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The Impact of Spelling-related Language Learning Strategies on Improving Dictation Abilities of Young Iranian EFL Learners, Teacher and Students Perspective

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Abstract

Generating a range of various functions, spelling and dictation have both been used as a technique to help improve language skills. Dictation is extensively different from spelling, although their similarities cannot be denied. The purpose of this study was to explore whether spelling-related language learning strategies affect dictation abilities of young Iranian EFL learners. After selecting thirty-five learners out of forty-six participants through an online Cambridge Key English Test (KET) during Covid-19 pandemic lockdowns, the experimental and control groups were randomly formed. Kristin-F Anderson's questionnaire was implemented along with Kimura's six-minute partial dictation test as pretest and posttest for the two groups. The treatment included teaching the same course book for both groups by means of a special program for the experimental group to be involved more in spelling- related learning activities. The findings through the independent-samples t-test, and repeated measures ANOVA run on the data collected in this study revealed that all null hypotheses were rejected and consequently the spelling strategies significantly affected the improvement of learners' dictation ability.

Keywords: language-learning strategies, dictation ability, spelling skill

1. Introduction

The fact cannot be denied that spelling is the podium for the later developments an EFL learner achieves in reading and writing. According to Jaffe, Androutsopoulos, Sebba, and Johnson (2014), spelling is a representation of language. In other words, what one learns about language skills is simply manifested through spelling. Thus, it would be fair to suggest that spelling should never be taken for granted in language training courses. Perhaps, it is now conceivable that why Turbill (2000) considered learning spelling a process comprising of visual and auditory processing that should be taught systematically and explicitly. O'Sullivan and Thomas (2007) conferred that learning to spell is tightly associated with young learners' perception of the way spoken language is written down and accordingly with their learning to read. While traditional approaches to teaching languages in public schools and private training centers have apparently belittled the role of spelling and dictation

activities as a language learning strategy, Kazazoglu (2013) has even gone beyond accomplishing a study of dictation as a language learning tool. He reported that teacher-lead dictation culminated in different results compared to tape-recorded dictation which signifies the interference of other skills like listening in the learning process. This confirms that the solution for the existing problems with skills such as reading and writing could be found in spelling activities.

2. Review of the Related Literature

2.1. Spelling

Spelling has been defined by Perfetti, Reubin and Karol (1997) as a linguistic ability constituted of converting linguistic systems into written systems where spoken language delivers the linguistic units-phonological strings, morphemes, and words. One of the obvious results of this statement is that learning English has never been without spelling challenges for the learners of foreign languages because of its puzzling grammar and various exceptions (Bowen, 2011). This issue probably originates from the fact that the spelling of words, in many cases, does not correspond to the way they are pronounced (Fromkin, Hyams & Rodman, 2014). Learners have to expand their language knowledge in several grounds such as phonological, morphological, visual memory skills, semantic relationships as well as adequate knowledge of spelling rules to tackle the problem (Staden, 2010). Meanwhile, Zohrabi and Kaashef (2017) investigated a new micro-strategy for teaching spelling patterns and demonstrated that it improved the spelling performance of the learners and thus could be implemented in teaching and learning spelling. Spelling has, also, been used to develop language skills. For example, Lensk and Verbruggen (2010) suggested that improving spelling skills eventuates to an improved writing skill. While Hughes and Searle (2000) argued that advancement in spelling is facilitated through reading, Ehri (1997, as cited in Perfetti, Reubin, & Karol, 1997) contended that spelling and reading are identical in that they access the same kind of information in memory. However, Snowling (2000) investigated how spelling relates to reading and reported that improvement in spelling enhances reading. Gentry (2004) asserted that accurate spelling could facilitate reading and writing resulting in fluent speakers and productive writers. On the other hand, Frith (1980) studied the relationship between spelling ability and reading skill, differentiated good and poor spellers, and concluded that they implement different reading techniques. While good spellers use all clues available to read, paying attention to all letters and the order in which they appear, poor spellers use half clues that assists them to read faster at the cost of losing facts and figures related to the letters and their order (Sterling & Robson, 1992).

2.2. Dictation

Despite bearing similarities, dictation and spelling are far too different from one another. Dictation has long been used as a technique in both language teaching and language testing where a passage is read aloud to students or test takers, with pauses during which they must try to write down what they have heard as accurately as possible (Richards & Schmidt, 1985). Likewise, Davis and Rinvolucri (1988) explained dictation to be decoding the sounds of English and recoding them in writing. Dictation can also be applied to expand the learners' ability in learning foreign language skills, and expanding listening skill in particular. For example, De La Paz and Graham (1997) construed that the difficulties such as poor spelling could be lessened through dictation so that well-established paragraphs would be resulted. Although dictation has not necessarily been acknowledged as a testing device, it has

traditionally been applied as a method of teaching language. According to Lado (1961), dictation is preferred by numerous teachers and students as a teaching as well as testing device, but it apparently measures very little of language. Moreover, he stipulated that dictation is an activity which is suitable for a wide range of levels and ages. In other words, it was a common traditional type language test before his introduction of scientific orientation, who criticized it in several grounds and concluded that dictation becomes reduced to a mere spelling test. Meanwhile, these criticisms were rejected by Oliver (2002) and others. They demonstrated that a dictation test is a more accurate indicator of overall language proficiency than any other sub-test of a battery they administered which included conventional-type questions on vocabulary, grammar, comprehension and phonology. On the other hand, Oller (1971) explained more by arguing that a test of dictation taps directly the process involved in the comprehension of language. Furthermore, Cordewener, Hasselman, Verhoeven, and Bosman (2018) examined the role of instruction for spelling performance and spelling consciousness in the Dutch language and found that the students in all three training conditions _ strategy-instruction, strategic-monitoring, self-monitoring, or control condition_ made more progress in both spelling performance and spelling consciousness than students in the control condition. Meanwhile, Kimura (2016) developed a six-minute partial dictation test and demonstrated that its quality had been good enough to be used as constituent of a placement test.

2.3. Language Learning Strategies

Learning strategies have been defined as being the actions or individual learning styles that learners choose to improve their own learning (Oxford, 1990). They include various types of language learning strategies that learners exercise to learn a new language and are classified into six types of memorization, cognitive, compensation, metacognitive, affective and social strategies. The use of most common language learning strategies has been investigated by various researchers concluding that they facilitated learning processes (Al-Qahtani, 2013; Chamot, 2004; Charoento, 2016; Magogwe & Oliver, 2007; Wu, 2008). These strategies have mainly been categorized into direct and indirect strategies where memory, cognitive and compensatory strategies as specific means of language use refer to the former, and metacognitive, affective and social strategies refer to the latter (Oxford, 1990). The review of 15 articles by Alshahrani (2019) on classroom interventions that successfully enhanced learners' vocabulary and spelling skills demonstrated that writing strategies resulted in spelling skill improvement for students with learning disabled. To find out whether spelling-related language learning strategies can improve dictation abilities in young learners, this study sought to introduce a new technique to improve dictation abilities of EFL students.

3. Method

The following hypotheses were formulated to accomplish the present study:

- Q1. Does using spelling-related language learning strategies have any significant effect on improving dictation abilities of young Iranian EFL learners?
- Q2. Does using no spelling-related language learning strategies have any significant effect on improving dictation abilities of young Iranian EFL learners?
- Q3. Is there any statistically significant difference between the effects of using spelling-related language learning strategies, compared to using no spelling-related language learning strategies, on improving dictation ability of the young Iranian EFL learners?

3.1. Participants

This study was accomplished during the summer 2021, when horrific Delta variant of the Coronavirus pandemic ripped through the whole country causing several lockdowns and affecting all educational bases from language schools and institutes to high schools and universities to libraries and training centers. While minimum 60 volunteer language learners were needed for the onset of the study, the researchers encountered numerous problems because of closures and bans for disease contagion threats. As a result, they decided to swing to online classes for treatment, although internet disconnections, Wi-Fi shortages and power cuts were extensive hindrances against the training process. Finally, 46 high school boys and girls aged 15 to17 studying at G-10 and G-11 of a private, not-for-profit educational entity in Tehran were assembled online and screened through a KET test, allowing only thirty five learners to the training program. The learners had all passed 4 to 5 years of public schooling formal English lessons from G. 7 to G. 10 and minimum one year of English courses in private language schools in elementary and pre-intermediate levels. The tests required the learners' scores to be one standard deviation above and one standard deviation below the mean score in order to be allowed to the next stage. The selected learners, then, randomly brought together into an experimental group of 18 and a control group of 17 learners before pre-test and the treatment.

3.2. Instruments

For the purpose of reviewing the role of spelling-related language learning strategies on dictation ability of Iranian EFL learners in this study, the following instruments were employed: a) Cambridge Key English Test (KET) for homogenizing the learners, b) Kristine F. Anderson's (1986) questionnaire along with c) Kimura's (2016) six-minute partial dictation test for pre-test and post-test, d) American English File 1, second edition, Oxford University Press, as a course book for the treatment.

3.2.1. Cambridge Key English Test (KET) as Proficiency Test

In order for the learners in both experimental and control groups to be homogenized, Cambridge Key English Test (KET) was employed prior to the treatment. The one-and-a-half-hour test included separate 7 parts of reading and writing with 32 questions, 5 parts of listening with 25 questions and 2 parts of speaking which was omitted for non-relevance reasons. Reading and writing part consisted of two discrete multiple choices, a multiple matching, a multiple-choice cloze, an open cloze, a guided writing and a picture story, totally contributing for 50% of the scores. The writing part asked the learners to write a 25-word email and a 35-word short story based on pictures, respectively. The listening part consisted of three distinct multiple choices, a gap fill and a matching part.

3.2.2. Kristin-F Anderson's Questionnaire and Kimura's six-minute partial dictation test as Pre-test and Post-test Instruments

Anderson's questionnaire consisted of 20 questions where "the first five items…focus on… sound; rules; analogies, or words related in meaning or structure; the dictionary; and visual information. The sixth and seventh questions focus on proofreading or self-correcting...The rest of the questions involve seven general categories of words that often prove troublesome for basic writers" (Anderson, 1987, p.73). Learners had to choose among 'always', 'frequently', 'occasionally' and 'never' as the correct choice.

The dictation test "consists of 20 sentences and each sentence has three successive blanks to fill in for a total of 60 blanks. Each blank is counted as one item. The three linguistic forms

do not necessarily constitute a linguistically well-formed unit but include both content and function words" (Kimura, 2016, p.56).

3.2.3. Instructional Material for Treatment

The material researchers selected to use for training both groups was American English File 1, second edition, Oxford University Press. Learners were taught equal subjects in both groups, from grammar, vocabulary and pronunciation to listening and reading. However, in the experimental group only, learners were encouraged to be more engaged in spelling-related activities like peer evaluation on spelling while the teacher tried to raise their awareness of spelling rules, implemented spelling structure techniques and helped develop their spelling skills.

3.3. Data Collection Procedure

3.3.1. Pilot Testing

In order for the tests to be piloted before being administered as pre-tests and post-tests, the reliability of the devices were calculated, although test developers had separately verified an adequate reliability for both the questionnaire and the dictation test. The pilot group, consisting of twenty learners, was administered the questionnaire along with the dictation test and the analysis indicated that the devices relished the reliability required for the study.

3.3.2. Homogenization

A total 46 volunteer learners were selected for the study through a simple interview to ensure that the participants retain basic background knowledge in English and have passed a minimum one year English courses in language institutes other than the formal education they had had in public or private schools. Then, a sample test of Cambridge Key English Test (KET) was administered based on the results of which only 35 learners could be allowed in the study. These learners were randomly organized into an experimental group of 18 learners and a control group of 17 learners. Only the high and low scores were similarly shared.

3.3.3. Pre-test

The piloted Anderson's questionnaire along with Kimura's six-minute partial dictation test were administered as a pretest to the experimental and control groups in order to observe their spelling and dictation ability before the treatment. While the first test assessed the learners' skills concerning sounds, rules, analogies, words related in meaning or structure, the dictionary, visual information, self-correcting of analysis, inference, evaluation, and reasoning, the second and main test measured their knowledge of not linguistically well-formed units but both content and function words. The only help learners were offered during the test was with the translation of some survey questions into L1 to ensure the comprehensibility of the questions, since learners in both groups belonged to A1 level of The Common European Framework of Reference for Languages (CEFR).

3.3.4. The Treatment

The learners in the experimental group received the treatment process on the basis of the objectives of the spelling-related language learning strategies for eight weeks, participating three times a week in one-and-a-half-hour classes. During the course, learners encouraged to be engaged more in spelling-related activities such as peer evaluation on spelling, and at the same time, the teacher tried to draw their attention on spelling rules, implemented spelling structure techniques and helped develop their spelling skills in general. The lesson plan, order

and sequence of the spelling activities were extracted from American English File series, second edition. Meanwhile, the learners in control group received the treatment in accordance with the instructional techniques proposed in their textbooks without special spelling drills being accentuated. Another strategy used to support learners with spelling activity was Carter, Wong and Mayton's (2013) teaching strategy known as Cover, Copy, Compare (CCC), where learners are taught spelling by being asked to look at the word, cover the word and copy the word down as they remembered the spelling, and then compare it with the word's correct spelling.

3.3.5. Post-test Administration

When the treatment course was ended, both Anderson's questionnaire and Kimura's six-minute partial dictation test were administered as a post-test to both control and experimental groups to discover if spelling-related language learning strategies affected the learners' dictation ability.

3.4. Data Analysis

Descriptive and inferential statistics were the two series of statistical analyses implemented for the study. Descriptive statistics was used for analyzing Testing Normality of Data, KET Test by groups, and for the two groups on pretest and post-test of dictation.

Inferential statistics was used for the independent-samples t-test and repeated measures ANOVA to run on the mean scores of the two groups on pretest and posttest to conclude if spelling-related language learning strategies affected dictation ability of young Iranian EFL learners.

4. Results

The results of the independent-samples t-test, and repeated measures ANOVA run on the data collected through this study are discussed below. These statistical techniques, besides their own specific assumptions assume normality of the data. Table 1 displays the skewness and kurtosis indices, and their ratios over the standard errors. Since the ratios were within the ranges of +/- 1.96 (Field, 2018), it was concluded that the assumption of normality was retained.

Table 1.
Descriptive Statistics; Testing Normality of Data

Group		N	Skewness			Kurtosis		
		Statistic	Statistic	Std. Error	Ratio	Statistic	Std. Error	Ratio
Experimental	KET	18	.432	.536	0.81	-.296	1.038	-0.29
	Pre-Dictation	18	-.466	.536	-0.87	.374	1.038	0.36
	Post-Dictation	18	-.327	.536	-0.61	.420	1.038	0.40
Control	KET	17	.158	.550	0.29	-.558	1.063	-0.52
	Pre-Dictation	17	.205	.550	0.37	-.790	1.063	-0.74
	Post-Dictation	17	-.329	.550	-0.60	-1.023	1.063	-0.96

The participants in this study were selected from among 46 students who took the KET test. The students whose score were higher than 75 were selected and divided into two groups of experimental (n = 18) and control (n = 17). The KR-21 reliability index for the KET test was .88 (Table 2).

Table 2.
Descriptive Statistics, and KR-21: KET Test

	N	Minimum	Maximum	Mean	Std. Deviation	Variance
KET	46	57	98	83.09	10.481	109.859
KR-21	.88					

An independent-samples t-test was run to compare the experimental and control groups' means on KET test in order to show that the two groups were homogenous in terms of their general language proficiency prior to the administration of the treatment. The results indicated that there was not any significant difference ($t(33) = .675$, $p > .05$, $r = .117$ representing a weak effect size) (Table 3) between experimental ($M = 88.72$, $SD = 5$) and control ($M = 87.65$, $SD = 4.37$) groups' means on the KET test. It should be noted that the assumption of homogeneity of variances was retained (Levene's $F = .261$, $p > .05$) (Check Appendix II for the t-test's complete table).

Table 3.
Descriptive Statistics, and Independent-samples t-test; KET by Groups

Group	N	Mean	Std. Deviation	Std. Error Mean	t(33)	r
Experimental	18	88.72	5.004	1.179	.675	.117
Control	17	87.65	4.372	1.060		

Repeated measures ANOVA plus simple effect analyses were run to compare the experimental (spelling-related language learning strategies) and control (no spelling-related language learning strategies) groups' means on pretest and posttest of dictation in order to achieve the following four objectives: a) to compare the two groups' means on pretest to prove that they were homogenous in terms of their ability in writing English dictation prior to the administration of the treatments, b) to compare the experimental group's mean improvement from pretest to posttest of dictation in order to probe the first research question, c) to compare the control group's mean improvement from pretest to posttest of dictation in order to probe the first research question, and finally, to compare the two groups' means on posttest in order to explore the third research question. It should be noted that the researcher tried to run one-way analysis of covariance; however, the assumption of linearity was violated (Appendix III).

Before discussing the results, it should be noted that the assumptions related to repeated measures ANOVA were retained. First, repeated measures ANOVA assumes homogeneity of covariance matrices (Table IV.1 Appendix IV). That is to say the correlation coefficients between pretest and posttest of dictation should be roughly equal across the two groups. The non-significant results of the Box's test ($M = 2.35$, $p > .001$) indicated that the assumption of homogeneity of covariance matrices was retained. As noted by Tabachnick and Fidell (2014), Pallant (2016) and Field (2018), the Box's test should be reported at .001 levels.

Second, repeated measures ANOVA requires groups to enjoy homogenous variances. The non-significant results of the Levene's test (Table IV.2, Appendix IV) indicated that the assumption of homogeneity of variances was retained on pretest ($F(1, 33) = .548$, $p > .05$); and posttest ($F(1, 33) = .451$, $p > .05$) of dictation. Repeated measures ANOVA also requires that the differences between any two tests should have equal variances across groups. This assumption needs at least three tests (dependent variables) to be computed. If a study includes two dependent variables, as is the case in this study, the probability of the Mauchly's sphericity test cannot be computed. As displayed in Table IV.3 (Appendix IV), the probability of the sphericity test was not computed, and all epsilon values were equal to one; i.e. there was no need to correct the degree of freedom.

Table 4 displays the descriptive statistics for the two groups on pretest and posttest of dictation. The results showed that the experimental and control groups had fairly close means on pretest of dictation. Their means were 32.55 and 32.82 respectively However, the experimental group (M = 49.94, SE = 1.03) had a higher means than the control group (M = 33.58, SE = 1.06) on posttest of dictation. Although the following results cannot probe any of the researcher questions, the results of repeated measures ANOVA indicated that: a) there was a significant difference between experimental and control groups' overall means on dictation disregarding time of testing (F_{Group} (1, 33) = 74.78, $p < .05$, $p\eta^2 = .694$ representing a large effect size), b) there was a significant difference between overall means on pretest and posttest of dictation disregarding group membership (F_{Test} (1, 33) = 112.47, $p < .05$, $p\eta^2 = .773$ representing a large effect size); and finally, there was a significant interaction between group and test ($F_{Group*Test}$ (1, 33) = 94.32, $p < .05$, $p\eta^2 = .741$ representing a large effect size) (Appendix V).

Table 4.
Descriptive Statistics; Pretest and Posttest of Dictation by Groups

Group	Dictation	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
Experimental	Pretest	32.556	.695	31.142	33.970
	Posttest	49.944	1.034	47.841	52.048
Control	Pretest	32.824	.715	31.369	34.279
	Posttest	33.588	1.064	31.424	35.753

$F_{Group}(1, 3) = 74.78$, $p < .05$, $p\eta^2 = .694$
$F_{Test}(1, 3) = 112.47$, $p < .05$, $p\eta^2 = .773$
$F_{Group*Test}(1, 3) = 94.32$, $p < .05$, $p\eta^2 = .741$

Table 4 and Table 5 display the results of the simple effect analysis. As noted by Field (2018), simple effect analysis explores the effect of a one variable (Group) within levels of the second variable (Test). Based on these results, and the descriptive statistics displayed in Table 3, it can be concluded that:

a) There was not any significant difference between experimental (M = 32.55) and control (M = 32.82) groups' means on pretest of dictation (MD = .268, $p > .05$). Thus, it can be concluded that the two groups were homogenous in terms of their dictation ability prior to the administration of the treatments.

Table 5.
Simple Effect Analysis; Comparing Groups on Pretest and Posttest of Dictation

Dictation	(I) Group	(J) Group	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval for Difference	
						Lower Bound	Upper Bound
Pretest	Control	Experimental	.268	.997	.790	-1.761	2.297
Posttest	Experimental	Control	16.356*	1.484	.000	13.338	19.375

*. The mean difference is significant at the .05 level.

b) The experimental group (M = 49.94) had a significantly higher mean than the control group (M = 33.58) group on posttest of dictation (MD = 16.35, $p < .05$). Thus, it can be concluded that the third null-hypothesis was rejected.
c) The experimental group's mean on posttest (M = 49.94) was significantly higher than their mean on pretest (M = 32.55) (MD = 17.38, $p < .05$). Thus, it can be concluded that the first null-hypothesis was rejected.
d) (MD = .765, $p > .05$). Thus, it can be concluded that the second null-hypothesis was supported.

Table 6.
Simple Effect Analysis; Comparing each Group's Improvement from Pretest to Posttest of Dictation

Group	(I) Posttest	(J) Pretest	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval for Difference	
						Lower Bound	Upper Bound
Experimental	Posttest	Pretest	17.389*	1.193	.000	14.962	19.816
Control	Posttest	Pretest	.765	1.228	.538	-1.733	3.262

*. The mean difference is significant at the .05 level.

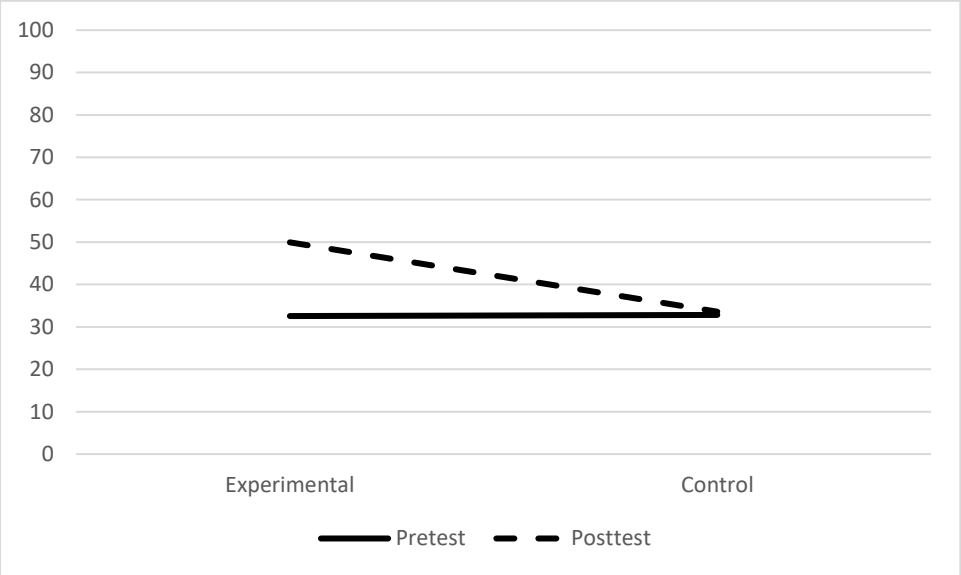

Figure 1. Means on Pretest and Posttest of Dictation by Group

5. Discussion and Conclusion

This study was accomplished for the purpose of investigating the role of spelling-related language learning strategies on improving the dictation ability of young Iranian EFL learners. The overworked foreign languages instruction system in the country accompanied by less-qualified educator employment structure has left a majority of language learners staggering on their skills and dictation in particular. As a result of overlooking learners' wants and desires in many grounds, spelling activities are also represented as being insignificant in training classes. However, relying on the analytical results of this study, experimental group's performance on dictation improved to a great extent in comparison with learners in control group. The findings of the study indicated a statistically significant difference between the experimental and control groups' overall mean scores on dictation. In other words, learners in the experimental group retained higher scores than the learners in control group. This implies that there has been a consistency between the results of this study and the findings reported in earlier studies by Zohrabi and Kaashef (2017), O'Sullivan and Thomas (2007), Lenks and Verbruggen (2010), Snowling (2000), Gentry (2004), Cordewener, Hasselman, Verhoeven, and Bosman (2018). Consequently, it could be claimed that the findings of this study has been endorsed by other researchers' findings, stipulating the appropriate teaching techniques selected, prepared and employed to improve learners' spelling strategies. The statistical analysis of the data clearly showed that the mean score in the experimental group (M = 49.94) was significantly higher than the means in control group (M = 33.58) on posttest of dictation. Although this does not disparage the spelling activities devised in the course books, the efficiency of a spelling activity proposed by Carter, Wong and Mayton (2013) and selected as the (CCC) teaching strategy used for the treatment of the study is underscored.

The analysis of repeated measures ANOVA plus simple effect analyses were employed to compare the experimental (spelling-related language learning strategies) and control (no spelling-related language learning strategies) groups' means on pretest and posttest of dictation.

A significant difference between the overall means on pretest and posttest of dictation evidently supports the constructive role that stressing spelling strategies has on contributing to the learners' dictation improvement. The descriptive analysis run on the learners' performance on tests in both groups additionally approved that improvement in spelling enhances reading ability. This has also been in line with the earlier studies reviewed in the literature. Undoubtedly, further researches are needed to determine if the origins of the reported misspelling and dictation errors in this study rise out of reading deficiency, mispronunciation or the interference of Persian sound system into English language. Meanwhile, the training patterns delineated in the study will hopefully brighten the path for teaching vocabulary and other language skill through spelling-focused activities. That is to say, learners' attentive participation in spelling activities could also result in remarkable improvements in reading comprehension and correct writing. Another implication of the study could be for the prospective researchers to discover if a similar study in other age ranges with different proficiency levels would mark identical results.

Appendix I

Table I.1 displays the Kolmogorov-Smirnov and Shapiro-Wilk tests of normality. Since all probabilities were higher than .05, it was concluded that the assumption of normality was retained.

Table I.1.
Kolmogorov-Smirnov, and Shapiro-Wilk Tests of Normality

Group		**Kolmogorov-Smirnov**			**Shapiro-Wilk**		
		Statistic	**df**	**Sig.**	**Statistic**	**df**	**Sig.**
Experimental	PET	.121	18	.200	.952	18	.461
	Pre-Dictation	.145	18	.200	.956	18	.531
	Post-Dictation	.147	18	.200	.962	18	.643
Control	PET	.115	17	.200	.970	17	.814
	Pre-Dictation	.196	17	.082	.939	17	.302
	Post-Dictation	.180	17	.147	.933	17	.244

Appendix II

Table II.1 displays the complete results of the independent-samples t-test ran to compare the experimental and control groups' means on PET test. Since the assumption of homogeneity of variances was retained (Levene's $F = .261$, $p > .05$), the results of the first row; i.e. "Equal variances assumed", were reported.

Table II.1.
Independent Samples t-test; PET Test by Groups

	Levene's Test for Equality of Variances		t-test for Equality of Means						
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper
Equal variances assumed	.261	.613	.675	33	.504	1.075	1.592	-2.164	4.315
Equal variances not assumed			.678	32.812	.503	1.075	1.586	-2.152	4.303

Appendix III

It should be noted that the researcher tried to run one-way ANCOVA on posttest of dictation controlling for the effect of pretest; however, as displayed in Table III.1 the assumption of linearity was not retained. It should be mentioned that one-way ANCOVA assumes that the relationship between the pretest (covariate) and the dependent variable (posttest) is a linear one. The non-significant results of the linearity test ($F (1, 23) = .000$, $p > .05$) indicated that the statistical null-hypothesis as, the relationship between pretest and posttest of dictation was not a linear one, was supported. That was why the researcher was forced to run repeated measures ANOVA; instead of one-way ANCOVA.

Table III.1.
ANOVA Test of Linearity of Relationship between Pretest and Posttest of Dictation

			Sum of Squares	df	Mean Square	F	Sig.
PostDictation * PreDictation	Between Groups	(Combined)	1163.036	11	105.731	1.343	.264
		Linearity	.000	1	.000	.000	1.000
		Deviation from Linearity	1163.036	10	116.304	1.477	.211
	Within Groups		1810.964	23	78.738		
	Total		2974.000	34			

Appendix IV

Repeated measures ANOVA, besides the assumption of normality, has three more assumptions; i.e. homogeneity of covariance matrices, homogeneity of variances of groups, and sphericity test. Table IV.1 displays the results of the Box's test of homogeneity of covariance matrices. It should be noted that repeated measures ANOVA assumes that the correlation coefficients between pretest and posttest of dictation are roughly equal across the two groups. The non-significant results of the Box's test ($M = 2.35$, $p > .001$) indicated that the assumption of homogeneity of covariance matrices was retained. As noted by Tabachnick and Fidell (2014), Pallant (2016) and Field (2018), the Box's test should be reported at .001 levels.

Table IV.1.
Box's Test of Equality of Covariance Matrices

Box's M	2.355
F	.733
df1	3
df2	221558.284
Sig.	.532

Second; repeated measures ANOVA requires groups to enjoy homogenous variances. The non-significant results of the Levene's test (Table IV.2) indicated that the assumption of homogeneity of variances was retained on pretest ($F(1, 33) = .548$, $p > .05$); and posttest ($F(1, 33) = .451$, $p > .05$) of dictation.

Table IV.2.
Levene's Test of Equality of Error Variances

		Levene Statistic	df1	df2	Sig.
PreDictation	Based on Mean	.860	1	33	.360
	Based on Median	.548	1	33	.464
	Based on Median and with adjusted df	.548	1	33.000	.464
	Based on trimmed mean	.911	1	33	.347
PostDictation	Based on Mean	.426	1	33	.519
	Based on Median	.451	1	33	.507
	Based on Median and with adjusted df	.451	1	30.805	.507
	Based on trimmed mean	.433	1	33	.515

Repeated measures ANOVA also requires that the differences between any two tests should have equal variances across groups. This assumption requires at least three tests (dependent variables) to be computed. If a study includes two dependent variables; as is the case in this study, the probability of the Mauchly's sphericity test cannot be computed. As displayed in Table IV.3, the probability was not computed, and all epsilon values were equal to one; i.e. there was no need to correct the degree of freedom.

Table IV.3.
Mauchly's Test of Sphericity

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon		
					Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Dictation	1.000	.000	0	.	1.000	1.000	1.000

Appendix V

Table V.1 and Table V.2 display the main results of repeated measures ANOVA. The results indicated that; a) there was a significant difference between experimental and control groups' overall means on dictation disregarding time of testing ($F_{Group}(1, 33) = 74.78$, $p < .05$, $p\eta^2 = .694$ representing a large effect size), b) there was a significant difference between overall means on pretest and posttest of dictation disregarding group membership ($F_{Test}(1, 33) = 112.47$, $p < .05$, $p\eta^2 = .773$ representing a large effect size); and finally, there was a significant interaction between group and test ($F_{Group*Test}(1, 33) = 94.32$, $p < .05$, $p\eta^2 = .741$ representing a large effect size).

Table V.1.
Tests of Between-Subjects Effects; Pretest and Posttest of Dictation by Groups

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	96935.177	1	96935.177	6406.578	.000	.995
Group	1131.463	1	1131.463	74.780	.000	.694
Error	499.309	33	15.131			

Table V.2.
Tests of Within-Subjects Effects; Pretest and Posttest of Dictation by Groups

Source		Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Dictation	Sphericity Assumed	1440.617	1	1440.617	112.477	.000	.773
	Greenhouse-Geisser	1440.617	1.000	1440.617	112.477	.000	.773
	Huynh-Feldt	1440.617	1.000	1440.617	112.477	.000	.773
	Lower-bound	1440.617	1.000	1440.617	112.477	.000	.773
Dictation * Group	Sphericity Assumed	1208.103	1	1208.103	94.323	.000	.741
	Greenhouse-Geisser	1208.103	1.000	1208.103	94.323	.000	.741
	Huynh-Feldt	1208.103	1.000	1208.103	94.323	.000	.741
	Lower-bound	1208.103	1.000	1208.103	94.323	.000	.741
Error(Dictation)	Sphericity Assumed	422.668	33	12.808			
	Greenhouse-Geisser	422.668	33.000	12.808			
	Huynh-Feldt	422.668	33.000	12.808			
	Lower-bound	422.668	33.000	12.808			

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