The Effect of Multimedia Texts Presented on Interactive Whiteboards on Iranian High School EFL Learners’ Reading Comprehension Performance

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Abstract

The integration of interactive whiteboard (hereafter IWB) in language classrooms has attracted the attention of many researchers all over the world. The purpose of the current study is to teach reading texts (multimedia) presented on an IWB to determine their effectiveness on enhancing Iranian high school EFL learners’ reading comprehension. To conduct the study, fifty three first-grade high school students from two different high schools were randomly selected and assigned to two groups: one experimental group (N=25) taught through the IWB and one control group (N=28) taught through conventional method. During the first week, a standardized reading comprehension test was given to both groups as the pretest to assure the homogeneity of the two groups, and also to assess the participants’ achievements as a baseline for comparison with posttest results. The training took ten sessions during a two-month period, and the same instructor taught the groups ninety minutes each session. Then, the same reading comprehension test used as pretest was given to the participants as posttest at the end of the instruction. The results of independent sample t-test revealed that teaching reading comprehension through an IWB has a significant effect on EFL learners’ reading comprehension performance.

Therefore, in contributing to the body of the IWB research literature, this study is expected to advance students’, researchers’, educators’ and syllabus designers’ understanding of how digital technology is used in education, and to help them in establishing a learning environment that will promote effective use of existing technology (IWB) for L2 reading comprehension.

Keywords: EFL learners; interactive whiteboards (IWB); multimedia texts; reading comprehension; smart boards.
1. Introduction

With the advent of computer-assisted Language Learning (hereafter CALL), the scholars have been trying to revisit the teaching and learning methodology. Due to the features of e-learning, the early attempts were made to develop e-content that best suits the educational goals. Reading, due to its prominence in EFL/ESL classes, is of no exception. Reading comprehension has come to be the ‘‘essence of reading’’ (Durkin, 1993). Levine, Ferenz, & Reves (2000) state: ‘‘The ability to read academic texts is considered one of the most important skills that students of English as a Second Language (ESL) and English as a Foreign Language (EFL) need to acquire’’ (p. 1).

However, many students enter higher education underprepared for the reading demands that are placed upon them. This might not be so surprising when one considers that research conducted by Durkin (1979) revealed that teachers actually devoted only 2% of the classroom time designated for reading instruction to teaching students how to comprehend what they read. The situation in Iran is not any different, namely, in high schools. Reading comprehension instruction is limited to the assignment of a reading passage, accompanied by a number of short or multiple-choice questions relating to the passage. In order to meet the reading needs of students within the 21st century, educators are pressed to develop effective instructional means for teaching reading comprehension. The cognitive theory of multimedia learning (Mayer, 2009) was founded on the idea that there are different processing systems for the two kinds of information, and that these channels show a limited processing capacity. According to Verhoeven & Perfetti (2008), the components which are mixed up in the multimedia cognitive theory offer opportunities to facilitate teaching and learning comprehension. They further stated that the processing of verbal information normally includes the comprehension of written text, which can be viewed as a secondary language process partly obtained from primary spoken language processes, or audio or verbal illustration of words. They added that the processing of pictorial information normally includes written text or images.

Today, developments in Information and Communication Technology (hereafter ICT) have led teachers and syllabus-material designers to consider the possibility of integrating technology into the mainstream curriculum development (Tavakoli& Golshan, 2014). The classroom environment has been equipped with tools and devices to enhance teaching and learning. Among them, IWBs with their fascinating qualities have created a new way for classroom teachers to develop their lessons with sounds, images, and video segments. The use of the IWB may be the most significant change in the classroom learning environment in the past decade and the relationship between multi-modal pedagogy and multi-modal technologies is an emerging and increasingly investigated area of research into teaching and learning. Analytic work (e.g. Glover, Miller, Averis, & Door, 2005) has already shown that the introduction of IWBs has affected teaching and learning interactions. The IWB affects learning in several ways, including raising the level of students’ engagement in a classroom, motivating students and promoting enthusiasm for learning. The IWB supports many different learning styles and is used in a variety of learning environments (Al-Faki& Khamis, 2014). The major advantage claimed with regard to IWBs as a teaching tool is the touch...
sensitive quality of the screen, thus making the IWB ‘interactive’. It is this feature which clearly separates IWBs from other display devices that may be used in classrooms. This has already been noted a number of times. BECTA (2003) states that students are motivated in lessons with an IWB because of “the high level of interaction – students enjoy interacting physically with the board, manipulating text and images” (p. 3).

Although considerable research has been devoted to the effectiveness of IWB for students learning improvement, rather less attention has been paid to the smartboard application for reading comprehension teaching in the classrooms, especially for high school students. This current study will focus on this area by using e-reading texts presented on a smartboard to teach reading comprehension to high school students.

Research Questions
1. Does IWB have any effect on students’ reading comprehension performance?
2. Does teaching through multimedia texts presented on IWB compared with traditional methodshave a significant effect on students’ reading comprehension?

2. Literature Review

2.1 Reading comprehension instruction

Teaching reading comprehension has many components. When students learn comprehension strategies, they develop the skills needed in order to independently and automatically carry out the reading strategies. This teaches the students to be thoughtful readers and ultimately improves their reading comprehension. Therefore, reading comprehension instruction is critical not only for the success of the student in reading class, but across all of the content areas (Martin, 2010).

Boyles (2004) emphasizes the importance of teaching the reader, not the reading. She states that in order for students to improve their comprehension, teachers must teach them how to think while they are reading. This teacher-friendly book introduces teachers to six reading comprehension strategies: connecting, picturing, wondering, noticing, guessing, and figuring out.

The National Reading Panel discusses the implications computer technology has had and will continue to have on reading instruction. The following computer functions have had a tremendous impact on reading comprehension: speech recognition capabilities, multi-media presentations, and the Internet. The panel focuses on the fact that computer technology cannot be studied independent of instructional content, and computer technology is not an instructional method. Instead, computer technology is a tool by which instruction is delivered. Studies reviewed by the National Reading Panel found that there were positive results for speech to computer presented texts, the use of hypertext, where highlighted text is linked to an underlying definition, and the use of the computer as a word processor due to the fact that reading instruction is effective when combined with writing instruction. The panel
still has many questions about the use of the computer technology and its instructional applications (National Institute of Child Health and Human Development, 2000).

For those espousing an interactionist second language acquisition (hereafter SLA) there is an assumption that L2 acquisition is facilitated by learners’ interaction in the target language, thereby providing opportunities to comprehend message meaning. Accordingly, a key concern for research is how these ideal features and appropriate tasks can be incorporated into an experimental reading program. This concern is relevant due to the goals of the current study, namely:

1. To provide students with the choice of a hypermedia text presented on IWBs and,
2. To improve learner’s reading comprehension through interacting with this technology type.

2.1.1 Reading Comprehension through Multimedia (E-reading)

Although multimedia, hypertext and hypermedia seem to share the same characteristics, there are some differences among these terms. In Chun’s (2001) words hypertext has been defined as basically the same as regular text [in that] it can be stored, read, searched, or edited, [but] with an important exception: hypertext contains connections within the text to other documents or locations, and it allows for non-sequential reading and writing of documents by using embedded links to jump from one place in the document to another. Thus, hypermedia combines hypertext and multimedia, i.e., sounds, pictures, movies, and animations.

According to Mayer (2009, as cited by Alkhasawneh, Rahman, Ayub, & Daud, 2012), multimedia presentation offers many possibilities to facilitate knowledge construction. Likewise, Verhoeven & Perfetti (2008) suggested that researchers had to examine how students learn from multimedia texts, especially now that ICT is progressively being integrated into the school curriculum. The concentration of instruction of school subjects and networked technologies appears unavoidable. According to Mayer (2001, 2005, 2010), various multimedia presentations offer the opportunity for students to use words and pictures. Words refer to printed text or spoken text. Pictures refer to drawing, charts, graphics, maps, photos, animations and videos. Mayer (2010) states that using words and pictures is better than using words alone. The students comprehend better when watching and listening, than when watching alone (Mayer & Moreno, 1998). In brief, multimedia is able to increase the student’s reading comprehension achievement. Thus multimedia presentation offers many possibilities to facilitate knowledge construction.

Verhoeven & Perfetti (2008) pointed out that the students cannot comprehend the text with only the information presented in the text, but that students also use their prior knowledge to construct new knowledge. During this process, the reader is involved with two levels of representation - the text model, a model of the propositions of the text, and the situation model which is a model of what the text is about. Readers who have other sources of information read more comprehensively than readers using only the printed text. According
to Multimodal text processing, the students using text model and pictorial model are expected to read more comprehensively than students who use the text model.

In another study, Son (2003) aimed to find out the degree of usefulness of hyperlinks on the online lexical resources, which provide readers with optional assistance during independent reading. The finding showed that the integration of text with sound and images eventually paves the way for greater comprehension of the reading text, as well as better pronunciation and contextual use of lexical items in a way that instructional paper-based texts cannot achieve.

E-learning has many faces in classrooms. IWB is one of many tools of e-learning through which multimedia texts could be presented.

2.2 Interactive Whiteboards (IWB)

2.2.1 Background

IWB is a large touch-sensitive display unit, connected to digital data projector and computer. IWB functions as interactive board, computer screen (monitor), and mouse at the same time. Users can change monitor to whiteboard and vice versa, or use them at the same time. The Users can use their fingers, a special electronic pen (stylus), a pointer or a pen to operate the board and/or control computer icons. Many people called it smart board because SMART Technologies Company was a pioneer provider to the education sector. The first smart board was introduced in 1991. It was used in business presentation. Nowadays, it is used in classrooms, lectures halls, and language labs. According to some studies and reports based primarily on research in science, math or other content-based classrooms, the use of IWBs makes the learning and teaching atmosphere more enjoyable, creative, and interesting. There are also numerous claims about the benefits and positive impact of IWBs on learning, but these remain largely anecdotal (Levy, 2002).

2.2.2 The Impact of IWB on Teaching

According to Clarkson (2011), a number of different ways teaching is supposed to benefit from the use of IWBs were identified by Smith, Higgins, Wall and Miller (2005) including: the flexibility and versatility they introduce to the lesson. This versatility extended to the content of lessons and activities. Using an IWB also allows the teacher more flexibility to teach from various places within the classroom. The multimedia capacities they can inject into teaching, the way they can support planning, the range of materials, the facility to manipulate them, and the interactivity and participation they introduce into lessons is reported as a major benefit of IWBs across the curriculum. Austin (2003) reported the use of a number program where the pupils themselves came up to the board and, using the pen, count forwards or backwards on a number line. The IWB was felt by some teachers to enhance teacher-pupil interaction, “by encouraging students to offer answers to questions, which if correct can be noted on a flipchart” and was supported by the “the strong visual and
conceptual appeal of the information and learning resources that are displayed” (Levy, 2002, p. 8).

Another implication resulting from this model of learning is the acknowledgement that pupils also benefit from working together in small groups. Because IWBs presented the introductory part of lessons so efficiently, more time was freed for interactive activity-based learning. In other words, this observational study of IWB use found that far from transforming classroom practice, the new technology appears to have been uncritically absorbed into teachers’ pre-IWB practice.

Overall, literature on the effects of IWBs on teaching is again mixed; some of it quite positive but other research less so. The jury is still out as to whether the key feature of IWBs, the interaction with the touch sensitive board, actually changes teaching, although they are effective in the hands of a gifted teacher/mediator (Clarkson, 2011). However, the crucial claim for the use of IWBs is that they enhance interactivity, and as a consequence impact positively on learning.

2.2.3 The Impact of IWB on Learning

In Barone & Wright (2008), Wright says, “What makes today’s kids really sit up and fires their neural fibers? Technology. Kids don’t see laptops, MP3 players, cell phones, PDAs, DVD players and video games as technology, it’s just life. Schools need to connect education to their students’ lives with technology.” (p.298)

With today’s students, some of whom have a limited attention span and a need to be visually stimulated, technology integration is inevitable (Jewitt, Moss & Cardini, 2007). Al-Faki & Khamis (2014) lists important roles of IWB in the learning process as follow:
1. IWBs facilitates learners’ participation by enabling them to interact with materials on the board.
2. IWBs provide more opportunities for interaction and discussion in the classroom, especially compared to other ICT.
3. Smart boards facilitate communication among learners, and between learners and their teacher.
4. Different learning styles could be accommodated, as teachers could call on a variety of resources to suit particular needs.
5. IWB captures learners’ attention and encourages the involvement of learners in the subject.
6. Learning techniques involves visual rather than verbal instruction. Learners are able to see their work on the board.
7. IWB enables teachers to mix face-to-face interaction and e-learning platform - to create a rich learning environment.
8. IWBs contribute to the cognitive and conceptual developments of the learners.
Clements, Moore and Nelson (2001), investigating the use of IWBs from a constructivist perspective found that group work, a vital aspect of constructivist teaching and learning, was significantly diminished. Wall, Higgins & Smith (2005) however, found that IWBs help students think about their learning. On the other hand, the BBC in their Report to the ‘Department of Education and Skills Evaluation on the Implementation of IWBs’ pointed out that IWBs have not had a positive impact on national test results in schools that intensively use IWBs. Gains were greater the longer teachers had used IWBs(Clarkson, 2011).

2.2.4 More Empirical Evidence about the Impact of IWBs on Different School Subjects

Alongside the research on classroom pedagogy and interactivity outlined above is a much smaller body of research which attempted to provide an empirical basis for such optimism. Clemens, Moore, & Nelson(2001), in an industry-sponsored study, had found measurable enhancement of low attaining learners’ performance at the beginning of their school career. Similarly Weimer’s (2001) study of student attitudes and motivation adopted an experimental design and found clear benefits associated with the use of the IWB. Beeland’s (2002) study found that both teachers and students were positive about the technology, but that further research was needed to identify how to ensure that the increased motivation was translated into increased learning.

In their study, Hall & Higgins (2005), investigated the teaching/learning success based on comprehensive installation of IWBs in England. Students’ achievement, structured lessons observation, and both teachers’ and students’ attitudes were the areas under investigation. The results indicated that technology use changes teachers’ practice, and they showed that teachers’ and students’ attitudes were much positive. However, the results indicated that the students’ attainment on the national test was very low. Concerning teachers and students’ attitudes toward using technology in education, Mathews-Aydinli & Elaziz (2010), investigated the attitudes of teachers and students toward the use of IWBs in foreign language teaching and learning context. Data were collected through the questionnaire distributed to 485 students and 82 teachers in different institutions in Turkey ranging from primary schools to universities. The analysis of the questionnaire revealed that both students and teachers have positive attitudes toward using smart boards in language instruction.

Through an empirical study, Bell (2000), investigated if smart boards have any effects on writing achievement, writing attitude, and computer attitude among 90 eighth graders in junior high school during a six week period. The experimental group was taught through IWB projectors and videos while the control group was taught in the traditional way. She concluded that the students’ achievement was not different in the two groups based on their posttest but their attitudes towards computer use were improved and consequently their attitudes towards writing changed to the better.

Robinson (2004), investigated the impact of technology on middle school students’ mathematics. He investigated using IWBs in teaching a unit on transformation. Two seven grade classes were the participants of this study. One group used IWB while the other did not.
Results indicated that students’ attitude toward IWBs and consequently toward learning mathematics increased although the students’ achievement was not statistically different in both groups.

The results of all the directly above research-based studies have shown that the linkage between the use of IWBs and enhancing teaching and learning is indeed somewhat ambivalent (Clarkson, 2011). According to Golonka, Bowles, Frank, Richardson, Freynik (2014), although no studies have reported learning outcomes, there is some evidence regarding the impact of IWBs on the process of learning and on learner affect. For instance, the use of the IWB improved students’ reported ability to memorize material, promoted independence in learning, and encouraged more practice and recycling of already learned material. Language teachers felt that the use of the IWB had a positive and sometimes dramatic effect on their teaching and changed their roles in the classroom (Gray, Hagger-Vaughan, Pilkington, & Tomkins, 2005), that the IWB brought a “‘wow’” factor to the classroom (Orr, 2008), and that it increased students’ enthusiasm, interest, and engagement in the learning process (Tozcu, 2008), and attracted attention (Schmid, 2007).

However, few inquiries have focused the experimental evidences on the application of IWBs in classrooms. Due to the advantages of using IWBs in EFL classes and the significance of reading comprehension as one of the major language skills, this current study deals with this issue, making use of multimedia texts to explore its impacts on high school EFL learners’ learning.

3. Methodology

The current research was conducted to find out if integrating technology into reading comprehension instruction improved students’ reading comprehension performance. By using the smart board as an instructional tool, the students were provided with a different mode for practicing the reading comprehension taught in class. Through the utilization of the smart board as an engaging and motivating tool and fascinating qualities of multimedia texts, the study hoped to show that students would be able to practice reading texts more easily and learn the materials better ultimately improving their reading comprehension.

3.1 Participants

The participants of this study consisted of 53 female students in two different first-grade high schools in Khalilabad, Khorasan Razavi, Iran. They were selected randomly from two different high schools. All students were the native speakers of Persian. The students had studied English for three years before attending junior high school. The students’ age range was 15 to 16. They came from the same cultural and social background as they were living within the same context. The participants were assigned randomly into two groups: the experimental group (N=25) and the control group (N=28).
3.2 Instruments

To collect data for this study, the following instruments were developed.

**Interactive Whiteboard (IWB)**

The Interactive Whiteboard (IWB) was the instrument used for the experimental group to examine its effect on students reading comprehension performance. This presentation device is a touch-sensitive screen that works in conjunction with a computer and a projector. The computer images are displayed on the board by a digital projector, where they can be seen and manipulated. Users can control software both from the computer and from the board. Participants can add notations, and emphasize by using a pen and or highlighter tool. By using his/her finger as a mouse, the teacher or student can run applications directly from the board. Another user at the computer can also have input. Any notes or drawings can then be saved or printed out and distributed to group members.

**Reading passages**

The reading passages of students’ English course book administered by Ministry of Education were employed for reading comprehension teaching. Thus the difficulty level of the texts was based on the students’ proficiency level. Each passage followed by some comprehension multiple-choice, open-ended, and fill-in the-blank questions.

**Khate-Sefid Educational Software**

The teacher, who was the researcher as well, utilized the multimedia version of the texts prepared by Khate-Sefid publication for the experimental group. This educational software is widely used in Iranian high schools. It is a kind of multimedia version of the students’ course book which covers new vocabularies, reading comprehension passages and grammars of the book, containing images, sounds, and videos of different sections of the book. On the other hand, Participants in the control group were taught through their paper-based texts and whiteboard and they were required to answer the reading comprehension questions presented at the end of each passage. The students were taught ten passages during three months-treatment period, each session consisted of a ninety-minute class hour once a week. The texts Reading texts included different topics.

**Reading comprehension test**

A reading comprehension test for the pre-and post-test used to address whether or not an IWB has any effect on Iranian high school students’ reading comprehension achievement during the learning process. The test used in the present study include a standardized test (KET TEST, Cambridge University Press 2010), the reading comprehension section of the
test (KET) was used as the pretest and posttest. The test consists of 30 multiple-choice items to assess reading proficiency level of the learners.

3.3 Data Collection Procedure

The researchers took the following steps in order to conduct the present study. First, the reading comprehension section of a proficiency test (KET TEST) was administrated in the first session of the term. It was going to assess the reading proficiency level of the e-learners. That way, it could be ensured that the proficiency level of all participants was roughly the same. Having done it, the homogeneity of the experimental and control groups was assured. It was also exercised as the pretest. Then the same part, which was used as the pretest, was once again employed as the posttest. The purpose of administrating pretest and posttest was to observe the possible changes that might have occurred in the reading ability of the e-learners.

The participants of the study were classified into two groups randomly: the experimental group was taught reading comprehension texts through an IWB while the control group was taught with the conventional method using their textbooks. The IWB or smart board was used by the teacher regularly as the traditional whiteboards. The study was based on ten ninety-minute sessions. The experimental group took the treatment, which comprised of some assignments for teaching reading comprehension taken from the students’ English textbooks. One of the researchers who was the teacher as well took good care to have relatively the same condition in two classes over the treatment period.

While teaching reading comprehension, at first the teacher played the CD that read the text and paused at the end of each paragraph. The students made use of properties of multimedia texts such as sounds and pictures accompanied with the texts presented on the IWB. The students were already taught the new words used in the texts and tried to understand the paragraph in their groups and this process went on up to the end of the last paragraph. At the end, they answered some reading comprehension questions related to the texts which were taught. The instruction took one session each week, within a period of two months. At the end, a reading comprehension posttest was used to check the improvement. After the treatment, the results of the reading comprehension pretest and posttest of the two experimental and control groups were compared to determine whether using smart boards had any effect on Iranian high school students’ reading comprehension improvement or not.

4. Data Analysis and Results

The purpose of the study was to see what effect educational technology specifically the IWB had on students’ reading comprehension.
First, the assumption of normality was calculated by the Kolmogorov-Smirnov test. Table 1 shows that the amount of significance value for the control and the experimental groups were greater than Alpha (p = 0.508>0.05). Thus the normality of groups was ensured.

Table 1 Test of Normality of Experimental and Control Group

<table>
<thead>
<tr>
<th>pretest</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>Z</th>
<th>Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>control &amp; experimental group</td>
<td>53</td>
<td>13.6226</td>
<td>5.73682</td>
<td>0.823</td>
<td>0.508</td>
</tr>
</tbody>
</table>

Table 2 shows the results of the descriptive statistics including the mean and standard deviation of the participants’ scores in the reading comprehension pretest in the control and experimental groups.

Table 2 Descriptive Statistics of Experimental and Control Groups

<table>
<thead>
<tr>
<th>Pretest</th>
<th>Group</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error of Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Experimental</td>
<td>25</td>
<td>14.800</td>
<td>6.67083</td>
<td>1.33417</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>28</td>
<td>12.5714</td>
<td>4.63024</td>
<td>0.87503</td>
</tr>
</tbody>
</table>

Table 3 Independent Samples t-Test for Homogeneity of Students in Experimental and Control Group

<table>
<thead>
<tr>
<th>TEST</th>
<th>MeanDifferences</th>
<th>t</th>
<th>df</th>
<th>Sig.(2-tailed)</th>
<th>Std.Error Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control-experimental pretest</td>
<td>2.22857</td>
<td>1.425</td>
<td>51</td>
<td>0.160</td>
<td>1.56362</td>
</tr>
</tbody>
</table>

Then an independence t-test between the pretest scores of the two groups was run to ensure the homogeneity of the students in the two experimental and control groups (table 3). Table 3 shows that the mean difference between the control and experimental groups in the pretest (M = 2.228) is not statistically significant (t = 1.425; p = 0.160> 0.05), indicating that both groups were at the same level of reading comprehension at the beginning of the study and the assumption of the homogeneity of the groups was met, too.
Table 4 Independent Samples t-Test of Control and Experimental Groups’ Performance in the Reading Comprehension Pretest and Posttest

<table>
<thead>
<tr>
<th>Tests</th>
<th>Mean Differences</th>
<th>t</th>
<th>Df</th>
<th>Sig.(2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>control-experimental</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>pretest</td>
<td>2.228</td>
<td>1.425</td>
<td>51</td>
<td>0.160</td>
</tr>
<tr>
<td>control-experimental</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>posttest</td>
<td>4.201</td>
<td>2.081</td>
<td>51</td>
<td>0.042</td>
</tr>
</tbody>
</table>

Table 4 shows the results of the independent t-tests performed to compare control (traditional whiteboard users) and experimental (smartboard users) groups’ performance in the reading comprehension pretest and posttest.

It is clear from the table that the mean difference between the control and experimental groups in the pretest (M = 2.22) is not statistically significant (p = 0.160 > 0.05), suggesting that both groups were at the same level of reading comprehension knowledge at the beginning of the study. Likewise, the mean difference between the control and experimental groups in the posttest (M = 4.201) is not statistically significant (p = 0.042 < 0.05), demonstrating that the experimental group in which smart boards were used did outperform the control group which made use of the traditional methods.

Table 5 Paired Samples Test of Comparing the Performance of Control and Experimental Group in Reading Comprehension Pretest and Posttest

<table>
<thead>
<tr>
<th>Tests</th>
<th>Mean Differences</th>
<th>T</th>
<th>Df</th>
<th>Sig.(2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>pair 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>experimental</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>pretest-posttest</td>
<td>-6.080</td>
<td>3.76</td>
<td>24</td>
<td>0.01</td>
</tr>
<tr>
<td>pair 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>control</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>pretest-posttest</td>
<td>-4.10</td>
<td>2.87</td>
<td>27</td>
<td>0.008</td>
</tr>
</tbody>
</table>

As the results of the above within-group analysis show, the difference between the performance of the control group in the reading comprehension pretest and posttest is significant (p = 0.008 < 0.05). Similarly, the difference between the experimental group’s performance from the pretest to the posttest is significant (p = 0.01 < 0.05). The significant progress observed in the posttest shows that all students, regardless of the group could, to some extent, improve their reading comprehension in this course. However, the progress is more evident in the experimental than the control group as the mean difference between the pretest and posttest shows (0.01 vs. 0.008); and in this way the second null hypothesis is rejected confirming the fact that reading comprehension instruction has a positive effect on EFL learners’ reading comprehension performance.
5. Discussion

As indicated by the results of the within-group analysis, the first research hypothesis stating that teaching through IWBs influences students’ reading comprehension is supported. These findings provided evidence for the usefulness of the reading comprehension instruction using multimedia texts, either through smart boards or whiteboards. As stated in such previous studies as Alkhasawneh et al. (2012), the significantly positive effect of multimedia texts on students ‘reading comprehension achievement based on Mayer’s cognitive theory of multimedia teaching is thus demonstrated. Chun (1997) focuses on the current research on learning with multimedia, and how learners integrate verbal and visual information, particularly with respect to the individual differences among learners. The study proposes that while text comprehension is an indirect transformation between a text as a symbolic representation and the mental model as an analog representation, picture comprehension is a direct mapping of the picture as an analog representation onto the mental model as an analog representation by establishing an analogy between the visual information and the corresponding mental model (Schnotz, 1993; Schnotz & Grzondziel, 1996). These qualitative differences can be used to aid text comprehension, namely, by supporting the processes of selecting information, organizing the presented information into a coherent structure, and integrating these new ideas into the existing mental model.

The second research hypothesis stating that teaching Iranian high school EFL learners through IWBs instead of traditional methods leads to a better reading comprehension achievement among them was also confirmed. According to Bajoolvand, Mahmoodi, & Vafaeeeseresht (2014), IWB affect learning in several ways including, promoting enthusiasm for learning and motivating students (see, for example, Miller et. al., 2005; Blanton & Helms-Breazeale, 2000; Bush et al., 2004; Cooper, 2003; Greenwell, 2002; Lathman, 2002), and raising the level of student’s engagement in classroom (see, for example, Kent, 2003; Lee & Boyle, 2003)(pp. 348-349).

This finding was in agreement with Fatemi, Alishahi, Seifi, & Esmaelzadeh (2014) who explored the impact of employing smart boards as an effective learning tool to enhance EFL learners’ speaking and listening skills. Coyle (2013) shows the effectiveness of the use of smart boards and interactive games for improving reading comprehension in students with moderate cognitive disabilities. Also students in Phillips’ study (2013) showed an increase in their quiz scores of vocabulary acquisition when smart boards were utilized.

Unlike the present study, Martin (2010), found no significant effect for IWBs on students’ reading comprehension; although he concluded that when used correctly and with proper training, smart boards can be an influential tool that can impact the way students learn, thus motivating them and enhancing their engagement. Moreover, Hassani, Behjat, & Abdorahim Zadeh (2014) investigated the impact of IWBs as an instructional tool on Iranian high school
students’ vocabulary achievement. The results did not show a significant impact for the use of IWBs on students’ vocabulary breadth.

6. Conclusion

The article set out to investigate the impact of IWBs using multimedia texts on high school students’ reading comprehension. Based on the results obtained, the outcomes of the research can be summarized as follows. First, using multimedia texts presented on IWBs has a positive effect on improving students’ reading comprehension. Second, IWBs are an influential educational tool for reading comprehension instruction compared to traditional methods in teaching reading comprehension.

However, where differential impact is noted in the literature, it seems to relate more to changes in teachers’ pedagogy than to their exploitation of the technology’s technical interactivity (Higgins, Beauchamp, & Miller 2007). Regarding these issues, further research is needed to investigate whether the technology itself affects learning or it is the teachers’ different pedagogical methods that bring the change in students’ learning. Moreover, it should be noted that this study was conducted with a limited number of participants and that only intermediate high school students were included in this study. Further research can be done with larger sample size and various proficiency levels.

In general, IWB, as a new instructional tool, can attract learners’ attention and consequently improve their performance. Bearing the finding of this study in mind, it is recommended that teaching language through IWB can be adopted more frequently by language teachers. In fact, using IWB to teach language should be extended to other language skills and other subject matters.
References


