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Research Paper

The Effect of Post-teaching Techniques on the English Vocabulary Recall and Retention of Iranian Students with Learning Disability

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Abstract

One of the most important needs in learning a second or foreign language is vocabulary acquisition. Certainly, failure to keep vocabulary in mind is a problem for both typically-developing learners as well as those with a learning disability (LD). This language demand requires teachers to use techniques in order to reinforce vocabulary recall. The current study is an attempt to investigate the effect of two post-teaching vocabulary learning techniques of diglot-weave and cooperative learning on vocabulary knowledge of LD students and to compare them with the common instruction of picture-word definition. To this end, 90 Iranian female LD students from 10 intact classes in two Junior Exceptional Schools in Shiraz were randomly assigned to one of the three groups. After the intensive teaching sessions, the test was administered to examine their vocabulary recall performance in each group and after a two-week interval, the same test was used to examine their vocabulary retention. The results by conducting the one-way ANOVA indicated that both experimental groups of diglot-weave and cooperative learning techniques outperformed the control group of picture-definition in the vocabulary recall and retention tests. However, there was no significant difference between the performance of diglot-weave and cooperative learning groups. Therefore, the findings of the present study could provide useful implications for

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foreign language teaching programs particularly in Special Education and students with LD.

Keywords: Cooperative Learning, Diglot Weave, Learning Disability (LD), Post-teaching Techniques, Retention, Vocabulary Recall

There is no doubt that knowledge of vocabulary is viewed as crucial in foreign language teaching since it is important for understanding other language skills such as reading, listening, speaking and writing, and, in fact, it is an element that links these four skills. Every language has its own lexicon containing specific vocabularies which are called “entity”, and in every language, vocabulary entities can be discerned from other non-vocabulary entities (Yedla, 2013). In order to acquire a foreign language and communicate well in that language, one should develop and acquire enough vocabulary as well as knowing how and where to use them accurately. For a long time, in second or foreign language classes, teachers regarded grammar as a priority since some educationists believed that knowing how words work together to build sentences is more essential (Allen, 1983). Therefore, the secondary focus of language teachers was on teaching vocabulary and more or less teaching vocabulary was neglected. Since numerous studies (Decarrico, 2001; Schmitt, 2010; Blasco, 2015) have concentrated on the importance of learning vocabulary and consider it as absolutely necessary for language learners, many teachers have dedicated much time to vocabulary learning and emphasized it in order to enhance their students’ vocabulary knowledge to assist them to learn other skills and aspects of language such as grammar.

As highlighted by previous studies, language learners have a consequential problem memorizing and remembering broad quantities of

vocabulary to achieve fluency in foreign language learning (Oxford, 1990). Moreover, the ways of vocabulary learning, difficulties of remembering vocabulary, or lack of vocabulary knowledge might reduce the learners' self-efficacy in second or foreign language learning. In this respect, Ping and Siraj (2012) stated that lack of vocabulary knowledge strategies and the learners' low motivation are factors that can be considered as impediments to vocabulary learning. Certainly, there are many ways and resources to teach new words and build vocabulary. Evidently, introducing and utilizing additional books and resources in the classroom does not provide the desired outcome in language competency levels. Traditionally, most teachers taught the isolated word and its definition, without presenting any specific techniques or applying any strategies, and learners were forced to memorize a large number of vocabulary lists that might be forgotten over time. In this regard, Ahmadi (2014) stated that in English as a Foreign Language (EFL) classes, the way teachers teach vocabulary has a great influence on the way learners learn the words. Previous studies (Delik & Yuruk, 2013; Eslami & Huang, 2013; Gerami & Tavakoli, 2012; Karimian & Talebinejad, 2013; Wei, 2014) have reported that there are numerous methods, techniques and strategies for vocabulary learning (e.g. translation, semantic mapping, making visual pictures, guessing meaning from the context, keyword method, mnemonic devices, etc.), however, there is much disagreement on the effectiveness of different approaches, methods or techniques for presenting and teaching vocabulary items.

According to Spies and Dema (2014), in general education, language learning is particularly problematic and challenging for English language learners (ELL) who are typically-developing learners as well as students with learning disabilities (LD). They claimed that since there are various language

difficulties for these different groups, students in both groups have exceptionally language needs that require specific instruction and target programs to attain and improve language skills and sub-skills. LD children have an exceptionally reduced and impaired ability to comprehend and process new or complex knowledge; they have impaired intelligence to learn new skills. This intellectual disability affects most areas of their life such as education and worse they encounter these difficulties in early childhood (Castell & Kroese, 2016).

Therefore, for LD students and their complex needs, it is important that, in classrooms, teachers be equipped with the standards, and know how to execute appropriate techniques that contribute to all these learners' needs. Moreover, due to the use of word-learning strategies and techniques which do not present significant results, students with LD have limited and less complete word knowledge recall, as well as, inadequate knowledge of word features (Swanson, 1986). Furthermore, in learning a second or foreign language, a person with an intellectual disability might comprehend a word immediately but not have retention over time. Retention is "the ability to recall or remember things after a while. In language teaching, retention of what has been taught (e.g. grammar rules and vocabulary) may depend on the quality of teaching, the interest of the learners, or the meaningfulness of the materials" (Richards & Schmidt, 2002, p. 457). Therefore, according to Ruutmetts (2005), having ideal expertise and ability to implement strategies and techniques in appropriate conditions might facilitate the learning process of new vocabulary and lead to retention for students. Accordingly, there is a need for research on the advantages of using vocabulary learning techniques to help teachers improve the vocabulary knowledge of LD students.

Literature Review

Research into language learning strategies began in the 1960s and numerous studies have attempted to explain vocabulary learning strategies (Burden & Williams, 1997). Existing knowledge in the fields of vocabulary learning strategies indicates that in foreign language learning, knowing a vocabulary item is beyond simply memorizing the word and its meaning (Dilek & Yuruk, 2012). Hence, they stated that vocabulary learning is not simple and that to determine the appropriate approach, method, or technique, both the teacher and students must exert a great deal of effort which takes a long process. Vocabulary learning strategies need theoretical support in how the human brain supposedly stores words, or in other words, how the human brain makes associations among any piece of information. Applying any kind of strategy, the brain makes more associations for a word in order to store and retain it easier. In many cases, when a learner does not remember a vocabulary item previously encountered, the deficiency is due to an earlier failure to keep that vocabulary item in long-term memory (Baleghizade & Naeim, 2011). While there is an argument against direct vocabulary instruction and several types of research were conducted on the various strategies (Demir, 2013; Faraj, 2015), further study is still required dealing with the efficiency of teaching specific vocabulary strategies.

Furthermore, due to the considerable number of LD children, it is necessary to assess these children and their families to increase both the understanding of their development and the quality of services that should be offered to them (APA, 2013; Cen & Aytac, 2016; Goldstein, 2011). Wilson et al. (2011) have reported that children with exceptional learning needs have difficulty preserving content information from the standard curriculum which is used in the educational setting. It is difficult for teachers to adjust language

curriculum to the learning needs of these special children without any assistance in the classroom. Therefore, it is noteworthy to contemplate the goals of special education and contemplate universal instruction that is designed appropriately for students with special needs. Setting instructional practices is the prerequisite to address and meet the instructional demands of LD students. They provide opportunities to acquire academic vocabularies like integrating new background knowledge with their existing information, applying strategies to understand the spoken and written language (Fall, Roberts, Swanson, Vaughn & Wanzek, 2015).

Researchers have sought to designate effective techniques or strategies for teaching new vocabulary that emphasize the special ability of students with LD. For instance, some traditional strategies use dictionary or context clues for word learning (Bryant, Bryant, Goodwin & Higgins, 2003) or the application of Computer Assisted Instruction (CAI) by Carnine, Gersten, and Johnson (1987) where applying this strategy was similar to direct instruction. One of the early studies on LD students was conducted by Hendrickson, Roberts, and Shores (1978) that demonstrated the effect of antecedent modeling and contingent modeling. Both models were effective and suitable for lower intelligence LD students and somehow took much more time particularly in the contingent model that might have been boring for these students and had caused negative interaction between the child and the teacher.

Moving forward from antecedent and contingent modeling, Conduis, Marshall, and Miller (1986) conducted a study on LD poor readers in three groups of keyword-image, picture-context, sentence-experience. Furthermore, Bos and Anders (1990) in their study compared the effectiveness of three interactive vocabulary strategies such as semantic mapping (SM),

semantic feature analysis (SFA), and semantic /syntactic feature analysis (SSFA). The results obtained in these two studies enhanced the conceptualization that, by involving learners in ideas, we can help them convert the ideas to the schema and facilitate their deeper learning. However, using keyword strategy or making the learners generate their own mnemonic images might have been difficult for these students.

Years later, researchers conducted studies on LD students or compared the outcomes of applying the strategies with non-LD ones. For instance, Steele and Watkins (2010), investigated the effects of text reading context and text variables such as the position of informative context, number of exposures to the target words, part of speech, and contextual clues. The results suggested that inferring and recalling word meanings during reading caused difficulty pointing to the need for vocabulary intervention in the upper elementary years for LD children. Deshler, Harris and, Schumaker (2011) examined the application of teaching morphemic analysis strategy for analyzing and guessing the meaning of words on high school LD students and other students in general education classes. The students without LD were able to learn these vocabulary strategies and could apply them to analyze and predict meaning for unknown words and important skills while reading assignments and taking reading tests. However, due to their cognitive deficit, applying and introducing these cognitive methods were somehow difficult for students with LD.

Espin and Seifert (2012) considered the effects of vocabulary learning and text reading. Reading fluency and vocabulary knowledge of upper elementary LD children were positively enhanced through the text reading and contextual clues techniques, however, these cognitive methods are somehow difficult for LD students because of semantic or syntactic deficits referred to

earlier. In another study, Deshler, Harris and, Schumaker (2011) examined the application of teaching morphemic analysis strategy, the word mapping condition (morphological analysis) and the vocabulary LINCing condition (mnemonic strategy) for word processing and guessing the words meaning. and guessing the meaning of words on high school LD students and other students in general education classes. The students without LD were able to learn these vocabulary strategies and could apply them to analyze and predict meaning for unknown words and important skills while reading assignments and taking reading tests. However, based on the cognitive deficit, applying and introducing these cognitive methods were somehow difficult for students with LD.

In 2014, Spies and Dema explored the type of in-depth word knowledge of ELL and LD students through semantic mapping, word structure, and grammatical placement strategies. The students were able to learn these vocabulary strategies and could apply them to analyze and predict the meaning of unknown words in academic texts. Using an example of instructional technology, Deshler, Kennedy, and Lloyd (2015) investigated the effects of using content acquisition podcasts (CAPs) and the keyword mnemonic on vocabulary acquisition of LD and non-LD students which revealed both groups of students' performance was significantly higher than the other LD students who were taught using the same content, but with the multimedia instruction that did not support any specific theoretical design framework. Recently, Douglas and Jozwik (2017) presented a multicomponent academic word intervention by presenting explicit vocabulary instruction (e.g., modeling, guided practice with feedback, independent practice), self-regulation procedures (i.e., self-goal setting, self-recording, self-evaluating), and cooperative learning structures (e.g., think-pair-share, inside-outside-

circle). The follow-up measures at one, three, and six months indicated positive results on students' performance.

As highlighted by educational studies, teachers and researchers have applied various strategies to promote the vocabulary knowledge of LD learners. In the research and practice, some strategies indicated more effective results than the traditional or even the other new ones (e.g. mnemonic strategy). However, investigation on effective strategies or unique learning needs of students with LD were neglected for many years. Furthermore, we observed that in Iran exceptional schools English teachers' instructions are based on a common method in which new words are taught by using pictures or realia, and they mostly rely on course-books. So far, no research in Iran has been conducted to survey the application of new techniques on students with LD to improve their vocabulary competency. Therefore, to study the effectiveness of new techniques on vocabulary knowledge of LD learners, the current study considered two recent vocabulary learning techniques on ELL learners: diglot-weave and cooperative learning techniques. These two techniques were considered post-teaching techniques used after the teaching process. The post-teaching technique is a kind of exercise that acknowledges the importance of students and teacher experiences due to the engagement in the learning procedure that the meaning given to those experiences lead to better comprehension and retention (Steadward, Watkinson, & Wheeler, 2003). Through the diglot-weave technique, students are presented with target language vocabulary items in a first language context. Maleki and Nemati (2014) noted that the expression diglot-weave, retrieved from the Greek "di", meaning "two", and "glot", meaning "language", is a development in language learning. Diglot-weave is related to code-mixing and code-switching which are common and well-documented processes in the speech of

multilingual individuals. They claimed that more comprehension was achieved when the first language surrounds the novel words in the second language. Other studies by Celik (2003) explored how code-switching as a variation of diglot-weave can be presented in language classes to teach vocabulary. The teacher told them a story inserting carefully chosen vocabulary items and then asked them to discuss the story in pairs and the teacher circulated to monitor the conversation and then, she had the students write down what they had discussed. Based on the results and analysis of checking their writing papers, he asserted that using code-mixing had a positive effect on teaching L2 vocabulary. In Iran, Rahimi (2014) evaluated the impact of code-mixing as a variation of diglot-weave, thematic clustering, and contextualization on L2 vocabulary recognition and production on ELLs which indicated effective outcomes.

Another technique is cooperative learning or peer cooperation that is a global term for a variety of techniques and educational activities in the classroom in which the learning task is divided among pupils to create interdependence among them (Aronson, Blaney, Stephan, Sikes, & Snapp, 1978). The technique is used with pupils of different abilities in small groups and without direct teacher intervention to improve their understanding of a subject. It causes their cognitive growth and leads to the improvement and achievement of the students' own learning, as well as, the learning of his or her fellow group members (Denham & Weissberg, 2004; Freedman, 2003; Mafra, 2015; Rich, 1996). The approach of this technique relies on Vygotsky's theory that greatly emphasizes the value of social interaction. Vygotsky (1978) notes that human beings are social in nature; hence, their cognitive skills were enhanced in group cooperation and setting. For instance, Fredrick and Hughes (2006) tested the effectiveness of combining classwide peer

tutoring (CWPT) and constant time delay (CTD) on the academic performance of LD and non-LD. The learners memorized and retained the novel words over time, generalized the words across context, and generalized the CTD peer tutoring procedures across content.

To summarize, when considering the difficulty that LD students have with acquiring words, despite the few existing studies in the literature on effective vocabulary learning techniques and strategies for LD students, there is still a need for further investigation on vocabulary learning strategies of LD students. Moreover, in the Iranian EFL contexts, where the common method of picture-definition instruction is still dominant, further research in this line of inquiry is needed to convince more EFL teachers to apply different techniques to improve vocabulary learning of LD students. Finally, considering the beneficial application of two techniques of cooperative learning and diglot-weave for typically-developing EFL/ESL students raises the possibility that these techniques might help teachers improve vocabulary knowledge of EFL/ESL students with LD. Therefore, to investigate the effects of these two techniques on vocabulary learning of LD students, two research questions were posed:

RQ1: Is there a significant difference among the effects of the three techniques of diglot-weave and cooperative learning, and the common technique of picture-word definition on LD learners' performance in the vocabulary recall test?

RQ2: Is there a significant difference among the effects of the three techniques of diglot-weave and cooperative learning, and the common technique of picture-word definition on LD learners' performance in the vocabulary retention test?

Method

Participants

The participants in this study were about 100 Iranian female LD students in two Junior Exceptional Schools in Shiraz, Shahid Khedri, and Kheirie Eslami. Among them, data from 90 students were analyzed regarding the purposes of the current study. The age of the participants ranged from 13 to 18. They were selected from ten intact classes that were randomly assigned to one of the three groups of diglot-weave, cooperative learning, and common instruction (picture-definition). In each group, 30 students participated. For the homogeneity of the participants, we considered their scores from the Wechsler Intelligence Scale which were obtained by the Shiraz education department. This test generates an IQ score that represents a child's cognitive ability. As reported by these two schools, the participants' IQ scores ranged from 50 to 70. Therefore, based on the Wechsler Test, scores lower than 69 signal mental retardation.

Instruments

The first instrument was a vocabulary familiarity questionnaire which examined the students' familiarity/unfamiliarity with the target and novel vocabulary definitions. The test was like a checklist used as a pre-test to ensure the researchers that the students did not know the words. However, it was not a pre-test to control the role of its interaction effect on the results. This method is derived from, Shu, Anderson, and Zhang (1995) in which learners were given a vocabulary list then were instructed to indicate which they do and do not know. The students were asked to select words that they knew their meaning among fifty target words from their 9th-grade textbook. Then, 42 words were selected as unknown and were taught to the three groups.

The second instrument was a pack of flashcards which was made by the researcher. For the cooperative technique, three sets of cards were employed. On one set, the target English word, on the other set the relevant pictures and on the last set, the Persian equivalents were presented. And for the other two techniques, one set of cards with the target English words and their relevant pictures were presented.

The last instrument was a vocabulary learning test which was constructed by the researchers to measure the students' vocabulary recall and retention of the target words. These tests consisted of matching and multiple-choice items as a recognition test which contained 42 items. For the multiple-choice items, the participants were asked to choose the best answer (picture) relevant to the target word. For the matching items, the participants were asked to match each English word in column A with its Persian equivalence in column B. The reliability of the test was obtained by SPSS which was 0.90, and the content validity of the test was confirmed by two independent experts in Teaching English as a Foreign Language (TEFL). The test was administered to the three groups after the treatment sessions to evaluate vocabulary recall, and two weeks after the instruction, to evaluate vocabulary retention.

Procedure

Before applying each technique to the three groups, all the students took a vocabulary familiarity questionnaire to make us certain that they did not know the words. Among 50 target words that were selected from their 9th-grade textbook, 42 words were selected as unknown by the students in this questionnaire and so they were instructed in six sessions during the treatment section of the study. Each session was about 30 to 40 minutes. In this study, the teacher was one of the researchers who taught seven words in each session.

For the control group, we had an interview with teachers of special education, and we were informed of the common instruction to teach vocabulary items. Therefore, the researcher taught the words by using their common instruction in which they were taught by using pictures.

In the second group, when the teacher taught the vocabulary items by using flashcards, the students used the diglot-weave technique. Each set of seven words in each session was organized to be related in a special context (e.g. animals). In every session, the teacher wrote the target words on the board and gave students about five minutes to make a story in their L1 by using the corresponding words. Then, each student told her story to the class.

In the third group, when the teacher used flashcards to teach the vocabulary items, in every session, the students were randomly divided into pairs. In their pairs, they matched each word with its translation and picture by using flashcards in five minutes. Finally, in all of the three groups and at the end of every session, the teacher asked the words by showing their relevant pictures to know how much they had learned the words. After the intensive teaching sessions, the test was administered to examine their vocabulary recall performance in each group and after a two-week interval, the same test was used to check their vocabulary retention.

Data Analysis

After finishing the treatment procedures, the collected data from the two tests were entered into SPSS 22 program for each group. First, the collected data were checked for their normal distribution. And then, to determine the differences in the participants' performance of the three groups regarding their vocabulary recall and retention of the target words, the one-way ANOVA was used for both post-tests.

Results

For each research question, initially, normality and homogeneity of variance assumptions are checked, then the relevant results based on statistical analysis of variance are presented.

Vocabulary recall Test

Both normality and homogeneity of variances assumptions were checked for the vocabulary recall test. Normality Assumption was met through checking the skewness and kurtosis (see Table 6 in Appendix). The values of Skewness and Kurtosis were within the acceptable range of -2 and +2 for all groups of participants according to Bachman (2004); hence, the data had the required normality for ANOVA.

The p-value of .001 for Levene's test of Homogeneity of Variances for vocabulary recall post-test was lower than the significant level .05 (see Table 7 in Appendix). Therefore, the assumption of homogeneity was not satisfied based on this test. However, according to Pallant (2013), the two tests of Welch and Brown-Forsythe are preferable when the homogeneity of variance is violated. The p-value in both tests was lower than .05, hence, the assumption of homogeneity was satisfied (see Table 8 in Appendix).

The descriptive statistics presented in Table 1. revealed that the cooperative group had the highest mean, followed closely by the diglot-weave group, and the picture-definition group had the lowest mean.

Table 1.

Descriptive Statistics for the Groups on the Vocabulary Recall Test

Groups	N	Mean	SD
Cooperative	30	38.30	1.968
Diglot-weave	30	37.77	2.269
Picture-definition	30	22.67	4.196

Running the one-way ANOVA test, as shown in the last column in Table 2., there are significant differences ($p = .000 < .05$) somewhere among the mean scores of the three instructional groups on vocabulary recall post-test. Then, in order to obtain the magnitude of this difference, the effect size was calculated by dividing the sum of squares for between-groups by the total sum of squares as indicated in Table 2. Given the eta value of .8 and comparing it with the guidelines proposed by Cohen (1988), it was concluded that there was a large effect size showing a substantial difference between these groups. This, however, did not indicate which group was different from the other groups. Post-hoc tests, nevertheless, provided the statistical significance of the differences between each pair of groups.

Table 2.

One-Way ANOVA for Vocabulary Recall Test

Groups	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	4726.956	2	2363.478	266.236	.000
Within Groups	772.333	87	8.877		
Total	5499.289	89			

Table 3. reveals that there is no significance difference ($p = .7 > .05$) between cooperative learning and diglot-weave groups. However, there is a

statistically significant difference at $p = .000 < .05$ level in mean scores on the vocabulary recall learning test for the two experimental groups of diglot-weave and cooperative with picture-definition group. More specifically, the participants' scores in diglot-weave and cooperative learning technique group indicated that they had better performance than the picture-definition group.

Table 3.

Vocabulary Recall Test Multiple Comparisons

(I) group	(J) group	Mean Difference (I-J)	Std. Error	Sig.
Cooperative	Diglot-weave	.533	.769	.768
	Picture-definition	15.633*	.769	.000
Diglot-weave	Cooperative	-.533	.769	.768
	Picture-definition	15.100*	.769	.000
Picture-definition	Cooperative	-15.633*	.769	.000
	Diglot-weave	-15.100*	.769	.000

Vocabulary Retention Test

Before running the one-way ANOVA test, both normality and homogeneity of variances assumptions were checked for vocabulary retention test. Therefore, for Normality Assumption the skewness and kurtosis were checked which were within the acceptable range of -2 and +2 for all groups of the participants (see Table 9 in Appendix). And, for the homogeneity of variances, the Levene's Test of Homogeneity of Variances generated the p-value of .409 which was bigger than the significant level (.05), and was satisfied (see Table 10 in Appendix).

Again, descriptive statistics, presented in Table 11 in Appendix, revealed that the cooperative group had the highest mean, followed closely by the diglot-weave group, and the picture-definition group had the lowest mean.

Running the one-way ANOVA for vocabulary retention test, as it is evident in the last column in Table 4., there were significant differences ($p = .000 < .05$) somewhere among the mean scores on the vocabulary retention test for the three instructional groups.

Table 4.

One-Way ANOVA for Vocabulary Retention Test

Groups	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2619.622	2	1309.811	153.122	.000
Within Groups	744.200	87	8.554		
Total	3363.822	89			

Given the eta value of .7, it is concluded that there was a large effect size showing a substantial difference between these groups. A post-hoc-test was conducted to provide the statistical significance of the differences between each pair of groups.

As shown in Table 5, there is no significance difference ($p = .1 > .05$) between diglot-weave and cooperative technique group. However, there is a statistically significant difference at $p = .000 < .05$ level in mean scores on the vocabulary retention test for the two groups. In other words, the participants' scores in the diglot-weave technique group and cooperative technique indicated that they had better performance than the picture-definition group.

Table 5.

Vocabulary Retention Test Multiple Comparisons

(I) group	(J) group	Mean Difference (I-J)	Std. Error	Sig.
Cooperative	Diglot-weave	1.367	.755	.172
	Picture-definition	12.067*	.755	.000
Diglot-weave	Cooperative	-1.367	.755	.172
	Picture-definition	10.700*	.755	.000
Picture-definition	Cooperative	-12.067*	.755	.000
	Diglot-weave	-10.700*	.755	.000

Discussion

The present study was conducted to investigate the effect of two vocabulary recall techniques of diglot-weave and cooperative learning which are the post-teaching techniques on vocabulary knowledge of students with LD and compare them with the common instruction (picture-definition). The results of the analyses indicated that in the vocabulary recall and retention tests, both experimental groups of diglot-weave and cooperative learning techniques outperformed the control group (picture-definition). However, there was no significant difference between the experimental groups of diglot-weave and cooperative learning techniques.

Although, there is no study to investigate the effect of the diglot-weave technique on LD students, the result of this study is in accordance with the finding of Celik (2003), Maleki and Nemati (2014), and Rahimi (2014) that investigated the application of this technique on vocabulary learning of ELL learners. The significant difference in the results of the diglot-weave technique and common instruction might be due to the further opportunity that the diglot-weave technique allows learners to use and hear vocabulary in a meaningful and memorable context. Students can associate the word with a person, place, thing, feeling, and imaginary or authentic situation and

narrating an event related to their previous experiences using L2 words in L1 context. Particularly, using the first language to learn the target vocabulary items assists LD students to learn a second or foreign language smoothly and increases their self-efficacy and motivation. Furthermore, as noted by Maleki and Nemati (2014), the diglot-weave technique is related to code alternation, and code-switching and code-mixing can be stated as two variations of it. This technique as a variation of code-switching is related to one of Dorneyei's (1995) taxonomy of communication strategies. Code-switching is compensatory nature in communication strategies in which learners try to utilize their own first language to complete their partial and inadequate knowledge. Therefore, applying such a strategy will help and motivate the learners who wish to learn a foreign language and communicate appropriately in that language. However, some points are to be considered for applying the diglot-weave technique that learners must share the same L1 since L2 words should be presented in an L1 context. Besides, although preparation and implementation of the diglot-weave technique do not need additional materials and need insignificant quantities of time, presenting words in a specific context to make a story is somehow difficult. Moreover, it might be difficult for lower intelligence students to make stories.

The result of the cooperative learning technique in this study is in line with the study which examined the effectiveness of combining classwide peer tutoring (CWPT) and constant time delay (CTD) on the academic vocabulary which was conducted by Fredrick and Hughes (2006) on ELL and LD students that indicated positive effect and measures of social validity indicated that both teachers and students were satisfied with the CTD peer tutoring procedures. And in order to explain why in the present study the scores were higher in the cooperative technique as compared to the common instruction,

we can consult Vygostky's (1978) theoretical conception of the Theory of Mind (ToM) and the value of social interaction. In this theory, he argues that children can stimulate and generate their learning by different processes and promote their competency only when they interact with people in the environment and have cooperation with peers. Therefore, by interacting with peers, children learn to complete tasks they could not do alone and then they can correct one another and mediate learning.

Another perspective on small group or peer cooperation learning is based on Piaget's (1932) theory of socio-cognitive conflict that happens when children had to re-examine their comprehension and point of view according to the contradictions that exist when interacting with others. Although the current study showed that cooperative learning improved the learners' performance compared to the common instruction, it should be considered that simply dividing students into pairs and asking them to do a task in pairs do not guarantee satisfying results. Teachers should train students in collaborative skills and provide an atmosphere and opportunity in the classrooms to involve them in joint work (Baleghizadeh, 2012). Besides, due to the nature of cooperative learning techniques that require students to be active and have a good relationship in their classes, sometimes, the homogeneity or heterogeneity of pairs causes difficulty in presenting the technique. Therefore, random assignment to create pairs, which was used in the present study, could be a suitable solution for this limitation. Moreover, as reported by Gresham and Reschly (1986), both parents and teachers asserted that LD learners are less socially talented than non-LD ones. Since anxiety can impress on these learners' social lives, presenting cooperative learning techniques might cause difficulty for less sociable LD learners.

Conclusion

The central issue addressing learning a second or foreign language is basically a matter of learning the vocabulary of that language. Therefore, we may assert that one cannot comprehend a sentence when s/he does not know the definition of most of the vocabulary items used in it, and consequently, the deficiency of vocabulary knowledge has an impact on all four language skills. Second or foreign language teachers discuss that retaining the new vocabulary in mind for the long-term is an important concern for learners. Hence, vocabulary learning strategies are considered as a way to help and motivate students to learn and remember words in learning a foreign language. Thus, addressing the instructional needs of students with intellectual disabilities, it would be helpful to examine the strategies and enhance their awareness in the learning processes.

As stated before, few pieces of research in the literature and no study in Iran were conducted to investigate different vocabulary strategies on LD students. In this vein, the current research aimed to examine the effect of two post-teaching techniques of diglot-weave and cooperative learning and the common technique of picture-word definition on LD learners' vocabulary recall and retention. Applying these post-teaching techniques indicated positive outcomes compared to the common instruction on LD learners. This implies that due to the intellectual disability of LD students, the traditional method of teaching vocabulary through synonyms or pictures is not sufficient and does not provide efficient outcomes. In other words, using various techniques such as those applied in the current study that suits the learners' special ability, needs, and interests could significantly enhance their vocabulary learning and retention.

However, employing a certain method or technique cannot guarantee that it always gives the conventional result since any learner has a different comprehension capacity, tendency, and interest. For students with disabilities, any change in their educational growth has become a serious issue or a certain barrier that must be overcome to make sure that this change is advantageous. Consequently, this study provides limitations and recommendations for researchers who are interested to conduct studies on the application of different learning strategies on LD learners and their special needs.

Considering the results of this study, several suggestions for future research arise. First of all, these techniques need to be more extensively investigated on LD students in other contexts to increase the validity of the results and transferability of this study either to other similar settings or the other L1 ones. Since this study was conducted on elementary students, the Iranian EFL learners' vocabulary knowledge could be further analyzed with respect to other levels of proficiency to infer some generalizations. Besides, this study didn't discriminate the effect of male and female performances on the obtained findings, though, when considering such elements of language, gender may bring different outcomes. Recent studies have been indicated that gender is an influential factor in social situations and could affect individuals' performance in different researches (Simpson, 2003). Based on the received effective outcomes in this study, further research is suggested using these techniques in other skills (e.g. speaking, writing, reading, and listening) and sub-skills (e.g. grammar) of language learning on LD students. Because of the limited number of words taught in this experiment as well as the duration of the study which was approximately one week, future research is needed to examine the extent to which presenting these techniques across a semester or in the long run may lead to achievement. Finally, the results of presenting

these two techniques provide a basis for researchers and special educators to investigate bilingualism, different second language learning strategies, and instructional needs of LD students, particularly in Iran Special Education.

Due to the importance of knowledge of vocabulary learning strategies in second language acquisition, the results of this study could have a very important pedagogical implication for teachers, decision-makers and, course designers, especially in Iran Special Education to improve vocabulary learning processes. Hence, investigating the effectiveness of cooperative learning and the diglot-weave technique as a determinant of achievement in vocabulary learning in which the LD learners' awareness is activated in teaching processes compared to teacher-fronted classrooms indicated improvement in the recall, and increase students' motivation and attitude for participating in classes. Many teachers might think that presenting these techniques requires more time than the traditional one, however, we observed that their use was not comparatively time-consuming.

The outcomes can have implications for students, too. By applying these communicative and socio-cognitive techniques LD students can be more active, motivated, and responsible in the learning process than being engaged in instructions that just rely on the cognitive aspect of learning and the highly motivated student will get better learning results. Moreover, based on Cheatham and Barnett's (2016) claim that bilingual students with LD performed as well or better than their monolingual peers with LD on second language skills, the findings also supported the belief that the presence of a disability does not appear to prevent students from being bilingual or EFL learners.

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Appendix

Table 6.

Normality Assumption Test for Vocabulary Recall Test

	N		Skewness		kurtosis	
	Statistics		Statistics	Std.Error	Statistics	Std.Error
Cooperative	30		.044	.427	-.194	.833
Diglot-weave	30		-.184	.427	-.459	.833
Picture-definition	30		.302	.427	.291	.833
Valid N (listwise)	30					

Table 7.

The Levene's Test of Homogeneity of Variances for Vocabulary Recall Test

Levene Statistic	df1	df2	Sig.
7.638	2	87	.001

Table 8.

Robust Tests of Equality of Means

	Statistic	df1	df2	Sig.
Welch	177.895	2	54.651	.000
Brown-Forsythe	266.236	2	58.500	.000

Table 9.

Normality Assumption Test for Vocabulary Retention Test

	N		Skewness		kurtosis	
	Statistics		Statistics	Std.Error	Statistics	Std.Error
Cooperative	30		-.194	.427	-.736	.833
Diglot-weave	30		-.262	.427	-.283	.833
Picture-definition	30		-.342	.427	-.628	.833
Valid N (listwise)	30					

Table 10.

The Levene's Test of Homogeneity of Variances for Vocabulary Retention Test

Levene Statistic	df1	df2	Sig.
.903	2	87	.409

Table 11.

Descriptive Statistics for the Groups on the Vocabulary Retention Test

Groups	N	Mean	SD
Cooperative	30	27.43	2.445
Diglot-weave	30	26.07	3.129
Picture-definition	30	15.37	3.146

Appendices 1

Appendix A: Vocabulary Familiarity Test

Dear student

Please indicate your familiarity with each of the following words by check marks; if you know a word, write the meaning of it.

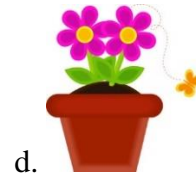
Selected words	Familiarity	Meaning
Plate		
Cup		
Teaspoon		
Kettle		
Chair		
Water		
Table		
Bus		
Queen		
Tea		
Mother		

Cheese Butter Bread Father Clean Cat Robot Egg Ball Student Skate Tennis Hat Rain Umbrella Board Classroom Door Desk Read Art Window Teacher Pencil Notebook Rubber Box Bag Sharpener Tree Game Snake Zebra Zoo Mouse Dog Lion Football Fish		
--	--	--

Appendix B: Vocabulary Test

A. Choose the best picture for the word.

1. Tree

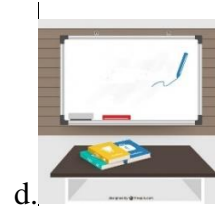


B. Match each word in the left column to the definitions in the right column, one definition is excessive.

- | | |
|-------------|--------------|
| 2. Teaspoon | ماهی |
| 3. Chair | در |
| 4. Student | موش |
| 5. Door | قاشق چایخوری |
| 6. Mouse | دانش آموز |
| | صندلی |

C. Choose the best picture for the word.

7. Robot



D. Match each word in the left column to the definitions in the right column, one definition is excessive.

- | | |
|---------------|----------|
| 8. Plate | میز |
| 9. Tea | پنجره |
| 10. Window | کلاس درس |
| 11. Zoo | باغ وحش |
| 12. Classroom | چای |
| 13. Egg | بشقاب |
| | تخم مرغ |

E. Choose the best picture for the word.

14. Skate



b.



c.



d.

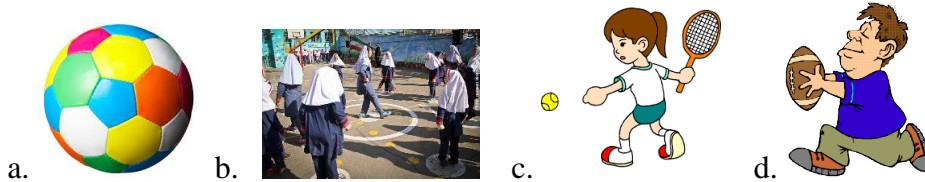


F. Match each word in the left column to the definitions in the right column, one definition is excessive.

- | | |
|-------------|-----------|
| 15. Desk | خواندن |
| 16. Read | معلم |
| 17. Board | دفتر |
| 18. Teacher | مداد |
| 19. Pencil | میز تحریر |
| 20. kettle | تخته کلاس |
| | کتری |

G. Choose the best picture for the word.

21. Tennis

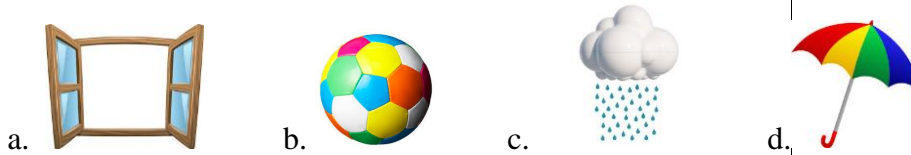


H. Match each word in the left column to the definitions in the right column, one definition is excessive.

- | | |
|------------|-----------|
| 22. Hat | کلاه |
| 23. Cheese | پاک کن |
| 24. Bread | باران |
| 25. Rain | نان |
| 26. Clean | پنیر |
| | تمیز کردن |

I. Choose the best picture for the word.

۲۷. Umbrella



J. Match each word in the left column to the definitions in the right column, one definition is excessive.

- | | |
|--------------|-------|
| 28. Zebra | دفتر |
| 29. Notebook | گورخر |
| 30. Lion | شیر |

- | | |
|------------|------|
| 31. Butter | کره |
| 32. Queen | کیف |
| 33. Fish | ملکه |
| | ماهی |

K. Choose the best picture for the word.

34. Sharpener



L. Match each word in the left column to the definitions in the right column, one definition is excessive.

- | | |
|------------|--------|
| 35. Dog | مار |
| 36. Bag | کیف |
| 37. Snake | پاک کن |
| 38. Rubber | توپ |
| 39. Box | سگ |
| 40. Ball | فنجان |
| 41. Cup | جعبه |
| | درخت |

M. Choose the best picture for the word.

42. Table

