The Effect of Keyword and Pictorial Methods on EFL Learners' Vocabulary Learning and Retention

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ABSTRACT: This research investigates how the two different mnemonic non-verbal approaches (the keyword method [KWM, here after] and Pictorial method) to teaching lexical items affect learning and retention of vocabulary items. For this purpose, 60 adult female elementary students studying English at a language school in Isfahan were chosen to participate in this study. After homogenizing the participants, they were then randomly divided into three equal groups (two experimental groups and one control group). At the end of each section of the treatment, a battery of quizzes were used to measure the participants' short-term memory recall of the lexical items. Two weeks after the treatment, a multiple-choice delayed-posttest of vocabulary was administered to compare vocabulary achievement among the three groups. The results revealed the effect of the keyword method on the participants' vocabulary learning. Analysis of immediate posttest and delayed posttest also confirmed the hypothesis that the participants who used the keyword method could store and retain vocabulary items in their long-term memory better than those who used the pictorial method.
Keywords: Mnemonics, Keyword method, Pictorial method, Long-term memory, Short-term memory, Retention

El efecto del método Keyword y otro basado en imágenes pictóricas para el aprendizaje y retención de vocabulario en estudiantes de inglés como lengua extranjera

RESUMEN: Esta investigación indaga cómo dos aproximaciones nemotécnicas diferentes no verbales para enseñar léxico (el método Keyword [KWM] y el método basado en imagines pictóricas) afectan al aprendizaje y la retención de vocabulario. Para ello se seleccionó a sesenta estudiantes, todas ellas mujeres, de nivel elemental que estudian inglés en una escuela de idiomas en Isfahan. Después de homogeneizar a las participantes, fueron agrupadas aleatoriamente en tres grupos iguales (dos grupos experimentales y un grupo de control). En la último parte de cada sección del tratamiento, se pasaron una serie de pruebas para medir el nivel de recuerdo a corto plazo de las participantes de los términos léxicos. Dos semanas después, se les pasó una prueba alternativa post-test de vocabulario para comparar el logro en la adquisición de vocabulario entre los tres grupos. Los resultados revelaron el efecto del método Keyword en el aprendizaje de vocabulario de las participantes. Análisis de post-test inmediato y post-test posterior también confirmaron la hipótesis de que las participantes que usaron el método Keyword pueden guardar y retener nuevo vocabulario en su memoria a largo plazo mejor que las personas que usaron el método de imagines pictóricas.
Palabras clave: Nemotécnico, método Keyword, método de imágenes pictóricas, memoria a corto plazo, retención

1. INTRODUCTION

Experienced teachers of English as a second language know very well how important vocabulary is. Laufer (1997) argues for the fact that vocabulary learning is at the heart of any language learning and language use. Metaphorically, Zhan-Xiang (2004) explains that Words of a language are just like bricks of a high building; despite quite small pieces, they are vital to the great structure. If we spend most of our time studying grammar, our English will not improve enormously, much improvement is attained if we learn more words and expressions; little can be said with grammar but almost anything with words (Thornburry, 2002). Researchers now view vocabulary as an important language component upon which effective communication relies (Oxford & Scarella, 1994).

Regardless of this importance, for many years, there was little or no emphasis on vocabulary teaching. It was supposed that students could learn all the words they need without the help of their teachers. But is it actually possible to learn L2 words without the help of teachers (specifically if learners live in an EFL context)? Recently, researchers pay more attention to a number of strategies and techniques for teaching vocabulary (e.g. Rott, Williams & Cameron, 2002; Min, 2008; Boers, Piquer Piriz, Free, & Eyckmans, 2009; Mizumoto, & Kansai, 2009; Hummel, 2010; Shen, 2010). One reason is that these researchers have mostly dealt with lexical problems. Through research the scholars are finding that lexical problems frequently interfere with communication; communication breaks down when people do not use the right words (Allen, 1983). Studies in vocabulary learning are considered as a "promising area of inquiry" (Ellis, 1990, P. 214).

Now that there is general agreement among vocabulary specialists on the point that lexical competence is at the very heart of communicative competence, there is a need for expanding the body of experimental studies to address several key questions about the effectiveness of different strategies and techniques of L2 vocabulary instruction on learning and retention. Following this line of investigation, the present study is aimed at giving learners and teachers some insights into the effectiveness of key-word and pictorial methods of instructions on L2 lexical learning and retention.

2. THEORETICAL BACKGROUND

After a long period of relative neglect, language teachers and researchers have recently been cognizant of the fact that vocabulary is an important aspect of language, which is worth investigating. However, learners usually admit that they experience considerable difficulty with vocabulary and many of them identify the acquisition of vocabulary as their greatest source of problems. The problem is to discover which ways or skills will best help learners better learn, retain and retrieve vocabulary. Consequently, it is essential for language teachers to be aware of the effectiveness of different methods of vocabulary teaching to choose the ones that are the most effective to their students; this is what we follow in this experimental study.

A number of researchers have recently examined the fruitfulness of different techniques of vocabulary instruction (Rott, Williams & Cameron, 2002; Singleton, 2008; Min, 2008; Mizumoto, & Kansai, 2009; File & Adams, 2010). Formal second language vocabulary ins-

truction, indeed, should be based on a variety of teaching techniques and activities in order to cater for individual learning styles and to break the classroom routines. It is of extreme importance to encourage learners' active participation in vocabulary learning and cooperation with their peers and the teacher (Singleton, 2008). Following this line of research, Rott, et al, (2002) investigated the effectiveness of 'multiple-choice L1 glosses and input-output cycles on lexical acquisition and retention'. Using immediate assessment of word knowledge after the treatment, they found that the multiple- choice gloss treatment resulted in significantly deeper receptive and productive word gains, but retention of receptive word gain was significantly achieved only via the combined treatment condition. In a quasi-experimental study, Min (2008) compared the effectiveness of reading accompanied by vocabulary enhancement activities and narrow reading. The analysis revealed that students in the reading plus vocabulary (RV) group significantly outperformed those students in the narrow reading group in a vocabulary learning and retention tests. Hence, the researcher concludes that reading plus focused-vocabulary exercises are more effective and appropriate than narrow reading in vocabulary acquisition and retention among EFL secondary students.

Similarly, Mizumoto, and Kansai (2009) investigated the effect of explicit instruction of vocabulary learning strategies of Japanese learners' vocabulary knowledge and motivation, their results showed that students in an experimental group outperformed those in control group. Their findings, they claim, make contributions to a better understanding of strategies in general and vocabulary learning strategies in particular. File and Adams (2010) compared the isolated and integrated vocabulary teaching with reading; they revealed that both instructional techniques came to more learning and retention of vocabulary knowledge than incidental exposure alone.

Meanwhile, over the past two decades, research has revealed a great deal about vocabulary learning strategies which learners exploit in order to improve their vocabulary (Stoffer, 1995; Schmitt & Schmitt, 1995; Schmitt, 1997; Rodriguez & Sadoski, 2000; Nation, 2001; Shapiro, & Waters, 2005; Sagarra & Alba, 2006; Atay and Ozbulgan, 2007). Nation (2001), for instance, proposed a guessing strategy based on clues extracted from context. Similarly, Schmitt and Schmitt (1995) recommended arranging the notebook in a loose-leaf binder or index card file, in which, for example, students write word pairs and semantic maps, which help them visualize the associative network of relationships existing between new and familiar words.

ESL/EFL teachers should agree to apply different strategies in teaching vocabulary so that students could easily boost their vocabulary repertoire. For example one such strategy could be the use of mnemonics. Mnemonics are basic kinds of associations or strategies used by learners to increase the retention and retrieval of lexical items (Hatch and Brown, 1995).

The mnemonic technique under investigation in this study is called keyword method for which we can find different definitions in the literature (Holden, 1999; Hustiljn, 1997; Paivio, 1983; Thompson, 1987) the most comprehensive of which is the definition provided by Hulstijn (1997):

The keyword method comprises three strategies: 1- an L1 or L2 word, preferably referring to a concrete entity, is chosen based on acoustic/orthographic similarity with the L2 target word; 2- a strong association between the target word and the keyword must be constructed, so that the learner, when seeing or hearing the word is immediately reminded of

the keyword; 3- a visual image must be constructed combining the referents of the keyword and the target word, preferably in a salient, odd, or bizarre fashion in order to increase its memorability. (P. 204)

To materialize the definition of the keyword method offered above, an example from Persian may help clarify the point. To teach the meaning of the word "magician", the teacher points to a culturally familiar example in Persian like "AJI Maji", when the magician says, "Aji Maji", and takes a rabbit out of his sleeve. Here the teacher links the meaning of English word "magician" with the meaning of Persian word "Aji Maji" using some phonological similarity between them. The word "Aji Maji" is not the exact English equivalent of "magician", but the context in which its meaning is clarified conveys such idea. There are plenty of such examples across Persian and English which appear in both immediate and delayed vocabulary tests.

The keyword method has been shown to be an effective procedure for the acquisition of vocabulary in L2 learning. A number of studies have investigated the effects of instruction based on mnemonics on vocabulary learning. For example, McDaniel and Pressley (1989) compared the keyword technique, in which students learn words through the combination of an auditory and imagery link, with the context method and found the former to be significantly more facilitative to learning than the latter. However, for longer term retention, findings related to the effect of use of the keyword method are more mixed, with some research demonstrating growth in recall after an immediate decline (Lawson &Hogben, 1998) and other research showing decline in levels of recall (e.g., Avila & Sadowski, 1996 and Wang & Thomas, 1995). To our knowledge and experience, we suppose that the mixed results seem to be associated with use of different experimental procedures and testing protocols applied in these studies.

Another study by Pressley, Levin, and Miller (1981) carried out an experiment with elementary school students in which keyword training facilitated the recall of Spanish words with both concrete and abstract referents. For materializing the keyword method, Olshtain and Barzilay (1991) used English-language vocabulary items of a rare and rather technical kind. They found keyword superiority for concrete but not for abstract words on immediate post-testing.

In addition, there was some evidence that the imagery KWM actually hindered recovery of abstract concepts two weeks later. In Fang's (1985) study, five intact classes were taught three lessons of medical terminology by one or more of the three methods: traditional, keyword in the classroom and keyword in individualized learning. Results indicated that the class taught to use the keyword strategy retained the medical terminology to a significantly better extent than the class taught by a traditional method.

Recently, studies on the effectiveness of the keyword method again proved to be significant (e.g. Shapiro & Waters, 2005; Sagarra & Alba, 2006; Atay and Ozbulgan (2007). With the aim of exploring the cognitive processes underlying KWM for foreign vocabulary learning, Shapiro and Waters (2005) designed an experiment to investigate its effectiveness. Their findings revealed that the KWM was effective because it offered a meaningful visual image upon which to base memory for a new word's meaning. Sagarra & Alba (2006, using different mnemonic methods, indicated that vocabulary learning techniques requiring deeper processing through form and meaning associations, that is, the keyword method) yield the best retention. Atay and Ozbulgan (2007), compared the performance of students trained

in bidirectional retrieval using the keyword method to learn new Spanish words and their English definitions with that of control group students who used the standard keyword procedure; the results confirmed that there was a noticeable difference in the level of recall between the two groups: the retrieval group recalled about 70% of the meanings of the 11 target words, while the level for the standard group was about 50%. Therefore, almost all studies that have so far investigated the effectiveness of the keyword method confirm its significant role in L2 vocabulary learning and retention.

Moreover, Crutcher & Ericson, 2000 and Crutcher & Ericson, 2003, identified two models of retrieval that could be operative during recall of the definition of FL words that had been learned using the keyword method. In the direct access model of retrieval, it is proposed that retrieval occurs through accessing of a simple associative link between the FL word and the definition, without the involvement of the mediational keyword. In contrast, in the mediational model retrieval results from accessing the keyword mediator that links the FL word and its definition. Using Spanish–English vocabulary items Crutcher & Ericson (2000) found that the evidence available from accuracy, latency and verbal report data supported the mediational model of retrieval when moderate amounts of practice used in most keyword research is provided. When the amount of practice given to the vocabulary pairs was substantially increased, the pattern of recall performance was more compatible with "a process in which the English equivalent is directly accessed from the Spanish word with no intermediate working memory steps" (p. 1312).

Empirical evidence has so far demonstrated that pictorial clarification assists learners to comprehend and maintain L2 idioms. However, in their study, Boers, et al. (2009) called into question the claim that pictorial elucidation is helpful. That is, as far as their findings can be generalized to vocabulary learning, they may cast doubts on "the rather indiscriminate and abundant use of pictorials in modern textbooks and CALL packages" (p. 367). As we will observe in the 'Discussion section' of this paper below, Boers, et al.'s findings are also corroborated regarding the second experimental group.

Within the framework of dual coding theory, Shen (2010) compared two methods: verbal encoding and verbal encoding plus imagery encoding. Analysis of the results revealed that, compared with the verbal encoding method, the verbal plus imagery encoding method does not demonstrate a greater effect in retention of the sound, shape, and meaning of concrete words, but statistically significant differences are present in retention of the shape and meaning of abstract words. Her findings hence support dual coding theory and confirm the importance of visual learning in Chinese vocabulary acquisition. Hummel (2010) explored whether translation activities can impede or help short-term vocabulary retention. Although the researcher found significant effect of translation on short-term vocabulary retention for the three conditions, more important advantage was obtained regarding the "rote-copying condition" than the two translation conditions. Hummel's findings are notably related to what is found in this study concerning the effect of translation technique on vocabulary learning and retention. All in all, the results of the studies discussed in this section all confirm the positive role of strategies and techniques in acquisition and retention of foreign language learners regarding L2 vocabulary.

Although the effectiveness of mnemonics, especially KWM in vocabulary instruction, has been proven in several studies (discussed above), researchers indicate that they should not serve as a substitute for the principles of contextual learning, but must be added to the

contextual method when this is necessary and applicable (Hall, Wilson, & Patterson, 1981). Considering the fragility of vocabulary learning through translation-focused input, this study aimed at investigating the effect of two non-verbal methods, the keyword method and the pictorial method, on vocabulary retention. More information regarding the present study will be provided in the following sections.

3. PURPOSE AND RESEARCH QUESTIONS

Considering language learning conditions in Iran, in which learners usually memorize word lists through translation techniques, there appears a need for students to be presented with some non-verbal techniques of vocabulary teaching to be better able to learn, retain and recall vocabulary. Concerning the important and frequently asked questions of students –"how can we learn vocabulary in an effective way?"–, they usually find vocabulary learning difficult and assert that they can not remember many of the words they have learned. Considering the students' needs for vocabulary learning and their interest in learning effective techniques for learning new words, the present study was intended to find out the influence of two non-verbal methods of teaching vocabulary and compare them with a traditional verbal method (translation). Hence, the following research questions were addressed:

1-Do the different types of instruction on vocabulary (the key-word method, pictorial method and translation) affect learners' vocabulary development differently?

2-Do the two non-verbal techniques of vocabulary teaching differ significantly in terms of permanency of the acquired items? (Which one leads to the storage of the lexical items in long – term memory?)

According to what was found in the literature (especially Shapiro, & Waters, 2005; Sagarra & Alba, 2006; Atay and Ozbulgan, 2007), it was hypothesized that the new method of teaching, KWM, affected the participants' vocabulary learning and retention.

4. METHOD

4.1. Participants

The population from which the participants were selected for this study included Iranian EFL learners whose first language is Persian. To begin data collection, almost all the students at the Elementary level at an English institute in Isfahan were initially considered to participate in the study. The sample participants who had voluntarily agreed to take part in this study were all female EFL learners in a language school in Isfahan, who enrolled for the 2008 summer English courses . Female students were chosen only so as to neutralize the potential effect of sex on the outcome of the study. Their age range was between eighteen to thirty-two (i.e., mainly adults) and this was kept constant too, in order to eliminate the age effect. From the existing students, eighty of them initially were chosen to take part in this study. 60 students comprised the final number of participants in the study. The reason for reducing the number of the participants to 60 was that because 20 of them had either extremely high or extremely low scores on the test.

Moreover, this study followed a pretest-posttest-immediate and delayed posttest design to determine whether the keyword method could affect the participants' vocabulary learning and retention. For this purpose, the participants were all equally and randomly (using Tables of random numbers) distributed in the three groups so each group had twenty female homogeneous adult participants at elementary level. The reason for having 20 participants in each group was to allow and arrange for equal numbers of students in each group and, therefore, keep the number of the participants the same among the three groups in the study.

The three groups of the study were then arranged, according to the purpose of the study, in the following ways:

1- The first experimental group, EG1, which was supposed to receive the treatment in the form of the keyword method;

2- The second experimental group, EG2, which had to receive instruction based on pictorial representation of the words; and

3- The third group, as the control group (CG), which was to receive no effective instruction.

4.2. Instrumentation

For the purpose of data collection, four instruments were prepared, which will be described in order:

4.2.1. The Nelson test

In this study, the Nelson test was used at the beginning of the study for determining the participants' proficiency level. The reason behind using such a test was to curtail the effect of subject selection on the outcome of the study.

4.2.2. Pre-Test of target words

To make sure of the students' unfamiliarity with the target words, a test of vocabulary was used prior to the experiment. This was a test with one hundred items; each item questioned the meaning of one of the target vocabulary items. The words were chosen from "Elementary Vocabulary" by Thomas (1990), and from "The Oxford Picture Dictionary" by Shapiro (1999). To suit the purpose of the study, the words had to meet three criteria: first, they had to be appropriate for the students' level; second, those words that lend themselves to pictures were chosen; third, words that can have a strong phonological similarity with an L1 (here Persian) or L2 word were selected. Twenty words were discarded from the experiment, because they were not new for most of the students. Therefore, eighty words with which no student was familiar were used in the study and together they formed the content of the pretest.

4.2.3. Immediate post-tests

Five multiple-choice vocabulary-in-short- context tests (quizzes) were constructed in order to test the participants' short-term memory regarding the instructed lexical items at the

end of each session. These quizzes comprised 5 to 6 items based on the words instructed on that particular day.

4.2.4. Delayed Post-test

An eighty-item recognition vocabulary –in- short- context test was also constructed to measure the learners' lexical acquisition and recall. The posttest was administered two weeks after the treatment to test retention of the learned words in long-term memory.

In addition, to assure the content validity of both immediate and delay post-tests, two scholars in the field examined them thoroughly and meticulously. After the content of the tests was deemed suitable for the purpose of the instruction, some modifications were specifically made on the included items based on the experts' suggestions in order to alleviate the existing problems.

4.3. Piloting

After preparing the items and before starting the experiment the tests were piloted with some students similar to the participants of the study in terms of English background to remove any potential flaws and to find out whether the instructions are comprehensible , the allotted time is enough, and the distracters are effective or not. In the piloting stage, 50 students took the immediate post-tests and the delayed posttest. These students had studied most of the target words before. After calculating item difficulty and item discrimination and choice distribution, some ineffective or malfunctioning items were either excluded or modified from the final version of the tests, and using KR21, the reliability obtained was .075. As a result of the revision process, the tests were eventually prepared for the main study.

4.4. Procedures

First, a fifty-item Nelson test of language proficiency was used to ensure homogeneity of the students. This general proficiency test was adopted from Nelson English Language Test. All the eighty students took part in the test. They were given forty five minutes, as required by the test to react to the questions. The results were then used to select those students who were supposed to be the final participants of the study. Those students whose scores fell between15-36 were chosen, based on the test requirement, for the final data analysis.

Second, the pretest was administered to the participants. The students were asked to write the Persian translation or the English definition of each word in front of it or simply tick it if they knew it but they could not remember.

•**Treatment**
After administrating the test of vocabulary unfamiliarity and Nelson test, there remained 60 participants and 80 words with which none of the students were familiar. These words were then divided into groups of five to six words to be taught during each session. The reason for exposing the participants to 5-6 words each session lies in Finocchiaro and Bonomo's assertion (1973) that in general, no more than about eight new words should be presented at one time; otherwise, it is not manageable by the students. The treatment lasted 15 days of instruction: thirteen sessions every day, each session 15 minutes.

In EG1, the keyword method was introduced in the first session of the experiment. In EG2, the pictorial method was explained in the first session. In the CG, papers including the same five to six words as the experimental groups were distributed among the learners and they were justified to memorize these words just by reading the Persian equivalent of each word written in front of it.

Right after the treatment, first, five multiple-choice vocabulary tests were administered as the immediate posttests. They were designed to measure short-term memory of the participants regarding the words taught the same day by the instructor. So they were administered randomly in five sessions immediately after the instruction of the day and the questions were based on just the words presented in the very session. The time the students had to answer the questions of each quiz was six minutes. The average of each student's score on these five quizzes was recorded as her short-term memory score.

Second, two weeks after the treatment, the delayed posttest was administered to measure the subjects' long-term memory regarding the instructed words. The test comprised all the 80 words which were taught during the treatment. The time for this test was 50 minutes. The learners were supposed to select the word that was the most appropriate among other choices to complete the meaning of the provided sentence or sentences for each item and to mark it in their answer sheets. The order of the items in the test was different from the order in which the target words were instructed to avoid memorization effect.

• **Scoring procedure**

As far as the scoring of the Nelson test is concerned, 1 point was given for each correct answer, and zero for each incorrect one. Next, the correct answers to the whole test were added up to a total sum. This total sum was considered in the following procedures for deciding upon language proficiency of learners. Those whose scores were ranging from 15 to 36 were chosen.

It was noted in the earlier sections that each immediate posttest included 5 questions and every student took five immediate posttests after some random sessions. With respect to the scoring procedure, each question was assigned four points; so each correct response had four points, whereas, wrong responses or items with no answers were given zero. Then the average of the sum of the scores on these five immediate posttests was calculated, for each individual student, to be used as the score of each participant on short-term memory recall in later analyses. Likewise, participants' answers on the delayed posttest were collected and each single question was assigned one point. These scores were then used as long-term memory recall scores.

Relevant to the purpose and the nature of obtained data, various statistical measures were used, namely one-way ANOVA, and one-way MANOVA. Following is the report of how obtained data were analyzed.

5. Results

In order to investigate the research questions posed in this study, a number of analyses were run and the following findings and results were obtained:

5.1. The relationship between the type of instruction and vocabulary development

After the treatment, subjects took a multiple-choice vocabulary in a short-context test containing eighty questions. Their scores on this test were summarized, described and analyzed, the results of which appear in the Tables below.

Table 1. Descriptive statistics for each groups' performance on the delayed posttest

	N	Min	Max	Mean	St d.	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Deviation Statistic	Statistic	St d. Error	Statistic	St d. Error
Keyword	20	26.00	80.00	62.6500	15.98445	-1.117	.512	.270	.992
Pictorial	20	25.00	75.00	50.3500	15.31176	.147	.512	-.746	.992
Control	20	24.00	70.00	45.0500	13.69777	.354	.512	-.843	.992

As is clearly depicted in Table 1, the mean scores show that the first experimental group (EG1) did much better than the other two on the posttest. In addition, the second experimental group (EG2) performed better on the test than the control group, which scored the lowest on the test. Figure 1 reflects group means:

1= the keyword method
2= pictorial method
3= translation
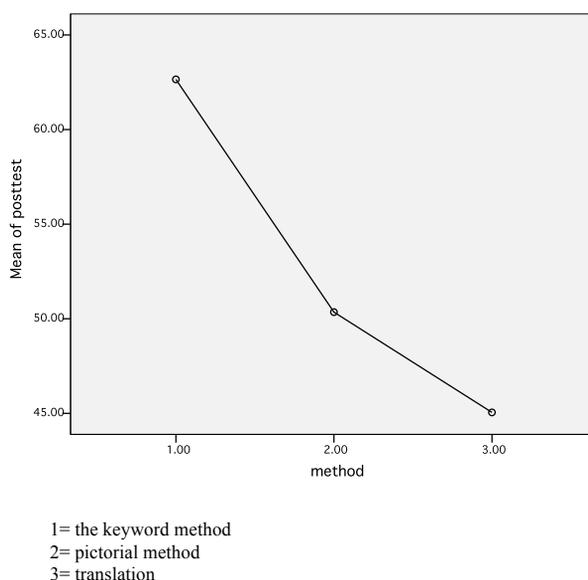
Figure 1. Means Plots.

In order to make these descriptive findings more meaningful, inferential statistics like analysis of variance (ANOVA) was required. To investigate the hypothesis regarding EG1 students' success in vocabulary development over the EG2 and CG, a one-way analysis of variance (ANOVA) was run regarding the results of the posttest, and the groups were com- pared so as to locate the point of significance between and among the groups in the study. Table 2 presents the results.

Table 2. One-way analysis of variance on the posttest scores of the three groups

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	3260.933	2	1630.467	7.219	.002
Within Groups	12874.05	57	225.861		
Total	16134.98	59			

This table gives both between-groups and within-groups sums of squares, degrees of freedom, F value etc. The sig value is .002. Since .002 is smaller than .05, (.002<.05), there is a significant difference somewhere among the mean squares on the independent variable (posttest scores) for the three groups. As is observed in Table 2, these results coincide with what is illustrated in the means table further above (Table 1), where the mean tended to change with each group in the case of the posttest. Having received a statistically significant difference, we can now look at the results of the post-hoc tests provided in Table 3 to be able to locate the "source" of significance in our data.

Table 3. Post-hoc tests

(I) method	(J) method	Mean Difference (I-J)	St d. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
1.00	12.30 3.00	12.30000*	4.75248	.032	.8635	23.7365
		17.60000*	4.75248	.001	6.1635	29.0365
2.00	1.00 3.00	-12.30000*	4.75248	.032	-23.7365 -	-.8635
		5.30000	4.75248	.509	6.1365	16.7365
3.00	1.00 12.30	-17.60000* -	4.75248	.001	-29.0365 -	-6.1635
		5.30000	4.75248	.509	16.7365	6.1365

*. The mean difference is significant at the .05 level.
1= the keyword method
2= pictorial method
3= translation

Asterisks show that the two groups being compared are significantly different from one another at the p<.05 level. The exact significant value is given in the column labeled sig. In the results presented above, group 1 is statistically significantly different from groups 2 and 3. EG1 which received instruction through the keyword method is significantly diffe- rent from EG2 that received pictorial method and CG that received ineffective method of translation. The significant value of EG2 and EG3 is more than .05 (.509>.05), so they are not significantly different from one another at p<.05 level.

These significant results allow us to safely confirm the hypothesis that the instruction of vocabulary items through the keyword method, which is a mnemonic device, is more effective in learners' vocabulary development compared to the pictorial method and verbal method of translation.

5.2. Relationship between the type of instruction and the immediate and delayed re-tention

For investigating the second research question, a number of analyses, both descripti-ve and inferential, were run. After administering the immediate post-test, the scores were analyzed descriptively, the results of which appear in the table below.

Table 4. Descriptive statistics for the results on the immediate posttest

Mean	Maximum	Minimum	N	Groups
71	100	32	20	EG1
56	82	34	20	EG2
48.6	72	28	20	CG

As can be seen, the statistics are very much similar to the statistics obtained in the delayed posttest. It is clear that EG1 is still ahead, with the EG2 following and the CG remaining in the last position.

An interesting point that can be observed by comparing the numerical data presented in the above Table (4) and delayed posttest Table (1) is that all the groups performed a little better on the immediate posttest than on the delayed posttest. Although this can be attributed to many interrelated factors, probably the lapse of time (about two weeks) might have contributed to lower scores on the delayed posttest.

For examining the hypothesis regarding the first research question, it was necessary to provide more statistical information; so the inferential statistics, i.e. multivariate analysis of variance (MANOVA) was conducted. MANOVA was performed because in this study two layers were defined for the dependent variable, i.e. immediate and delayed post-tests.

A one-way between-groups multivariate analysis of variance was performed to indicate whether there are statistically significant differences among the groups on immediate vo-cabulary posttests and delayed vocabulary posttest. The independent variable was method, which had three levels, and the dependent variables were the average scores of immediate posttests, the quizzes that were used to test short-term memory, and the scores on delayed posttest, which was conducted after the treatment to test the subjects' long-term memory. The results are shown in Table 5 below.

Table 5. Values of MANOVA

Effect	Value	F	Hyp. df	Error df	Sig.	Partial Et a Squared	Noncent. Parameter	Observed Power[a]
Pillai's Trace	.952	1142.367[b]	2.000	116.000	.000	.952	2284.735	1.000
Wilks' Lambda	.048	1142.367[b]	2.000	116.000	.000	.952	2284.735	1.000
Hotelling's Trace	19.696	1142.367[b]	2.000	116.000	.000	.952	2284.735	1.000
Roy's Largest Root	19.696	1142.367[b]	2.000	116.000	.000	.952	2284.735	1.000
Pillai's Trace	.259	8.707	4.000	234.000	.000	.130	34.830	.999
Wilks' Lambda	.741	9.384[b]	4.000	232.000	.000	.139	37.534	1.000
Hotelling's Trace	.350	10.055	4.000	230.000	.000	.149	40.221	1.000
Roy's Largest Root	.350	20.460[c]	2.000	117.000	.000	.259	40.920	1.000

a. Computed using alpha = .05
b. Exact statistic
c. The statistic is an upper bound on F that yields a lower bound on the significance level.

In the second section of the table, the associated significance level value of Wilks' Lambda is .000, which is less than .05; therefore, the analysis confirms that there is a difference among the groups. The keyword method had a positive effect on the participants' retention of vocabulary items in memory.

At this point the results corroborated the hypothesis that the subjects who were instructed through the keyword method proved to be more successful not only in remembering the meaning of the items that are still in their short-term memory, but also in retaining the meaning of the items in their long-term memory.

6. Discussion

This study aimed at investigating the impact of two non-verbal methods of instructing vocabulary, the keyword method and pictorial method, on learning and retrieval of vocabulary items among adult elementary students of English as a foreign language. After a one-way ANOVA, post-hoc tests for the two experimental groups were conducted, and results confirmed the first hypothesis that the instruction of vocabulary items through the keyword method, which is a mnemonic device, proved to be more effective in learners' vocabulary development, compared to the pictorial method and verbal method of translation. The ANOVA tables presented above showed great significant results for the first experimental group in the study, confirming a major finding of the study that the keyword method, as an innovative and modern method, is quite successful at enhancing vocabulary development of elementary students. Yet, the second experimental group, who received pictorial instruction, showed no significant advantage over the control group in vocabulary development.

For investigating the hypothesis regarding the second question, a one-way MANOVA on short-term memory scores and another on long-term memory scores between the two experimental groups were run. The results showed that the subjects who used the keyword

method could store and retain vocabulary items in their long-term memory better than the subjects who used the pictorial method. At this point, the results supported the hypothesis that the type of instruction proved to be effective in retention time of the learned items.

After running a number of analyses, it was proved that the first experimental group, who received instruction based on the keyword method, yielded different results from the other two in the number of words developed and the permanency of the words in long-term memory. They had better access to the words for a longer time. This finding strongly corresponds to Hatch and Brown's point of view (1995) that mnemonics, or memory-aiding techniques, are basic kinds of associations used by learners to increase recall and these techniques are used for consolidation of form-meaning connections in memory.

The fact that EG1 outperformed the other two groups on the immediate posttest as well as the delayed posttest is primarily because they linked the new words with already existing words in their minds in a meaningful way. As Levin (cited in Paivio, 1983) points out, the keywords provide direct retrieval paths back to the language. He further states that non-verbal memory storage is more stable than verbal memory storage over intervals of hours to days. The results are also in line with Riazi and Alvari (2004) who concluded that students who use more vocabulary strategies learn better and have longer retention compared to those who just memorize the words. Keywords help individuals learn faster and recall better because they aid the integration of new material into existing cognitive units and because they provide retrieval cues (Thompson, 1987). Thompson's findings actually provide empirical evidence in support of what we found in this study. The studies conducted by Atkonson & Raugh (1975), Levin & Pressley (1985), Shapiro & Waters (2005), Sagarra & Alba (2006), and Atay and Ozbulgan (2007) to name a few, further support the outcome of this study as in their studies the keyword method has been shown to be an effective procedure for the acquisition and retention of vocabulary in foreign language learning. This method is one of a number of procedures that have proved useful for the task of acquiring definitions of new foreign-language words (Ellis & Beaton, 1993; and Mc Daniel & Pressley, 1989), particularly for immediate recall. The findings obtained in this study is also in line with the results Carlson, Kincaid, Lance and Hodgson (1976) achieved, since they found a better recall in subjects who received a mnemonic device compared to a control group.

The findings obtained regarding the effect of keyword method on retention emphasize the discussion by Thompson (1987) that mnemonics work by utilizing some well-known principles of psychology: a retrieval plan is developed during encoding, and mental imagery, both visual and verbal, is used. They help individuals learn faster and recall better because they aid the integration of new material into existing cognitive units and because they provide retrieval cues. Thompson's argument provides theoretical support for the findings obtained in this study. However it should be noted that, according to Atkinson and Raugh (1975), this effectiveness of the key-word method depends to a large extent on a careful keyword selection procedure; a keyword is eligible if it sounds as possible like a part of the word to be learned; it should be easy to form a memorable imagery link to connect the keyword with its translation, and finally the keyword should be unique.

Furthermore, a second key finding of this study, which can make it different from similar ones, is that results of analysis made clear that the difference between the second experimental group (using pictorial method) and the control group (using translation) in terms of vocabulary development was not significant. This is against Gains and Redman's (1986) assertion that non-verbal techniques, of any kind, lead to a better retention than verbal me-

thods and that "there is little doubt that objects and pictures can facilitate memory" (p. 92), since EG2 did not perform better than CG in this study. Maybe because pictures just have a facilitating effect and are not sufficient for learning if they are used alone. The findings further lend support to what is obtained by Boers et al. (2009). That is, their overall results suggest that the addition of pictorial clarification contributes little to learners' retention of linguistic form and hence L2 vocabulary.

However, CG who received translation of the target words based on rote repetition had the lowest means of immediate posttest and delayed posttest. This strongly conforms to Ausubel's meaningful learning. According to him, rote learning is the process of acquiring material as isolated entities which have no meaningful relationships. Therefore, it seems clear that their retention is much less than meaningfully learned words through the keyword method. The findings obtained regarding the use of translation method in the present study partially confirm the results of the study by Hummel (2010) that, for short-term retention, more significant advantage was found regarding the 'rote copying condition' than two translation conditions.

7. CONCLUSION

As a concluding remark, it can be stated that the mnemonic device used in this study, the keyword method, was shown to be more effective in L2 vocabulary instruction than pictorial method and method of translation in elementary level among the subjects of the present study. Although any generalizations based on the results should be made cautiously and before any interpretation, the limitations imposed on the study must be taken into account. The above-mentioned experimental design procedure was carried out and certain significant findings were obtained as are presented here in brief:

- The subjects in the first experimental group, which received instruction based on the keyword method, were able to more successfully develop the learned items compared with the second experimental group that received pictorial instruction and the control group that received ineffective instruction in the form of translation.
- The difference between the second experimental group and the control group in terms of vocabulary development was not significant. That is, no difference was observed between pictorial and translation techniques in terms of their influences on vocabulary learning.
- The subjects in the first experimental group were more successful in retaining the words in their long-term memory compared with the subjects in the second experimental group. This underscores the significant role played by keyword method in vocabulary retention.
- All the subjects have more or less achievements regarding their vocabulary repertoire (so translation was less effective rather than ineffective).

Therefore, this study seems to have almost been able to show that the use of the keyword method, which is an innovative method, can largely reduce learners' problems in

the acquisition and retention of L2 words. The findings obtained in this study specify that the use of visual imagery is the cornerstone of how the keyword method works. This is somewhat similar to what Shapiro & Waters (2005) demonstrate in their study. Although the KWM has proved to be helpful, the principle features of context for teaching L2 vocabulary should not be overlooked by teachers and learners.

The findings obtained in this study may lead to a number of implications which could possibly be beneficial for language practitioners, teachers and students in an EFL context. First, this research is probably a call for language teachers, practitioners and researchers in language teaching and learning to pay more attention to L2 vocabulary teaching techniques. The findings may encourage teachers who still use the traditional verbal method of translation in their teaching to change their viewpoint in favor of a nonverbal method of teaching vocabulary. The result may especially be of great value to high-school teachers in an EFL context who are usually faced with the students' request for information about effective techniques of vocabulary learning.

Second, the findings of this study are also useful for teacher trainers to incorporate appropriate and practical techniques for instruction of vocabulary in their existing training courses. This way, teachers themselves would be informed of different vocabulary teaching techniques and will develop positive attitudes toward the incorporation of the best techniques into their conventional teaching programs.

In the long run, syllabus designers and textbook writers will also benefit from the results of this study; different mnemonics can be introduced within the graded vocabulary books and other materials in accordance to the level of the students for whom the material is designed.

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