The Combined Effects of the Keyword Method and Phonics Instruction on 5th Graders’ English Vocabulary Learning in Taiwan

Fang-Yi Lin  
Taipei Municipal University of Education  
fangyi0922@gmail.com

Chin-Kuei Cheng  
Taipei Municipal University of Education  
ckcheng@tmue.edu.tw

Abstract

This study aimed to examine the combined effects of the keyword method and phonics instruction on elementary school students’ English vocabulary learning. The participants were 105 fifth graders from three intact classes of an elementary school. These three EFL classes were randomly assigned to three treatment groups (keyword, phonics, and combined keyword-phonics). Each group received three 40-minute learning sessions within one week to learn 30 English target words, i.e., learning 10 words per session. Two recall tests were conducted to measure the learning effectiveness both immediately and one week after the three learning sessions were completed. One of the tests, the receptive recall test, was used to assess students’ learning of word meaning, and the other test was the productive recall test that measured students’ learning of spelling. The results showed that the keyword group and the combined keyword-phonics group performed significantly better than the phonics group on the immediate and delayed receptive recall tests, and that the phonics group and the combined keyword-phonics group performed significantly better than the keyword group on the immediate and delayed productive recall test. The findings suggest that the keyword method facilitates students’ learning of word meaning and that phonics instruction promotes students’ English spelling abilities. Therefore, combining the two methods will not only facilitate students’ learning of word meaning but also enhance students’ spelling abilities.

Key Words: keyword method, phonics instruction, English vocabulary learning
INTRODUCTION

Vocabulary serves as the foundation of language learning. Studies have shown that word knowledge is strongly correlated with academic accomplishment (Norbert, 2000). In addition, a rich vocabulary is necessary to successful reading comprehension (Norbert, 2000). Andrew (2001) notes that explicit instruction of vocabulary learning enables students to learn words and expand their vocabulary. The keyword method has been regarded as an effective mnemonic technique for acquiring foreign language vocabulary (Atkinson, 1975; Beaton, Gruneberg, Hyde, Shufflebottom, & Sykes, 2005; Pressley, Levin, Hall, Miller, & Berry, 1980).

Since Atkinson’s (1975) first description of the keyword method, many studies have been conducted to investigate its effectiveness. In these studies, two testing forms were used to measure students’ vocabulary recall performance: (1) the receptive/forward recall test and (2) the productive/backward recall test. The receptive/forward recall test is a form in which the learners are asked to write down an L1 translation when a foreign word is given. The productive/backward recall test is a form in which the learners are required to provide the target words when the L1 equivalents are given (Beaton, et al., 2005).

The majority of the keyword method studies concerning receptive/forward learning performance revealed that the keyword method helps students enhance their learning of word meaning (Dretzke & Levin, 1990; Fuentes, 1976; Hall, 1989; Lawson & Hogben, 1998; Mastropieri, Scruggs, & Fulk, 1990; Taguchi, 2006;
Zhang & Schumm, 2000). However, its effectiveness in productive/backward recall performance remains uncertain. Some studies demonstrated that there is no significant difference between the keyword group and the rote repetition group (Baddeley, Gathercole, & Papagno, 1998; Ellis & Beaton, 1993). Others indicated that the keyword method is more effective than a rote repetition or no-strategy method (Grunberg & Pascoe, 1996; Pressley & Levin, 1981; Pressley, et al., 1980).

Pressley and Levin (1981) pointed out that learners’ knowledge of letter-sound relationships influence the effectiveness of the keyword method in productive recall performance. Some educators also claim that learning of letter-sound correspondences through phonics instruction can enhance children’s spelling ability of vocabulary items (Adams, 1990; Baumann & Duffy, 1997). Furthermore, some studies revealed that phonics instruction enhances students’ word reading and spelling achievement (Adams, 1990; Ball & Blachman 1991; Ehri, Nunes, Stahl, & Willows, 2001; Juel, 1991). Thus, the primary purpose of this study was to investigate the combined effects of the keyword method and phonics instruction on Chinese EFL students’ vocabulary acquisition. It was hoped that after students received training on both the keyword method and phonics, both their receptive and productive recall performances could be enhanced.

To investigate the combined effects of the keyword method on the students’ vocabulary learning, 105 fifth graders from three intact classes of an elementary school were recruited. These three EFL classes were randomly assigned to three treatment groups (keyword, phonics, and combined keyword-phonics). The following two
research questions were addressed in this study:

1. Which of the three treatment groups (phonics group, keyword group, and combined keyword-phonics group) will perform the best on the immediate and delayed receptive recall tests?

2. Which of the three treatment groups (phonics group, keyword group, and combined keyword-phonics group) will perform the best on the immediate and delayed productive recall tests?

LITERATURE REVIEW

The Keyword Method

The keyword method is a mnemonic strategy of vocabulary learning. In 1975, Richard Atkinson first introduced the keyword method to help English-speaking college students improve learning of Russian. There are two steps in applying the keyword method: one is verbal, and the other is visual. The first step requires the student to identify an L1 keyword from the foreign word. The keyword must sound like some part of the spoken foreign word. This step is called an “acoustic link” (Atkinson, 1975). The second step requires one to mentally generate an “interactive” image of the keyword and the word meaning of the foreign word. This is called an “imagery link.” The “acoustic link” can be formed easily due to the similarity of sounds between the foreign word and keyword. The imagery link serves as a mnemonic aid for future retrieval from long-term memory. The keyword thus serves as a mediator connecting a foreign word to its mother language translation (Atkinson & Raugh, 1975).
The following is an example of the keyword method of English vocabulary learning. In English, the word *mirage* means 海市蜃樓 in Chinese (*hai shi shen lou*). The pronunciation of the English word contains a sound that resembles the sound of Chinese word 麻辣雞 (*ma la ji*, means *spicy chicken*, a food name). Using the Chinese words 麻辣雞 (*ma la ji*) as the keyword, one could generate a mental image of a mirage of spicy chicken in the desert (Guey, 2000a).

**The Theoretical Framework of the Keyword Method**

Memory cues help one to retrieve stored information, enhance memory and transform meaningless information to concrete information (Mastropieri, Sweda, & Scruggs, 2000). Pressley, Levin, and Delaney (1982) stressed that in addition to mnemonic concepts, the keyword method also has theoretical bases, including Elaboration Theory and Dual-Coding Theory.

**Elaboration Theory.** Cognitive psychologists define the term “elaboration” as a psychological construction, in which a learner would think, organize and analyze to-be-learned information and make a connection between already existing knowledge and the incoming information. Pressley (1982) claimed that in foreign vocabulary learning, elaboration is a critical component of the keyword method by connecting the new information of the target word to the old information of the keyword that is already encoded in the long-term memory to enhance vocabulary learning.

**Dual-Coding Theory.** Paivio’s (1971) *Dual-Coding Theory* proposes that the human brain stores two kinds of coding systems, *verbal* and *visual*. The two systems process and organize different
information. The verbal system represents and processes language, including speech and writing, and the visual system processes nonlinguistic information, including nonverbal objects, events, and situations (Sadoski, 2005). The use of the keyword method involves the linguistic information of the target word, L1 translation, and linguistic explanation as well as the nonlinguistic information of the keyword image and the interactive image between the keyword and the L1 translation. It is the linguistic and nonlinguistic information that creates strong memories of vocabulary learning by using the keyword method (Paivio & Desrochers, 1979).

The Facilitative Effect of the Keyword Method on Receptive Recall Performance

Almost all evidence has revealed that the keyword method is effective for “receptive” learning. Researchers have found a facilitative effect of the keyword method on the learning of word meaning in comparison with a no-strategy condition in different target languages, including: Russian (Atkinson, 1975), Spanish (Levin, Pressley, McCormick, Miller, & Shriberg, 1979), Latin (Pressley, Levin, Nakamura, Hope, Bispo, & Toye, 1980), Tagalog (Wang, Thomas, Inzana, & Primicerio, 1993), German (Desrochers, Gelinas, & Wieland, 1989) and Italian (Lawson & Hogben, 1998).

In addition to the learning of different languages, previous research also indicates that the keyword method is useful across different age levels, ranging from children (Dretzke & Levin, 1990), adolescents (Mastropieri et al., 1990) to adults (Atkinson & Raugh, 1975).
In Taiwan, researchers have also found the facilitative effect of the keyword method on learners’ vocabulary learning for receptive recall performance (Chen, 2003; Li, 1986; Liu, 1977). The results of these keyword method studies suggest that this method helps Taiwanese students learn English vocabulary in receptive learning.

**Conflicting Evidence on Productive Recall Performance**

While a number of studies have found considerable evidence for the facilitating effects of the keyword method on vocabulary learning in terms of receptive recall performance, some have failed to provide positive results on the productive/backward recall performance. Ellis and Beaton (1993) reported that rote repetition was superior to the keyword method for productive recall when a strict scoring criterion was used, even though evidence for facilitative effects of the keyword method exists for receptive learning (acquisition of word meaning). In Ellis and Beaton’s (1993), Pressley et al.’s (1980) and Pressley and Levin’s (1981) studies, the keyword method was inferior to rote repetition or no-instruction for productive learning of foreign language vocabulary.

Pressley and Levin (1981) claimed that the reason for learners’ ineffective productive recall performance results from their unfamiliarity with the knowledge of letter-sound relationships. Therefore, because the goal of phonics instruction is to provide students with information of letter-sound correspondences, the additional training of phonics should enhance students’ productive recall when the keyword method is used to teach students’ English vocabulary.
Description of Phonics Instruction

Phonics refers to a method of teaching children to read and spell. Children are instructed to recognize the relationship between letters and sounds with this method (Lapp & Flood, 1997). For example, a letter “d” is pronounced as “duh,” rather than “dee.” Children are taught the sounds of letters to make up words. They then try to build up the sound of a new or unfamiliar word by connecting the letters with sounds. This is a process of decoding.

Seventy to eighty percent of English words contain regular letter-sound correspondences (Fisher, 1993). Thus, with the instruction on letter-sound correspondences, learners will gradually develop the knowledge between letters and sounds and spelling ability. Based on studies investigating the effect of knowledge of letter-sound correspondences (phonics) on children’s spelling ability, researchers and educators support the importance of phonics instruction in vocabulary learning (Adams, 1990; Baumann & Duffy, 1997; Huang, 1999).

The Effect of the Phonics Instruction on Vocabulary Learning

Studies have demonstrated that phonics instruction is effective in enhancing word recognition and spelling ability. For example, Chall (1967) reviewed studies on phonics instruction since 1910 and concluded that phonics instruction is necessary for beginning reading and it leads to higher spelling achievement. It also enables children to read out words in context or in isolation.

According to the Nine-Year Integrated Curriculum, phonics instruction in Taiwan is primarily emphasized to facilitate students’
vocabulary knowledge, including word recognition, pronunciation, and spelling skills (Ministry of Education, 2003). Studies of explicit instruction on letter-sound correspondences indeed demonstrated that phonics instruction enhances Chinese EFL learners’ vocabulary learning. For example, Chu (2002) provided 102 eighth- and ninth-grade EFL students with explicit instruction on grapheme-phoneme correspondences. The purpose of this instruction was to enhance the students’ decoding skills. The results revealed that explicit phonics instruction, which focuses on letter-sound correspondences, significantly enhances EFL students’ decoding skills. Moreover, Chang (2003) investigated Taiwanese fourth graders’ word recognition and spelling abilities in English by comparing phonics instruction and the reading-and-writing method (students use reading and writing activities to learn word recognition and spelling abilities). The results showed that the phonics group outperformed the reading-and-writing group on both word recognition and spelling abilities tests.

Johnston and Watson (2005) claimed that for native English learners, phonics instruction can not only help them develop letter-sound correspondences, but also help them to acquire word meaning from authentic and meaningful reading. However, the National Reading Panel (2000) pointed out that although phonics instruction is centered on word recognition and on learning to decode print, comprehending the meaning of the print is not emphasized (as cited in Xue & Meisels, 2004). Brewster, Ellis, and Girard (2002) also claimed that in phonics instruction, word meaning is not always emphasized; thus, “sounds and words may sometimes be presented in sound sets but little other contextualization” (p. 111).
Moreover, Huang (1999) maintained that the context in Taiwan for EFL learners is different from English-speaking countries. He argued that Taiwanese learners do not have enough oral vocabulary to develop the knowledge of letter-sound correspondences. Thus, the effectiveness of phonics instruction is not as great as in English-speaking environments.

In sum, the literature reviewed in this section reveals that the keyword method is an effective mnemonic technique to facilitate vocabulary learning. Studies investigating its effectiveness of receptive recall performance indicate that this method greatly enhances learners’ vocabulary learning of word meaning. However, its effectiveness in productive recall performance (i.e., word spelling) is inadequate. On the other hand, studies of phonics indicate that the phonics instruction facilitates learners’ spelling abilities of vocabulary; however, it deemphasizes learning of word meaning. Therefore, it is hoped that combining training in the keyword method and phonics instruction can enhance both learners’ receptive and productive recall performance. So far, no research has been conducted to investigate the combined effects of the keyword method and phonics instruction on Taiwanese children’s learning of English vocabulary. Thus, the present study aimed to provide fifth graders with a combined keyword method and phonics instruction approach to examine whether students’ vocabulary knowledge in terms of both word meaning and spelling ability could be enhanced.
METHOD

Research Design

To explore the combined effects of the keyword method and phonics instruction on vocabulary recall performance, an experimental study was conducted. First, a pilot study was conducted to choose 30 target words. Second, keywords and images were prepared by the researchers in advance. Third, three classes of fifth graders with equivalent English proficiency were selected to serve as the participants for this study. The three classes were randomly assigned into three different treatments: (1) keyword method, (2) phonics instruction, and (3) combined keyword-phonics instruction. Fourth, before the treatments, a receptive vocabulary pretest and a productive vocabulary pretest were conducted. Fifth, the three learning methods were used to teach vocabulary to the participants of the different groups. Each group received three 40-minute learning sessions. All three learning sessions occurred within one week. A total of 30 words were taught to each group over the course of the three learning sessions. The first 30 minutes of each session was devoted to teaching 10 words. In the last 10 minutes of each session, immediate receptive and productive recall tests were conducted for each group. Finally, one week after the three learning sessions were completed, the participants were asked to take delayed receptive and productive recall posttests on all 30 target words.

Participants

The participants were 105 fifth graders from three intact classes of an elementary school. The participants in this elementary school
began learning English in the third grade for two periods per week, with 40 minutes for each period. The students in the three groups were selected according to their scores on the English final exam in the semester prior to the study. The mean scores of the three groups were 88.2, 88.4, and 88.1, respectively. Thus, the three classes’ English proficiency levels were considered equivalent. The first intact class was assigned to the keyword method group, the second to the phonics group, and the third to the combined keyword-phonics group. There were 35 participants in each group. Participants in the keyword method group learned 30 English words by the keyword method. The participants in phonics group learned the same 30 English words with the training on the letter-sound relationships contained in the 30 words. The combined keyword-phonics group was instructed on the same 30 words using both the keyword and phonics methods. The first researcher of the present study was the instructor of the three treatment groups.

**Materials and Training Procedures**

*The target words for the present study.* To select the 30 target words, the researchers first selected a total of 60 English words from the book 智慧字彙書 (理論與方法) compiled by Guey (2000b). In this book, each target word is provided with a keyword and an imagery link between the target word and the keyword. Two criteria were used when choosing the 60 words. First, the 60 words do not appear in the basic 2000 word list for elementary and junior high school students. This criterion was adopted to reduce the possibility that the participants had learned the target words before and thus their
prior knowledge could influence the test results. Second, to avoid the problem that the participants may be frustrated with the difficulty of the selected words, the words contain no more than three syllables. Then, to ensure that the participants were unfamiliar with the words to be learned, a pilot study was conducted. Twenty-one fifth graders who were not recruited for the present study received the test on the 60 words. Finally, 30 words that were not recognized by any of the 21 students were selected. Appendix presents the 30 words selected for the current study.

The training procedures for the three groups. Three learning sessions were provided for each of the three groups. All three learning sessions occurred within one week. Ten words were taught during each session. Learning materials were presented via an overhead projector in the classroom, including the target words and images in the keyword and the combined keyword-phonics groups as well as the target words in the phonics group. To provide the participants with equal chances of learning the target words, the frequency of the researcher pronouncing each target word, the frequency of the researcher saying the Chinese translation, the participants’ chances of reciting the target word and its Chinese translation were all fixed to six times.

For the keyword method group, two steps were required to apply the keyword method to the 30 words.

Step 1: Acoustic link. The learner associates the target word with an L1 keyword that sounds like some part of the target word. A concrete or memorable keyword is preferable.

Step 2: Imagery link. The learner is provided with an interactive mental image of the keyword and its translation referent.
In each learning session, the participants were instructed on 10 of the target words with the keyword method for 25 minutes. Then, they were asked to continue to practice the 10 words with the keyword method for 5 more minutes. Finally, the immediate recall tests on the 10 target words were conducted in the last 10 minutes.

For the phonics group, similarly, the letter-sound correspondences of the 10 target words in each session were taught for 25 minutes. Then, they were asked to continue to practice the 10 words with phonics for 5 more minutes, and the immediate recall tests were conducted in the last 10 minutes.

For the combined keyword-phonics group, the participants were instructed in both the keyword and phonics methods with the same amount of time of 30 minutes in each learning session. For each word, the participants were first taught using the keyword method and then the letter-sound relationships contained in each word were presented. In the last 10 minutes in each learning session, the participants of this group also took the immediate recall tests on the 10 target words.

**Vocabulary Tests**

**Pretests.** Two vocabulary pretests on the 30 target words were conducted one week before the treatments were initiated; one was for the receptive pretest and the other was for the productive pretest.

**Posttests: immediate and 1-week delayed recall tests.** At the end of each learning session, all the participants were given a receptive test and a productive recall test on the 10 words learned in that session. For the receptive recall test, the target words were written on each of the answer sheets, but pronunciation cues of those English
words were not provided. The participants were asked to provide the Chinese translations for the English target words. For the productive recall test, Chinese translations of the target words were written on each of the answer sheets, and the cues of letter-sound relationships were not given. The participants were asked to provide the English spellings from the Chinese translations. The order of the test words was randomized. No feedback was given. The participants were not informed that one week after the three training session they were to be tested again on the 30 target words for both receptive and productive recall tests.

**Scoring of Test Responses**

The present study utilized a strict scoring criterion for both receptive and productive recall tests. Specifically, the participants’ responses on both receptive and productive recall tests were scored on a 0 to 1 scale, where 0 indicates missing or incorrect answers, and 1 indicates correct responses. For the receptive recall test, the participants’ responses revealed their learning of word meaning. Therefore, responses that used either a Chinese translation or Chinese phonetic symbols that presented the correct word meaning were both accepted. However, if the responses did not present the correct meaning of the English words, the responses were scored as incorrect. As for productive recall test, the scoring criterion was stricter than that of the receptive recall. Because the purpose of combining the keyword and phonics instruction was to enhance the learners’ productive recall performance, a correct performance of vocabulary learning was demanded. Therefore, the scoring criteria on the productive recall tests were that if the response indicated missing or
incorrect spelling, the response was scored as incorrect. Scoring for the participants’ responses was carried out by two raters who were graduate students from the Department of English Instruction at Taipei Municipal University of Education.

Data Analysis

To determine if the performance of the three treatment groups (phonics group, keyword group, and combined keyword-phonics group) was significantly different on the immediate and delayed receptive recall tests, a one-way ANOVA test was conducted twice; the first time the immediate receptive recall test scores were the dependent variable, and the second time the delayed receptive recall test scores served as the dependent variable.

Similarly, to determine if the performance the three treatment groups (phonics group, keyword group, and combined keyword-phonics group) was significantly different on the immediate and delayed productive recall tests, a one-way ANOVA test was conducted twice; the first time the immediate productive recall test scores were the dependent variable, and the second time the delayed productive recall test scores served as the dependent variable.

RESULTS AND DISCUSSION

Pretests

Receptive pretest scores. Table 1 shows the data concerning the three groups’ receptive pretest scores, including the highest scores,
the lowest scores, mean scores, standard deviations and ANOVA analysis results. The one-way ANOVA was conducted to see whether there was a significant difference among the three groups before the treatments were initiated. The results indicated that the three groups’ mean scores on the receptive pretest were very low, and no significant difference was found among the three groups at $\alpha = .05$ level, $F (2, 102) = .018, p > .05$. The results suggested that the participants in all the three groups had limited knowledge of the 30 target words. In other words, they could hardly recognize those target words before receiving the treatments.

Table 1

<table>
<thead>
<tr>
<th>Group</th>
<th>Keyword</th>
<th>Phonics</th>
<th>Combined</th>
<th>$F$</th>
</tr>
</thead>
<tbody>
<tr>
<td>n</td>
<td>35</td>
<td>35</td>
<td>35</td>
<td></td>
</tr>
<tr>
<td>Highest</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Lowest</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>.018</td>
</tr>
<tr>
<td>$M$</td>
<td>.77</td>
<td>.74</td>
<td>.77</td>
<td></td>
</tr>
<tr>
<td>$SD$</td>
<td>.73</td>
<td>.70</td>
<td>.73</td>
<td></td>
</tr>
</tbody>
</table>

**Productive pretest scores.** The three groups’ highest scores, the lowest scores, mean scores, standard deviations as well as ANOVA analysis results are listed in Table 2. One-way ANOVA analysis was again conducted to examine if there was a significant difference among the three treatment groups. The analysis showed that the three
groups’ productive pretest scores were very low, and no significant difference was found among the three groups at $\alpha = .05$ level, $F (2, 102) = .012, p > .05$. This result indicated that the participants had limited knowledge of the spellings of those target words. Only a few of them could correctly spell a couple of words based on the given Chinese translations before the treatments.

Table 2

Descriptive Statistics and ANOVA Results for the Participants’ Productive Pretest Scores

<table>
<thead>
<tr>
<th>Group</th>
<th>Keyword</th>
<th>Phonics</th>
<th>Combined</th>
<th>$F$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Highest</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Lowest</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>.012</td>
</tr>
<tr>
<td>$M$</td>
<td>.74</td>
<td>.71</td>
<td>.71</td>
<td></td>
</tr>
<tr>
<td>$SD$</td>
<td>.92</td>
<td>.93</td>
<td>.86</td>
<td></td>
</tr>
</tbody>
</table>

Receptive Recall Performance

*Immediate receptive recall performance.* A one-way ANOVA was conducted to determine the effects of the three learning methods on immediate receptive recall, with the learning methods as the independent variable and the immediate recall test scores as the dependent variable. The three groups’ mean scores and standard deviations of the immediate receptive recall posttest as well as the ANOVA results on the immediate receptive recall scores are listed in Table 3.
Table 3
Descriptive Statistics and ANOVA Results
for the Participants’ Immediate Receptive Recall Scores

<table>
<thead>
<tr>
<th>Groups</th>
<th>Keyword</th>
<th>Phonics</th>
<th>Combined</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>27.20</td>
<td>23.20</td>
<td>28.11</td>
<td>11.360***</td>
</tr>
<tr>
<td>SD</td>
<td>3.63</td>
<td>6.47</td>
<td>2.86</td>
<td></td>
</tr>
</tbody>
</table>

Note. *** p < .001

The results of the ANOVA revealed a significant difference among the three vocabulary learning methods in terms of their effects on students’ immediate receptive recall test scores, $F(2, 102) = 11.360$, $p < .001$. Fisher’s LSD Post Hoc multiple comparisons of the three groups for immediate receptive test indicated significant differences among the three groups. The results are listed in Table 4. First, the keyword group ($M = 27.20, SD = 3.63$) performed significantly better than the phonics group ($M = 23.20, SD = 6.47$) on the immediate receptive recall test. Second, the combined keyword-phonics group ($M = 28.11, SD = 2.86$) significantly outperformed the phonics group. Third, no significant difference was found between the keyword group and the combined keyword-phonics group.
Table 4
Fisher’s LSD Post Hoc Multiple Comparisons for the Participants’ Immediate Receptive Recall Scores

<table>
<thead>
<tr>
<th>Fisher’s Test</th>
<th>Group</th>
<th>Group</th>
<th>Mean Differences</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>phonics</td>
<td>keyword</td>
<td>-4.00000</td>
<td>.000***</td>
</tr>
<tr>
<td></td>
<td>phonics</td>
<td>combined</td>
<td>-4.91429</td>
<td>.000***</td>
</tr>
<tr>
<td></td>
<td>keyword</td>
<td>combined</td>
<td>-.91429</td>
<td>.406</td>
</tr>
</tbody>
</table>

Note. *** p < .001

Delayed receptive recall performance. A one-way ANOVA was conducted again to determine the effects of the three vocabulary learning methods on delayed receptive vocabulary recall. Table 5 shows the mean scores and standard deviations of the three groups on the delayed receptive recall test. Furthermore, the table also presents the results of the one-way ANOVA for the delayed receptive recall scores of the three groups. The analysis demonstrated that learning methods had a significant effect on the delayed recall performance ($F = 5.026$, $p < .01$).

Table 5
Descriptive Statistics and ANOVA Results for the Participants’ Delayed Receptive Recall Scores

<table>
<thead>
<tr>
<th>Group</th>
<th>Keyword</th>
<th>Phonics</th>
<th>Combined</th>
<th>$F$</th>
</tr>
</thead>
<tbody>
<tr>
<td>M</td>
<td>12.80</td>
<td>8.11</td>
<td>13.83</td>
<td>5.026**</td>
</tr>
<tr>
<td>SD</td>
<td>8.01</td>
<td>6.69</td>
<td>8.65</td>
<td></td>
</tr>
</tbody>
</table>

Note. ** $p < .01$
As can be seen in Table 6, Fisher’s LSD Post Hoc multiple comparisons tests indicated that the keyword group \( (M = 12.80, \ SD = 8.01) \) significantly outperformed the phonics group \( (M = 8.11, \ SD = 6.69) \) on the delayed receptive test. In addition, the combined keyword-phonics group \( (M = 13.83, \ SD = 8.65) \) was also significantly better than the phonics group. However, no significant difference was found between the keyword group and the combined keyword-phonics group in terms of their performance on the delayed receptive recall test. To conclude, the results revealed that one week after the treatments, both the keyword group and the combined keyword-phonics group still performed better than the phonics group.

Table 6
Fisher’s LSD Post Hoc Multiple Comparisons for the Participants’ Delayed Receptive Recall Scores

<table>
<thead>
<tr>
<th>Fisher’s Test</th>
<th>Group</th>
<th>Group</th>
<th>Mean Differences</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>phonics</td>
<td>keyword</td>
<td>-4.68571</td>
<td>.016*</td>
</tr>
<tr>
<td></td>
<td>phonics</td>
<td>combined</td>
<td>-5.71429</td>
<td>.004**</td>
</tr>
<tr>
<td></td>
<td>keyword</td>
<td>combined</td>
<td>-1.02587</td>
<td>.594</td>
</tr>
</tbody>
</table>

Note. * \( p < .05 \), ** \( p < .01 \)

Discussion of the receptive recall test results. The preceding sections presented the results of the three vocabulary learning methods on the immediate and delayed receptive recall tests. The results suggest that both the keyword method and the combined...
keyword-phonics methods are more effective in enhancing the participants’ learning of word meaning than phonics instruction for both immediate and delayed recall.

First of all, the results can be explained by Elaboration Theory. According to Elaboration Theory (Rohwer, Raines, Eoff, & Wagner, 1977; Slavin, 2007; Wittrock, 1978), the more connections that are made between word meaning and the target word, the better the information will be remembered and retrieved. In the case of the keyword method application, the interactive image functions as the mediator that connects the target word and its word meaning and thus promoted the effectiveness of learning word meaning.

By contrast, in the phonics group explicit letter-sound relationships were taught, and Chinese translations of new words were also provided. However, explicit instruction on how to remember the word meaning was not offered. Therefore, for the participants in the phonics group, they were learning the arbitrary relationship between the target word and the word meaning. As a result, the only way for them to remember the word meaning was through rote learning. Thus, the participants in both the keyword group and the combined keyword-phonics group had more memory cues of connection to retrieve the word meaning than the participants in the phonics group.

Second, the beneficial effects of keyword learning on receptive recall performance can also be explained by Paivio’s (1971) Dual-Coding Theory. Dual-Coding Theory suggests that through two different coding systems, i.e., verbal and visual systems, information can be stored in the memory, and thus the information can be stored in
the long-term memory for future retrieval. The keyword method utilizes the elements of the dual-coding elements on verbal and visual encoding to consolidate the memory and thus boosts learning effectiveness. In addition, Oxford (1990) maintained that with the use of the keyword method, the target word initially gets into memory and can thereby be recalled from long-term memory via the combination of sound and imagery. Hence, in this study it is the interactive image that allowed learners to get more access to the word meaning, and thus the memory traces in both the keyword group and the combined keyword-phonics group made the students perform better than those in the phonics group. In addition, the advantages of the connections found in immediate recall performance were carried over to the long-term retention.

On the contrary, the participants in the phonics group were provided with the explicit letter-sound relationship knowledge and Chinese translations. In other words, the participants in the phonics group only received verbal information of definition, lacking the visual coding. Therefore, when the phonics learners were asked to write down the Chinese translation, they simply retrieved the word meanings based on verbal information, and thus the results were not as effective as the keyword group and the combined keyword-phonics group.

One thing to be noted is that in the receptive recall test, all the participants were given written English words without any sound cues. Despite this, the results still support the beneficial value of the keyword method. The results may be due to the fact that the participants were fifth graders, and they had already learned some basic knowledge of letter-sound relationships previously. Therefore,
in this study, even though the participants in the *keyword* group and the *combined keyword-phonics* group were not specifically taught on the sound-letter relationships in the target words, they were still able to use their prior knowledge to figure out the approximate pronunciation of the target words. After that, they were able to recall the keywords, which in turn helped them retrieve word meaning.

To conclude, the receptive results suggested that the use of the keyword method, either in the *keyword* group or in the *combined keyword-phonics* group, helped the learners to recognize more words than the *phonics* group. In addition, the beneficial effectiveness of keyword learning was extended one week later. The long-lasting advantage of the keyword learning can be accounted for by both Elaboration Theory and Paivio’s Dual-Coding Theory.

**Productive Recall Performance**

*Immediate productive recall performance.* A one-way ANOVA was performed to determine the effects of the three learning methods on immediate productive recall, with the learning methods as the independent variable and the immediate productive recall test scores as the dependent variable. The three groups’ mean scores and standard deviations on the immediate productive recall posttest are listed in Table 7. Moreover, the table also presents one-way ANOVA results of the immediate productive recall test scores, indicating a significant difference among the three vocabulary learning methods in terms of their effects on the immediate productive recall test scores, $F(2,102)=4.369$. 

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Table 7
Descriptive Statistics and ANOVA Results for the Participants’ Immediate Productive Recall Scores

<table>
<thead>
<tr>
<th>Group</th>
<th>Keyword</th>
<th>Phonics</th>
<th>Combined</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>M</td>
<td>22.63</td>
<td>25.63</td>
<td>26.17</td>
<td>4.369*</td>
</tr>
<tr>
<td>SD</td>
<td>5.62</td>
<td>5.67</td>
<td>4.87</td>
<td></td>
</tr>
</tbody>
</table>

Note. * p < .05

Fisher’s LSD Post Hoc multiple comparisons of the three groups for the immediate productive recall test revealed significant differences among the three treatment groups. First, the phonics group ($M = 25.63, SD = 5.67$) performed significantly better than the keyword group ($M = 22.63, SD = 5.62$). Second, the combined keyword-phonics group ($M = 26.17, SD = 4.87$) significantly outperformed the keyword group ($M = 22.63, SD = 5.62$). Third, no significant difference was found between the phonics group and the combined keyword-phonics group (Table 8).

Table 8
Fisher’s LSD Post Hoc Multiple Comparisons for the Participants’ Immediate Receptive Recall Scores

<table>
<thead>
<tr>
<th>Fisher’s Test</th>
<th>Group</th>
<th>Group</th>
<th>Mean Differences</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>keyword</td>
<td>phonics</td>
<td>-3.00000</td>
<td>.022*</td>
</tr>
<tr>
<td></td>
<td>keyword</td>
<td>combined</td>
<td>-3.54286</td>
<td>.007*</td>
</tr>
<tr>
<td></td>
<td>combined</td>
<td>phonics</td>
<td>.54286</td>
<td>.675</td>
</tr>
</tbody>
</table>

Note. * p < .05
In conclusion, the results revealed that both the phonics group and the combined keyword-phonics group performed significantly better than the keyword group on the immediate productive recall test. This result suggests that the explicit phonics instruction given to the phonics group and the combined keyword-phonics group indeed enhanced students’ spelling abilities.

Delayed productive recall performance. For delayed productive vocabulary recall, one-way ANOVA was used again to determine the effects of the three learning methods on delayed productive vocabulary recall. Table 9 shows the mean scores and standard deviations of the three groups on the delayed productive recall test. The table also provides the results of the one-way ANOVA for the delayed productive recall scores of the three groups. The analysis revealed that the three treatment groups were significantly different in terms of their delayed productive recall performance, F(2,102)=4.316.

<table>
<thead>
<tr>
<th>Group</th>
<th>Keyword</th>
<th>Phonics</th>
<th>Combined</th>
<th>F</th>
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</thead>
<tbody>
<tr>
<td>M</td>
<td>6.91</td>
<td>10.94</td>
<td>12.23</td>
<td></td>
</tr>
<tr>
<td>SD</td>
<td>6.54</td>
<td>8.34</td>
<td>8.64</td>
<td>4.316*</td>
</tr>
</tbody>
</table>

Note. * p < .05

Fisher’s LSD Post Hoc multiple comparisons of the three groups for the delayed productive test revealed significant differences among
the three groups. The results are listed in Table 10. First of all, the *phonics* group (*M* = 10.94, *SD* = 8.34) performed significantly better than the *keyword* group (*M* = 6.91, *SD* = 6.54) on the delayed productive recall test. Second, the *combined keyword-phonics* group (*M* = 23.23, *SD* = 8.64) significantly outperformed the *keyword* group. Third, no significant difference was found between the *phonics* group and the *combined keyword-phonics* group.

**Table 10**

**Fisher’s LSD Post Hoc Multiple Comparisons**

for the Participants’ Delayed Productive Recall Scores

<table>
<thead>
<tr>
<th>Fisher’s Test</th>
<th>Group</th>
<th>Group</th>
<th>Mean Differences</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>phonics</td>
<td>keyword</td>
<td>4.02857</td>
<td>.035*</td>
</tr>
<tr>
<td></td>
<td>phonics</td>
<td>combined</td>
<td>-1.28571</td>
<td>.497</td>
</tr>
<tr>
<td></td>
<td>keyword</td>
<td>combined</td>
<td>-5.31429</td>
<td>.006**</td>
</tr>
</tbody>
</table>

*Note.* *p* < .05; **p* < .01

**Discussion of productive recall test results.** For the productive recall tests, Chinese translations of the target words were written on each of the answer sheets, and the cues of letter-sound relationships were not given. The participants were asked to provide the English spellings from the Chinese translations. Despite the fact that no sound cues of the target words were provided on the tests, the *phonics* group and the *combined keyword-phonics* group still significantly outperformed the *keyword* group on the two productive recall tests. This result is in agreement with Harris and Smith’s (1976), Johnston
and Watson’s (2005), Rhona’s (2004), and Theresa’s (2006) studies which showed that explicit instruction on letter-sound relationships facilitated students’ spelling abilities.

Why might the performance of the *keyword* group be less effective than the other two phonics learning groups on the productive recall test? An explanation is that without the knowledge of the graphophonic cues to retrieve the spellings of the target words from the short-term memory, the participants in the *keyword* group misspelled more words than the other phonics learners. In addition, after a one-week delay, the limited knowledge toward the graphophonic cues also prevented the participants in the *keyword* group from retrieving the spellings of the target words from their long-term memory. Therefore, the results of the delayed productive test show that the two groups receiving *phonics* instruction performed better than the *keyword* group.

More specifically, the productive test required the participants to spell out the English target words; however, the participants in the *keyword* group did not receive explicit information on the letter-sound relationships in the target words. Therefore, when the participants in the *keyword* group were required to spell out the target words, they were less able to segment a word into sounds and convert the sounds into letters. As a result, even if the sound traces of the keywords were recalled, lack of the explicit knowledge on the graphophonic cues might prevent the participants from spelling the target words correctly. For example, the participants in the *keyword* group misspelled the target word *hick* as *heck*, *nap* as *nop*, *sour* as *seur*, *cape* as *cabe*, *bark* as *brak*, etc.
Moreover, this result is in accordance with Pressley and Levin’s (1981) statement that the participants’ unfamiliarity with orthographic-phonological knowledge toward the target words would cause difficulties when the students were asked to spell out the target words. In the present study, the keyword group did not receive instruction on the letter-sound relationships contained in the target words. Accordingly, both the phonics group and the combined keyword-phonics group significantly outperformed the keyword group on the immediate and delayed productive recall test. This suggested that the explicit instruction of letter-sound relationships helped the participants in the phonics group and the combined keyword-phonics group spell out more target words than the keyword group.

**Participants’ Overall Performance**

The results presented in Table 11 show that the participants’ overall performance, including both their receptive and productive recall scores immediately and one week after the treatments. Specifically, the keyword method was effective in promoting the learning of word meaning, while phonics instruction was beneficial in enhancing students’ spelling abilities. As a result, the combined keyword-phonics method facilitated both aspects, i.e., learning of word meaning and English spelling, and the beneficial effectiveness continued to be observed after a one-week delay.
Table 11
ANOVA Test Results for Participants’ Overall Performance and LSD Post Hoc Comparisons among the Three Groups

<table>
<thead>
<tr>
<th>Group</th>
<th>M</th>
<th>SD</th>
<th>F</th>
<th>p</th>
<th>LSD Post Hoc Test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Immediate</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Receptive</td>
</tr>
<tr>
<td>phonics</td>
<td>23.20</td>
<td>6.47</td>
<td></td>
<td></td>
<td>keyword &amp; combined &gt; phonics</td>
</tr>
<tr>
<td>keyword</td>
<td>27.20</td>
<td>3.63</td>
<td>11.360</td>
<td>.000***</td>
<td></td>
</tr>
<tr>
<td>combined</td>
<td>28.11</td>
<td>2.86</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Productive</td>
</tr>
<tr>
<td>phonics</td>
<td>25.63</td>
<td>5.67</td>
<td></td>
<td></td>
<td>phonics &amp; combined &gt; keyword</td>
</tr>
<tr>
<td>keyword</td>
<td>2.63</td>
<td>5.62</td>
<td>4.369</td>
<td>.015*</td>
<td></td>
</tr>
<tr>
<td>combined</td>
<td>26.17</td>
<td>4.87</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Delayed</td>
</tr>
<tr>
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<td></td>
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<td>Receptive</td>
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<td>phonics</td>
<td>8.11</td>
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<tr>
<td>keyword</td>
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<td>8.01</td>
<td>5.026</td>
<td>.008**</td>
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<tr>
<td>combined</td>
<td>13.83</td>
<td>8.65</td>
<td></td>
<td></td>
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<td></td>
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<td></td>
<td>Productive</td>
</tr>
<tr>
<td>phonics</td>
<td>10.94</td>
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<td>phonics &amp; combined &gt; keyword</td>
</tr>
<tr>
<td>keyword</td>
<td>6.91</td>
<td>6.54</td>
<td>4.316</td>
<td>.016*</td>
<td></td>
</tr>
<tr>
<td>combined</td>
<td>12.23</td>
<td>8.64</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. * p < .05; ** p < .01; *** p < .001
CONCLUSION AND IMPLICATIONS

Major Findings of the Current Study

The results revealed that although the three groups’ input was equal, different effects were produced. More specifically, the keyword method can enhance learners’ learning of word meaning, but it is not as effective as phonics in helping students remember word spelling. On the other hand, phonics instruction can promote learners’ spelling abilities, but it is not as useful as the keyword method in helping students remember word meaning. The combined keyword-phonics method is effective in promoting students’ learning of both word meaning and spelling at the same time, and the combined effectiveness can also be extended after a one-week delay.

Concerning the overall performance of the three groups, it is concluded that the combination of the keyword method and phonics instruction contributes to a beneficial effect on the elementary school students’ learning of English vocabulary, not only in the aspect of remembering word meaning but also in enhancing their spelling abilities.

Pedagogical Implications

Based on the experimental results of the current study and the comparisons with previous studies, the findings of the present study lead to several implications for pedagogical practice. First of all, combining the keyword method and phonics instruction enhances students’ learning of both word meaning and spelling. The findings of the current study lead us to believe that combining these two methods is beneficial in helping elementary school students learn English
vocabulary.

Second, other aspects of vocabulary learning beside word meaning and spelling are worth teaching and learning. The present study found that the keyword method was helpful in enhancing students’ learning of word meaning and that phonics instruction could enhance students’ spelling abilities. Combining these two methods was beneficial in facilitating students’ both abilities. However, there are more aspects of vocabulary learning besides word meaning and spelling. Since no single method can cover all aspects of vocabulary learning at the same time, other vocabulary learning strategies should be introduced to students, such as using word analysis strategies (prefixes, roots, and suffixes), guessing from the context, teaching words as part of a semantic field (word categories), and so forth.

Third, the researcher observed that the students in the keyword method group talked with each other about the keywords and their images of the target words during the treatment instruction and during the break time. The learners proposed that they were interested in generating their own keywords and images. Many students recommended that there were other keywords and images they thought were easier to remember and were closer to the sounds of the target words. However, Levin (1983) found that for beginning learners, teacher- or researcher-provided keywords and images were better than self-generated ones. This is why the researchers of this study provided the keywords and the interactive images used in the training sessions. However, it was found through this study that the fifth graders were able to generate their own keywords and images. It is suggested that teachers can provide opportunities for students in the
fifth grade or higher to come up with their own keywords and images in the use of the keyword method. Nonetheless, since the quality of images used in the image link has been identified by Beaton and his colleagues (2005) as a critical factor determining the effectiveness of the keyword method, teachers should ensure the quality of student-generated keywords and images before they are used.

Fourth, some oral feedback was obtained from some students concerning how many words should be taught in one session during the experiment. Specifically, after the testing sessions, some students complained that learning 10 words for each 40-minute learning session was too overwhelming. They suggested that seven words would be a more appropriate number. Thus, it is suggested that six to seven words for each 40-minute learning session may be the optimal number of words.

Finally, although the results of this study showed that the provision of an acoustic link via an L1 keyword was helpful for students to remember word meaning, teachers should take measures to prevent the potential negative effect of the keyword method on students’ pronunciation accuracy. For example, in this study, the instructor always presented the correct pronunciation of the target word before introducing the keyword. In addition, the participants were constantly reminded that the keyword should only be used as a memory aid, not as a correct model for word pronunciation.

**Limitations of the Present Study and Suggestions for Future Research**

Although the current study supports the combination of the keyword method and the synthetic phonics instruction on enhancing elementary school students’ vocabulary learning, several limitations
of the present study should be noted. First, all the participants were from the same elementary school. Although the participants’ performance might reflect the learning results of the vocabulary learning methods, it is not representative of all the Taiwanese elementary school students. Therefore, in order to generalize the results to a larger population, it is suggested that for future research, students from different elementary schools can be recruited as participants.

Second, the delayed effectiveness of the learning methods can be investigated beyond a one-week interval. The retention effect of the keyword method, phonics instruction, and the combined keyword-phonics technique on vocabulary learning was examined in the present study. The values of engaging both verbal and visual coding in use of the keyword method enabled the students to remember the target words even after a one-week interval. Similarly, the merit of graphophonetic cues assisted the students in becoming capable of retrieving the spellings of the target words from long-term memory. However, it is an open question regarding whether the delayed efficacy can remain for longer intervals. Future research studies thus can lengthen the interval to examine the retention effects of the three methods on vocabulary learning.

Third, in the present study, how students with different proficiency levels reacted to these three treatments was not examined. To further investigate the learning effects of the keyword method, phonics instruction, and the combined keyword-phonics method on the students’ vocabulary learning, future studies might include students with different proficiency levels. Given that different learners
have different prior knowledge and ways of learning English, different learning effectiveness may exist for students with different proficiency levels.

Fourth, the productive recall tests used in this study assessed students’ spelling abilities. However, whether or not students can orally produce the target word is another type of productive performance. In fact, many English teachers in Taiwan are concerned that the imprecise sound representation of the keyword (e.g., 麻辣雞 for mirage) might affect the pronunciation accuracy of beginning EFL learners. Thus, it is recommended that future studies can investigate the effect of the keyword method on word pronunciation.

Finally, future studies can investigate how students perceive different vocabulary learning methods. Individual students may have different reactions to the different vocabulary learning strategies. The current study investigated the effects of the three methods on students’ vocabulary learning, without examining the students’ perceptions of those treatments. Thus, researchers in future studies can examine students’ perceptions of different vocabulary learning methods. The findings can help teachers determine what vocabulary learning methods will be appropriate for their students.

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**ABOUT THE AUTHORS**

Fang-Yi Lin received her MA degree from the Graduate Institute of English Instruction at Taipei Municipal University of Education.

Chin-Kuei Cheng received her doctoral degree in Curriculum and Instruction with a specialization in TESL from the University of Kansas. She is now an associate professor in the Department of English Instruction at Taipei Municipal University of Education. She teaches courses related to teaching English as a second/foreign language. Her major research interests include schema theory research, reading strategies, metacognition, vocabulary acquisition, and extensive reading.
### APPENDIX

**The 30 Target Words for the Current Study**

<table>
<thead>
<tr>
<th>Learning Session 1</th>
<th>Learning Session 2</th>
<th>Learning Session 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>hare</td>
<td>booth</td>
<td>stun</td>
</tr>
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<td>dilemma</td>
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<td>spit</td>
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<tr>
<td>lug</td>
<td>cable</td>
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融合「關鍵字學習法」及「字母拼讀法」之教學
對於國小五年級學童學習英語單字之影響

摘要
本研究之目的為探討融合「關鍵字學習法」及「字母拼讀法」對於國小學童學習英語單字的效益研究。本研究對象為一百零五位國小五年級學童，學習三十個英文單字。學童分為三組：關鍵字組、字母拼讀組、及融合關鍵字與字母拼讀學習組，各組學童在一週內分別以該組的學習法學習英文單字共三次。每次學習十個單字，學習後會有立即的單字學習測驗，測驗項目有「字義」測驗及「英語拼字」測驗兩項。訓練結束一週後學童再接受相同的測驗。研究結果顯示：(一)「關鍵字學習法」與「融合關鍵字學習法與字母拼讀法」兩組在「字義」的測驗上無論在立即測驗或一週後延宕測驗均顯著優於使用「字母拼讀法」的學童。(二)「字母拼讀法」與「融合關鍵字學習法與字母拼讀法」兩組在「英語拼字」的測驗上無論在立即測驗或一週後延宕測驗均顯著優於使用「關鍵字學習法」的學童。綜觀上述結果，融合「關鍵字學習法」與「字母拼讀法」不僅有助於學童於「字義」上的學習，更能提升「英語拼字」能力。

關鍵詞：關鍵字學習法 字母拼讀法 英語單字學習