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Implementing Web-based Hypertext for Teaching Reading Skill to Iranian Intermediate EFL Learners

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ABSTRACT

Objective: Having in mind to address and have contributions regarding the reading comprehension, this study focuses on using hypertext reflection on the reading comprehension of Iranian Intermediate EFL learners.

Methods: In this study, 60 participants were assigned into one control group and an experimental group. While the experimental group was treated with hypertext reading texts, the control group was exposed to conventional method.

Results: Based on the quantitative results obtained in the participants' pretest and post-test scores, participants' reading comprehension was measured before and after the treatment. Quantitative findings of the study highlighted the outperformance of the experimental group in comparison with the control one regarding hypertext reflection on the reading comprehension of Iranian EFL intermediate learners.

Conclusion: The results and findings of the statistical analyses run indicated that the experimental group significantly outperformed the control group after the treatment revealing that the instruction was quite successful in helping the participants to improve their reading comprehension. The implication of the current research could pave the way for instructors and curriculum designers to include hypertext as a significant element in enhancing Iranian EFL learners' reading comprehension.

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1. Introduction

Perhaps the most powerful indicator of the speed of change in our society is the blast of technology. Computers are providing individuals with a powerful means to transmit, access, and take an enormous and growing body of information worldwide. In doing so, it is changing the way people live and work. Inherent in this blast of the ability to manipulate information is a corresponding need for education and experience in this new area.

It seems highly indispensable to highlight the role of web-based instruction in L2 studies. Web-based instruction (WBI) refers to the utilization of online resources, applications, and software for enhancing instruction and course delivery methods. Any attempt to integrate these online resources for classroom instruction represents a form of WBI. According to Khan (1999), WBI "can be viewed as an innovative approach for delivering instruction to a remote audience, using the web as a medium" (p. 5). Several terms have recently been utilized in educational settings. For example, Web-Based training, Web-based teaching and learning, Web-based testing, Web-based communication, etc. However, all these concepts may slightly differ in nature, but they are used interchangeably to refer to the abilities of Web technology for classroom instructions.

The purpose of the present study is to examine and explore to see if Web-based hypertext can enhance reading comprehension ability of Iranian EFL learners. The modern technological aids are claimed to help researchers to pave the way for them for solving traditional pedagogical issues. As such, the current study attempts to explore the effect of using hypertext on promoting learners' reading comprehension difficulties.

2. Literature Review

According to Vaughan (1984), reading is the ability to understand the writer's intended meaning. Thus, recently the attention on the nature of reading has shifted "from a focus on the product of reading (such as a score on reading comprehension test) to an emphasis on determining the strategies that readers use in various reading contexts" (Anderson, 1991, p. 466). Reading is an interactive process combining top-down and bottom-up processing (Barnett, 1989). The major purpose of reading a document is comprehension (Protopsaltis & Bouki, 2005). Wixson and Peters (1984) described reading comprehension as "the process of constructing meaning through the dynamic interaction among the reader's existing knowledge, the information suggested by the written language, and the context of the reading situation" (p. 5).

2.1 Web-based Instruction

The proliferation of technology has infused innovative and novel communication practices worldwide. Reading in the hypertext environment absolutely differs from reading from a textbook or any other printed formats (Coiro, 2003; Chorney, 2005; Miall, 2000; Warschauer & Kern, 2000). On the other hand, technology has provided e-writers with amazing capabilities to increase the number of their audience as they communicate through asynchronous and synchronous digital tools and resources, including social media networks, blogs, and websites (Gee, 2004; Lankshear & Knobel, 2003; Merchant, 2007).

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With the rapid growth of computer technology, computer-based instruction (CBI) has been a popular scaffolded teaching tool used worldwide to motivate students to learn autonomously (Gunduz, 2005; Higgins, 1995). Thus, some printed texts are designed as hypertexts to assist learners look for and process multiple resources during a timely manner (Iiyoshi et al., 2005; Wang et al., 2010). Although comprehending a hypertext as an "analog to traditional reading environments" (Lawless & Kulikowich, 1996, p. 385) requires the same cognitive processes involved in reading a printed text, hypertexts differ dramatically from traditional texts in that they provide readers with the opportunity to interact with the text (Lawless et al., 2003). Hypertexts especially provide new text formats, new purposes for reading, and new ways to interact with information which will help to extract meaning from traditional paper-based texts to attain higher comprehension scores and degree of satisfaction (Chen et al., 2011; Huang et al., 2009; MacArthur & Haynes, 1995; Ray, 2004; Ray & Belden, 2007).

The idea behind WBI is to give the user some freedom to select the time, place, computer platform and operating system for learning (Hannum, 2001). Crossman (1997) names the advantage of web-based environments as "the ability to carry a vast amount of information and a variety of media from anywhere to anywhere" (p. 19). This ability makes it possible for a person to communicate with a single person or with the entire world. This structure, being able to communicate with any other person and to access many resources independent of time and distance, has been related to constructivism because it is based on collaboration and social interactions from which a person builds his own knowledge (Miller & Miller, 1997).

2.2 Hypertexts

The term hypertext was introduced into the world of science by Ted Nelson in the early 1960s. In his understanding, hypertext means non-sequential writing. For the reader, hypertext offers several different branches to acquire the meaning of the written text. Hypertext does not really have either the beginning or the end, because it is the reader who decides for how long and which paths to follow in the hypertext labyrinth.

Although reading hypertext seems to be a requirement in fulfilling academic success for L2 learners, little attention had been drawn to its importance. Cunningham (1999) explained some reasons for supporting the importance of integrating the Internet into pedagogy. First, the Internet makes a condition for individual learning as needed. Second, it is considered as a practical medium for improving learning skills. Finally, it provides a vast amount of information in every field.

Hypertexts are distinctly different from printed texts in ways in which prompt readers to use unique cognitive processes and methods (Coiro & Dobler, 2007). According to Kasper (2003), reading hypertexts may be a "naturally dynamic, recursive, and integrated process, one that gives multiple opportunities for college kids to accumulate, test, and reframe knowledge through cognitive reconstruction of text, intertextual analysis and exposure to varied perspectives on issues" (p. 29). When reading hypertexts, readers must select a target location instead of turning the page, in order to move through the text (Coiro & Dobler, 2007). Consequently, in comparison to printed texts, hypertexts require readers to take a much more active role in manipulating texts on screen as they adapt to the online reading environment for better reading comprehension (Gervais, 2007).

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A second difference is that contemporary hypertexts often incorporate navigation buttons or images "linked electronically by multiple paths, chains, or trails in an open-ended, perpetually unfinished textuality" (Landow, 1997, p. 3) to supply a visible representation of a hyperlink instead of a textual one. As described by Fitzgibbons (2008), the most basic property of hypertext is its capacity to create links within and among texts. Within a document, elements of the apparatus, like definition of terms and references, can all be hyperlinked to supply readers with additional information for comprehension. Consequently, hypertext readers must integrate decoding processes and interpret images and pictures with their own comprehension strategies (Kinzer & Leander, 2003). In other words, English language learners reading a hypertext must be able to identify what information is needed to enhance their specific comprehension of the topic and where to find that information via hyperlinking.

Finally, hypertexts differ dramatically from traditional texts therein they supply readers with the chance to interact with the text (Lawless et al., 2003). Hypertexts especially provide new text formats and new ways to interact with information, which may help to extract meaning from traditional paper-based texts (Coiro, 2003). Hypertexts can be interactive and satisfy specific requirements of an EFL reader and allow readers to make decisions about what information to access (Landow, 1992; Moos & Marroquin, 2010). Nevertheless, Gervais (2007) found that hypertext readers read quickly and are lost in the overflow of digital information.

2.3 Hypertext Reading

With the advance of computer technology, researchers have begun to investigate the ways in which hypertexts could be employed to enhance students' reading comprehension. For over a decade, educational technologists have studied the uses and effects of hypertexts and are centrally concerned with the role of hypertexts as a replacement for traditional printed texts (Eveland & Dunwoody, 2002). Thus, numerous studies have been conducted in testing the unique contributions that hypertexts can make to the comprehension process, showing that students attain significantly higher comprehension scores by reading the hypertext version which they also state a preference for that mode over the print version (Chen et al., 2011; Huang et al., 2009; MacArthur & Haynes, 1995; Ray, 2004; Ray & Belden, 2007). However, relatively few studies have reported the effect of hypertext reading on reading comprehension within the EFL context (Coiro & Dobler, 2007; Huang et al., 2009). Although hypertexts offer students many benefits, Rouet and Levonen (1996) advised that without overt scaffolding or intervention in the way to navigate hypertexts effectively, students may become lost in a sea of data because reading hypertexts often requires a more cognitively demanding mode of learning than it does when reading printed texts (Nowak, 2008; Shapiro & Niederhauser, 2004). Troffer's (2000) research showed that reading from the screen is about 30% slower than reading from the printed text, and most hypertext readers tend to scan a document rather than read word for word.

Foltz (1996) investigated the role of prior knowledge, text structure, and coherence of hypertexts with reference to reading comprehension. He argued that hypertexts provide fewer context cues than the traditional printed texts. His study further indicated that lower proficiency readers need additional scaffolds with practice or a well-structured navigation system to maintain coherence within the hypertext and to assist in their comprehension of hypertext information. The well-structured scaffolded hypertext should contain the "human interaction" text (Al-Seghayer, 2005,

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p. 197). That is, the hypertext should provide English language readers with concise directions regarding how it is organized and connected with well-structured hyperlinks. A number of research results strongly suggest that students are confused by the less structured hypertext reading system, therefore the learning effect is decreased (Al-Seghayer, 2005; Shapiro & Niederhauser, 2004). In the current study, a scaffolded hypertext reading system is defined as well-structured hypertext technology supports designed to augment EFL students' reading comprehension. Via doing pre-, during-, and post-reading activities in a well-structured hypertext system, it is assumed that EFL learners become aware of how and where to locate the necessary information with hyperlinks, thus acquiring the requisite amount of background and vocabulary knowledge to assist their comprehension of hypertext information (Lawless et al., 2003).

More and more practitioners have incorporated reading activities using the World Wide Web into their ESL instruction (Collombet-Sankey, 1997; Liou, 1997; Kasper, 2000). They have shown that students became much more motivated to read texts written in English through such activities. Researchers emphasize the importance of Web-based reading, especially to access authentic language materials through the activity (Warschauer & Healey, 1998; Felix, 1999; Ganderton, 1999).

On the other hand, there are two research streams that investigate the cognitive processes of the readers. One deals with reading print text (Goodman, 1967; Gough, 1972; Carrell & Eisterhold, 1988; Stanovich, 1980). This has a long tradition of analyzing the behavior of readers while reading print text. Various reading models have been advocated both in L1 and in L2. However, research perspectives have not been extended to examine the characteristics of Web-based reading, and there has been little discussion concerning the characteristics of hypertext, such as the multi-linearity and open-endedness.

The other research stream investigates the cognitive processes of reading hypertext (Chun & Plass, 1997; Jacobson & Spiro, 1995; Lomicka, 1998; Niederhauser et al., 2000; Oostendorp & Mul, 1996; Ridder, 2000; Rouet et al., 1996). Researchers in that stream, however, do not deal with authentic hypertext on the Internet. Rather, they create their own hypertext specifically for the purpose of their experiments. Research findings are, therefore, limited and difficult to apply directly for reading authentic hypertext in the World Wide Web.

Tseng (2008) compared the effects of reading printed text and hypertext on the EFL learners' reading comprehension. The results showed that the experimental group performed weaker in questions requiring skimming and scanning skills, but they scored higher in vocabulary questions since they had to guess the unknown words from the context. The influential factor was reading hypertext and the uncomfortable physical responses such as eyestrain and headaches. Shang (2016) measured the effectiveness of online metacognitive strategies, hypermedia annotations, and motivation on reading comprehension in a Taiwanese hypertext environment.

3. Method

The purpose of this study was to measure the effect of web-based hypertext on Iranian EFL learners' reading comprehension. This section discusses the methodology of the current study, and it contains five parts. The first part introduces the research design. The second section provides

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information regarding the participant. The third part provides a description of the research materials and instruments. The fourth part explains the research procedure, and the fifth and final part describes the methods of analyzing data in this study.

3.1 Research Design

A quasi-experimental design was employed by the researcher to run this study since participants of study were selected non-randomly based on convenient sampling. "By using a quasi-experimental, we control as many variable as we can and we limit the kind of interpretation we make about cause–effect relationship and hedge the power of our generalization statement" (Hatch & Farhadi, 1998, p. 24). The dependent variable of the study was EFL learners' reading comprehension measured through pretest and posttest. The independent variable of the study included web-based hypertext instruction. The participants of the study received web-based hypertext instruction along with their normal instruction in their general English course. The subjects were not randomly selected but they were randomly assigned into two groups of control and experimental. Both groups were exposed to the pretest, treatment (for experimental group), placebo (for control group), and posttest. The experimental group was exposed to the treatment (using web-based hypertext activities in a way that they provided flexible opportunities for learners to use their knowledge, skills, and strategies in web-based context for the purposes of reading comprehension). The participants of the control group received routine teaching methods, which are used in the language institute for reading comprehension.

3.2 Participants

The participants were 60 Iranian EFL learners who were selected out of original 90 learners based on their scores on the Oxford Placement Test in a language school in Rasht, Iran. The participants were 15-18 years old and all were female. Their native language was Persian. They were identified to be at intermediate level. They all had more than 3 years of experience in using computers and the Internet for studying and entertainment goals. The reasons for selecting the intermediate level were that, firstly, such group was a comparatively large number of L2 learners. Secondly, the lower level learners may not have been able to employ the reading strategies effectively to comprehend the hypertexts because they have a limited knowledge of grammar and vocabulary to comprehend hypertext; thus, more time and effort may be needed in terms of applying L2 reading strategies. Thirdly, advanced groups have already made up the necessary knowledge for appropriately applying L2 reading strategies; therefore, they may not need to participate in a training program. Lastly, the intermediate learners are more interested and motivated to achieve academic success. The experimental group was exposed to explicit training through a Web-based condition. A communicative approach with an emphasis on real communication was followed in the class. The teaching methodology included consciousness-raising tasks using a text from the Internet, followed by teacher-to-student discussions about the applied strategies.

3.3 Instruments

The instruments for the present study were OPT, the pretest and posttest. Following is the detailed explanation of the instruments.

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3.3.1 Oxford Placement Test (OPT)

The first instrument used in this study was the OPT (Edwards, 2007). OPT was employed in order to determine the participants' current level of language proficiency. This test enabled the researcher to select those learners who were compatible with the conditions of the study. OPT has been used to assess students' knowledge of grammar and vocabulary. It also enabled the researcher to have a greater understanding of what level their participants were at. This test consists of 70 items, including 10 multiple-choice and true-false reading, 10 writing, and 50 multiple-choice language use items. The time limit for answering the 50 multiple-choice questions and the reading task is 45 minutes and the time limit for the accomplishing writing task is approximately 20 minutes.

3.3.2 Pretest and Posttest

The reading section of PET which was assessed as a standardized intermediate test were used as pretest and posttest in order to assess the participants' reading comprehension ability before and after receiving the treatments of the study. It consists of 35 items with five separate reading tasks in all, Parts 1–5. These parts test a broad range of reading skills . Texts were drawn wherever possible from the real world and were adapted as necessary to the level of the PET examination.

The following 5 part stages were followed as meticulous process-oriented procedures:

Part 1 measured the learners' understanding of various kinds of short texts: authentic notices and signs, packaging information (for example, instructions on a food package or a label on a medicine bottle), and communicative messages (notes, e-mails, cards and postcards). Following the text was one multiple-choice question with three options, A, B, and C.

Part 2 measured the participants' comprehension of factual material. It consisted of five short descriptions of people and the learners had to match this content to five of eight short texts on a particular topic. The topic was usually to do with goods and services of some kind, for example purchasing books, visiting museums, staying in hotels or choosing holidays. The participants began Part 2 by reading through the five descriptions of the people. They then read through all eight texts carefully, underlining any matches within them. In order to choose the correct text, candidates needed to check that all the requirements given in the description are met

Part 3 assessed the learners' ability to work with a longer, factual text, looking for precise information. The information to be found is usually practical in nature, resembling the type of task with which people are often confronted in real life. Frequently, these texts take the form of brochure extracts, advertisements in magazines and website information. There are ten questions, which are single-sentence statements about the text. The task is made more authentic by putting these questions before the text, in order to encourage candidates to read them first and then scan the text to find each answer. The information given in the text follows the same order as the content of the questions.

Part 4 presents candidates with a text which goes beyond the provision of factual information, and expresses an opinion or attitude. There are five multiple-choice questions with four options, A, B, C and D. In answering these questions, candidates will demonstrate whether they have understood

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the writer's purpose, the writer's attitude or opinion, or an opinion quoted by the writer, and both the detailed and global meaning of the text.

Part 5 consisted of a short text containing ten numbered spaces and an example. There was a four-option multiple-choice question for each numbered space, given after the text. The spaces were designed to test mainly vocabulary, but also grammatical points such as pronouns, modal verbs, connectives and prepositions.

3.4 Procedures

In order to pursue the purpose of the study, a structured procedure was designed to collect data. The data collection procedure was conducted carefully in four steps, i.e., administering the OPT, administering the pretest, implementing the treatments and administering the posttest. In order to ensure the homogeneity of the participants, a standard proficiency test i.e., OPT was administered. As mentioned before, the test composed of 20 items including reading comprehension and spelling. A total of 80 EFL learners in their intact classes participated in proficiency test. Every correct answer was awarded +1 point and every incorrect answer was given 0 point. No negative score was considered for penalty in this test. Eventually, twenty of the participants were eliminated from the whole sample. The descriptive statistics are provided by SPSS (24.0) in chapter four to show the normality of scores. The remained 60 learners were randomly assigned into equal groups of experimental and control, each of which consists of 30 learners.

The next step was to administer the pre-test in order to ensure the homogeneity of the participants and to measure EFL learners' reading comprehension ability before the study. The students answered the items on an answer sheet. The pretest was blindly corrected by the researcher. In experimental group, a detailed explanation of the reading comprehension strategies and techniques was provided for learners. Then, the learners were asked to read five reading passages adopted from TOEFL preparation materials. The link has been sent to the experimental group through WhatsApp application. On the other hand, the participants of the control group received the same content but in a printed format and they were asked to get assistance from books and references available in the library.

The participants of the experimental group could read the reading passages in a hypertext environment. Moreover, they had access to large number of web-based materials such as reference tools (online dictionary, Thesaurus) and google tools to help them comprehend the reading texts. Finally, the participants of both groups received reading comprehension posttest in order to check and compare their reading comprehension achievement. After collecting data, they were analyzed through descriptive and inferential statistics.

3.5 Methods of Analyzing Data

Data were collected and submitted to SPSS 24.0 in order to perform the necessary statistical calculations. First, descriptive statistics (such as mean, standard deviation, and frequency) is needed for proficiency test to show the general information of obtained scores. Based on the definite scores determined by OPT guideline the participants of the study were selected. Then, their homogeneity was guaranteed by conducting an independent sample t-test and a Kolmogorov-

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Smirnov test of normality. An independent samples t-test was performed in order to ensure there was no significant difference between both groups in terms of reading comprehension at the beginning of the study. An analysis of covariance (ANCOVA) was performed in order to investigate the null hypothesis of the study regarding the differences in experimental and control groups on both pretest and posttest.

4. Results

This section has been allocated to the statistical procedures that the researchers followed gathering the necessary data and providing the needed information with regard to the present study. For the purpose of this study, the researchers focused on finding the variable relationships through utilizing the method of descriptive data analysis, as well as inferential data analysis. In other words, the researchers intended to illustrate statistically how the condition of the subjects participating in this study was affected or changed after deliberate manipulation of the variables.

4.1 Analysis of Proficiency Test

According to the Oxford Placement Test (Solutions) (2007), the intermediate learners are those who attain 31 and above (out of 50) on grammar and vocabulary section, and 8 and above (out of 10) on reading. The total score should not be less than 39. As Table 1 shows, fourteen participants could not attain the intended scores for intermediate level of language proficiency; therefore, they were excluded from the sample.

Table 1. The frequency of scores obtained from proficiency test

		Frequency	Percent
Valid	24.00	2	2.7
	25.00	1	1.4
	27.00	1	1.4
	28.00	1	1.4
	30.00	1	1.4
	31.00	2	2.7
	34.00	1	1.4
	35.00	1	1.4
	36.00	1	1.4
	37.00	1	1.4
	38.00	2	2.7
	39.00	6	8.1
	40.00	6	8.1
	41.00	10	13.5
	42.00	10	13.5
	43.00	5	6.8
	44.00	5	6.8
	45.00	5	6.8
	46.00	4	5.4
	47.00	4	5.4
	48.00	1	1.4
	49.00	1	1.4

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	50.00	1	1.4
	51.00	1	1.4
	53.00	1	1.4
	Total	74	100.0

In order to ensure the homogeneity of the participants, the participants were randomly assigned to two groups and their scores were compared by an independent samples *t*-test analysis. The results, as shown in Table 2, revealed that there is not any significant difference ($t = .75$, $p > .05$) among selected participants for intermediate level.

Table 2. Independent samples test of scores on language proficiency test

		Levene's Test for Equality of Variances		**t-test for Equality of Means**						
		F	**Sig.**	**t**	**df**	**Sig.**	**Mean Difference**	**Std. Error Difference**	**95% Confidence Interval of the Difference**	
									Lower	**Upper**
OPT	Equal variances assumed	1.583	.213	.750	58	.456	.62054	.82704	-1.034	2.2764
Homogenized										

In order to test the null hypothesis and further statistical analyses, the scores of the participants on the main tests of the study, i.e., OPT needs to be normally distributed. To do this, a one-sample Kolmogorov-Smirnov test was conducted. The results are shown in Table 3.

Table 3. Normal Distribution Kolmogorov-Smirnov Test

		OPT
N		60
Normal Parameters[a,b]	Mean	41.92
	Std. Deviation	9.639
Most Extreme Differences	Absolute	.187
	Positive	.113
	Negative	-.187
Kolmogorov-Smirnov Z		1.448
Asymp. Sig. (2-tailed)		.130

As Table 3 shows, the most extreme differences between the scores is not significant. The measured significance level for OPT scores was 0.13; both values were higher than the assumed level of significance (i.e., 0.05), so it can be concluded that there was no significant difference

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between the observed distribution of selected scores of pretest and the scores are normally distributed.

4.2 Analysis of Participants' Performance on Pretest

The participants of the study were pretested by pretest that was designed to test the participants' reading comprehension before receiving the treatments of study. The descriptive statistics of participants' performance on pretest is provided in Table 4.5.

Table 4. Descriptive statistics of participants' scores on pretest

		N	Minimum	Maximum	Mean	Std. Deviation
Pretest	Control	30	9	18	11.63	2.69
	Experimental	30	**9**	**17**	**10**.76	3.64

In order to ensure that there is no significant difference between the control and experimental groups regarding their performance on pretest, an independent sample t-test was performed. The results are provided in Table 5.

Table 5. Independent samples t-test of control and experimental groups on pretest

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig.	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Scores on Pretest	Equal variances assumed	.216	.176	.846	58	.353	.93333	.99751	-1.063	2.93006

The results indicated that there is no statistical significant difference between control and experimental groups (t = 0.84, p > 0.05) in their performance on pretest. In order to prove the normality of the scores of the control and experimental groups on pretest and posttest, one sample Kolmogorov-Smirnov test was performed. The results are shown in Table 6.

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Table 6. Kolmogorov-Smirnov Test for Pretest and Posttest Scores in Control and Experimental Groups

		Pretest - Control Group	Pretest - Experimental Group	Posttest - Control Group	Posttest - Experimental Group
N		30	30	30	30
Normal Parameters[a,,b]	Mean	11.63	10.76	22.53	33.94
	Std. Deviation	2.69	3.64	4.04	4.57
Most Extreme Differences	Absolute	.182	.141	.192	.166
	Positive	.182	.095	.192	.145
	Negative	-.159	-.141	-.121	-.166
Kolmogorov-Smirnov Z		.751	.580	.793	.683
Asymp. Sig. (2-tailed)		.625	.890	.555	.740
a. Test distribution is Normal.					
b. Calculated from data.					

As it is indicated in Table 6, p-value for each set of scores is higher than 0.05, therefore all sets of scores have normal distributions and the parametric test of ANCOVA can be used. In order to investigate the research hypothesis and for eliminating the effect of pretest on students' performance in the posttest, an analysis of covariance (ANCOVA) was run. Table 7 shows the results of Levene's test of equality of error variances.

Table 7. Levene's test of equality of error variances

F	df1	df2	Sig.
1.580	1	58	.218
Tests the null hypothesis that the error variance of the dependent variable is equal across groups.			
a. Design: Intercept + Pretest + Groups			

From the above table it is clear that the underlying assumption of homogeneity of variance for the one-way ANCOVA has been met – as evidenced by $F = 1.580$, $p = 0.218$. That is, p (0.218) > .05. As the relationship between the dependent variable (posttest) and the covariate (pretest) should be similar for two groups, the homogeneity of regression lines was checked the results of which are presented in Table 8.

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Table 8. Homogeneity of regression

Dependent Variable: Posttest					
Source	**Type III Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
Corrected Model	130.503[a]	3	43.501	25.042	.000
Intercept	12.428	1	12.428	7.154	.012
Groups	2.738	1	2.738	1.576	.219
Pretest	80.536	1	80.536	46.361	.000
Groups * Pretest	.672	1	.672	.387	.539
Error	52.115	56	1.737		
Total	13425.000	60			
Corrected Total	182.618	59			

a. R Squared = .715 (Adjusted R Squared = .686)

As it is shown in Table 8, the P-value is equal to 0.539 which is higher than 0.05, so interaction between the independent variable (flipped classroom) and covariate is not significant and the assumption of the homogeneity of regression is accepted. Therefore, the ANCOVA can be performed. With regard to the hypothesis of the study, that is, *implementing web-based hypertext has no significant effect on Iranian EFL learners' reading comprehension,* an ANCOVA was conducted. According to Dörnyei (2007), in quasi-experimental studies, the use of ANCOVA contributes to the reduction of the initial group differences. The results of this analysis are shown in Table 9.

Table 9. Analysis of covariance (ANCOVA)

Dependent Variable: Post-Test						
Source	**Type III Sum of Squares**	**Df**	**Mean Square**	**F**	**Sig.**	**Partial Eta Squared**
Corrected Model	129.831[a]	2	64.916	38.123	.000	.711
Intercept	12.545	1	12.545	7.367	.011	.192
Pretest	80.390	1	80.390	47.211	.000	.604
Groups	59.826	1	59.826	35.134	.000	.531
Error	52.786	56	1.703			
Total	13425.000	60				
Corrected Total	182.618	59				

a. R Squared = .711 (Adjusted R Squared = .692)

As it is shown in Table 9, the first line highlighted shows that the pretest is significantly related to the posttest ($p < 0.05$) with the magnitude of 0.604. The next line is the indicator of the main effect of web-based hypertext on the dependent variable, i.e., reading comprehension. After adjusting for pretest scores, there was a significant effect of the group, $F = 35.134$, $p < 0.05$, partial

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$\eta^2 = 0.531$. As *p*-value is less than 0.05, the difference between two groups is significant and the effect of web-based hypertext on reading comprehension is clear. Therefore, the null hypothesis is not accepted and the answer for the research question will be 'YES'. That is, implementing web-based hypertext has a significant effect on the reading comprehension of Iranian EFL students.

5. Discussion and Conclusion

This section introduces a discussion of the results which were presented in the previous chapter of this thesis and attempts to provide answers to the initial research questions. First, the purpose of this investigation will be reviewed along with research questions. After that, the main findings of this research will be explored and their implications with regard to each of the research questions will be discussed. Finally, the pedagogical implications of this study will be discussed in detail, and some recommendations for further studies in the area of WBI and reading comprehension will be introduced.

This study focuses on the discussion concerning the main findings of the study which is in line with looking into the impact of using hypertext reflection on the reading comprehension of Iranian Intermediate EFL learners. In this case, 60 participants were put into two groups as a control group and experimental group. Therefore, based on the quantitative results, the participants' pretest and post-test scores, their reading comprehension were measured before and after the treatment by running pretest and posttest. The result of statistical analyses indicated that the experimental group remarkably outperformed the control group after the treatment, it revealed that the instruction was quite successful in helping the participants to improve their reading comprehension.

The finding has converged from Lum (2015) which investigated using the hypertext to promote positive attitudes toward the use of self-reflection for speaking development. Seventy-five Thai EFL learners in university finalized ten hypertext recordings and self-reflection during the semester. Quantitative data were collected by focus groups and the final written self-reflection report. The result revealed that the hypertext and self-reflection activities had a positive impact on the participants' learner autonomy, language skills, and self-confidence. Moreover, several other studies have been conducted on the issues of effective learning through technology (Bates & Pool, 2003). Also, the findings are consisted of Hassan and Hoon (2013) conducted a study on hypertext application in studies of language learning. The outcome of this study showed that hypertexts significantly support learning not just in listening and speaking skill, but also in other language fields such as grammar, pronunciation, and vocabulary to show how the hypertext is able to contribute to the learning skills in English.

In the other aspect, the outcome of this study was in contrast with Stiffler et al. (2011) conducted that students did not have a positive trend toward using the hypertext. In addition, Rossel-Aguila (2013) argued that the pioneering studies on using the hypertext had concentrated on examining the perception and attitudes of learners toward the hypertext at a Japanese University. The researchers recommended plenty of integrated materials and lack of design perspective, which was the reason behind students' lack of interest in hypertexting.

In addition, findings are in line with Parra (2016) in his qualitative result. He conducted a study on the impact of student-created video hypertexts to promote foreign language grammar acquisition

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in middle school and learner's description regarding their experience. Although quantitative findings indicated that the use of student-created videos had no significant impact on foreign language grammar, the qualitative results provided insight for learners, parents, stakeholders, and school administration.

To recapitulate, quantitative findings of the study highlighted the outperformance of the experimental group (which used hypertext reflection as treatment) in comparison with the control one (in a conventional way of teaching) regarding hypertext reflection on the reading comprehension of Iranian EFL intermediate learners. In fact, the treatment sessions of reading comprehension, which were held through hypertext reflection, could pave the way for learners to improve their reading comprehension.

Quantitative findings of the study highlighted the outperformance of the experimental group in comparison with the control one regarding hypertext reflection on the reading comprehension of Iranian EFL intermediate learners. The results of the statistical analyses run indicated that the experimental group significantly outperformed the control group after the treatment revealing that the instruction was quite successful in helping the participants to improve their reading comprehension. The implication of the current research could pave the way for instructors and curriculum designers to include hypertext as a significant element in enhancing Iranian EFL learners' reading comprehension.

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