementation of actions, observation, and reflection. This model allows teachers to identify learning problems directly and take ongoing corrective actions. [15] also affirms that CAR is effectively used when teachers want to improve teaching practices based on empirical findings in the classroom. In this study, CAR was chosen because it is in accordance with the need to improve students' vocabulary mastery through crossword puzzle media intervention. The use of CAR provides flexibility for researchers to adjust the actions in each cycle according to the results of observation. In addition, the CAR provides a comprehensive overview of changes in student learning behavior before, during, and after the action is given. Thus, this design is considered the most appropriate to achieve the expected learning improvement goals. The choice of the PTK model needs to be explained more methodologically. The reflective spiral model (plan–act–observe–reflect) is ideal for: fixing repetitive and long-lasting vocabulary learning problems, providing space for teachers to reflect and adjust actions based on the results of each cycle, ensuring that interventions (crossword puzzles) are systematically implemented, observed, and evaluated according to the needs of the class.

This research was carried out at SMP Negeri 2 Karau Kuala which is a school with the characteristics of students from rural areas and has limited exposure to English. According to [16] the selection of a research location should consider the relevance of the context to the research problem being studied. The research subjects were 25 students of class VII C and were selected using purposive sampling techniques based on research needs. [17] explained that purposive sampling is suitable to be used when

researchers need groups that have certain characteristics that are relevant to the research objectives. Grade VII C students were chosen because the results of initial observations showed that their vocabulary skills were still low and needed learning interventions. The characteristics of the school, class, and academic condition of students are important backgrounds to understand the implementation of the actions taken. The selection of subjects also provides a real picture of the implementation of crossword puzzle media in the context of early junior high school learning. Thus, research can provide authentic findings and according to field needs.

The research procedure follows the CAR model which consists of repeated cycles ranging from planning, action, observation, to reflection. In the planning stage, the researcher compiles lesson plans, prepares crossword puzzle media, designs test instruments, and designs observation sheets. [18] stating that careful planning is essential to ensure that actions can be effective and measurable. At the action stage, learning activities are carried out according to plan by applying crossword puzzle media as the core of the activity. Furthermore, the observation stage is carried out to record student responses, teacher activities, and vocabulary mastery development using observation sheets and field notes. [19] observations in CAR must be carried out systematically to obtain accurate learning behavior data. The reflection stage is carried out to analyze the successes and obstacles in the cycle so that it becomes the basis for improvement in the next cycle. With a systematic procedure, this study was able to show gradual and continuous changes in learning.

The research instrument consisted of vocabulary tests (pre-test and post-test), observation sheets, student questionnaires, and documentation. According to [20] tests are an important instrument to measure language skills objectively and consistently. The pre-test is used to determine the student's initial ability, while the post-test is used to measure the improvement after the action is given. Data collection techniques are carried out through tests, observations, questionnaires, and field notes to obtain quantitative and qualitative data simultaneously. [21] states that triangulation methods can increase the validity of research findings. Quantitative data analysis was carried out by calculating pre-test and post-test scores to see an improvement in students' vocabulary skills. Meanwhile, qualitative data are analyzed through data reduction, data presentation, and conclusion drawing as recommended [22]. With a combination of quantitative and qualitative analysis, the results of the research become more comprehensive and can describe the effectiveness of the action more completely.

3 Result and Discussion

3.1 Result

Pre-Cycle Results

The results of the pre-test show that students' initial vocabulary ability is still in the low category. Of the 25 students, the score ranged from 40–70, with the majority (68%) being at a rating of 2, and none of the students achieving a rating of 4. Only 4 students (16%) achieved a rating of 3, while the other 4 students (16%) were rated 1. This condition shows that most students are not able to remember word forms, recognize meanings, and write vocabulary correctly. This weak vocabulary mastery is also consistent with the findings of the initial questionnaire, where most students stated that learning

vocabulary was difficult and boring, and that they had never used learning media before. These pre-cycle findings are the basis for the need for intervention through the use of crossword puzzle media as a vocabulary improvement strategy.

Cycle 1 Results

The implementation of Cycle 1 showed an increase in vocabulary skills compared to the pre-test, although the results were not optimal. Cycle 1's formative scores showed a score range of 40–90, with 4 students (16%) achieving a rating of 4 and 13 students (52%) achieving a rating of 3. However, there are still 3 students (12%) in rating 1 and 5 students (20%) in rating 2. This shows that some students still have difficulty solving crossword puzzles, especially in the aspect of understanding instructions and recognizing word forms.

The results of the questionnaire in Cycle 1 showed that students showed a positive change in attitude towards vocabulary learning. The majority of students (72%) stated that the use of crossword puzzles made the learning atmosphere more interesting and easier to follow. However, the results of observations showed that the teacher's explanation of how to do the puzzle was still not optimal (rating 2), thus affecting the understanding of some students. Nonetheless, student engagement increased significantly, as evidenced by more active group discussions and increased motivation to find puzzle answers. Cycle 1 provides the basis for refining learning strategies in Cycle 2.

Cycle 2 Results

A more significant improvement was seen in Cycle 2 after revising the RPP, simplifying instructions, using group competitions, and adding examples. The post-test results in Cycle 2 showed that the score ranged from 60–90, and all students managed to achieve learning completion. A total of 13 students (52%) achieved a rating of 4, 9 students (36%) achieved a rating of 3, and 3 students (12%) were rated 2. No students are in the rating category 1. This shows a sharp increase compared to Cycle 1 and pre-test.

Cycle 2 observations also show an increase in teacher support in managing learning media. The explanation of how to do the puzzle has increased from a rating of 2 to a rating of 3. Students look more confident, actively discuss, and understand puzzle clues faster. Learning also becomes more collaborative through group work, which helps students support each other in understanding new vocabulary. The improvement in results in Cycle 2 confirmed that crossword puzzles were effective in improving students' vocabulary skills through the process of retrieval practice, fun learning contexts, and high emotional engagement of students.

Comparison of Increases Each Cycle

Comparison of results shows a consistent improvement from pre-cycle, Cycle 1, to Cycle 2. In the pre-cycle no student achieved a rating of 4, while in Cycle 1 it increased to 16%, and in Cycle 2 it jumped to 52%. The 3 rating increase also shows a similar trend. Meanwhile, rating 1 decreased from 16% to 12% in Cycle 1, and to 0% in Cycle 2. This increase is not only quantitative, but also supported by qualitative findings from observations and questionnaires.

Overall, crossword puzzles have been shown to improve motivation, engagement, vocabulary memory, spelling ability, and the ability to understand the meaning of words in context. Learning becomes more meaningful, fun, and effective in improving vocabulary mastery of grade VII C SMPN 2 Karau Kuala students.

3.2 Discussion

The findings of this classroom action research clearly demonstrate that the use of crossword puzzles has a significant positive impact on students' vocabulary mastery. The consistent increase from the pre-test, formative test in Cycle 1, and post-test in Cycle 2 indicates that the intervention successfully addressed students' initial difficulties in remembering, spelling, and recognizing word meanings. This improvement aligns with [23] assertion that vocabulary acquisition requires repeated exposure and meaningful engagement with words. The progression of scores also suggests that crossword puzzles provide an effective platform for retrieval practice, which enhances long-term memory retention. Overall, the results confirm that crossword puzzles are not only an enjoyable learning tool but also an effective pedagogical strategy for improving vocabulary learning outcomes in junior high school students.

The use of crossword puzzles during the learning process also contributed to an increase in student engagement and participation. In Cycle 1, students began showing signs of active involvement through group discussions and attempts to complete puzzle clues. These behaviors intensified in Cycle 2, where students worked more collaboratively and demonstrated greater motivation in solving the puzzles. This supports [24] theory of active learning, which emphasizes that students learn more deeply when engaged in meaningful activities that require them to think, analyze, and interact. The playful and interactive nature of crossword puzzles reduces learning anxiety while fostering curiosity, allowing students to internalize vocabulary naturally rather than through rote memorization. Thus, crossword puzzles act as both motivational and cognitive tools in vocabulary learning.

The improved ability of students to recall and spell vocabulary items accurately across the cycles can be explained through the lens of cognitive theories of memory. According to [25] levels of Processing Theory, deeper processing of linguistic information such as analyzing word clues and associating them with familiar contexts enhances retention. The crossword puzzle requires students to think critically about spelling patterns, meanings, and word forms, thereby promoting deeper cognitive engagement. Additionally [26] emphasize that retrieval practice strengthens memory pathways and improves long-term retention. The repeated exposure and recall required when completing puzzles provide students with frequent opportunities to practice vocabulary actively. These cognitive mechanisms explain why students in Cycle 2 demonstrated more accurate recall and exhibited fewer spelling errors.

The emotional and affective dimension of learning also played a critical role in students' improved performance. The findings show that students felt more confident and less anxious when learning vocabulary through crossword puzzles. This aligns with [27] affective Filter Hypothesis, which argues that low anxiety and positive emotions enhance the intake of language input. The competitive yet collaborative atmosphere created during group work helped reduce students' fear of making mistakes and encouraged them to participate more openly. When students perceive learning as

enjoyable and game-like, their intrinsic motivation increases, allowing them to engage more deeply with the content. Hence, the positive affective environment produced by crossword puzzle activities significantly contributed to learning gains.

The progression from Cycle 1 to Cycle 2 underscores the importance of reflective instructional adjustments during classroom action research. While Cycle 1 showed initial improvement, it also revealed weaknesses such as unclear instructions, limited guidance, and uneven participation among students. Responding to these issues, the teacher refined instructional strategies in Cycle 2 by providing clearer explanations, adding more contextual examples, and incorporating group competition. These refinements resulted in a more structured and supportive learning environment, enabling students to perform better in the post-test. This iterative approach is consistent with [28] model of action research, where continuous reflection and adaptation are essential for improving classroom practice.

The findings of this study are consistent with previous research demonstrating the effectiveness of crossword puzzles in vocabulary instruction. Studies by [29], [30] reported similar improvements in students' vocabulary mastery when crossword puzzles were integrated into language learning activities. These studies highlight the dual function of crossword puzzles as cognitive reinforcement tools and motivational learning aids. The current study extends previous findings by showing that crossword puzzles are effective not only for individual learning but also in group-based, collaborative classroom settings. Furthermore, the significant improvement in student outcomes across two cycles provides strong empirical evidence supporting their pedagogical value.

The results of this study carry several important implications for teaching English vocabulary in junior high schools. First, teachers should consider incorporating interactive learning media such as crossword puzzles to foster active participation and enhance vocabulary retention. Second, the collaborative use of crossword puzzles encourages peer learning, which can be particularly beneficial in mixed-ability classrooms. Third, the success of Cycle 2 demonstrates the importance of clear instructions and structured guidance to help students maximize the benefits of the activity. For future research, similar interventions can be tested using digital crossword puzzle tools or combined with other game-based learning strategies. Further studies may also explore the long-term retention effects or the impact on other language skills such as reading comprehension or speaking ability.

4 Conclusion

The findings of this study conclude that the use of crossword puzzles is highly effective in improving students' vocabulary mastery, as evidenced by the consistent increase in scores from the pre-test to the post-test across two action research cycles. This improvement is supported not only by quantitative data but also by qualitative indicators such as increased motivation, engagement, confidence, and active participation during learning. The study demonstrates that crossword puzzles promote deeper cognitive processing and retrieval practice, contributing to better retention and understanding of vocabulary. Furthermore, the integration of collaborative learning in Cycle 2 significantly enhanced students' performance and reduced anxiety, creating a more supportive

learning environment. These results imply that crossword puzzles can serve as an alternative pedagogical tool for vocabulary instruction in similar educational contexts. For future researchers, this study suggests the importance of exploring digital versions of crossword puzzles, their long-term retention effects, and their applicability to other language skills or levels. Future studies may also consider larger populations or experimental designs to strengthen generalizability and to compare crossword puzzles with other game-based learning strategies.

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