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The Effects of Theme-Based Narrow Reading on Business English Vocabulary Acquisition among Chinese EFL College Students

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Abstract
Vocabulary plays a significant role in language learning and language development. It is important to acquire sufficient vocabulary to ensure effective communication. Some studies show the efficiency of narrow reading for general and academic vocabulary learning, but fewer studies investigate the effects of narrow reading on technical vocabulary, such as Business English vocabulary. This study aimed to investigate Business English vocabulary acquisition through theme-based narrow reading. The main purpose of this study was to fill the literature gap on learning Business English vocabulary through narrow reading, thereby contributing to the broader field of second language acquisition. This study employed a one-group quasi-experimental design and utilized purposive sampling to recruit twenty-five Chinese first-year students majoring in Business English, together with one Business English teacher as an instructor. This study covered quantitative and qualitative data, but this article only focuses on the quantitative part. The findings showed that students performed better in vocabulary recognition than in vocabulary mastery during the narrow reading process, and their overall performance fluctuated. However, they made significant progress after the narrow reading training. The findings indicated that narrow reading significantly improved participants' Business English vocabulary acquisition. This study will be beneficial to English learners, teachers, vocabulary researchers, reading material designers, and curriculum developers. For future studies in this field, researchers can use more groups in the experimental designs to investigate other variables of narrow reading on other branches of technical vocabulary. Besides, narrow reading can be explored more using other research methods on technical vocabulary acquisition.

Keywords: Business English vocabulary, Chinese EFL college students, narrow reading, technical vocabulary, vocabulary acquisition

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Introduction

In the global economic era, Business English (BE) plays a significant role in international trade. To cultivate talents in BE for doing business transactions globally, BE programs are conducted in vocational schools, colleges, and universities in China and other countries worldwide. According to Zhang and Sun (2018), BE vocabulary is "an integral part of business discourse and communication" (p. 5). Nevertheless, learners meet some challenges or difficulties in learning BE vocabulary in business contexts. For example, Xie (2024) found that the two main challenges were "lack of professional vocabulary" and "lack of business or interdisciplinary knowledge", and the two major difficulties were "vocabulary problems" and "lack of business knowledge and thinking skills" (p. 6). Tan et al. (2026) revealed that lack of business knowledge and insufficient mastery of BE vocabulary were two of the problems students met in BE writing. Hence, it is apparent that BE vocabulary becomes an obstacle in BE learning. Although some studies show that narrow reading (NR) has some positive effects on vocabulary learning, mostly on general or academic vocabulary (Abdollahi & Farvardin, 2016; Chang, 2019; Chang & Renandya, 2021; Kang, 2015; Yuan & Tang, 2023), limited attention is paid to BE vocabulary acquisition through NR.

To fill this gap, this study focused on research on NR in BE vocabulary learning among Chinese first-year BE students. The reason for recruiting these participants from first-year students in the university was that they had fewer BE words before the NR training, and their lower foundation in BE would reduce its impact on the experiment to some extent. This study aimed to investigate the effects of NR on BE vocabulary acquisition. The main purpose of this study was to fill the literature gap on learning BE vocabulary through NR, thereby contributing to the broader field of second language acquisition. The research objectives of this study are to examine BE learners' progress during the NR training and investigate their vocabulary gains after the NR training. The research questions for this study are as follows: (1) How did Chinese Business English learners perform across the eight vocabulary practice tests during the narrow reading training? (2) What vocabulary gains did Chinese Business English learners achieve after the narrow reading training?

Literature Review

Vocabulary Acquisition in English for Specific Purposes

Vocabulary is an important building block of language (Barcroft et al., 2011; Peters, 2026), and without words, human beings cannot express their ideas and feelings verbally and literally. Vocabulary in ESP is significant for learning English for Specific Purposes (ESP) courses and for future professional careers. Coxhead (2025) explained the reasons for the importance of ESP vocabulary as follows: First, studies on vocabulary at the tertiary level demonstrate that teachers and learners generally agree that vocabulary is crucial. Second, vocabulary has a close connection with the objectives of ESP learners and is essential for comprehension of technical materials, as well as for participation in discussions and topic writing. Third, knowing and utilizing the specialized terms in a specific field indicates group membership. Lastly, it is hard to envision employing specialists who cannot communicate effectively with different people or other experts in relevant fields. Taking the significance of vocabulary into consideration, it is necessary to know words in a comprehensive way, which involves three categories: form, meaning, and use, and each category includes three aspects showing receptive or productive knowledge (Nation, 2022). Vocabulary acquisition is not something that can be achieved overnight; rather, it is a long-term and arduous process, with incidental and/or purposive learning. Gouabi (2023) stated that the

outcomes of ESP teaching didn't match the students' demands in learning ESP courses, which covered specific skills as well as specialized vocabulary.

Technical Vocabulary Learning Challenges

Technical vocabulary does not commonly occur in daily life but is often learned when learners are studying subject matter, or it is used in specific areas. Schmitt (2010) defined technical vocabulary as "those which are recognizably specific to a particular field" (p. 77). Similarly, Nation and Gu (2019) considered technical vocabulary as "the words used in a specialized area and are usually not so commonly used outside that area" (p. 8). From these definitions discussed above, it is obvious that technical vocabulary is different from general vocabulary and academic vocabulary in the genre of vocabulary use. Technical vocabulary is used in special areas or fields, such as science, engineering, law, finance, trade, applied linguistics, etc. Tian and Umar (2025) mentioned the challenges of learning technical vocabulary, such as the specificity of the content, contextual settings, and limited exposure in general language learning situations. Chung and Nation (2003) mentioned that teachers were facing two major problems when teaching technical vocabulary. One was that they lacked specialist knowledge in technical fields. The other was that technical vocabulary must be acquired while mastering the specific areas. Coxhead (2025) discussed the following two challenges of vocabulary learning in ESP: one was to decide the size of technical words, and the other was to notice both general and specialized meanings of high-frequency words. Moreover, it is crucial to identify which technical vocabulary to teach or learn in a certain subject matter. Nation (2001) advocated two ways to make technical vocabulary lists: through using technical dictionaries and through using a corpus with a frequency basis. Chung and Nation (2004) suggested four methods: using rating scales, technical dictionaries, clues in texts, and computer-based approaches. Schmitt (2010) recommended two ways: through the intuitions of specialists in the subject matter, and from a corpus of technical texts. The studies above show the variety of ways to identify technical words. Therefore, researchers, teachers, and learning materials designers can choose suitable ways to determine technical words.

Technical words are normally taught and learned in ESP courses, such as English for Engineering, English for Medicine, English for Computer Science, Business English, etc. Taking medical English vocabulary as an example, they were generally taught with the methods of "etymology, word-formation, semantic field theory, cultural stories, metaphor and corpus" (Wang et al., 2021, p. 112). BE vocabulary, as one kind of technical vocabulary, is defined as "English words and expressions that are used in business settings for business purposes" (Zhang & Sun, 2018, p. 1). To assist BE vocabulary learning, some researchers identify BE words by creating BE word lists through existing corpora, self-compiled databases, or other sources, such as the Business Word List (BWL) (Konstantakis, 2007) and the Technical Business Keywords List (TBKL) (Tangpijaikul, 2014). Besides the word lists above, there are other existing BE word lists. Choosing a suitable BE word list for vocabulary research is a crucial step for researchers. In China, the teaching and learning of BE vocabulary has been overlooked. Hu and AlSaqqaf (2025) conducted a systematic review of BE teaching research in China, with the scope ranging from the year 2007 to 2023. They found that the areas of research interest covered "teaching effectiveness", "student experience", "Chinese private higher education", "intercultural communication", "intervention strategy", "curriculum development", "need analysis", "assessment in language learning", "teaching methodology", "second language acquisition" and "technology/mobile-assisted language learning" (Hu & AlSaqqaf, 2025, p. 10). However, they were more likely to

research BE at macro-levels; BE vocabulary as the basic element for language development was paid little attention to.

Narrow Reading

The concept of narrow reading (NR) is seldom heard in English classes among students and teachers in China, but it has aroused the interest of Chinese researchers in recent years. NR means "reading on only one topic, and several books by the same author" (Krashen, 1981, p. 23). Later, the scope of NR extended into "genre" in the two studies: Cho and Krashen (1994) and Cho and Krashen (1995). The concept of NR was restated as "reading in only one genre, one subject matter, or the work of one author" (Cho et al., 2005, p. 58). Hence, NR can be understood as reading narrowly under the same topic/theme, from the same author, or under the same genre. Krashen (2004) argued that readers could read the reading material under one topic, with one genre, or from the same author in a certain period and then shift to another topic, another genre, or another author afterwards. In the long run, learners read a lot of reading material systematically, and NR assists learners' vocabulary learning. NR enhances vocabulary learning through word repetition, expressive style, and familiarity with topics. Krashen (1981) stated that similar vocabulary would recur when readers read on the same topic within a fixed time, and authors had unique expressions and distinct styles, which would reduce the unfamiliarity of difficult vocabulary. Nation (2014) highlighted that NR could reduce vocabulary load and assist in learning technical vocabulary. According to some prior studies on vocabulary (Nation, 2001, 2022; Nation & Gu, 2019; Schmitt, 2008; Webb, 2007; Webb & Nation, 2017), repeated exposure to words assists in vocabulary acquisition and language development. There are some empirical studies of NR on vocabulary acquisition, such as Abdollahi and Farvardin (2016), Bunparit and Riabroi (2025), Chang (2019), Chang and Renandya (2021), Kang (2015), and Yuan and Tang (2023). However, NR still receives limited attention in vocabulary acquisition, and there are insufficient empirical studies in this field (Chang & Renandya, 2021; Yuan & Tang, 2023). What's more, empirical studies focus more on general or academic vocabulary and fewer on technical vocabulary. Moreover, empirical studies are normally conducted between two or more groups and/or with interviews. Taking these reasons into consideration, this study aimed to investigate the effects of NR on BE vocabulary acquisition among one group of Chinese BE first-year students with interviews.

Here is a conceptual framework for the quantitative part of this study (see Figure 1).

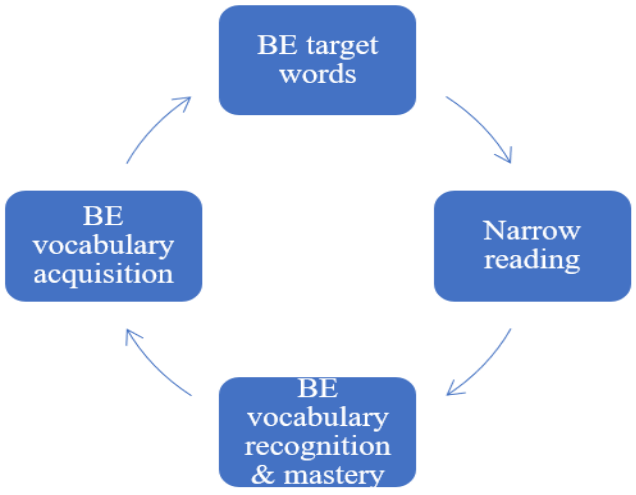


Figure 1. Conceptual framework

Methodology

Research Design

This study was a part of the main author's doctoral research, which applied a one-group quasi-experimental design. This study used a questionnaire, a vocabulary pretest, eight vocabulary practice tests, and a vocabulary post-test for quantitative data collection, while using three interviews, classroom observations, and teacher's reflections for qualitative data collection. The research was conducted in semester 2, the academic year 2024–2025, at University A in Zhaoqing City, China. This article addresses the quantitative research questions.

Participants

This study employed purposive sampling to recruit 25 BE first-year students and one BE teacher. The selection of the sampling method was based on the views of the following two researchers. Patton (2002) stated that "The logic and power of purposeful sampling lie in selecting information-rich cases for in-depth study" (p. 230). Etikan et al. (2016) mentioned that purposive sampling was “the deliberate choice of a participant due to the qualities the participant possesses” (p. 2). As this study researched BE vocabulary learning, it is appropriate to recruit BE first-year majors as student participants and one teacher as an instructor. Here is the demographic information about them. All the student participants were female, and they were from University A, aged 18 to 20 years old. They have been learning General English (GE) for over ten and a half years and BE for half a year. Their English scores for the College Entrance Examination (CEE) ranged from 87 to 130 points. Six participants passed the College English Test-4 (CET-4). None of the student participants had BE-related part-time job experience before entering the university, and they had little exposure to BE. Besides, a male BE teacher was recruited from University B in the same city, who was 27 years old. He had a master's degree in an English-related major, a higher education teacher qualification, and English teaching experience of two and a half years. He was responsible for the NR teaching in the experiment.

Research Instruments

Some instruments were used to collect data in this study. A small questionnaire was made in WeChat Questionnaire Star to collect student participants' demographic information. The NR materials were selected and adapted from BE textbooks published in China. Eighty BE target words were extracted from the NR materials, with a word frequency of at least 3. A BE vocabulary pretest was designed to test student participants' recognition of 80 BE target words. There were 10 groups of words, 8 BE target words, and 2 GE words as distractors in each group. The scoring scale was as follows: 1 — choose the right answer; 0 — choose the wrong answer; 0 — no answer. The time arrangement was 50 minutes. Besides, there were 8 vocabulary practice tests (VPTs), with two parts in each test. Part one was used to test participants' recognition of BE target words in each topic. Part two was employed to test their mastery of BE target words in each topic. The scoring scale of Part one was the same as that in the pretest. The scoring scale of Part two was: 2 — right words with correct forms; 1 — right words with wrong forms; 0 — wrong words. As some item numbers of BE target words varied in some topics, the total scores for the VPTs also varied (see Table 1). The time arrangement for each test was 15 minutes. A BE vocabulary post-test was the same as the pretest in terms of the content and the format, but the difference was the word order in each group. The total scores of the pretest and the post-test were 80 points, respectively. The format of the pretest, the post-test, and Part one in the VPTs was adapted from Schmitt et al.

(2001, p. 82), and that of Part two in the VPTs was adapted from Sulaiman (2021, p. 247). All the instruments were validated by experts before the pilot study and refined for use in the main study.

Table 1. *Total scores of VPTs*

VPTs	Test 1	Test 2	Test 3	Test 4	Test 5	Test 6	Test 7	Test 8
Total scores	30	27	27	30	30	30	33	33

Research Procedures

This study focused on the procedure of quantitative data collection. BE students filled in the questionnaires and took the vocabulary pretest before the NR training. Then they received 8 sessions of the NR training for 8 BE topics and took the VPTs at the post-reading stage of each session. After the NR training in the experiment, they took a vocabulary post-test.

Data Analysis

The data from the pretest and post-test were analyzed using the Statistical Package for the Social Sciences (SPSS) version 29. Descriptive statistics were used to show the basic statistical information of the pretest and post-test data. The Shapiro-Wilk test was applied to test the normality of the data. The Wilcoxon signed-rank test was employed to calculate the significance of the results. The data from the VPTs were analyzed using Excel and SPSS.

Results

The Chinese BE learners' performance during the NR training was analyzed using the data from the eight vocabulary practice tests (VPTs). Their vocabulary gains after the NR training were analyzed using the data from the pretest and the post-test. The detailed findings will be discussed as follows.

Chinese BE Learners' Performance during the NR Training

The Chinese BE learners' performance during the NR training consists of their separate performance in each part of the VPTs and their overall performance across all the VPTs.

Separate performance in each part of the VPTs. There were two parts in each VPT, which consisted of Part one testing students' vocabulary recognition, and Part two testing students' vocabulary mastery. The scores for each part were not the same; therefore, the students' raw scores for each part were converted to percentage scores [percentage score = (raw score / total score for that test) × 100]. From Table 2, it is evident that more participants performed better in Part one of Tests 2, 4, 5, 6, 7, and 8 than in Part two of each respective test.

Table 2. *Participants' performance in each part of VPTs*

	Test 1	Test 2	Test 3	Test 4	Test 5	Test 6	Test 7	Test 8
No. of students who got a higher percentage in Part one	10	18	10	18	18	21	20	18
No. of students who got a higher percentage in Part two	11	6	15	7	5	2	3	7
No. of students who got equal percentage in two parts	4	1	0	0	2	2	2	0

Overall performance across all the VPTs. Student participants' overall performance during the NR training was analyzed using data from the eight VPTs. Table 3 consists of "N", "Minimum", "Maximum", "Mean", "Std. Deviation (SD)" and "95% Confidence Intervals (CI) for Mean". Since the total scores of some VPTs were not the same, students' scores for overall performance were converted into percentage scores. Table 3 demonstrates the descriptive statistics of participants' overall performance across all the VPTs during the NR training. The mean scores range approximately from 58.00 to 75.88. The highest mean score (M = 75.88, SD = 12.14) is recorded in Test 8, while the lowest (M = 58.00, SD = 18.58) is recorded in Test 6. The range of SD, roughly from 12.14 to 19.94, reveals that there are some differences in the dispersion of scores across the eight VPTs. Among all the 95% CI for the mean for the eight VPTs, Test 8 has the highest scores of [70.8721, 80.8903].

Table 3. *Descriptive statistics of participants' overall performance across all the VPTs*

	N	Minimum	Maximum	Mean	Std. Deviation	95% CI for Mean
Test 1	25	30.00	93.33	66.6668	17.82084	[59.3107, 74.0229]
Test 2	25	29.63	92.59	58.2216	18.59582	[50.5456, 65.8976]
Test 3	25	25.93	96.30	59.8520	19.93631	[51.6227, 68.0813]
Test 4	25	20.00	96.67	68.8004	16.46855	[62.0025, 75.5983]
Test 5	25	30.00	86.67	60.3996	14.91722	[54.2421, 66.5571]
Test 6	25	30.00	96.67	57.9996	18.58480	[50.3282, 65.6710]
Test 7	25	9.09	90.91	59.1540	15.74983	[52.6528, 65.6552]
Test 8	25	51.52	90.91	75.8812	12.13514	[70.8721, 80.8903]
Valid N (listwise)	25					

The trend of students' overall performance in Figure 2 shows a zigzag pattern of mean scores, with two distinct troughs in Tests 2 and 6, and two peaks in Tests 4 and 8. The mean scores fluctuate considerably, with rises and falls. Tests 2-3 and Tests 5-7 are relatively stable, while Test 8 marks the highest peak. Overall, the mean scores show a general rising trend with fluctuations.

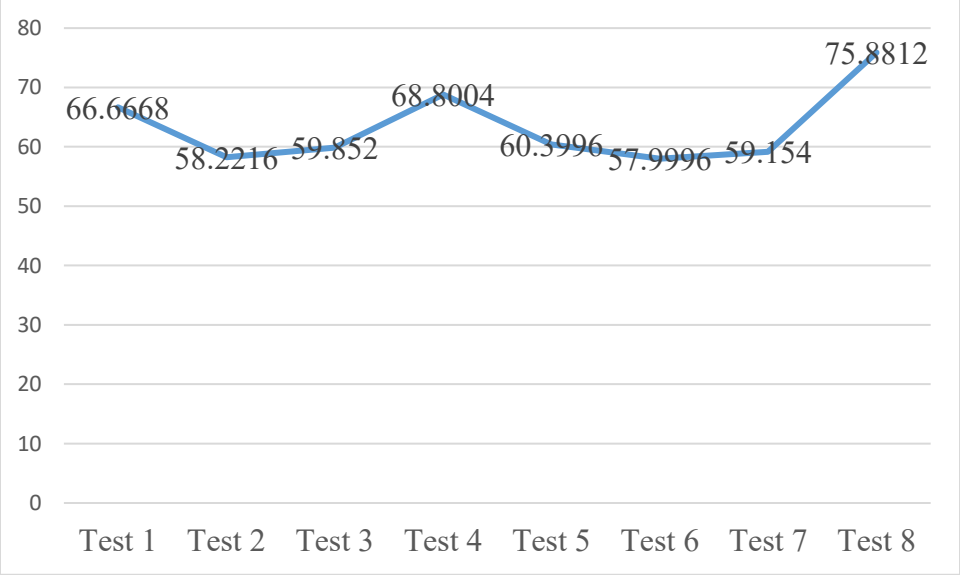


Figure 2. Mean performance trends across all the VPTs

Chinese BE Learners' Vocabulary Gains after the NR Training

The findings of the pretest and post-test data showed a promising result in terms of vocabulary gains after the NR training.

Descriptive statistics. The descriptive statistics of the pretest and post-test cover "N", "Minimum", "Maximum", "Mean", "Std. Deviation (SD)", and "95% Confidence Intervals (CI) for Mean". The total scores of the pretest and the post-test were 80 points, respectively. Table 4 shows that the number of participants (N = 25), Minimum (pretest) = 16, Maximum (pretest) = 63, Mean (pretest) = 40.96, SD (pretest) ≈ 11.16; Minimum (post-test) = 39, Maximum (post-test) = 74, Mean (post-test) = 59.92, SD (post-test) ≈ 10.83. The mean score between the pretest and the post-test jumps from 40.96 to 59.92 points, with a difference of about 19 points. The lowest score between the pretest and the post-test ranges from 16 to 39 points, with a difference of 23 points. The highest score between the pretest and the post-test ranges from 63 to 74 points, with a difference of 11 points. The difference between the two SDs is slight, with SD (pretest) ≈11.16 and SD (post-test) ≈ 10.83. The 95% CI for the mean of the post-test is [55.4489, 64.3911], which is higher than that of the pretest with [36.3535, 45.5665].

Table 4. *Descriptive statistics of the pretest and post-test data*

	N	Minimum	Maximum	Mean	Std. Deviation	95% CI for Mean
Pretest	25	16.00	63.00	40.9600	11.15975	[36.3535, 45.5665]
Post-test	25	39.00	74.00	59.9200	10.83174	[55.4489, 64.3911]
Valid N (listwise)	25					

Normality testing. The normality of the pretest and post-test scores was evaluated by the Shapiro-Wilk test. Table 5 shows that the pretest scores are normally distributed ($W = .988$, $p = .989$), while the post-test scores are not normally distributed ($W = .869$, $p = .004$). Therefore, the pretest and the post-test data could not be analyzed with parametric tests. The Wilcoxon Signed Rank test was used to compare the pretest and post-test scores.

Table 5. *Tests of Normality*

	Kolmogorov-Smirnova			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Pretest	.097	25	.200*	.988	25	.989
Post-test	.186	25	.025	.869	25	.004
*. This is a lower bound of the true significance. *a. Lilliefors Significance Correction*						

Wilcoxon Signed Rank Test. From Table 6, the null hypothesis of the Wilcoxon Signed Rank Test is 'The median of differences between Pretest and Post-test equals 0', which means 'There is no significant difference between the pretest and the post-test'. In this result, $p < .001$; hence, the

null hypothesis is rejected, which shows that there is a statistical difference between the pretest and the post-test data.

Table 6. *Hypothesis test summary*

	Null Hypothesis	Test	Sig.[a,b]	Decision
1	The median of differences between Pretest and Post-test equals 0.	Related-Samples Wilcoxon Signed Rank Test	<.001	Reject the null hypothesis.
a. The significance level is .050. b. Asymptotic significance is displayed.				

Figure 3 is a histogram of the Related-Sample Wilcoxon Signed Rank Test. All participants show improvement from the pretest to the post-test, as evidenced by the positive differences (=25). The number of participants shows by the y-axis, while the size of the change shows by the x-axis. This visual pattern was consistent with the Related-Sample Wilcoxon Signed Rank Test Summary (see Table 7), with statistical significance (Z=4.373, p<.001).

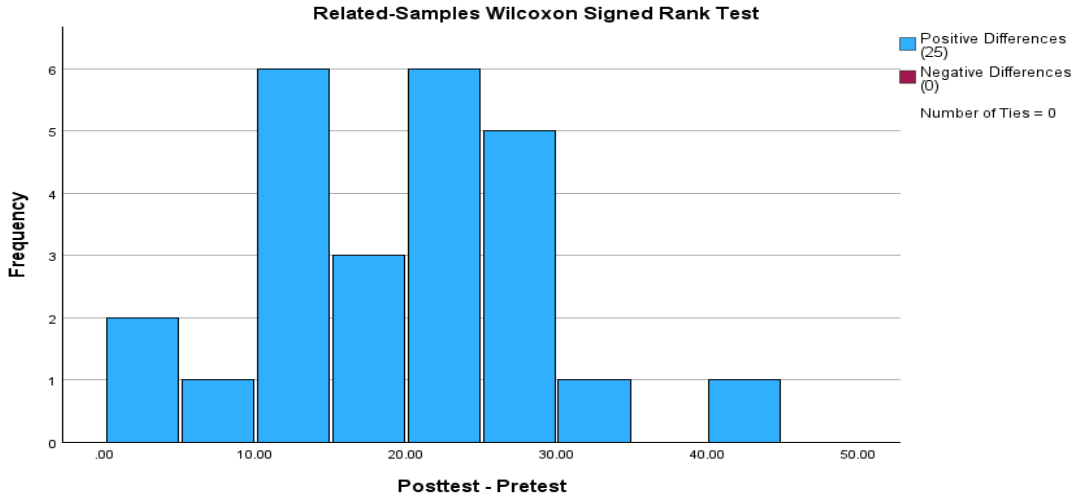


Figure 3. Related-Samples Wilcoxon Signed Rank Test

The results above show statistical significance in this study and higher scores after the intervention, but the effect size for the experiment is not shown directly in Figure 3 and Tables 6-7. Based on the results in Table 7, Z = Standardized Test Statistic = 4.373, N = 25, the effect size (r) can be calculated by the equation (Rosenthal, 1991, pp. 18–19): $r = Z/\sqrt{N} = 4.373/\sqrt{25} \approx 0.87$. According to the conventional guideline for the effect size: r = .10 (small effect size), r = .30 (medium effect size), and r = .50 (large effect size) (Cohen, 1988). Therefore, r = 0.87 is a large effect size in this study.

Table 7. *Related-Samples Wilcoxon Signed Rank Test Summary*

Total N	25
Test Statistic	325.000

Standard Error	37.157
Standardized Test Statistic	4.373
Asymptotic Sig. (2-sided test)	<.001

To sum up, the results of the Wilcoxon Signed Rank Test show that there is a statistically significant difference between the pretest and post-test ($p < .001$, $r = 0.87$).

Discussion

RQ 1 was about students' progressive performance during the NR training. Generally speaking, students performed better in BE vocabulary recognition in Part one than in vocabulary mastery in Part two across the eight VPTs. The reason may be that the VPTs were tested at the end of each session in the NR training. Hence, students didn't have enough time to master the usage of the BE target words. However, due to the repetition of the words in bold, they noticed the words and reinforced them in their brains. Therefore, their vocabulary recognition outperformed their vocabulary mastery. Moreover, their overall performance across all the VPTs fluctuated, with some ups and downs. The reasons for the fluctuation might be that students were unfamiliar with each BE topic and their BE vocabulary was limited. Nevertheless, although there were fluctuations throughout the eight VPTs, the trend of the overall performance was promisingly rising in the final VPT, with the highest peak in Test 8. These findings revealed that after the accumulation of learning in the previous seven BE topics, such as repeated BE words and gradual familiarity with BE knowledge, students performed the best in Test 8 among all the VPTs. These findings of RQ 1 showed that NR was positive for word recognition and assisted students' progressive performance during the NR training. The findings revealed the students' learning trajectory across the 8 sessions in the NR training. However, most previous studies of NR on vocabulary learning seldom investigated the ongoing vocabulary performance during the NR training. Normally, they focused on the findings from the pretest and post-test data. On the contrary, this study arranged one vocabulary practice test in each session of the NR training to assess students' immediate classroom performance. Therefore, more abundant evidence of the learning process was provided for the NR intervention, showing more comprehensive, more continuous, and more dynamic outcomes in the experiment. This study offers a new insight into instrument design in the research on vocabulary learning through NR.

RQ 2 was about the vocabulary gains acquired by the students after the NR training. The findings were from the pretest and post-test data, which showed that students made great progress after the intervention. Their vocabulary gains increased tremendously, indicating that the NR training had a positive effect on BE vocabulary learning. Specifically, the NR training had a statistically significant effect on BE vocabulary acquisition ($p < .001$), with a large effect size ($r = .87$). Some previous studies also investigated the effects of NR on vocabulary acquisition. At first, the discussions focus on vocabulary learning through NR in one group (Bunparit & Riabroi, 2025; Hanuvong, 2020). The findings of this study are in line with the findings in Bunparit and Riabroi's (2025) and Hanuvong's (2020) studies, which showed enhanced word knowledge. However, the differences lie in that this study examined technical vocabulary (BE words), while Bunparit and Riabroi's (2025) study compared three types of words: vocabulary, academic vocabulary, and technical vocabulary (words for agriculture and forestry), and Hanuvong's (2020) study

investigated general vocabulary in primary education. Second, the discussions are about NR studies on vocabulary learning between groups, an NR/experimental group and a regular/control group (CR group) or reading plus vocabulary enhancement group (RV group) (Abdollahi & Farvardin, 2016; Chang, 2019; Kang, 2015; Payá-Guerrero & Esteban-Segura, 2015). Overall, the findings of this study are similar to those of Abdollahi and Farvardin (2016), Chang (2019), and Kang (2015), indicating that vocabulary knowledge improved. However, there are some slight differences in research on different aspects of vocabulary knowledge. This study focused on vocabulary gains, while Abdollahi and Farvardin (2016) focused on vocabulary recall and retention, Chang (2019) on multiple dimensions (such as spelling, usage, and meaning), and Kang (2015) on comprehension of target words and their usage. The findings of this study differ from those of Payá-Guerrero and Esteban-Segura (2015), which revealed that the NR group and RV group both had a positive effect on vocabulary development: the NR group had an advantage in receptive knowledge, while the RV group overperformed in vocabulary gains. Third, the discussions involve vocabulary learning through NR among three or more groups (Chang & Renandya, 2021; Yuan & Tang, 2023). The findings of this study are different from those of Chang and Renandya (2021) and Yuan and Tang (2023) due to more variables in the latter two studies. In Chang and Renandya's (2021) study, there were 4 groups (author, genre, title, and random), and the findings showed that more words were acquired when author-limited or random texts were used than when title-limited texts were used. In Yuan and Tang's (2023) study, there were 3 groups: CR group, NR group, and a narrow reading plus morphological intervention group (NRMI group). The findings indicated that the two treatment groups performed better than the CR group in terms of receptive and productive vocabulary knowledge. In contrast, the NRMI group's vocabulary acquisition improved the most.

Apart from the discussions above, there are some obstacles that were encountered in implementing this study. First of all, it was the choice of the BE word list. A single existing BE word list was not comprehensive and suitable for this study. Therefore, several BE word lists were compiled and refined into one word list to be used in this study. Second, it was the design of NR materials. It was hard to find materials under the same BE topic and with the BE target words. At the same time, it should take the BE target word frequency and the readability of texts into consideration. Third, it was time for the NR training. Each session was about 3 hours, which was time-consuming. As it was a quasi-experimental design, the experiment was conducted outside of normal classes, so it was terribly difficult to find a long and fixed time to undergo the NR training. Finally, participant recruitment was difficult. The number of BE first-year students at University A was small, and some of them were not willing to attend the experiment due to their heavy learning load and other extracurricular learning activities. As for BE teachers, they had their normal teaching load and academic research tasks. In this sense, teaching in the NR training would be an extra and large workload for them. Nevertheless, the experiment was eventually completed, with promising

Conclusion

This study aimed to investigate the effects of NR on BE vocabulary acquisition among Chinese BE first-year students at a university in China. The findings of this study showed that students generally overperformed in BE vocabulary recognition in Part one than in vocabulary mastery in Part two in each session during the NR training. Although their overall performance fluctuated across the eight VPTs, after the accumulation of the previous BE knowledge, they reached the highest peak in Test 8. After the whole intervention of the experiment with eight sessions, the

findings of the pretest and post-test revealed that students made great progress in vocabulary gains through the NR training. This study had a statistically significant difference ($p < .001$, $r = 0.87$). This study is beneficial for BE learners, BE teachers, researchers in this field, materials designers, and curriculum developers.

There are some implications for future studies. First, researchers can investigate BE vocabulary acquisition through NR with different research designs, more groups, and more participants. Second, researchers are encouraged to explore more on NR under the same theme, with the same genre or from the same author in different ESP contexts. Third, researchers can design more NR materials in BE or other subjects in ESP courses. Fourth, researchers can advocate for implementing NR in normal classes and let more English teachers and students know about NR. To sum up, NR is expected to be explored more widely and deeply.

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