

Effects of Strategy Instruction on Strategy Adoption, Vocabulary Acquisition, and Motivation to Use Strategies Among Japanese Junior High School Students

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Abstract

The National Curriculum Standards, announced in 2017, highlight the importance of enhancing English vocabulary proficiency among junior high school students. Prior research underscores the pivotal role of vocabulary learning strategies in strengthening English vocabulary skills. Therefore, this study aimed to develop and evaluate a classroom-based program for teaching effective English vocabulary learning strategies. An analysis of psychological scales administered before and after the intervention revealed significant increases in the uses of both elaboration and repetition strategies. Moreover, the findings demonstrated strong positive correlations between vocabulary test performance and the application of elaboration and retrieval practice strategies. Additionally, a significant association was observed between test scores and self-efficacy levels. These results confirm the program's effectiveness in fostering vocabulary learning strategies, offering empirical support for its contribution to English vocabulary education for junior high school students.

Key words : vocabulary learning, strategy instruction,
junior high school students of English

1. Introduction

The growing emphasis on English vocabulary proficiency in Japan, particularly among junior high school students, is increasingly evident. This trend is largely driven by the expanded vocabulary requirements stipulated in the latest educational guidelines. For example, the National Curriculum Standards (MEXT, 2017) mandate familiarity with approximately 1,600 to 1,800 words—a substantial increase from the previous curriculum (MEXT, 2008),

which included only about 1,200 words, excluding the 600 to 700 words introduced in elementary education.

Furthermore, research by the Benesse Institute for Education Research (2014) indicates that approximately 59% of junior high school students perceive vocabulary learning as a challenge in their English studies. Additionally, a survey conducted by Benesse Institute for Education Research (2018) highlights that junior high school students recognize the significance of vocabulary acquisition for effective English use and achieving high scores on English

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exams, which play a crucial role in high school and college admissions. These findings suggest that while students acknowledge the importance of vocabulary learning, many still struggle with the process.

Therefore, providing instruction in vocabulary learning strategies could be beneficial for junior high school students. This raises key research questions: Which strategies can enhance the efficiency and effectiveness of English vocabulary acquisition among these students? Furthermore, which specific vocabulary learning strategy proves to be most advantageous for this group?

2. Literature Review

2.1. Research on Effective Vocabulary Learning Strategies for Japanese Learners of English

The intersection of psychology and applied linguistics has provided substantial insights into the impact of various strategies on second language (L2) vocabulary acquisition and utilization. Some Japanese scholars in this field include Horino and Ichikawa (1997), Kanayama and Kasahara (2016), Nakata (2015), and Uchida (2021). A common methodological approach in this domain involves the use of questionnaire surveys, which these researchers have effectively employed. Through factor analysis, they have categorized vocabulary learning strategies into four domains: cognitive, affective, social, and metacognitive, aiming to identify those most strongly associated with higher L2 proficiency. A key characteristic of this research area is its focus on specific techniques such as elaboration, repetition, and imagery. Elaboration includes strategies like linking target words to others or incorporating them into idiomatic expressions (e.g., memorizing a word along with its synonym or antonym). Repetition involves repeatedly writing or reading target words aloud, while imagery encompasses visualizing or creating images related to target words. Given the existence of various terms for strategies similar to elaboration—such as ‘association’ and

‘organization’—this study will use ‘elaboration’ collectively to maintain consistency and clarity in discussion and analysis.

Studies conducted with high school students by Horino and Ichikawa (1997), Saida (2006), and Uchida (2021) consistently demonstrate a positive correlation between the use of elaboration strategies and increased L2 proficiency, suggesting that elaboration is more effective than mere repetition. In contrast, repetition strategies have rarely shown a significant impact on language proficiency in previous studies. Supporting this trend, Terashima et al. (2023) observed the effectiveness of elaboration strategies among junior high school students, further advocating for their incorporation into language instruction across different educational levels. Unlike repetition strategies, which are often perceived as less effective, elaboration is strongly associated with higher L2 proficiency. Additionally, Kanayama and Kasahara (2016) and Nakata (2015) have emphasized the importance of retrieval practice, which involves actively recalling words from memory, and the spacing strategy, which entails studying vocabulary at intervals, both of which contribute significantly to vocabulary acquisition. It is crucial to note that these conclusions are based on objective assessments rather than subjective opinions, reinforcing their validity in the context of L2 research.

2.2. Research on Vocabulary Learning Strategy Instruction

It is essential for teachers not only to provide content knowledge but also to equip learners with effective learning strategies (e.g., Nation, 2013). Explicit instruction in learning strategies within the classroom can significantly enhance the learning experience. Research by Mizumoto and Takeuchi (2009) and Uchida (2023) supports this perspective.

Mizumoto and Takeuchi’s (2009) study, which involved 146 female university students, demonstrated that explicit instruction in vocabulary learning strategies led to improvements in both vocabulary

test scores and strategic learning approaches. This research underscores the enhanced effectiveness of integrating both metacognitive and cognitive strategies into teaching practices.

Similarly, Uchida's (2023) study highlighted the benefits of teaching the elaboration strategy, finding that students were able to apply these strategies quickly and consistently following instruction. Moreover, the study indicated that students who recognized their difficulties in vocabulary acquisition and understood the value of new strategies were more likely to adopt these methods, further emphasizing the importance of explicit strategy instruction in vocabulary learning.

2.3. Purpose

Building on these research findings, we designed and implemented a lesson for first-year junior high school students, focusing specifically on teaching learning strategies. The primary objective of this lesson was to assess its effectiveness in promoting the adoption of learning strategies, with a particular emphasis on enhancing the use of vocabulary learning strategies.

To guide this investigation, the following research questions (RQs) were formulated:

RQ1: Does an intervention focusing on vocabulary learning strategies influence learners' utilization of these strategies?

RQ2: What is the relationship between the utilization of vocabulary learning strategies and test scores?

3. Methods

3.1. Participants

The study involved 159 seventh-grade students from a junior high school in Miyagi Prefecture, Japan, across four classes, each comprising approximately 40 students. English instruction was typically conducted four times a week during the study period.

For statistical analysis, the study focused on data

collected from 117 students who completed both the pre- and post-lesson questionnaires and participated in the instructional activities. Parental and principal permission was obtained prior to conducting the study, and students were informed that they could withdraw from the study at any time if they wished.

3.2. Procedure, Worksheet, and Lesson

The study procedure consisted of a pre-questionnaire with a vocabulary pre-test, a lesson, and a post-questionnaire with a vocabulary post-test. There was a one-week gap between the pre-questionnaire and the lesson, followed by a three-week interval between the lesson and the post-questionnaire.

The lesson was developed as part of a customized program designed to teach English vocabulary learning strategies, accompanied by a specially created worksheet to facilitate effective strategy instruction. The primary objective of this program was to familiarize students with six key strategies: elaboration, metacognition, retrieval practice, spacing, imagery, and repetition. The worksheet, printed on both sides of A3 paper, was used as a booklet during the 45-minute instructional session.

The session was structured into five phases: introduction to the strategies; clarification of learning objectives; comprehensive explanations of each strategy; hands-on exercises for applying the strategies; reflective segment to reinforce learning. This structured approach aimed to maximize student engagement and retention of vocabulary learning strategies.

On November 16, 2022, the program was implemented in each participant's classroom using a customized worksheet to ensure uniformity in content delivery. The session was conducted by the first author, who was not the students' regular teacher. The session began with a 5-minute overview of vocabulary learning, designed to help students understand effective vocabulary learning strategies. Interactive quizzes, embedded in the worksheet, were used to identify common challenges faced by Japanese

junior high school students in vocabulary learning. Next, the first author delivered a 15-minute lecture on the six vocabulary learning strategies, presented in the following sequence: metacognition, repetition, retrieval practice, spacing, elaboration, and imagery. The primary activity of the session involved students actively engaging in the elaboration strategy through the worksheet. Specifically, students were required to create a concept map linking words related to a target word and incorporate these words into sentences and phrases, all within a 20-minute timeframe. After completing this task, selected students shared their outputs with classmates, fostering collaborative learning. The session concluded with a reflective exercise, where students recorded their insights and assessments of the vocabulary learning strategy instruction. Similar to the previous phase, students either articulated their views and evaluations or reflected on their acquired knowledge and the perspectives of their peers. The entire program was administered in Japanese to ensure clarity and comprehension.

3.3. Questionnaire for Vocabulary Learning Strategies and Motivations

In July 2022, a pilot study was conducted to assess the validity of psychological scales designed to measure vocabulary learning strategies among junior high school students. This exploratory study involved 84 university students, who retrospectively reported on the learning strategies they had employed during their junior high and high school years. The insights gained from this preliminary study played a pivotal role in refining the psychological scales utilized in the present research.

In November 2022, junior high school students completed a comprehensive questionnaire focused on vocabulary learning strategies. This questionnaire consisted of two segments. The first segment asked students to assess the frequency of their strategy use on a six-point scale, ranging from 1 (Never) to 6 (Always). The second segment examined the

motivational aspects of vocabulary learning, inquiring about students' interest in improving their vocabulary learning strategies, with response options ranging from 1 (Strongly Disagree) to 6 (Strongly Agree).

These measures were designed to provide a comprehensive evaluation of students' strategy use and motivation in vocabulary learning.

3.4. Vocabulary Test

The vocabulary assessment consisted of 20 words divided into two categories: 10 words introduced immediately before the program (e.g., *piece*, *which*, *role*) and 10 words scheduled for instruction after the program (e.g., *cousin*, *prepare*, *tomorrow*). These words were presented in Japanese, and students were required to provide their English equivalents. The vocabulary test was administered on the same day as the questionnaire, ensuring consistency in data collection.

3.5. Evaluation

To assess the differences in scores between the pre- and post-intervention questionnaires, the Wilcoxon signed-rank test was conducted using jamovi software. For factor analysis and correlation analysis, the Harmonic Analysis of Data (HAD) version 17 (Shimizu, 2016) was employed. This approach allowed for a comprehensive exploration of underlying patterns within the questionnaire responses, as detailed in the subsequent Results section.

In this study, as a benchmark for identifying outliers could not be established, the data was analyzed without processing outliers.

4. Results

4.1. Factor analysis¹⁾

Factor analysis was conducted using the maximum likelihood estimation method for each identified factor, with a promax rotation applied in cases where multiple factors were extracted. The dataset included

responses from both pre- and post-intervention questionnaires. This analysis identified four key factors related to vocabulary learning strategies: elaboration, retrieval practice, repetition, and metacognition. Additionally, two factors related to motivation were identified: self-efficacy and general motivation. Reliability coefficients for these factors were calculated and found to be within an acceptable range. The factor 'spacing' was excluded from the final analysis due to inconsistent results across pre- and post-intervention data. Moreover, 'imagery' and 'elaboration' were combined into a single factor labeled 'elaboration', as they were not distinctly separated in the factor analysis results.

4.2. Vocabulary Learning Strategies and Motivations

Table 1 presents the mean and standard deviation (*SD*) values for scores obtained in the pre- and post-intervention questionnaires. To assess changes in scale scores related to each vocabulary learning strategy and motivation factor, including self-efficacy, the Wilcoxon signed-rank test was conducted. The results

revealed statistically significant improvements in the use of both elaboration and repetition strategies. Additionally, a significant increase in self-efficacy scores was observed from pre- to post-intervention, indicating a positive impact of the instructional program on students' vocabulary learning strategies and confidence in their learning abilities.

4.3. Vocabulary Test

The vocabulary test comprised 20 items, each scored on a binary scale: one point for each correct answer and zero for incorrect responses, including misspellings. Due to the written format of the test, cases where students provided synonyms or similar terms (e.g., *fast*, *hurry*, *quick*, *early*) instead of the required word (*quickly*) were noted. However, scoring strictly adhered to predetermined correct answers aligned with textbook material. As a result, semantically similar but non-identical responses were considered incorrect. Subsequent analysis using the Wilcoxon signed-rank test on these test scores revealed significant improvements from pre-test to post-test, as detailed in Table 1.

Table 1

Average Points and Standard Deviation of Pre- and Post-Questionnaires Scores with Results of Wilcoxon Tests

	pre	post	<i>W</i>	<i>p</i>
VLS				
Elaboration	3.71 (1.04)	3.84 (1.05)	2285.5	.016
Metacognition	3.41 (1.46)	3.59 (1.38)	2162.5	.276
Retrieval Practice	3.97 (1.11)	4.09 (1.13)	2390.0	.160
Repetition	3.83 (1.13)	3.98 (1.10)	2182.0	.039
Motivation				
Self-efficacy	3.46 (1.40)	3.79 (1.24)	894.0	.001
General Motivation	4.65 (0.93)	4.62 (1.05)	2678.0	.728
Vocabulary test	5.07 (4.22)	8.26 (4.97)	48.0	< .001

Notes: VLS stands for vocabulary learning strategies, and values enclosed in brackets represent Standard Deviation. *W* represents Wilcoxon's *W*

4.4. Relationship Between Vocabulary Test Scores, Learning Strategies, and Motivations²⁾

Statistical analysis was conducted to determine the correlation coefficients between vocabulary test scores and scores from each scale in both the pre- and post-intervention surveys. The results identified significant positive correlations between vocabulary test scores and three key domains: elaboration strategy, retrieval practice, and self-efficacy. Notably, these correlations remained consistently significant across both pre- and post-intervention data, reinforcing the relationship between strategy use, self-efficacy, and vocabulary learning success. Table 2 provides a detailed breakdown of these correlation results.

Table 2
Correlations Between Vocabulary Test Scores, Learning Strategies, and Motivations

	pre	post
VLS		
Elaboration	.25 **	.25 **
Meta-cognition	-.01	-.04
Retrieval Practice	.20 *	.29 **
Repetition	.08	.18 †
Motivation		
Self-efficacy	.31 **	.32 **
General Motivation	.00	.14

Notes: VLS stands for vocabulary learning strategies.
† $p < .10$, * $p < .05$, ** $p < .01$

5. Discussion

5.1. Effectiveness of Instructional Programs on Vocabulary Learning Strategies

The primary objective of this study was to develop and validate a program aimed at teaching L2 vocabulary learning strategies to junior high school students. The efficacy of the program was assessed through pre- and post-surveys, which demonstrated a significant improvement in scores for both elaboration and repetition strategies, as shown in Table 1. This improvement serves as evidence of the program's success.

The increase in elaboration strategy scores can be attributed to the method of instruction, which combined explicit explanations with practical exercises for active engagement. These findings align with the theory that actively practicing targeted strategies enhances comprehension and application, a concept supported by Sato (1998) and Uchida (2023). Although elaboration strategies are often perceived as complex and may be less frequently used by junior high school students, the results indicate that they can be effectively taught through structured, active engagement.

In line with previous research (Horino & Ichikawa, 1997; Uchida, 2021), this study demonstrates a positive correlation between vocabulary test scores and the use of elaboration strategies both before and after the intervention, as shown in Table 2. Therefore, the program's emphasis on elaboration strategies likely contributes positively to vocabulary learning.

Additionally, scores for the repetition strategy also showed significant improvement, as seen in Table 1. Although students were made aware of the limitations of repetitive learning, they were encouraged to combine repetition with other methods such as retrieval practice and spacing for greater effectiveness. The increase in repetition scores, despite unchanged retrieval practice scores, suggests that repetition is relatively easy for students to adopt.

However, no notable improvements were observed in the use of retrieval practice or metacognitive strategies. This could be due to the short duration of the program, which primarily provided theoretical exposure rather than experiential learning. While retrieval practice is considered accessible for junior high school students (e.g., Karpicke et al., 2016), mere explanations may not be sufficient for effective adoption. Nevertheless, as shown in Table 2, retrieval practice usage was positively correlated with vocabulary test scores, suggesting its potential effectiveness. This finding underscores the need for future programs to incorporate more practical opportunities for students to actively engage in

retrieval practice.

The modest increase in the use of metacognitive strategies could be attributed to their complexity for junior high school students (Sato, 1998). Metacognitive strategies require conscious reflection on one's learning process, demanding a higher level of cognitive development. Introducing these strategies at a later stage, once students have mastered simpler techniques, might be more effective. Finally, the impact of spacing and imagery strategies on vocabulary learning remains uncertain, requiring further investigation and validation to confirm their effectiveness.

5.2. Effectiveness of Instructional Programs on Motivation for Vocabulary Learning Strategies

The instructional program was designed to enhance motivation for learning English vocabulary by focusing on vocabulary learning strategy instruction. The results, as shown in Table 2, indicated a significant improvement in students' self-efficacy regarding English vocabulary learning. Additionally, reflective comments collected from the program worksheets demonstrated positive student feedback. They include *"It was beneficial to learn English vocabulary learning techniques," "I intend to apply the learning methods I acquired," "I value this class because it has helped me improve my English vocabulary."* These comments suggest that the program likely boosted students' confidence and satisfaction in their learning process (e.g., Mizumoto & Takeuchi, 2009). These findings further highlight the effectiveness of incorporating explicit vocabulary learning strategy instruction to foster motivation and engagement in vocabulary acquisition.

5.3. Limitations and Future Directions

Before concluding, it is essential to address several limitations of this study and propose directions for future research. First, the study was limited to a single lesson, which may not have been sufficient for students to fully internalize the concepts taught. This

is particularly relevant for complex strategies like metacognition, which were not heavily emphasized during instruction. Given the brief 45-minute duration, it was challenging for junior high school students to grasp such intricate strategies.

Second, the post-questionnaire was administered only once, three weeks after the intervention. This approach did not allow for an examination of the long-term effects of the intervention. Evaluating whether a single lesson could sustain or enhance its effectiveness over an extended period (e.g., one month, six months, or a year) would be valuable in assessing its long-term viability.

Third, the factors measured by the psychological scales for the spacing strategy differed between the pre- and post-questionnaires. This inconsistency suggests the need for further validation of the scales used to assess spacing strategies. A potential explanation for this discrepancy could be the presence of similar or overlapping questions, leading to confusion in responses.

Fourth, this study did not incorporate effect size analyses, which were not calculated. While the correlation analysis revealed relationships between variables, the effect sizes were not substantial. This indicates that additional factors, beyond those examined in this study, may also influence the outcomes. Future research should incorporate effect size analyses to provide a more precise interpretation of the practical significance of the findings.

Future studies should address these limitations by incorporating longer-term interventions with follow-up assessments to evaluate sustained impacts. Additionally, refining the psychological scales to ensure clarity and distinct measurement of each strategy—particularly for complex concepts like spacing and metacognition—would enhance the reliability and accuracy of future findings.

6. Conclusions

Previous research has established the efficacy

of instruction in vocabulary learning strategies for adult and high school learners. This study extends these findings by demonstrating that instructional methods centered on vocabulary learning strategies can also be successfully implemented with junior high school students. Although the program has shown effectiveness, further research and validation are essential to comprehensively understand its impact on students and to clarify the relationship between learning strategies and vocabulary acquisition. Continued research is crucial for refining instructional techniques and enhancing educational outcomes in vocabulary learning. This progression is particularly important for adapting and evolving teaching methodologies to meet the learning needs of younger students, ultimately contributing to more effective language acquisition processes.

Notes

- 1) In psychological and cognitive science research, when using questionnaire items to measure mental responses related to learning strategies and motivation for learning, which are considered complex psychological constructs, different approaches are employed for data analysis. Some studies analyze single items, while others calculate the average or total score of a group of questions corresponding to each factor. In the latter case, factor analysis is used to derive factor scores, representing the underlying constructs more effectively. Although various perspectives exist regarding the measurement of psychological constructs, one prevalent view is that factor analysis is a valuable method for assessing mental responses to complex constructs. Factor analysis can be simply described as a statistical technique that categorizes a complex set of psychological constructs (e.g., intentions, attitudes, and personality) into statistically meaningful groups of items. This method enhances the reliability

and validity of psychological measurements by identifying latent structures within a dataset. For readers interested in a detailed discussion on this topic, Ozaki and Shojima (2014) provide comprehensive insights into the application and significance of factor analysis in psychological and educational research.

- 2) In psychological and cognitive science research, as well as in applied statistical research, correlation and regression analyses have been widely used as methods for examining associations between variables (for an overview, see Murayama, 2012). Among these, correlation analysis provides the most fundamental insight into relationships between variables, making it a widely utilized relational analysis technique. On the other hand, regression analysis encompasses a variety of methods that are applied under different assumptions and considerations (Yoshida & Murai, 2021). Since regression methods are not fixed and depend on specific modeling choices, careful selection of assumptions and analytical frameworks is required. Given these considerations, correlation analysis was selected as the most basic and effective method to examine relationships among variables in this study.

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