Integrating Interactive Whiteboards in EFL Learners' Learning and Retention of Non-congruent Collocations

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Abstract

Drawing on the assumptions of socio-cognitive linguistics, focusing on the effective role of interaction in terms of reducing the cognitive burden in the process of learning, this quasi-experimental study aimed at investigating the effect of the Interactive Whiteboard (IWB) usage on the learning and retention of non-congruent collocations among 60 homogenized Iranian EFL learners, aged 18 to 24 years old. To this end, the sample selection procedure yielded two intact groups: the experimental group (N=30) who experienced learning collocations through the IWB and the control group (N=30) who learned them through the use of conventional board. The t-test results of the comparison between the two groups on both the immediate and delayed post-tests indicate that the experimental group outperformed the control group, suggesting the effectiveness of the IWB for the purpose of learning (Sig. value = 0.01; Eta squared = 0.10) and retention (Sig. value = 0.04; Eta squared = 0.06) of non-congruent collocations, thus providing support for the interactive function of instructional materials, such as IWB. The procedure and promising findings may provide insights for considering the integration of IWB into Iranian EFL learning settings.

Keywords: Interactive whiteboard, educational technology, non-congruent collocations, EFL teaching/learning, Iranian EFL setting

Introduction

Today, technology is an important part of education, providing the language learners with a bulk of input as well as opportunities for social interactions. As Beatty and Nunan (2004, p.165) have maintained, "Technology is having a profound effect on all aspects of education. In addition to augmenting traditional 'transmission-based curricula', it is supporting the development of alternative constructivist models of education".

Some studies (e. g. Toscu, 2013; Wiebe & Kabata, 2010) have examined the impact of the application of technology on the quality of language learning and teaching, showing positive outcomes. In the same vein, Gasciogne (2006) believes that the application of multimedia in the educational programs allows learners to visualize the learning content. This would make them more imaginative and creative. Consequently, instructors have taken some steps forward to integrate a new vision into instruction, seeking to take the best advantage of the new technology (e. g. Venezky, 2004; Villano, 2006). In fact, in line with the recent trends in education, such as socio-cognitive approaches and constructivism, instructors are interested in creating an interactive L2 learning environment where technology is incorporated into class activities to maximize students' achievement.

One type of these technologies being used in many educational classes is the Interactive Whiteboard (IWB) which is a smart board, a touch-sensitive screen that works in conjunction

with a computer and a projector. Many studies dealing with the interactive characteristics of the IWB have focused on the extent to which the use of such technology can contribute to collaboration. As such, IWB has found its way to pedagogical settings including a variety of academic fields. For instance, as Kennewell and Beauchamp (2007) have asserted, the interactivity of the device makes it possible for both teachers and learners to engage in spontaneous and collaborative instruction and learning. Due to the innovative options and capabilities of the IWB, learners can participate in group learning by using motivating features such as, images, simulations or animations which may add to the effectiveness of instruction. Alternatively, the learners can collectively watch a simulation of a mechanism and interpret it. During this activity, the words can be matched with their corresponding photos under the supervision of the teacher or in cooperation with their peers.

These features are in line with the implications of the social constructivist theory. Smith, Higgins, Wall, and Miller (2005) have maintained that the main contribution of technology is concerned with its ability to create interactions for the pedagogical purposes. However, mere interaction with the whiteboard (whether individual or collective) by itself would not lead to an effective interaction. In fact, the instructor's role is of enormous importance when they try to organize and prepare the content for obtaining the intended results through purposeful interaction with the IWB (Glover & Miller, 2007).

In sum, not only has IWB made a great contribution to revolutionizing teacher-led lessons, as pointed out by Ur (2012), but also it plays a role in establishing interactions in the classroom. Socio-cognitive interactivity, as a result of both individual and collective interaction, can be developed and enhanced during the application of the IWB. This kind of interaction emanates from the joint brainstorming of the teacher and learners and/or between the learners themselves to co-construct the knowledge (Levy, 2002; Somekh, et al., 2007).

It goes without saying that most often language learners find it very challenging when they encounter new vocabulary items. One may attach enormous importance to vocabulary learning as one of the most important language components (Gass & Selinker, 2008). Nation (2001) has argued that vocabulary acquisition impacts the process of learning a language and enormously improves communication. In the same vein, when it comes to learning collocations, it appears to be even more challenging and problematic. In fact, educators studying vocabulary have put emphasis on the essential role of word combinations, commonly known as formulaic language. For instance, Conklin and Schmitt (2007) conclude that language makes widespread use of these formulaic expressions in its discourse, making a distinction between the language of native speakers and that produced by non-native speakers.

Moreover, collocation is believed to pave the way for less cognitive demands on language learners in terms of second language production and processing in a sense that all a learner has to do is to remember some prefabricated chunks of words (Conklin & Schmitt, 2008). As such, collocations are believed to be important in speech because of their role as a facilitator of the cognitive processes, which allows more effortless, fluent communication (Hill, 2000). Thus, it goes without saying that the inclusion of collocations in the syllabus of EFL classes is essentially required.

Despite the rising recognition of the importance of knowing collocations as an indispensable element of second language acquisition, studies conducted on collocations show that these items pose inherent challenges and problems to the second language learners. In particular, non-congruent collocations which lack translation equivalents in the first language appear to be even more problematic for EFL learners due to the premises of the strong version of Contrastive Analysis Hypothesis (CAH) (Howarth, 1998).

Another issue related to vocabulary learning is retention. As Khabiri and Pakzad (2012) state, retention refers to the act of continuing to recall something from a lesson after a while. When it comes to learning new words, collocations, in particular, the learner's main concern is how to deal with the challenge of retaining the learned items in memory for a longer period of time. Here, the use of technology may be of benefit to the learning and retention of the materials. In this regard, according to Reid (2002), the integration of technology changes the traditional ways of teaching by bringing about more creativity in the instructional materials to be used and the way they can be taught, leading to more efficient learning and retention.

In sum, as inspired by the assumptions proposed by social constructivism and socio-cognitive interactivity, one comes to the realization that interaction could be the key element of enhancement in the process of L2 learning. And it is assumed that while using the IWB, EFL learners interact with the interesting materials, content and activities to the extent that they develop a sense of understanding on their own. Such autonomous process may then be reinforced through interaction with peers and teachers by receiving feedback. It can also be hypothesized that due to the importance given to collocations in terms of the role they have in reducing the cognitive burden on one hand and the assumed effective function of the IWB for the same purpose, on the other, the integration of such technology into EFL learning setting may facilitate the task of collocation learning and retention. It is in the lieu of such views that the current study aims at investigating the matter.

Literature Review

As it holds true with the emergence of any innovation, research in the area of education, too, has increasingly embraced the integration of technology. Along with the increased demand for learning a second language, there has been a focus on technology use among language educators to increase the learners' interaction with teachers, with other learners, and with the materials. This focus originated from the shift of paradigm toward communicative-based approaches and later on was triggered in post-modernism with the rise of constructivist approaches (Richards, 2006); thus, calling for the use of more sophisticated technology including Interactive Whiteboard (IWB).

The first IWB was manufactured by SMART® Technologies Inc. in 1991. Through this technology, the digital photos are shown on the board, using a digital projector so that these images can be adjusted and manipulated. The users can operate and control the software and applications used in the whiteboard, both from the computer and from the board. Moreover, the learners are able to insert notations and highlight the texts through using a digital pen or a highlighter. The teacher or the learner can operate and manipulate the applications which are displayed on the screen using their fingers. It is also possible for the user to insert and manipulate the input. They can save their inputs and notes and print them, as well. These inputs can also be distributed among the other learners (Venezky, 2004).

According to Hall and Higgins (2005), IWB is believed to improve the quality and performance of current technologies in that it enhances interactivity through educational technology. This makes it superior to traditional media, such as PowerPoint presentations. According to Türel & Johnson (2012, p. 381), "Considering the possible advantages of IWB, teachers can enrich their instructions with various instructional strategies and techniques and, therefore, increase students' attention, motivation, participation, and collaboration by means of an IWB".

As a matter of fact, one can examine interaction on an individual level or collective level in the context of the classroom. The individual interaction is based on the assumption that learners

are interested in interacting with the board. This allows them to interact with the content and focus on in their personal learning. According to Smith, Higgins, Wall, and Miller (2005), such a type of interactivity is concerned with many skills used by the students, such as the activation of previous knowledge, the ability to think critically, the ability to interpret, the power of analysis, reasoning and making sense of information. As for the collective interaction, interactivity involves the exchange of knowledge and data among the peers in a group. This means that students will engage in interaction with their peers, forming small or large groups to find a solution or to do a task. Thanks to such interactive atmosphere, learners can come to perceive the real value of the discourse through collaboration and participation. Here, the instructor needs to manage the learning environment as the learners are immersed in their learning, inquiring, exploring, and constructing knowledge under the supervision of the instructor (Lim-Fong, 2010).

Therefore, the key element associated with the IWB is the capacity of socio-cognitive interactivity which has been fully encouraged by social-cognitive schools of thought, mainly social constructivism (e. g. Armstrong et al., 2005; Dhindsa & Emran, 2006; Glover & Miller, 2007; Schmid, 2008). There are a number of studies who have particularly supported such feature of the IWB. For instance, a study conducted by Levy (2002) showed that when learners apply IWBs to present their own work, it turns into a focal activity in which discussion between learners and instructors or among learners themselves, as well as providing feedbacks are dominant. This creates more time for interaction between the learners and instructor during task-related activities. Another investigation carried out by Somekh et al. (2007) indicated that using the IWB, learners can direct their attention to the participation in the whole lesson. Thus, given the influential role of the IWB as a pedagogical instrument in learning settings, EFL/ESL educators believe that it also holds true with teaching collocations.

As literature informs us, it is conceivable that collocations are the building blocks of the second language fluency as it allows more smoothness and fluidity while speaking. In addition, as Hsu and Chiu (2008) argue, lack of ability to correctly apply collocations highlights L2 learners' foreign-soundness. As Nesselhauf (2003) maintained, "collocations not only enhance accuracy but also fluency" (p. 223). Moreover, a review of the literature reveals that collocations pose important challenges for learners even at the most advanced levels of proficiency (e. g. Bahns & Eldaw, 1993; Bardovi-Harlig, 2002; Granger, 1998; Howarth, 1998; Nesselhauf, 2003).

A bulk of research shows that non-congruent collocations which lack translation equivalents in the first language create even much more challenges for second language learners than congruent (Bahns & Eldaw, 1993; Granger, 1998; Nesselhauf, 2003). One of the reasons that account for such difficulty is the phenomenon of L1 transferability (Mongkolchai, 2008; Yumanee, 2012). In fact, the reliance on the L1 may reflect learners' assumption that there is a one-to-one agreement between L1 and L2 collocation choices. As long as differences exist between linguistic units across languages, the negative transfer is likely to appear, causing learners to produce erroneous L2 combinations (Ellis, 2008; Gass & Selinker, 2008).

The realization of the importance of the issue notwithstanding, few studies have examined non-native speakers' use of collocations, especially non-congruent ones. Nesselhauf (2003) argues that these studies are few and unreliable. In the Iranian context of ELT, too, to the best knowledge of the authors, there is no investigation into the learning of non-congruent collocations. Thus, given the scarcity of research on non-congruent collocations in the context of Iranian EFL, on one hand, and concerning the potential positive effect of the IWB on non-congruent collocations learning and retention, on the other, this study aimed at examining the possible existence of such effect by posing the following research questions:

Q1: To what extent does the use of IWBs have an effect on Iranian Intermediate EFL learners' learning of non-congruent collocations?
Q2**:** To what extent does the use of IWB have an effect on Iranian Intermediate EFL learners' retention of non-congruent collocations?

Methodology

Participants and Setting

The participants of this study were initially 90 adult Iranian EFL learners available from 20 intermediate classes in private language institutes. These learners were randomly selected upon the alphabetical order of their family names. They were given a Preliminary English Test (PET), the results of which were used to homogenize the participants of the study in terms of overall language proficiency level. To do so, only those participants whose scores fell within the range of one standard deviation above and below the mean were chosen for the purpose of this study. Following that, 30 of these learners were randomly assigned to an experimental group and the other thirty, to a control group. This randomization was administered by assigning every other student from the roll to either group. All the participants were male learners and were studying English for the purposes of finding a better job, pursuing their studies or immigrating to an English speaking country. They ranged in age from 18 to 24.

Instruments and Materials

A preliminary English Test (PET) was administered to make sure that the learners were homogenous with respect to their language proficiency. It is a proficiency test developed by Cambridge ESOL for intermediate learners. An inter-rater reliability was established for the speaking and writing sections of the test and the Cronbach's Alpha was used to determine the reliability of listening and reading sections. All the reliability analyses were done on a pilot sample of 30 language learners with similar characteristics to the actual participants of the study.Table 1 shows the results of the Cronbach's Alpha. According to the results of the pilot study, the reliability index of PET was above 0.70 indicating the reliability of the PET for the purpose of the current study.

Table 1. *Reliability Analysis of PET Using Cronbach's Alpha*

	Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	Minimum	Maximum	Mean	SD
PET Pilot	0.86	0.85	37.00	63.00	52.75	6.74

Another instrument used in this study was a Vocabulary Knowledge Scale (VKS) proposed by Paribakht and Wesche (1993) who have included five levels or stages on the scale to determine the acquisition rate of individual words:
I do not remember having seen this word before.
I have seen this word before, but I do not know what it means.
I have seen this word before, and I think it means _____. (Synonym or antonym).
I know this word. It means _____. (Synonym or antonym)
I can use this word in a sentence: _____.

The rating process of the VKS scale varies from the total unfamiliarity, through the recognition of the word and some ideas about its meaning, to the ability to use the word in a sentence with grammatical and semantic accuracy.

It was used as a criterion to select those non-congruent collocations that learners were unfamiliar with. To this end, 100 non-collocations were chosen from ten units of "Collocations in Use". In the next stage, ten experienced English language teachers with at least 5 years of teaching experience at the intermediate level of language proficiency were asked to rate the items so that the non-congruent ones could be determined. Based on the measures proposed in the VKS scale, the list was reduced to 80.

Then, the scale was translated into Persian to remove any chances of ambiguity in this respect. Having received a copy of the translated scale, the learner participants were asked to choose the items which would fit best in the first two descriptions above, suggesting unfamiliarity. The teacher researcher monitored the learners while doing the activity to assure that they were on the right track. They came up with a list of 40 unfamiliar non-congruent collocations. The rationale behind this procedure was to prevent distorting the effect of IWB procedure.

Also, the teacher-researcher devised a multiple choice test of non-congruent collocations to be used as a post-test (available upon request). In doing so, all 40 identified non-congruent collocations were included in the test. The validity of the test was determined through the employment of a "differential experiment" procedure. Then, the test was administered to two different groups of learners, i.e. pre-intermediate and upper-intermediate students. The obtained scores were analyzed, using an Independent Samples t-test. Table 2 illustrates the results of this test.

Table 2. *Results of the Validation Process*

	Group	Mean	SD.	T	Sig.
Non-congruent Collocation Test	Pre-intermediate	14.96	2.59	1.38	0.00
	Upper-intermediate	31.51	3.28		

As shown in Table 2, the significance level is 0.00 which is lower than the confidence level of 0.05, suggesting a significant difference between the two sets of mean scores, i.e. the upper-intermediate learners outperforming the pre-intermediate ones. Therefore, it could be inferred that the test measured the intended construct for which it had been developed; hence, the validity of the test is established.

Also, the statistical procedure of test-retest was employed to assure the reliability of the test. To this end, the test was administered twice to the upper intermediate learners with a time interval of 15 days. Then, the results of Pearson correlation coefficient analysis showed an acceptable reliability index. As Table 3 indicates, the reliability index is 0.961 at the confidence level of 0.01 which shows that the test enjoys a satisfactory level of the reliability index.

Table 3. *Results of the Reliability Test*

		First Administration of the vocabulary test
Second Administration of the Non-congruent Collocation Test	Pearson Correlation	0.96
	Sig. (2-tailed)	0.00
	N	30

As for the instructional material, English Collocations in Use, written by McCarthy and O'Dell (2006) was used. The book contains sixty units covering different topics through which a

lot of collocations are presented. Exclusively for the treatment, an Interactive White Board, measuring 1.50 m×1 m, was used along with a digital pen, a projector, and a laptop.

Procedures

As stated in the previous section, initially 90 language learners at the intermediate level were selected based on their availability. Then, their PET scores were used as the criteria to establish the homogeneity of the participants in terms of English language proficiency. Table 4 shows the descriptive statistics of the 90 intermediate language learners' scores on PET.

Table. *Descriptive Statistics of the 90 Language Learners' English Proficiency*

	N	Minimum	Maximum	Mean	Std. Deviation
PET	90	55.00	85.00	69.90	6.70
Valid N (listwise)	90				

Table 4 shows that the participants obtained a mean score of 69.90 out of 90 (SD=6.70) on PET. Figure 1 illustrates the distribution of PET scores obtained by the sample of this study.

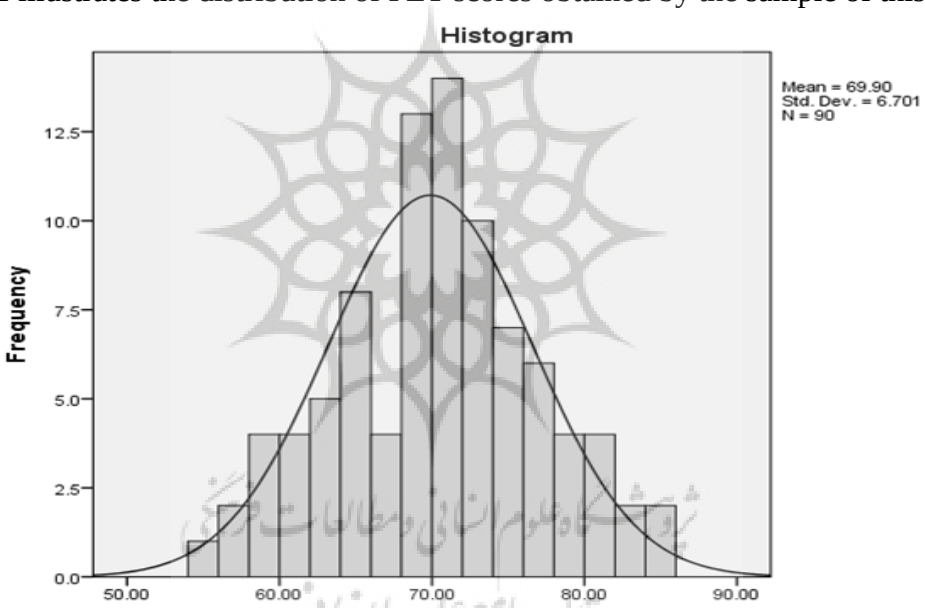

Figure 1. *Distribution of PET Scores Among the 90 Participants*

As seen in Figure 1, the mean scores obtained from PET can be a good indicator of central points of distributions, suggesting a normal distribution. To assure the homogeneity of the sample, those students whose PET scores fell within the range of mean score ±1 SD were derived out from the pool of 90 English L2 learners. Table 5 shows the descriptive statistics of the homogenized sample.

Table 5. *Descriptive Statistics of the Scores Within the Mean Score, ±1 SD*

	N	Minimum	Maximum	Mean	Std. Deviation
PET Homogenized	60	64.00	76.00	70.18	3.34
Valid N (listwise)	60				

According to Table 5, 60 language learners were found homogenized according to their obtained language proficiency scores. Although the mean score of the homogenized sample (M=70.18; SD=3.34) did not differ much from that of the initial pool of learners, the SD was almost half reduced.

After assuring the homogeneity among the participants, they were further randomly divided into two groups of control and experimental. Based on the alphabetical list of the class roll, randomization was done through assigning the first thirty students to the experimental group, and the rest to the control group.

Ten teaching sessions were determined for teaching the 40 selected non-congruent collocations which were taught to both study groups in equal measurement. It is noteworthy that the learners in both groups were equally taught other materials based on the syllabus of the Institute. Moreover, the initial sixty collocations (out of 100 items) which were determined as known collocations were also incorporated into the course for both groups on an equal basis. Therefore, there were about eight collocations taught every session alongside the syllabus of the institute, but the focus of the treatment and the evaluation was only on the 40 non-congruent collocations.

As for the experimental group, the teacher initially briefed the students on the use of the IWB. Then, in each class session, the instructor went through the following stages:

- The four collocations (out of 40) corresponding to the unit under the instruction were written on the board.
- The learners were first encouraged to guess the meaning of the words. The teacher provided examples and clues so that the students were able to guess the meaning of the collocations more easily. It should be noted that at this stage the teacher-researcher just gave some verbal encouraging feedback so as to elicit more guesses from the learners.
- The teacher drew the participants' attention to the meaning of those new collocations. Then, he noted down the synonyms of the individual component words of the collocations, using a digital pen.
- The learners were encouraged to work in pairs and groups to guess the meaning of the collocations.
- They came to the whiteboard to write the meaning of the collocations.
- The teacher finally explained the meaning of the collocations and provided further examples.
- In the next session, the learners were encouraged to use the collocations they had already learned in a short passage. They were asked to write about memorable events in their lives and their personal experiences, using those collocations.
- The learners displayed their passages on the whiteboard using the projector. The collocations in each passage were linked to a descriptive meaning so that by clicking on the link the meaning appeared on the whiteboard.

As for the control group, the learners were introduced to the non-congruent collocations using the same course material and syllabus as used by the experimental group, and taught by the same teacher. The only difference was that there was no IWB in the control group.

Having finished the 10 sessions in which the 40 unknown collocations were covered, the post-test devised by the researcher was administered to both study groups immediately after the treatment to test their non-congruent collocation performance. In order to measure the retention of the non-congruent collocations, the same test was administered to the participants in both groups after a 15- day interval, the results of which were used to explore the effect of IWB on the collocations retention.

Study Design and Analysis

This quasi-experimental study examined the effect of IWB on the participants' learning and retention of non-congruent collocations. A total of 60 homogenous Iranian EFL learners who were statistically stratified out of a pool of 90 available participants were randomly divided into two study groups. The experimental group received the treatment; i.e., teaching non-congruent collocations using IWB while the control group was taught according to the conventional syllabi.

This study enjoyed different methods of statistical analysis for a number of purposes. First, the validity and reliability of the instruments were assured through statistical processes, such as Independent Samples t-test. Also, descriptive statistics and Pearson Correlation Coefficient assured the homogeneity of the participants. As for the preliminary analysis, such as the normal distribution of the data, Kolmogorov Smirnov was run and finally, aside from descriptive analyses, Levene's test of equality of variances and inferential statistics, like Independent Samples t-test, were used to compare the mean scores and eventually determine whether teaching non-congruent collocations using IWB had any effect on the participants' learning and retention of non-congruent collocations.

Results

Checking for the Normality of Distribution

Before starting any statistical referential analysis of the data, it deemed necessary to decide on the parametric or non-parametric statistics. The main assumption for the parametric statistic is normality distribution of the data. So, all the data sets related to non-congruent collocation test underwent the check for normality, using Kolmogorov Smirnov test of normality. Table 6 displays the statistics related to the normality test of Kolmogorov Smirnov.

Table 6. *Results of the Test of Normality*

		Kolmogorov-Smirnov[a]		
	Groups	Statistic	Df	Sig.
Posttest	Experimental	.089	30	.200*
	Control	.155	30	.065
Delayed	Experimental	.121	30	.200*
	Control	.112	30	.200*

Table 6 clearly shows that all the significant levels related to statistical values of Kolmogorov Smirnov test of normality for the scores related to both the posttest and the delayed posttest are greater than the confidence interval of 0.05 which means that all the related data sets enjoy normal distribution. Accordingly, the use of the parametric statistics was quite acceptable.

Investigating the First Research Question

In order to examine the effect of IWB on the learning of non-congruent collocations, it was needed to compare the two study groups' mean scores on the test of the non-congruent test. Table 7 shows the descriptive statistics of the two groups on the posttest.

Table 7. *Descriptive Statistics of the Study Groups on the Posttest*

	Groups	N	Mean	Std. Deviation	Std. Error Mean
Post-test	Experimental	30	27.06	3.43	0.62
	Control	30	24.86	3.20273	0.58

The results indicate that the experimental group with a mean score of 27.06 (SD=3.43) outnumbered the control group who gained a mean score of 24.86 (SD=3.20). It was not possible to make a firm decision on the significance of such a difference between the two groups; therefore, a t-test was run on the data. Table 8 shows the results of the independent samples t-test between the experimental group and the control group.

Table 8. *Results of the Independent Samples t-test Between the 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
Posttest	Equal variances assumed	0.44	0.50	2.56	58	0.01	2.20	0.85	0.48	3.91
	Equal variances not assumed			0.56	57.72	0.01	2.20	0.85	0.48	3.91

According to the results of Levene's test of equality of variances, both groups had equal variances in their scores ($p>0.05$), based on which the researcher assumed equal variances for the two groups. The results of the t-test showed that the significant level was smaller than the confidence interval of 0.05, indicating significant differences between the experimental and the control in terms of non-congruent collocation scores. Besides, based on the calculated effect size of 0.10, suggesting a fairly large effect (Cohen, 1988), it can be stated that 10 percent of variance in collocation learning is explained by the effect of IWB. Therefore, it is concluded that since the

experimental group obtained a significantly higher mean score on the posttest, the use of IWB was found more effective for learning non-congruent collocation than the traditional instruction.

Investigating the Second Research Question

To measure the retention of collocation after the treatment, the same test of non-congruent collocations was administered to both experimental and control groups 15 days after the first administration. In order to examine if there were any significant differences between the study groups in terms of retention of non-congruent collocations, the groups' scores on delayed posttest were compared. Table 9 shows the descriptive statistics of the two groups on collocation delayed posttest.

Table 9. *Descriptive Statistics of the Study Groups on the delayed Posttest*

	Groups	N	Mean	Std. Deviation	Std. Error Mean
Delayed	Experimental	30	25.13	4.24	0.77
	Control	30	22.73	4.69	0.85

The obtained data show that the experimental group had a mean score of 25.13 (SD=4.24) while the control group obtained a mean score of 22.73 (SD=4.39). In order to gain confidence whether such a difference was significant, the independent samples t-test was run. Table 10 shows the results.

Table 10. *Results of the Independent Samples t-test for the Study Groups' Scores on the Delayed Posttest*

		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
Delayed	Equal variances assumed	0.07	0.78	2.07	58	0.04	2.40	1.15	0.08	4.71
	Equal variances not assumed			2.07	57.42	0.04	2.40	1.15	0.08	4.71

Levene's test of equality of variances (see Table 10) indicates that both groups had equal variances in delayed collocation scores ($p>0.05$). The results of the t-test show significant differences between the experimental and control groups in terms of collocation retention ($P\leq0.05$). The calculated effect size of 0.06 suggests a moderate effect (Cohen, 1988). In other words, 6.88 percent of the variance in retention is explained by the effect of IWB. Thus, such a result is suggestive of the effective use of the IWB for the retention of non-congruent collocations, as compared to the traditional instruction.

Discussion and Conclusion

It can be concluded from the results that the IWB can be positively used to enhance the learning and retention of non-congruent collocations by Iranian EFL learners. The findings suggest that the null hypothesis set forth in the present study was rejected in that the notion of interactivity involved in the IWB could bring about the same desirable conditions for learning which have been the center of attention of the recent socio-cognitive theoretical frameworks, like social constructivism. In fact, the findings of the current study provide support for Beatty and Nunan (2004) who addressed the contribution of modern technology to alternative modes of constructivism in education. More specifically, the researchers came to agree with Hall and Higgins (2005) who stated that the IWB has actually improved the quality of educational technologies by enhancing interactivity.

As informed by the theoretical and empirical literature of the field (e.g. Glover et al., 2007; Kennewell & Beauchamp, 2007; Levy, 2002; Somekh et al., 2007), it is also concluded that the contribution of the IWB to such success can be explained by the fact that the new educational technologies attract learners' attention by getting them engaged in a lively and exciting learning environment, causing collaboration, raising concentration and triggering creativity on the part of the learners. As once pointed out by Reid (2002), the creativity brought about as an integration of technology would ultimately lead to more efficient learning and retention.

The positive effect of the implementation of the IWB on the learning and retention of collocations is in line with the body of literature on IWB and language learning, suggesting the effectiveness of the IWB in various aspects of language pedagogy (e.g. Brown, 2003;; Levy, 2002), as well as on learners from a variety of linguistic backgrounds (e.g. Toscu, 2013; Venezky, 2004; Wiebe & Kabata, 2010). As a matter of fact, such results conform to the ideas set forth by Conklin and Schmitt (2008) and Hill (2000) who refer to collocations as prefabricated chunks which play the role of the facilitator of the cognitive process, reducing the volume of the cognitive demand. And the findings of this study suggest that such a role is even reinforced when the medium of instruction; i.e. the IWB, as a means of interaction, is intervened in the process of learning collocations.

Additionally, one may conceive that the IWB was plausibly attractive for the participants of this study who belong to the age group of young adults. Such students are more likely to be involved in working with and taking pleasure in technology in their daily life. Therefore, the use of new technologies in the classroom can be quiet appealing to them and engage them more in the learning process. It may be concluded that even reluctant students were more willing to engage in the activities when they used the IWB. As a result, these students outperformed those who were deprived of such excitement in their lessons.

The excitement and engagement developed through the use of the IWB can be linked to more concentration and consequently more effective learning. Attention has a particular role in SLA and some scholars, such as Schmidt (2000), suggest that attention and noticing are necessary for learning to take place. According to Schmidt (2001, p. 30), "people learn about the things that they attend to and do not learn much about the things they do not attend to". His Noticing Hypothesis suggests that it is through noticing that the condition is provided for converting "input" into "intake" whereas subliminal language learning may not lead to success.

Finally, the present study outlines a new approach to the strategy of teaching non-congruent collocations. Based on the results of this study, the incorporation of the IWB in language teaching curriculum is highly recommended. EFL teachers are encouraged to take advantage of

the IWB techniques in teaching L2 vocabularies and collocations. In the same veins, it is of benefit to design training programs on the integration of the IWB for pre-service and in-service L2 teachers. In respect to this, the treatment procedure, proposed by this study, may contribute to the L2 pedagogy. It can be potentially used for developing and improving learners' vocabulary and collocations.

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