Individuality in higher education: The use of the multiple-mnemonic method to enhance ESP students' vocabulary development (depth and size) and retention

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Abstract
Vocabulary learning is considered to be the most comprehensive and the most difficult part of language learning for all the students especially for ESP students. These students complain that vocabulary items are too many and are easily forgotten after they are learned. Mnemonic devices, a group of mental strategies, are developed to facilitate vocabulary learning and retention for such students. These students, however, have varied needs and interests and if vocabulary teaching and learning are planned to be effective and enjoyable, various methods and strategies must be employed. To this end, the multiple-mnemonic method was developed and studied. Two intact groups of ESP students participated in this study. In the experimental group the multiple-mnemonic method was used while in the control group the vocabulary items were just taught and reviewed. The results of the study showed that the multiple-mnemonic method group significantly performed better than the control group in terms of vocabulary development and retention. EVKS was also further evaluated and used in this study as a measure of vocabulary size and vocabulary depth.

Keywords: Individuality, vocabulary size, vocabulary depth, mnemonic devices, multiple-mnemonic method, EVKS

Introduction

Although research on language attrition has concentrated on the possible causes of forgetting all or parts of second language skills, it has a little to say about the strategies and techniques that can be employed to prevent it (Brown, 2014). Forgetting all materials especially newly learned vocabulary elements is what teachers usually observe and students usually complain about (Schmitt, 2000, 2010). Schmitt (2000) believes that vocabulary knowledge is not an exception and lexical knowledge is even more prone to forgetting than other linguistic elements such as phonology and grammar. It happens because "vocabulary is made up of individual units rather than a series of rules"(Schmitt, 2010, p.23). In many countries such as Iran, the use of English for all students especially for ESP (English for Specific Purposes) students is usually limited to English classes. This condition makes vocabulary learning even more difficult and leads to more vocabulary forgetting due to the infrequency of input and lack of enough exposure to language (Amiryousefi, Vahid Dastjerdi , & Tavakoli, 2012; Brown, 2014). Acquiring enough English vocabulary to perform well in academic reading and writing tasks expected of ESP students is, therefore, a huge challenge for many of them, and it is why they consider vocabulary learning an intractable challenge.

To help students to retain the learned elements for a longer period of time, mnemonic devices have been developed. Mnemonic devices are those memory

enhancing instructional strategies through which new information is linked or pegged to the already existing information to make stronger connections. Research (Amiryousefi & Ketabi, 2011; Mastropieri &Scruggs, 1989; Schumaker & Deshler, 1994) has shown that mnemonic devices can also help language learners learn and retain vocabulary elements more effectively and hence minimize vocabulary attrition or forgetting. By the use of mnemonic devices or strategies, language learners can relate new words to their existing web of information using some form of imagery or grouping.

However, there are individual differences among language learners and students, and they may tend to use and benefit from those strategies which are based on their psychosocial predispositions, needs and interests (Amiryousefi et al., 2012). Teachers, consequently, need to use various methods and strategies if they want to make their classes more effective and more interesting (Fritz, Morris, Acton, Voelkel, & Etkind, 2007; Sagarra & Alba, 2006; Tomlinson, 2010).

The present study is, therefore, an attempt to delve more into the above-mentioned issues by exploring the effects of the multiple-mnemonic method on the Iranian ESP students' vocabulary development and retention.

Individual differences in language learning

Ever since its existence, experts (Armstrong, 2009; Dörnyei, 2005; Visser, Ashton, & Vernon, 2006) in the field of psycholinguistics have tried to follow two contradictory objectives, namely determining the general characteristics of language learners and at the same time dealing with the individual differences existing among them. These experts believe that language learners are different from each other. They, for example, have different and varied levels of intelligences, motivation, anxiety, life experiences and world knowledge which can interact with the input and instructions presented to them and affect the mental processes involved (Grey, Williams, & Rebuschat, 2015). These differences can be caused because of the differences in:

1. biological endowment—including hereditary or genetic factors and insults or injuries to the brain before, during, and after birth; 2.personal life history—including experiences with parents, teachers, peers, friends, and others …; 3.cultural and historical background—including the time and place in which you were born and raised and the nature and state of cultural or historical developments in different domains (Armstrong, 2009, p.27).

In the same fashion, Graham (2009) believes that students also have different learning styles and tend to learn differently despite their common grade, age, or academic level. These differences can be seen in the use of mnemonic devices too. Boers and Lindstromberg (2008), for example, believe that "high imagers" perform better than those students who have a "verbalizing style" in the use of mnemonic devices which involve pictorials (p.194).The notions of individuality and individual differences are also supported by the tenets put forth by Communicative Language Teaching (CLT), Multiple Intelligences (Gardner, 2004), and Differentiated Instruction (Tomlinson, 2010). Based on the underlying theories and principles of these approaches, students are varied in terms of characteristics such as motivation, interests and intelligences, and a "one-size-fits-all" language learning

approach cannot be successful (Kumaravadivelu, 2009, p.28). Therefore, classroom instructions and procedures should be based on students' needs and aspirations, and should be applied in a way that can involve more students rather than to be suitable for "an intellectual elite"(Macaro, 2001, p.268). Accordingly, teachers and educational planners need to resort to a wide range of teaching strategies, materials, curricula and lesson plans in a way that all students can have their predispositions addressed at least some of the time in the classroom (Armstrong, 2009).

Mnemonics

An important aim of research in the area of vocabulary learning and teaching is to find ways to minimize vocabulary forgetting and to maximize the transference of lexical items from the short-term memory to the more permanent long-term memory which is considered to be the most important objective of vocabulary learning (Schmitt, 2000). This is for this reason that mnemonic devices are for long proposed and studied in the literature. Mnemonic devices have been the most popular vocabulary learning strategies which are believed to provide substantial contribution to vocabulary development and retention and to decrease vocabulary forgetting. They belong to a group of mental strategies devised to help learners to remember learned vocabulary items for longer periods of time (Amiryousefi & Ketabi, 2011; Amiryousefi et al., 2012; Levin, 1993; Solso, 1995).

Aitchison (2002) believes that our mind is like the London Underground System. It means that information stored in the brain is linked in different ways like a spider's web. The general picture of the mental lexicon, according to him, is one in which there are a variety of links between words, some strong, some weak. The main way to transfer vocabulary items from short-term memory to long-term memory, the ultimate purpose of vocabulary learning and teaching, and create a strong connection is to find some elements in the mental lexicon to attach the new lexical items to (Amiryousefi & Ketabi, 2011; Schmitt, 2000;). Mnemonic devices are techniques, either verbal or visual in nature, that serve to improve the storage and the recall of new information by meaningfully relating it to what is already known. By the use of mnemonic devices, teachers can relate new lexical items to information students already have in their long-term memory and hence improve vocabulary learning and recall, and decrease vocabulary forgetting (Amiryousefi & Ketabi, 2011; Thompson, 1987).

Different types and classifications of mnemonic devices have been proposed throughout the literature. Thompson (1987), for example, classifies mnemonic strategies into five classes, namely linguistics, spatial, visual, physical response and verbal methods. Oxford (1990), on the other hand, identifies four major strategies, namely creating a mental linkage, applying images and sounds, reviewing well, and employing action. While Baddeley (1999) believes that mnemonic devices are classified into visual imagery strategies and verbal strategies. The major mnemonic devices proposed and studied in the literature are the loci method, the key word method, the visualization method, the pegword method, the storytelling method, the picture method and the translation method (Amiryousefi & Ketabi, 2011).

Multiple-mnemonic method

As mentioned earlier, due to the existence of individual differences, all the students may not be able to use all the mnemonic devices well and benefit from them equally.

Different students may, consequently, prefer different mnemonic devices (Amiryousefi et al., 2012). To attend to this issue in the area of vocabulary learning and teaching in the context of ESP (English for Specific Purposes), multiple-mnemonic method was used in this study. The multiple-mnemonic method does not support the use of a single strategy, but several strategies which are selected based on the nature of the classes and needs and interests of the learners. Through the multiple-mnemonic method, teachers can present several strategies at once and encourage students to use the one/ones which they find more interesting and useful.

In the present study a combination of the following mnemonic devices was used based on the nature of the Iranian ESP classes and students: 1) the loci method in which students imagine a very familiar place like a room or a house and then associate each new word to a part of it to be remembered. In other words, the students take an imaginary walk along their familiar places and retrieve the items they have put there.

As people's experiences are different, students may come up with different pictures; 2) the visualization method in which students imagine a picture or a scene which is associated with the target word. Its difference with the method of loci is that in visualization for each word a picture or a scene is imagined while in the method of loci several words are related to a familiar place and seen as an imaginary walk through that place; 3) the storytelling method in which students link the words together in a story. At first they should associate the target words to a topic or some topics, and then they should connect them by making up a story containing the words and 4) pegword method in which students relate the new

lexical elements to easily memorable items which act as pegs or hooks. Pegword method has two stages. At first, students are asked to remember 10 number-rhyme pairs like "one is bun or john, two is shoe, and three is tree". In the second stage, the students are asked to visualize the words and try to link them to the rhyming words. The words are, therefore, learned in a composite picture of the given word and the peg (Amiryousefi & Ketabi, 2011; Amiryousefi et al., 2012; Eysenck, 1994; Groeger, 1997; Holden, 1999; Mirhassani & Eghtesadei, 2007; O'Malley & Chamot, 1990).

Vocabulary depth and size and the related measurement tools
A distinction has been made by the researchers in the field of vocabulary learning and teaching (Akbarian, 2010; Amiryousefi, 2015; Haastrup & Henriksen, 2000; Meara, 1996; Nassaji, 2004; Read, 2000) between two aspects of vocabulary knowledge, namely size and depth. Size of vocabulary knowledge is defined as the number of words known by a language learner at a specific level of proficiency. Depth of vocabulary knowledge, on the other hand, refers to the quality of vocabulary knowledge possessed by a language learner or how well he/she knows different aspects of a word such as pronunciation, spelling, register and stylistic aspects and semantic relations with other vocabulary elements, and how well he/she can use it with semantics and pragmatics appropriateness.

Various assessment tools such as Vocabulary Size Test (Meara & Jones, 1990) , Level's Test (Nation, 2001), Vocabulary Knowledge Scale (VKS) (Paribakht & Wesche, 1993a, 1993b; Wesche & Paribakht, 1996), Word Associates Test (WAT) (Read, 1993, 1995, 2000), V-Links test (Wolter, 2005) and

Extended Vocabulary Knowledge Scale (EVKS) (Amiryousefi et al., 2012; Amiryousefi, 2015) have been developed and used in the literature to measure these two aspects of vocabulary knowledge. These measurement tools have their own merits and demerits. Vocabulary Size Test and Level's Test are, for example, used as measurement tools of the size of vocabulary knowledge and cannot be used to measure vocabulary depth (Amiryousefi, 2015). VKS is the most quoted word knowledge test in the literature which measures vocabulary knowledge in different degrees or levels. Some scholars such as Wolter (2005) have, however, voiced their criticism against it. They believe that it does not measure multiple meanings of a word and word relations such as synonymy and collocations (Milton, 2009).Word Associate Test is also a measure of the depth of vocabulary knowledge which is based on the principle of word association. Its problem is that it can be used for the words that appear well-connected like "sudden"(figure1). It cannot, however, be used appropriately with the words like "circuit" in this study that are much more restricted in their use and do not collocate so widely, or may not appear to associate in the same way as words like "sudden" do (Milton, 2009).

Sudden

beautiful	quick	change	doctor
surprising	thirsty	noise	school

Figure 1: Sample items for revised version of Word Associates Test (Milton, 2009, p.163)

EVKS (Amiryousefi et al., 2012) was developed to study the effects of vocabulary knowledge on EAP (English for academic purposes) students' reading comprehension and reading strategy use. Amiryousefi (2015) also used it to assess the vocabulary knowledge of the ESP students. EVKS is the

extended form of VKS (Paribakht & Wesche, 1993a, 1993b; Wesche & Paribakht, 1996) which is believed to measure both aspects of vocabulary knowledge in levels or degrees.

Research questions
The questions addressed in this study are:

- Q1. Can multiple-mnemonic method result in greater vocabulary development and retention among ESP students?
- Q2. What are the Iranian ESP students 'attitudes toward the multiple-mnemonic method?

Method
Participants
To carry out the study, at first two intact ESP classes at Isfahan University of Technology were selected. These students took an ESP class in fall 2014 and their field of study was Electrical Engineering. Their level of proficiency was assessed and controlled based on the results of an Oxford Placement Test (OPT henceforth) given to them prior to the study. As it is impossible to change the arrangements of the classes in Iranian universities, those students who did not match the others in terms of proficiency could not be discarded from the class, but their data (scores, responses to the questionnaires, etc.) were not collected and analyzed not to affect the results.

The students involved in the study were at the intermediate level based on their scores on OPT. Table1 represents the number of the students present in each class and the number of the students involved. In one of the classes the multiple-mnemonic method was used to teach the given vocabulary items and the next class served as the control group. The students in the control group and the students in the multiple-mnemonic

method group did not meet each other during the study, and were not aware that their performance would be compared. However, the students were informed about the study and were asked to sign a written consent if they were willing to participate.

Table 1: **The Number of the participants in each group**

Groups	Students present in the class	Students involved in the study
Multiple-mnemonic method group	39	28
Control group	39	29

Instruments
Extended Vocabulary Knowledge Scale (EVKS)

Extended Vocabulary Knowledge Scale (EVKS) (Amiryousefi et al., 2012; Amiryousefi, 2015) was used in the study to measure the subjects' vocabulary knowledge. EVKS is an extended version of VKS (Paribakht & Wesche, 1993a, 1993b; Wesche & Paribakht, 1996). To compensate for the problems attributed to VKS by scholars such as Wolter (2005) and Milton (20090 as not being able to measure word relations and multiple meanings, Amiryousefi et al. (2012) and Amiryousefi (2015) added three self –report items (items 5, 6, and 7, Table 2) to it and classified the items into two major categories, namely size and depth. Its advantage over VKS is that it can better assess different aspects of vocabulary knowledge. Its advantage over WAT is that it can be used with academic words such as "aggregate, alloy, charge" (words used in the present study) that do not associate and collocate well with other words and cannot be tested appropriately using a fixed set of associations and collocations used in WAT.

As shown in Table 2, EVKS has two major parts: vocabulary size part and vocabulary depth part. Vocabulary size part measures the size of vocabulary knowledge in four levels ranging from total unfamiliarity to the ability of providing the correct meaning of the intended word.

The size part determines the familiarity or non-familiarity of the subjects with the given word based on their responses to four response categories available. If the first response category is selected, it shows that the given word is totally unfamiliar. The second respond category, however, shows a very loose remembrance of the word form but not its meaning. By selecting this category the subjects indeed report that the form is rather familiar but the meaning is not. As the purpose of vocabulary teaching is to help students to get familiar with the form and meaning of a word on one side (vocabulary size) and its other meanings, relations with other words and its usage on the other side (vocabulary depth), the first and the second response categories of the size part do not have any specific values in this regard. In the scoring procedure no point is, therefore, assigned to them. The third and the fourth categories of this part ask the subjects to provide an English definition and/or a L1 equivalent for the given word. Response category number three is selected if the subjects know the meaning of the given word but they are not sure of it. If the answer is correct in the scoring procedure point one is given to it. The selection of response category number four shows that they know the meaning and they are sure it is correct. As it shows a rather higher level of learning in the scoring procedure point two is given to it if the provided answer is correct. The minimum score for this part will be zero and the

maximum will be two.

The vocabulary depth part of EVKS is, however, intended to examine the aspects of word meanings and subjects' depth of lexical knowledge. This part has four response categories each of which measures a specific aspect of depth of vocabulary knowledge including multiple meanings of the word (response category number 5), its relation with other words by asking for its synonyms and/or antonyms (response category number 6), its collocations (response category number 7), and the ability to use the word in a sentence with grammatical and semantic correctness (response category number 8). For each item of the depth part of EVKS one point is assigned except for number four to which two points are given, one for grammatical and the other for semantic correctness of the given word in the sentence provided.

Table 2: **The revised version of Extended Vocabulary Knowledge Scale (EVKS)**

A. Size:
1. I do not remember having seen this word before ☐
2. I have seen this word, but I do not know what it means ☐
3. I have seen this word, and I *think* it means *(An English definition and/or a Farsi equivalent)*……………………
………………………………………………………...
4. I have seen this word, and I am *sure* it means *(An English definition and/or a Farsi equivalent)*…………..
………………………………………………………
B. Depth:
5. I know other meanings of this word, they are:
1…………………………………….......................
2………………………………………......................
6. An ***antonym*** or ***a synonym*** for this word is……………………………………...……………. …
………………………………………………………
7. This word can be used with *(Write down its Collocations)*…………………………………………..
………………………………………………………
8. I can use this word in a sentence (*write down a sentence containing it*):
……………………………………………………
………………………………………………………

EVKS reliability and validity indexes
Amiryousefi et al. (2012) and Amiryousefi (2015) checked the content validity of the test through expert judgment and its reliability through test re-tests method with the correlation of 0.91. To further check the content validity of EVKS, it was mailed to 10 experts in the field whose expertise is vocabulary teaching and learning. They were informed about the nature, the purpose and the scoring procedure of the test and were asked to send back their comments. 7 out of 8 experts replied believed that it is well-designed and can appropriately be used for the purpose defined. However, they suggested some changes in the wording of the test which were applied and the revised version was used in the present study.

To further explore its reliability, it was given to a group of 33 ESP students who were comparable to the participants of the study and the following results were obtained. As shown in Table 3, α is bigger than 0.7 for both the size part and depth part of EVKS which shows the reliability of the instrument used.

Table 3: The reliability statistics of EVKS

position	Cronbach's Alpha
Size part	0.781
Depth part	0.766

The words were listed and for each word eight options were provided. The subjects were also given an instruction in Farsi, their mother tongue, to help them know how to complete EVKS. It was used in the study and scored twice after it was completed by the subjects. Once each part (the size part and the depth part) was scored separately to assess the subjects' size and depth of vocabulary knowledge, and then these two scores were added together to arrive at a general score for the subjects' vocabulary

development (overall vocabulary score).

The survey

Galloway, Conner and Pope (2013) and Scruggs and Mastropieri (1992) believe that students and teachers are the most important agents in all educational contexts but their attitudes are not usually attended to in the studies done on them. Schmitt (2010) also believes that vocabulary learning is cyclical and it begins with "an Initial Appraisal of Vocabulary Learning Experience" which is described as learners' values, interests and desires toward vocabulary learning tasks and activities (p.94). In order to explore the subjects' attitudes toward the multiple-mnemonic method used in this study, three questions were given to the subjects at the end of the study. The questions evaluating the subjects' attitudes were taken from Mnemonic Attitude Survey (MAS) (Richmond, 2006). Students rated each question on a five-point Likert scale with the anchor points of 1: very unpleasant to 5: very enjoyable for question number one which asked if the subjects enjoyed the multiple-mnemonic method; 1: very unlikely to 5: very likely for question number two which asked if the subjects intended to use the multiple-mnemonic method again; and 1: very ineffective to 5: very effective for question number three which asked if the subjects thought the multiple-mnemonic method was effective.

Procedures

At first, around 75 novel words were selected from English for Electrical Engineering (Amiryousefi & Rezaei, 2013), the book taught to Electrical Engineering students at Isfahan University of Technology, and their novelty was tested two weeks before the study. The subjects were given a list of the words and were asked to mark those which were familiar to them and write down their meaning in Farsi.

Those words which were familiar to the majority of the subjects were omitted and finally 64 words remained as the target words of the study.

In the experimental group, at first an introductory session was held before the study to instruct the subjects how to use the selected mnemonic devices (the loci method, the visualization method, the story telling method and the pegword method). During the study, the target words were taught in three steps. In step 1, the students were provided with a list of the new words along with a brief and understandable definition, one or more examples and when possible synonyms, antonyms and some collocations for each word. The words and the accompanying information were read out and described to the subjects. The subjects were sometimes asked to give their own synonyms, antonyms, collocations and/or other meanings, and were encouraged to use the target words in sentences. The purpose of this part was to provide a context which is deemed essential for vocabulary learning and mnemonic instruction (Atay & Ozbulgan, 2007). In step two, the available mnemonic devices were reviewed and the subjects were required to apply the one/ones they favored to learn the new words better. In step three, some of the students were called to show what strategies they used and how they used them. The students were helped out if needed. In the control group, instead of step two and three the given words and the accompanying examples were, however, reviewed and the students were asked to read out the words from the list or to make their own examples.

In each group the EVKS was given to the subjects twice, once immediately after the instruction to measure their vocabulary development and once two weeks after it to measure their vocabulary retention. At the

end of the study MAS was given to the subjects in the experimental group. The study lasted eight sessions.

Results

To answer the research questions, the subjects' responses to different parts of EVKS were scored using the procedures described earlier. Then, the collected data were analyzed by the use of the statistical package for the Social Sciences (SPSS) version 16 and the following results were obtained. Table 4 represents the descriptive statistics of the subjects' scores. The scores obtained from the size and the depth parts of EVKS were converted to a scale of 200 to achieve scoring consistency. Therefore, the size and the depth scores are out of 200 and the overall scores are out of 400. Number1 after the vocabulary scores represents the vocabulary scores on EVKS given to the subjects at time 1, immediately after the instruction, to measure their vocabulary development or gain, while number 2 is used for the vocabulary sores on EVKS at time 2 given to the subjects two weeks after the instruction to measure their vocabulary retention. As it is shown, the mean scores of the vocabulary size, vocabulary depth and overall vocabulary are higher for the multiple-mnemonic method group**.**

To ensure sample homogeneity, Kolmogorov-Smirnov Test was used. As shown in Table 5, all significant values are bigger than 0.05 which represent sample homogeneity.

To answer question number one, a series of independent T-tests was used to compare the subjects' scores in the multiple-mnemonic method group with the subjects' scores in the control group on the EVKS (vocabulary size scores, vocabulary depth scores and their overall vocabulary scores) at time 1 and at time 2.

As shown in table 6, Sig. (2-Tailed) values are less than 0.05 for all the parts representing a statistically significant difference between the multiple-mnemonic method group and the control group in all the scores obtained from EVKS both at time 1 and time 2. By examining the mean scores shown in Table 5 it can be understood that the mean scores of the subjects in the multiple-mnemonic method group are higher. It can, therefore, be concluded that the subjects in the multiple-mnemonic method group outperformed the subjects in the control group in all aspects of vocabulary knowledge, namely vocabulary size, vocabulary depth and the overall vocabulary knowledge both at time 1 and time 2.

To answer question number two, the frequency of the subjects' responses in the multiple-mnemonic method group to MAS was calculated. The results showed that 72% of the subjects selected very enjoyable and enjoyable for question number one showing that the multiple-mnemonic method can be an enjoyable strategy for ESP students. For question number 2, the results were somehow different. 49% of the subjects selected very likely and likely, 11% had no idea and 42% selected unlikely representing that around half of the subjects intended to use it for their future vocabulary learning. Their responses to question number three also represented that 67% of the subjects selected very effective and effective showing that most of them believed that the multiple-mnemonic method is an effective strategy for vocabulary learning.

Table 4: Descriptive statistics of the scores

		O1	S1	D1	O2	S2	D2
Mu.	N	28	28	28	28	28	28
	M	267	170	98	217	138	78
	SD	6.4	2.8	4.8	6.1	2.9	4.1
	Min.	247	161	86	202	132	70
	Max.	276	173	104	233	144	89
Con.	N	29	29	29	29	29	29
	M	254	164	89	174	114	59
	SD	6.7	4.0	6.1	9.4	6	6.3
	Min.	235	155	80	155	107	48
	Max.	270	172	99	209	138	71

O: overall vocabulary score, S: vocabulary size, D: vocabulary depth, Mu: multiple-mnemonic method, Con.: control group

Table 5: **The results of the Kolmogorov-Smirnov Test**

		O1	O2	S1	S2	D1	D2
Mul.	Statistic	0.80	0.62	0.98	0.56	0.80	0.61
	Sig.	0.53	0.82	0.28	0.90	0.53	0.84
Con.	Statistic	1.09	0.51	0.63	0.77	0.77	0.75
	Sig.	0.17	0.95	0.82	0.57	0.59	0.62

O: overall vocabulary score, S: vocabulary size, D: vocabulary depth, Mu: multiple-mnemonic method, Con.: control group

Table 6: The Results of the Independent Samples T-Tests

	t	df	Sig. (2-tailed)	Mean Difference
S1[*]	5.58	50.1	0.000	5.16
S2	18.9	55	0.000	23.98
D1	5.54	55	0.000	8.15
D2[*]	13.5	48.4	0.000	19.05
O1	7.54	55	0.000	13.24
O2	20.3	55	0.000	43.03

O: overall vocabulary score, S: vocabulary size, D: vocabulary depth
: Equality of variance is not assumed

Conclusion and discussion

The results of the analysis of the data obtained from the study showed that the subjects in the multiple-mnemonic method group significantly performed better than the subjects in the control group in terms of vocabulary development and retention. The results also showed that the subjects found the multiple-mnemonic method an enjoyable and effective practice and around half of them liked to use it for their future vocabulary learning.

The results of the study are somehow in line with both the discussions presented in the area of vocabulary learning strategies (VLSs) and the discussions presented in the area of psycholinguistics. Scholars in the area of VLSs (Celce-Murcia, 2001; Gu, 2005; Hatch & Brown, 1995; Kim, 2008; Lin, 2008; Moir & Nation, 2002, 2008; Nation, 2001, 2005; Schmitt, 2000; Schmitt, 2010; Takac, 2000) believe that VLSs have a facilitative role in vocabulary learning and can help learners both in discovering the meaning of a word and consolidating it, and are especially needed when language learners are encouraged to act independently. The results of this study also showed that mnemonic devices, as a major group of VLSs, can improve vocabulary learning and retention.

Experts in the area of psycholinguistics (Armstrong, 2009; Visser et al., 2006) also believe that there are individual differences among students in each class that need to be taken into account. They, for example, believe that students have different and varied levels of intelligences, motivation, anxiety, life experiences and world knowledge. Teachers, therefore, need to resort to varied instructions, strategies and modified contents to meet students' diverse needs and interests, and create a classroom where everyone can be successful despite a variance in levels, needs and styles (Tomlinson, 2010).

The reason why the subjects in the multiple-mnemonic method group significantly

performed better than the subjects in the control group in terms of vocabulary development and retention can be attributed to the fact that ESP students are also varied in terms of factors such as interests, capabilities and intelligences. By learning vocabulary through the multiple-mnemonic method, they have the chance to use those mnemonic devices in which they are interested. In this way, their individuality is better addressed than in an instruction in which all the students have to use the same strategy.

The subjects also had positive attitudes toward the multiple-mnemonic method which represents their appraisal for it. As Schmitt (2010) puts forth, the appraisal of the vocabulary learning experience can lead to an increase in the capacity for vocabulary development. Dörnyei (2005) also believes that students' preferences can affect their functioning. He believes that students' attributes such as motivation, aptitude and cognitive styles determine the amount of effort they choose to put into improving their own learning, and individualized strategies, techniques and activities help them excel their active participation in the learning process.

The reason why the subjects in the multiple-mnemonic method group performed better and liked the experience they had can be attributed to the fact that through the multiple-mnemonic method they had the chance to choose and use those strategies which were based on their attributes and styles.

The multiple-mnemonic method developed in this study by the researcher is, therefore, a way of addressing the notion of individuality in the area of vocabulary learning and teaching. It supports the fact that students have varied needs, interests and attributes,

and these factors affect their strategy preferences (Lewis & Hurd, 2008). The multiple-mnemonic method does not, however, consist of a set of fixed mnemonic devices. It leaves room for creativity, individuality and contextualization.

Limitations of the study

Although efforts were made to follow rigorous procedures for data collection and data analysis, the study suffered from some limitations. The present study used intact groups of ESP students due to the problems stated earlier. It was also impossible to have more subjects to be assigned to other groups and to employ only one of the mnemonics used in the multiple-mnemonic method in each of them to compare the performance of the subjects in the multiple-mnemonic method group with the performance of the subjects in these groups to see if the same results can be obtained with each of the mnemonics too.

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