

The Influence of English Learning Strategy Instruction on Vocabulary Learning Performance of Higher Vocational College Students

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ABSTRACT Vocabulary learning is fundamental to English acquisition among higher vocational college students, yet many learners face inefficient memorization, unstable retention, and insufficient awareness of effective learning strategies. This study examines the influence of English learning strategy instruction on vocabulary learning performance using a quantitative quasi-experimental design. A total of 86 first-year non-English-major students from a higher vocational college in China participated, with two intact classes assigned to an experimental group and a control group, each containing 43 students. The experimental group received strategy instruction integrated with regular vocabulary teaching, while the control group received conventional vocabulary instruction for eight weeks. Data were collected through a vocabulary pre-test, post-test, delayed test, and questionnaire. The results show that the two groups were comparable in the pretest, while the experimental group performed significantly better in both the post-test and delayed test, with statistically significant differences and moderate effect sizes. The experimental group also showed more positive changes in strategy use, motivation, and confidence. The findings indicate that explicit strategy instruction can improve immediate vocabulary performance and short-term retention in vocational English teaching.

INDEX TERMS english learning strategy, vocabulary learning, vocational education, quasi-experimental design, learning performance

I. INTRODUCTION

A. BACKGROUND AND RESEARCH GAP

ENGLISH is an important subject in higher vocational education, and vocabulary is a fundamental basis for the development of learners' overall language competence. For higher vocational college students, vocabulary knowledge affects not only general English learning but also the ability to understand professional materials, participate in workplace communication, and improve future employability. Therefore, vocabulary learning remains a central issue in English teaching in higher vocational colleges [1-3].

Despite its importance, vocabulary learning is often challenging for students in higher vocational education. In classroom practice, many learners still rely heavily on rote memorization, repeated copying, or short-term review. Although such methods may support temporary recall, they often fail to promote stable retention or flexible use of vocabulary [3,4]. As a result, students may invest considerable time in vocabulary learning without achieving satisfactory outcomes.

With the growing emphasis on learner-centered education

and autonomous learning, increasing attention has been paid to the role of learning strategies in second language acquisition. English learning strategies refer to the conscious techniques and behaviors that learners use to improve learning efficiency and outcomes [5-7]. In vocabulary learning, strategies such as association, semantic grouping, contextual guessing, review planning, and self-monitoring may help learners process lexical information more deeply and systematically [8]. Compared with mechanical memorization, strategy-based learning may contribute to better understanding, stronger retention, and more effective vocabulary use [8].

Previous studies have shown that strategy use is associated with vocabulary knowledge and language performance, but several limitations remain in the existing literature. First, many studies focus on general university students rather than higher vocational college students. Second, some studies emphasize descriptive accounts of learners' strategy preferences but provide limited classroom intervention evidence. Third, some studies address broader English achievement rather than vocabulary learning as a specific

outcome. In addition, short-term delayed retention is not always examined as an independent dimension of vocabulary learning performance. Therefore, a context-specific quantitative study is needed to examine whether explicit English learning strategy instruction can improve immediate vocabulary achievement, short-term retention, and strategy-related learning behaviors among higher vocational college students [9-11].

B. RESEARCH OBJECTIVES AND QUESTIONS

This study aims to examine the influence of English learning strategy instruction on the vocabulary learning performance of higher vocational college students. Specifically, it investigates whether strategy instruction can improve students' immediate vocabulary achievement, short-term delayed retention, and strategy use in vocabulary learning. It also explores whether students' strategy use is associated with vocabulary learning performance.

Accordingly, this study addresses the following research questions:

RQ1: Does English learning strategy instruction significantly improve the vocabulary test performance of higher vocational college students?

RQ2: Does English learning strategy instruction significantly improve students' short-term delayed retention of vocabulary?

RQ3: Does English learning strategy instruction influence students' strategy use and attitudes toward vocabulary learning?

RQ4: Is there a significant relationship between students' strategy use and vocabulary learning performance?

C. RESEARCH HYPOTHESES

Based on the research questions and relevant literature, the following hypotheses are proposed:

H1: Students who receive English learning strategy instruction will achieve significantly higher post-test scores than students who receive conventional vocabulary instruction.

H2: Students who receive English learning strategy instruction will perform significantly better in the delayed vocabulary test than those in the control group.

H3: English learning strategy instruction will improve students' use of vocabulary learning strategies and their attitudes toward vocabulary learning.

H4: Students' level of strategy use will be positively correlated with their vocabulary learning performance [11-13].

D. SIGNIFICANCE OF THE STUDY

This study has both theoretical and practical significance. Theoretically, it contributes empirical evidence on the relationship among strategy instruction, vocabulary performance, and short-term retention in a vocational EFL context. Practically, the study provides a classroom-based reference for integrating explicit strategy instruction into reg-

ular vocabulary teaching. The findings may offer useful implications for improving vocabulary teaching practices and promoting more active and strategic learning in higher vocational colleges [11-13].

II. LITERATURE REVIEW

A. ENGLISH LEARNING STRATEGIES AND VOCABULARY LEARNING

Learning strategies have long been regarded as an important factor influencing second language acquisition. In English learning, strategies generally refer to the conscious actions, techniques, and procedures that learners use to improve their understanding, retention, and application of language knowledge. Unlike passive exposure to language input, strategy use reflects learners' active efforts to manage and regulate the learning process. Therefore, learning strategies are closely related to learning efficiency, learner autonomy, and academic performance [14].

Previous research has commonly classified English learning strategies into several categories [15]. Memory strategies are used to store and retrieve language information, such as repetition, association, semantic grouping, and the use of word formation knowledge. Cognitive strategies involve direct mental operations on learning materials, including note-taking, summarizing, guessing meanings from context, and applying vocabulary in sentences. Metacognitive strategies refer to higher-level processes such as planning, monitoring, and evaluating one's learning. In addition, affective strategies help learners regulate emotions such as anxiety and frustration, while social strategies support learning through interaction with teachers or peers [5-7]. Among these categories, memory, cognitive, and metacognitive strategies are particularly relevant to vocabulary learning [2,3]. Vocabulary acquisition requires not only memorization of word forms and meanings but also repeated processing, contextual understanding, organized review, and active retrieval [1-3]. If learners rely only on mechanical repetition, vocabulary learning may remain superficial and unstable. By contrast, appropriate strategy use may help students process words more deeply, connect new vocabulary with prior knowledge, and retain lexical information more effectively over time [3,8].

This issue is especially important in higher vocational education. Many higher vocational college students enter English classrooms with relatively limited vocabulary knowledge, uneven language foundations, and weak autonomous learning habits. In practice, they often rely heavily on rote memorization, repeated copying, or short-term review, which may support temporary recall but often fail to promote stable retention and flexible vocabulary use. Traditional vocabulary teaching, which is often dominated by direct explanation, pronunciation drills, and word-list memorization, does not always respond effectively to these learner characteristics [1-3]. Under such circumstances, explicit strategy instruction may provide a more structured and sustainable approach to vocabulary learning by helping

students connect vocabulary with context, organize review, and apply more active learning methods [11-13].

B. PREVIOUS STUDIES AND RESEARCH GAP

A considerable number of studies have examined the relationship between learning strategies and language achievement. Many researchers have argued that successful language learners tend to use a wider range of strategies and apply them more flexibly than less successful learners [5,6]. In the field of vocabulary learning, previous studies have shown that strategy use may positively affect word recognition, retention, comprehension, and productive use [8,9]. Learners who employ association, contextual inference, semantic mapping, or structured review often perform better than those who depend mainly on rote repetition [8,9]. In addition to describing learners' natural strategy use, many studies have investigated strategy instruction as an educational intervention. These studies generally suggest that explicit strategy training can enhance learners' awareness of how to learn and may improve academic performance. In English education, strategy instruction has been applied to reading, listening, writing, speaking, and vocabulary learning. For vocabulary learning in particular, some studies have reported that students receiving strategy instruction achieved higher test scores, demonstrated better retention, and developed more positive attitudes toward language learning [11-13].

At the same time, previous findings are not fully consistent. The strength of instructional effects may vary according to intervention duration, learner proficiency, teacher implementation, and the fit between strategy type and task demands. Moreover, some existing studies rely mainly on questionnaires or interviews to describe strategy preferences without examining actual learning outcomes through pre-test and post-test comparison. Some intervention studies report positive teaching experiences but provide limited quantitative evidence, especially with respect to delayed retention [12,13]. In addition, many studies focus on general university students, whereas relatively few target higher vocational college students, whose learning foundations, classroom needs, and motivational patterns may differ from those of academically oriented university learners.

These limitations indicate several research gaps. First, higher vocational college students remain underrepresented in vocabulary-related strategy instruction research. Second, vocabulary learning as a specific outcome still requires more focused investigation, since some earlier studies address overall English achievement rather than lexical performance itself [1-3]. Third, more context-sensitive quantitative evidence is needed to examine not only immediate post-intervention gains but also short-term delayed retention and strategy-related changes in learners' attitudes and behaviors [9,10]. Therefore, the present study adopts a quasi-experimental design to investigate the influence of English learning strategy instruction on the vocabulary learning performance of higher vocational college students by combining pre-test, post-test, delayed test, and questionnaire

data.

C. THEORETICAL BASIS OF THE PRESENT STUDY

The present study is supported mainly by learner-centered language teaching and the view that strategic learning promotes deeper cognitive processing [6,7]. Vocabulary learning is not merely a matter of repeated exposure; it also involves attention, encoding, storage, retrieval, and application [1-3]. When learners use appropriate strategies, they are more likely to engage actively with lexical information rather than receive it passively. For example, association and semantic grouping may support meaningful encoding, contextual guessing may strengthen inferencing, and review planning may improve retrieval and retention over time [1,2].

Strategy instruction is also consistent with the principle of developing learner autonomy. In higher vocational education, students need not only short-term examination performance but also practical learning ability that can be transferred to future professional and lifelong learning contexts [13,14]. Therefore, helping students master vocabulary learning strategies may be valuable not only for improving immediate test performance but also for strengthening their capacity for more independent learning [10,13].

On this basis, the present study assumes that explicit and systematic English learning strategy instruction may improve students' vocabulary learning performance in two related ways. First, it may directly enhance vocabulary acquisition and short-term retention by providing more effective learning methods. Second, it may support more positive learning behaviors by increasing students' strategic awareness, motivation, confidence, and engagement in vocabulary learning [11-13]. These assumptions provide the theoretical foundation for the research design and hypotheses of the present study.

III. METHODOLOGY

A. RESEARCH DESIGN AND PARTICIPANTS

This study adopted a quantitative quasi-experimental design to examine the influence of English learning strategy instruction on the vocabulary learning performance of higher vocational college students. A quasi-experimental design is commonly used in classroom-based language research when intact classes rather than randomly reassigned individuals are compared under different instructional conditions [11-13].

The participants were 86 first-year non-English-major students from a higher vocational college in China. Two parallel intact classes were selected, with 43 students in the experimental group and 43 students in the control group. All participants were taking College English as a compulsory course at the time of the study, and their ages ranged from 17 to 19 years. The use of first-year students was appropriate because vocabulary learning forms an important foundation for later English learning and practical language use in higher vocational education. This study was approved

by the Ethics Committee of Beijing Vocational College of Agriculture, and was performed in accordance with the principles of the Declaration of Helsinki. All eligible participants signed an informed consent form.

One class was assigned as the experimental group and the other as the control group in order to preserve the normal classroom structure and reduce disruption to routine teaching. To improve comparability, both classes used the same teaching materials, were taught by the same teacher, and received the same amount of instructional time. A vocabulary pre-test was administered before the intervention, and the results indicated that there was no statistically significant difference between the two groups at baseline.

B. INSTRUCTIONAL INTERVENTION

The intervention lasted for eight weeks. Both groups studied the same target vocabulary selected from the College English teaching materials used in the participating classes. Approximately 25 target words were covered each week, resulting in about 200 target words during the intervention period. The weekly teaching time was kept the same for both groups, with two 45-minute sessions per week.

To reduce potential differences in instructional intensity and classroom engagement, both groups followed the same teaching schedule, covered the same vocabulary content, and completed comparable amounts of classroom practice and after-class review. Both groups were taught by the same teacher, and the overall lesson structure remained consistent across the intervention period. The principal difference between the two groups was that the experimental group received explicit strategy instruction integrated into vocabulary teaching, whereas the control group received conventional vocabulary instruction without explicit strategy training.

The control group received conventional vocabulary instruction. In this mode, the teacher explained pronunciation, spelling, part of speech, and basic meanings of target words, and students learned vocabulary mainly through repetition, note-taking, and regular review. Example sentences and short exercises were also used to reinforce word recognition and usage. In addition, the control group completed routine review activities, including teacher-led in-class review of previously taught words and after-class vocabulary revision based on the textbook and class notes. However, no explicit instruction on vocabulary learning strategies was provided. The experimental group received English learning strategy instruction integrated with regular vocabulary teaching. The strategy instruction focused on three types of strategies commonly discussed in vocabulary learning research: memory strategies, cognitive strategies, and metacognitive strategies [3,9,15]. Memory strategies included word association, semantic grouping, keyword connection, and the use of prefixes, suffixes, and roots. Cognitive strategies included contextual guessing, sentence making, vocabulary classification, and note organization. Metacognitive strategies included

learning goal setting, review planning, self-monitoring, and self-evaluation [14].

The strategy instruction was delivered explicitly in three steps. First, the teacher introduced the target strategy and explained its purpose. Second, the teacher demonstrated how the strategy could be applied to the target vocabulary. Third, students practiced the strategy through guided classroom tasks and short follow-up activities. In this way, the instructional treatment aimed not only to teach vocabulary items, but also to help students develop more transferable methods for vocabulary learning [6].

To support implementation consistency, weekly instructional records were maintained throughout the intervention. These records documented the target vocabulary covered, the main classroom activities, and, in the experimental group, whether the three planned instructional steps—strategy explanation, teacher demonstration, and guided student practice—were completed in each session. The records were reviewed regularly after class to help ensure that the planned procedures were implemented consistently across the eight-week period.

In Week 1, both groups completed the vocabulary pre-test and the initial questionnaire. During Weeks 2 to 9, the teacher implemented the intervention according to group assignment. In Week 10, both groups completed the vocabulary post-test and the second questionnaire. In Week 12, a delayed vocabulary test was administered to assess short-term delayed retention.

C. RESEARCH INSTRUMENTS

1) Vocabulary Tests

Three vocabulary tests were employed: a pre-test, a post-test, and a delayed test. The three tests were designed to be comparable in structure, score range, and cognitive demand. Each test had a full score of 100 and included common classroom vocabulary assessment tasks such as word meaning recognition, matching, sentence completion, and simple contextual use. Rather than treating the three tests as formally standardized or psychometrically equated parallel forms, the present study regarded them as comparable classroom-based assessments developed from the same instructional blueprint.

The test content was aligned with the vocabulary taught during the intervention. Before formal administration, the test papers were reviewed by two English teachers to ensure clarity, instructional relevance, and appropriate difficulty. A small pilot administration with students of a similar proficiency level was also conducted to check wording, time allocation, and item comprehensibility. These procedures supported the content appropriateness and general comparability of the tests for the present study, although the tests should still be understood as context-specific classroom measures rather than standardized proficiency instruments.

2) Questionnaire

A questionnaire was used to investigate students' vocabulary learning strategy use and attitudes toward vocabulary learning. The questionnaire consisted of 18 items, including 6 items on strategy use, 6 items on learning motivation, and 6 items on learning confidence. A five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree) was adopted. The questionnaire served as a supplementary instrument to capture self-reported changes in learning behavior and attitude rather than as a stand-alone causal test of instructional effect.

The questionnaire was developed with reference to previous studies on vocabulary learning strategies, language learning strategies, and self-regulated learning [7,8]. The wording of the items was adjusted to fit the English learning context of higher vocational college students. Before use, the questionnaire was checked for language clarity and contextual relevance by the course teacher and one colleague in English education.

3) Instructional Records

Instructional records were maintained during the intervention to document weekly vocabulary scope, major classroom activities, and the implementation of strategy training in the experimental group. For the experimental group, the records specifically noted whether the three planned instructional steps—strategy explanation, teacher demonstration, and guided student practice—were completed in each session. The records were reviewed regularly after class to check whether the planned procedures had been implemented consistently throughout the eight-week intervention. These records were used to support implementation fidelity and procedural consistency.

D. DATA ANALYSIS

After data collection, all quantitative data were entered into statistical software for analysis. Descriptive statistics, including means and standard deviations, were first calculated to summarize students' vocabulary test scores and questionnaire responses. Prior to inferential analysis, the dataset was checked for completeness and general distributional reasonableness.

For the vocabulary tests, independent-sample t-tests were used to compare the experimental group and the control group at each testing phase (pre-test, post-test, and delayed test), because the principal research question concerned phase-specific between-group differences under a classroom-based quasi-experimental design. For the questionnaire, within-group pre-post comparisons were used to describe the direction and magnitude of change in self-reported strategy use and learning attitudes. Pearson correlation analysis was then conducted to examine the associations between questionnaire dimensions and vocabulary learning performance. Effect sizes were reported for the major between-group comparisons, and statistical significance was set at $p < 0.05$.

Because the available classroom dataset was analyzed primarily as phase-specific group comparisons rather than as a full repeated-measures model, the findings should be interpreted as evidence of post-intervention group differences and related associations rather than as a direct estimate of a group-by-time interaction effect.

E. VALIDITY AND RELIABILITY CONSIDERATIONS

Several steps were taken to strengthen the validity and reliability of the study. Both groups were taught by the same teacher, used the same teaching materials, and received the same amount of instructional time. In addition, both groups followed the same teaching schedule and completed comparable amounts of classroom practice and review activities, so that the primary instructional difference lay in the explicit strategy training provided to the experimental group. A pre-test was administered to establish baseline comparability between the two groups. The vocabulary tests were designed to be comparable in structure and aligned with the intervention content, while the questionnaire dimensions matched the strategy categories emphasized during the intervention. Instructional records were also reviewed regularly to monitor procedural consistency during the intervention.

F. ETHICAL CONSIDERATIONS

The study was conducted in a normal educational setting and did not involve physical or psychological risk. Participants completed regular classroom learning activities and tests as part of ordinary English instruction. Before the study began, students were informed that the collected data would be used for academic research only, and individual information would be kept confidential.

IV. RESULTS

A. VOCABULARY TEST RESULTS

Before the intervention, an independent-sample t-test was conducted to compare the vocabulary pre-test scores of the experimental group and the control group. As shown in Table 1, the mean score of the experimental group was 61.02 ($SD = 8.37$), while that of the control group was 60.47 ($SD = 8.88$). The difference between the two groups was not statistically significant ($t = 0.294$, $p = 0.770$, Cohen's $d = 0.06$), indicating that the two intact classes were broadly comparable in vocabulary performance at baseline.

After the eight-week intervention, both groups completed the vocabulary post-test. The experimental group achieved a mean score of 75.36 ($SD = 7.54$), whereas the control group obtained a mean score of 70.82 ($SD = 7.18$). The independent-sample t-test showed that the difference between the two groups was statistically significant ($t = 2.856$, $p = 0.005$, Cohen's $d = 0.61$). Within the limits of the present analytical framework, this finding indicates a clear post-intervention advantage for the experimental group.

To examine short-term retention, a delayed test was administered two weeks after the post-test. The experimental group obtained a mean score of 71.48 ($SD = 7.63$), while the

control group obtained 67.12 (SD = 7.41). The difference remained statistically significant ($t = 2.689$, $p = 0.009$, Cohen's $d = 0.58$). Although both groups showed some decline from the post-test, the experimental group maintained a higher level of short-term delayed retention than the control group.

Taken together, these results suggest that English learning strategy instruction was associated with stronger immediate vocabulary learning performance and better short-term delayed retention. Accordingly, Hypothesis 1 and Hypothesis 2 were supported at the level of phase-specific group comparison. However, the findings should still be interpreted with caution because the present analysis did not directly estimate a group-by-time interaction effect.

TABLE 1. Comparison of vocabulary test performance between the experimental group and the control group

Test	Group	N	Mean	SD	t	p
Pre-test	Experimental group	43	61.02	8.37	0.294	0.770
	Control group	43	60.47	8.88		
Post-test	Experimental group	43	75.36	7.54	2.856	0.005
	Control group	43	70.82	7.18		
Delayed test	Experimental group	43	71.48	7.63	2.689	0.009
	Control group	43	67.12	7.41		

Note: N = number of participants; SD = standard deviation.

The overall comparison of pre-test, post-test, and delayed test scores between the experimental group and the control group is presented in Figure 1.

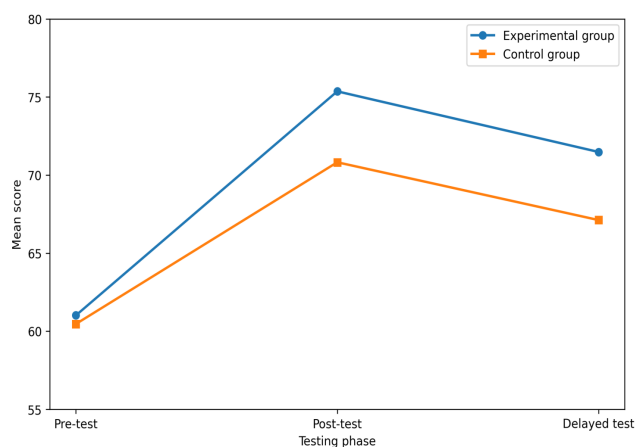


FIGURE 1. Comparison of pre-test, post-test, and delayed test scores between the experimental group and the control group

Note: Both groups showed similar vocabulary performance in the pre-test. After the instructional intervention, the experimental group obtained higher scores in the post-test and delayed test, suggesting better immediate vocabulary learning performance and short-term retention.

B. QUESTIONNAIRE RESULTS ON STRATEGY USE AND LEARNING ATTITUDES

To investigate whether the intervention influenced students' strategy use and attitudes toward vocabulary learning, ques-

tionnaire data collected before and after the intervention were compared. Cronbach's alpha for the questionnaire after the intervention was 0.864, indicating acceptable internal consistency for the full scale in the present sample. Because the questionnaire was a self-report instrument and the analysis centered mainly on within-group change, the results were used to complement the vocabulary test findings. As shown in Table 2, the experimental group demonstrated noticeable improvement in strategy use, learning motivation, and learning confidence after the intervention. In contrast, the control group showed only limited change. The experimental group showed statistically significant improvement across all three dimensions, although the strength of change varied across measures, whereas the control group's increases did not reach statistical significance. These results indicate a clearer positive within-group change pattern in the experimental class, but they should not be interpreted as equivalent to a formal test of between-group change differences.

TABLE 2. Questionnaire results before and after the intervention

Dimension	Group	Before (Mean $\pm$ SD)	After (Mean $\pm$ SD)	p
Strategy use	Experimental group	2.89 $\pm$ 0.46	3.42 $\pm$ 0.48	< 0.001
	Control group	2.91 $\pm$ 0.49	3.06 $\pm$ 0.47	
Learning motivation	Experimental group	3.01 $\pm$ 0.51	3.39 $\pm$ 0.46	0.002
	Control group	2.98 $\pm$ 0.50	3.10 $\pm$ 0.48	
Learning confidence	Experimental group	2.87 $\pm$ 0.47	3.21 $\pm$ 0.45	0.006
	Control group	2.85 $\pm$ 0.49	2.97 $\pm$ 0.46	

Note: The p values in this table refer to within-group comparisons before and after the intervention. The table is intended to show the direction and magnitude of change within each group rather than to serve as a formal test of between-group differences in change.

Overall, the questionnaire findings provide additional evidence supporting Hypothesis 3. They are best understood as convergent evidence that is consistent with the vocabulary test results rather than as a definitive statistical confirmation on their own.

C. CORRELATION BETWEEN STRATEGY USE AND VOCABULARY LEARNING PERFORMANCE

Pearson correlation analysis was conducted to examine the relationship between students' strategy use and their vocabulary learning performance. As shown in Table 3, strategy use was positively correlated with post-test scores ($r = 0.438$, $p < 0.01$) and delayed-test scores ($r = 0.401$, $p < 0.01$). Learning motivation and learning confidence also showed small-to-moderate positive correlations with vocabulary performance. These coefficients indicate meaningful associations among the measured variables, but they do not by themselves establish causal direction.

TABLE 3. Correlation between questionnaire dimensions and vocabulary learning performance

Variable	Post-test score	Delayed test score
Strategy use	0.438**	0.401**
Learning motivation	0.327**	0.296**
Learning confidence	0.361**	0.318**

Note: Pearson correlation coefficients are reported. All correlations shown in this table are statistically significant at $p < 0.01$. These coefficients indicate association rather than causal direction.

These results suggest that students who reported more active use of vocabulary learning strategies tended to achieve better vocabulary learning outcomes. Therefore, Hypothesis 4 was supported at the correlational level.

D. SUMMARY OF RESULTS

Overall, the results indicate that the experimental group outperformed the control group in both the post-test and the delayed test, while also showing more positive change patterns in strategy use, motivation, and confidence. In addition, strategy use was positively associated with vocabulary learning performance. Taken together, these findings indicate that English learning strategy instruction had a positive effect on immediate vocabulary learning and short-term retention in the present study.

V. DISCUSSION

A. INTERPRETATION OF THE MAIN FINDINGS

The results showed that the experimental group performed significantly better than the control group in both the post-test and the delayed test, with moderate effect sizes. Within the limits of the present quasi-experimental design, this indicates that explicit strategy instruction had a positive effect on immediate vocabulary learning performance and short-term delayed retention in the present study.

This finding is consistent with previous studies indicating that strategy instruction may improve language achievement and learner regulation [10-13]. It also supports the view that vocabulary learning outcomes are influenced not only by the amount of lexical input but also by the ways learners process, organize, and revisit lexical information [8,9]. In the present study, the delayed-test findings further indicate that strategy instruction contributed not only to immediate gains but also to short-term retention. A possible explanation is that strategies such as association, semantic grouping, and review planning may support stronger encoding and retrieval pathways. Learners who organize vocabulary meaningfully and review it systematically may be more likely to retain lexical items than those who rely mainly on short-term repetition [1-3].

The questionnaire results also showed more positive change patterns in strategy use, learning motivation, and learning confidence in the experimental group than in the control group. These findings indicate that strategy instruction influenced not only vocabulary outcomes but also learners' awareness and engagement in vocabulary learning.

Although the questionnaire analysis in the present study focused mainly on within-group change rather than formal between-group change testing, the results provide additional evidence consistent with the vocabulary test findings. This interpretation is compatible with self-regulated learning research, which emphasizes the role of strategic awareness, self-monitoring, and self-efficacy in academic improvement [13,14].

In addition, the correlation analysis showed that strategy use was positively associated with both post-test and delayed-test performance, while learning motivation and learning confidence also showed small-to-moderate positive associations with vocabulary outcomes. These relationships indicate meaningful links between strategy-related learning behaviors and vocabulary performance. Although correlation does not by itself establish causality, the observed associations are consistent with the overall pattern of results in the present study [8,9].

B. PEDAGOGICAL IMPLICATIONS

The present study suggests that vocabulary teaching in higher vocational colleges may benefit from moving beyond explanation-centered instruction and mechanical memorization. Teachers may integrate explicit strategy training into regular classroom practice, particularly in the areas of memory, cognitive, and metacognitive strategies. Such an approach does not necessarily require a complete change in curriculum content, but it does require a shift in instructional emphasis from teaching vocabulary items alone to helping students learn how to learn vocabulary more effectively.

At the same time, strategy instruction should be embedded in practical classroom tasks rather than presented as abstract theory. This is especially important in higher vocational education, where students often need concrete, transferable, and classroom-applicable learning support. Guided use of association, contextual processing, review planning, and self-monitoring may help students develop more sustainable vocabulary learning habits over time.

C. LIMITATIONS

Several limitations should be noted. First, the sample size was relatively limited and came from a single institution, which restricts the generalizability of the findings. Second, the study adopted a quasi-experimental intact-class design rather than random assignment at the individual level, so selection effects and class-level influences cannot be fully excluded. Although both groups were taught under comparable instructional conditions and the control group also completed routine review activities, the possible influence of differences in instructional format and classroom engagement cannot be completely excluded in a natural classroom setting. Third, the main vocabulary analyses were conducted as phase-specific between-group comparisons rather than as a full repeated-measures interaction model, which means that the findings should be interpreted with appropriate caution. In addition, although the three vocabulary tests

were designed to be comparable in structure and content, they were not formally standardized or psychometrically equated, which should be considered when interpreting score differences across testing phases. Fourth, the delayed-test interval was relatively short, so the longer-term retention effect could not be fully evaluated. Finally, part of the data relied on self-reported questionnaire responses, which may have been affected by subjective bias.

D. FUTURE RESEARCH

Future research may expand the sample size, involve multiple vocational colleges, and extend both the intervention period and the delayed-test interval. In addition, future studies may compare different types of strategy instruction, employ fuller repeated-measures or multilevel analytical models, and further explore the interaction among strategy training, learner characteristics, and classroom context.

VI. CONCLUSION

This study examined the influence of English learning strategy instruction on the vocabulary learning performance of higher vocational college students through a quantitative quasi-experimental design. By comparing an experimental group receiving strategy-based vocabulary instruction with a control group receiving conventional vocabulary teaching, the study investigated differences in immediate vocabulary achievement, short-term delayed retention, strategy use, and learning attitudes.

The results showed that the experimental group and the control group were comparable before the intervention, whereas after the intervention the experimental group achieved significantly better results in both the post-test and the delayed test, with moderate effect sizes. The questionnaire findings further indicated more positive change patterns in strategy use, learning motivation, and learning confidence in the experimental group. In addition, the correlation analysis showed small-to-moderate positive associations between strategy-related variables and vocabulary learning performance. Taken together, these findings provide supportive evidence for the educational value of strategy-based vocabulary instruction, although they should not be interpreted as definitive causal proof because of the quasi-experimental intact-class design and the analytical scope of the study.

These findings suggest that vocabulary learning in higher vocational education may be strengthened when students are explicitly taught how to learn, rather than being asked only to memorize lexical items mechanically. From a pedagogical perspective, the study supports the cautious integration of memory, cognitive, and metacognitive strategy instruction into routine English vocabulary teaching in higher vocational colleges. Such practice may help students develop more effective and sustainable vocabulary learning habits, particularly among students with relatively weak English foundations and limited autonomous learning ability. Although the present study has limitations in terms of sample

size, intervention duration, delayed-test length, non-random intact-class grouping, self-report questionnaire data, and the absence of a direct interaction-effect test, it still provides a useful empirical basis for the application of strategy-based vocabulary teaching in higher vocational education and for future classroom-based research in this area.

AUTHOR CONTRIBUTIONS

Xiaojia Li designed, collected and analyzed the data, and drafted the manuscript. Xiaojia Li conducted the study, critically revised the manuscript for important intellectual content, and gave final approval of the version to be published. Xiaojia Li participated fully in the work, take public responsibility for appropriate portions of the content, and agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

CONFLICTS OF INTEREST

The author declares no conflict of interest.

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Not applicable.

HUMAN RESEARCH SUBJECTS

This study was approved by the Ethics Committee of Beijing Vocational College of Agriculture, and was performed in accordance with the principles of the Declaration of Helsinki. All eligible participants signed an informed consent form.

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