The Effect of Online Interpretations via Interactive White Boards on Vocabulary Learning

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ABSTRACT

Background: English, as a foreign language, has become an essential part of educational curriculum in Iranian educational contexts. However, there has not been enough research in the domain of using technology in English classes in Iran to make learning easier and more accessible. The present study aims at investigating the effect of online interpretation of English lessons through Interactive White board on learning new vocabularies in an Iranian international school in the academic year 2017-2018.

Methods: To achieve the goal, 60 female students were randomly selected as homogeneous learners after a placement test (Oxford Placement Test). Following a pre-test of vocabulary, all 60 participants were randomly assigned to 3 groups of 20 to be exposed to the experiment. The participants of all three groups received English vocabulary lessons on IWB screen while simultaneously receiving the online interpretation of each lesson through auditory, video, and pictorial annotations attached to the new words. In this process, the participants read the vocabularies and their usage in the texts. In the meantime, they were able to consult the data attached to them through IWB to find their definitions through auditory definition, pictures, or movies by touching the board. In order to measure the influence of whiteboard on their learning ability, the subjects of all three groups were given an immediate post-test after the lessons.

Results: The data was analyzed through ANOVA and the results indicated that the group who received video interpretation (m=5.27) outperformed the auditory (m=4.42) and pictorial annotation groups (m=4.20), and auditory group displayed a significantly better performance than pictorial group.

Conclusion: The results provide significant implications for teaching English vocabulary in international schools. They highlight the role of English language syllabus designers and international school educators and instructors in providing electronic programs that can substantially improve the learning process.

Keywords: Annotation, Interactive white board, Auditory definition, Pictorial materials, Video interpretation

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Introduction

English, as an international language, has become an essential component of educational curriculums in Iranian educational contexts in 20th and 21th centuries, especially in international schools. Most of the international schools in Iran include nursery schools and primary and secondary (high) schools. Some of these schools follow either American or British curriculums, and the programs should be delivered in English in almost all schools. The philosophy of establishing these schools is to provide education for people like the executives of multinational corporations and their children, foreign diplomats' family members living in Iran, employees of non-governmental organizations (NGO), and local people who would like to study abroad later. In fact, the main body of students is from other countries and most of them are not from English language countries including Arab countries, Europeans, or countries form Far East, where their first language is not English. These schools offer high educational standards with small class sizes, first-rate and up-to-date facilities as well as extra-curricular programs. Using smart technological devices enables teachers to impart sufficient knowledge to students in line with international standards. One of these up-to-date facilities are Interactive White Boards.

Schools and universities will continue to offer their courses in physical classrooms, and the introduction of online technology will not reduce the physical presence of learners. Instead, the use of online technologies in face-to-face teaching and distance education systems in higher education institutions will be highlighted (1). Face-to-face learning environment is prevalent in educational systems in all countries and educational experts believe that human interactions are considered an essential part of learning. In addition, e-learning environment provides greater time and opportunity for thinking and creates equal opportunities for learners to share their thoughts. In recent years, new innovations in the higher-education curricula around the world have provided enormous educational opportunities for learners. They can now benefit from face-to-face classrooms along with online instructions and application of educational tools such as blogging, virtual classes, discussion boards, and talking forums. This form of learning is known as blended learning.

Being a modern version of the traditional whiteboards, an interactive white board is an interactive large screen that is connected to a PC and a projector to show the computer's desktop information onto the board. Users can control the computer via special pens, their hands, or other devices that are used to touch the screen of this smart board. Teachers, managers or students can drag, click, copy and also handwrite notes to transform data into text or save them.

This tool allows learners to boost interactive and collaborate learning. It also enables the integration of media content into teaching materials or lectures to support collaborative learning, and hence provides a wide range of learning opportunities. Interactive whiteboards are considered, therefore, a cost saver because a single computer is utilized to provide learning stimuli for a whole classroom. One may not have to equip an entire classroom with many computers or rent a computer lab for class activities, or give every student a laptop. Although this device was originally used in business to show concepts in meetings and record them, nowadays it is widely used in educational environments from primary schools to university level. While there are some mobile interactive whiteboards, they are normally fixed on the walls in the classes to make it easy for everybody to see and use them (2).

As a pedagogical tool, interactive whiteboard helps promote creative teaching allowing the lecturers to provide different learning styles, including:

Audio learners participate in class discussion,

Visual learners enjoy a clear view of the class contents,

Tactile learners move things around the board, make notes and highlight elements.

Related Studies

Not much research has been conducted on the effectiveness of multimedia annotations on learning English vocabulary. However, as indicated in this section, more studies can be found about reading comprehension. According to Paivio's Dual-coding Theory (3), there is an interconnectedness between two distinct cognitive visual and verbal systems. The verbal system is those word-like codes that include visual, articulatory, auditory, and other verbal codes, while the nonverbal system includes special modality images for sounds, actions, shapes, skeletal sensations which are related to emotion and other nonlinguistic events and objects. Mayer and Sims [quoted in Shams & Dabaghi (1)] emphasized that according to the Dual-coding Theory, although the two systems of visual and verbal systems are independent, the referential connection between them is crucial for conceptualization. They stated that if these two systems are applied simultaneously, it may assist the formation of referential connection. In view of this reality, most related studies have focused on investigating the effect of integration of these two modes of multimedia representation on vocabulary retention and reading comprehension among foreign language learners (4-7).

Al-Seghayer (8) also conducted a similar study on 30 ESL students and found that the integration of printed text definition and video clips resulted in greater achievements in vocabulary retention, as compared to integrating printed text definitions and pictures. On the other hand, Chun and Plass (9) have done a research on comparing the effect of two types of presentation. Their findings revealed that the group who received vocabulary definitions through texts along with pictures performed better than the ones who received an integration of pictures and video clips of vocabulary definitions.

Al-Mansour and Al-Shorman (10) also conducted a study on the effect of computerized instruction on ESL courses. They revealed the positive effect of visual aspect of technology usage in teaching English.

Shams and Dabaghi (1), following Dual-coding Theory (3), have done a study on Iranian students to find out the effect of using IWB on the English reading comprehension. In their experimental design research, they found that pictorial annotation group outperformed the auditory annotation group, and video annotation group showed better performance than the other two groups in reading comprehension.

An overall look at the related studies shows the usefulness of using technological tools in educational contexts, especially smart boards such as IWB in schools. However, there is room for more experiments and studies on the usefulness of such tools as well as the better ways of using them to make them more useful and cost effective in schools. The present study aims to review and explore the effectiveness of annotations in learning English vocabulary in international schools focusing on comparing three modes of combining pictorial, auditory, and video presentation along with online annotation through IWB. The study follows the theoretical framework of Dual-coding Theory of Paivio (3). By comparing the functions of auditory, textual, and video explanation through IWB, the author decided to find out which one is more effective for learning and retaining vocabulary, which is the basis for all other lessons in international schools. In a way, this study duplicates a similar study by Shams and Dabaghi (1), except that it is conducted in a different setting in Iran, i.e. an international school where there has not been any study to make teaching and learning more effective and up-to-date and in line with other foreign and international schools all around the world. Therefore, the research question is:

Is there any significant difference between audio, video, and pictorial online annotations via Interactive White Board in terms of their effect on learning vocabulary among international students?

The hypothesis of the study then is:

There is no significant difference between auditory, video, and pictorial online annotations via Interactive White Board in learning vocabulary among international students

Methods

The research population consisted of all female students in an international school in Tehran in the academic year 2017-2018. However, in order to choose homogeneous students in accordance with the aim of the study, the researcher selected 60 participants from a total of 109 female students after conducting a placement test based on Oxford Placement Test (OPT) (11). This placement test was used because it is known as a standard test used in most institutions to determine the levels of students and place them in appropriate levels. The total score of this test was 100 and for the purpose of this study, those who obtained 96 to 100 were ranked as excellent (A+), 80 to 95 as very good (A), 65 to 79 as partially good (B), 50 to 64 as not good enough (C), and below 50 as weak students. However, the majority of students (89) were placed in the group A, so among them 60 were selected randomly. The age of the selected subjects ranged from 12 to 14 years. Then, they were randomly assigned in three groups each of which consisted of 20 students. The criteria for entering the study included enrollment at the beginning of the academic year. Those who had more than four absences were excluded from the study according to the school's educational rules. All individuals in the sample were present until the end of the study. The ethics committee of research approved the study and ethics code was allocated accordingly. In addition, written informed consent was obtained from all participants.

The experimental groups (all three groups) were given the academic achievement test (pre-test) before the experiment. The instruction lasted for 13 weeks and involved teaching each group the same topics, but adopting different techniques. At the end of

the 13th week, the post-test was implemented. The reliability coefficient of pre-test and post-test was calculated using Kuder-Richardson formula (KR-21). Pre-test in the model helps to know the degree of group similarity in the pre-experimental process and adjust the results of post-test accordingly (Karasar, 2010). This study did not have any control group as the aim was comparing experimental groups only. During the academic year, each group was exposed to online annotations (auditory, video, and pictorial) through IWB in separate classrooms.

For each group, the first session was dedicated to explaining the learning procedure and introducing the parts of teaching including the role of IWB, annotations, online texts and modes of definitions through the board for that group. Throughout the online presentation of the lesson, students or teachers could consult the annotations for each new vocabulary by touching the hyperlinked boldface words on the screen. The link provided access to the auditory definitions of the annotated words (for auditory group), or pictures of the words (for pictorial group), or videos and animations related to the meaning of the hyperlinked words (for video group).

The next step was the implementation process (examination), which included collective presentations, students' description of the content delivered by the instrument, learning assessment based on the procedure, evaluating previous lessons by providing oral and written feedback, and teaching new topics.

Therefore, the intervention in three classes was carried out in three steps. In the first phase (introduction of content), the annotation method was introduced to the students and the lesson plan was explained to them. In the second step (student contributions in using whiteboard and annotations), the content of the course was recorded in lectures and recorded sessions were made available to the students on the Web. Thereby the students had the opportunity to study course content at home. There were also resources available to these students to solve the problems. In the third step (examination), the teacher held

a virtual web-based session each week for questioning and answering the students. Then the teacher reviewed the contents of previous sessions 15 minutes after attending the classroom. Then the other students had 60 minutes to solve the classroom exercises in groups using the assigned annotation types provided by the whiteboard. During class sessions, the students continually observed other students' activities and provided feedback to each other. In third phase and at the end of each session, students underwent 15 minutes of progress assessment by answering the questions about the lessons delivered. It should be noted that two to three people were invited to observe the classes in all stages. All three classes were handled by the trained teachers according to the aim of study with identical teaching methods and all were observed by the researcher to ensure the accuracy of the procedure.

After the instruction (13 weeks), the final examination (as post-test) was administered. The achievement post-test was designed in parallel (equivalent) with the pre-test exam with the help of three English teachers and the reliability and validity of the exam items were ensured by the researcher. All three groups took the achievement test both as the post-test and the final exam. Finally, the data were analyzed using SPSS 21 software and presented in descriptive and inferential statistics (t-test and paired t-test).

Data Analysis

For data analysis, descriptive statistics and one-way analysis of variance (ANOVA) were used to calculate the mean and standard deviation of scores for each group and to investigate whether there was any difference in the scores of the experimental groups. The Post hoc Scheffe test was also applied to evaluate the differences between the three groups, if there were any at all.

Results

The aim of this study was to compare international female students who were divided into three auditory, video, and pictorial online annotation groups using whiteboard. To do this, the researcher applied ANOVA formula to compare their performance. At first, descriptive statistics of pre-test of experimental group was calculated.

The demographic information of the participants is shown in Table 1.

Table 2 demonstrates the result of descriptive analysis of three experimental groups' pre-test scores of the study.

As the table shows, the results of each group demonstrate no significant difference among the groups before the experiment. Therefore, the researcher applied one-way ANOVA to find out if there was any significant difference between the performances of experiment groups before instructions. ANOVA results could display the amount of variance between and within the groups, if there was any difference. Table 3 shows the results of one-way ANOVA of pre-tests.

The results in the Table 3 show that the significance level (0.857) was greater

Table 1: Demographic information of participants in three experimental groups

Group	Age (Mean)	Gender	Mean of OPT sore	Mean of Listening test
		Girl		
Vid.	13	20	89	82
Pic.	13	20	89	82
Aud.	13	20	89	82

Table 2: Descriptive statistics of the Pre-test of experimental groups

Group	N	Min.	Max.	Mean	St. Deviation
Video	20	2.25	5.95	3.70	1.03
Pictorial	20	2.00	5.55	3.82	1.02
Auditory	20	2.45	5.00	3.66	0.71
Total	60	2	6.00	3.74	0.92

Table 3: One-way ANOVA results of pre-test scores

Groups	Sum of squares	Df	Mean squares	F	Sig.
Within groups	50.21	57	0.88		
Between groups	0.27	2	0.13	0.15	.857
Total	50.48	59			

Table 4: Descriptive statistics of the Post-test of three groups

Group	N	Min.	Max.	Mean	St. Deviation
Video	20	4.50	7.50	5.27	0.83
Pictorial	20	3.00	6.50	4.42	0.93
Auditory	20	3.00	6.00	4.20	0.80
Total	60	3.00	7.50	4.63	0.95

than alpha level (P>0.05, F=0.15), which indicates no significant difference between the performances of all group's before experiment. In addition, the observed *f* value was lower than critical *f* value, which also shows no significant difference between the groups. All the results indicated that all three groups were at the same level of English proficiency before receiving instruction through three different modes of auditory, pictorial, and video annotations.

Results of Analysis of Three Groups' Post-Tests

Descriptive statistical results of post-test scores of all three study groups are listed in Table 4. In this table, the scores of the students are compared as well.

As observed in Table 4, the mean score of video annotation group (m=5.27) is significantly higher than the other two groups (Mpictorial=4.42 and Mauditory=4.20) and

also the mean score of pictorial group is a little higher than auditory group. So the results demonstrate the difference among the mean post-test scores of all three groups after the experiment. To calculate the degree of variance among the groups, a one-way ANOVA was employed again (Table 5).

The results in the Table shows that the significance level (0.000) is lower than the alpha level (P<0.05) which shows significant difference between all three groups. It means that the post-test scores of the groups differ significantly due to different online annotations through IWB (auditory, pictorial, and video annotations), which has significantly affected the participants' vocabulary retention. However, in order to find out which group outperformed the other groups, the Post-hoc Scheffe test was employed to compare their mean scores. The results are demonstrated in Table 6.

The results in Table 6 demonstrate that

Table 5: Intra-group and inter-group effects test results using One-way ANOVA results

Groups	Sum of squares	df	Mean squares	F	Sig.
Within groups	41.07	57	0.72		
Between groups	12.85	2	6.42	8.92	0.000
Total	53.93	59			

Table 6: Post-hoc Scheffe results of the post-test scores

(I) Group 1	(J) Group 1	Mean difference (I-J)	Std. Error	Sig.	95% confidence interval	
					Lower bound	Upper bound
Audio	Picture	-0.22	0.268	0.705	-0.899	0.449
	video	-1.07*	268	0.001	-1.749	-0.400
Pictorial	Audio	0.22	268	0.705	-0.449	0.899
	video	-0.85*	268	0.010	-1.524	-0.175
Video	Audio	1.07*	268	0.001	0.400	1.749
	picture	0.85*	268	0.010	0.175	1.524

video group outperformed the other two groups significantly, which reveals that integrating video annotation with online instruction through IWB had the greatest effect on the performance of participants in comparison with the other two groups. In addition, the auditory annotation group displayed better performance than pictorial group, which again shows that auditory annotations through IWB affect learning performance more than pictorial annotations through IWB.

Discussion

The purpose of the study was to evaluate the effectiveness of different online annotations through Interactive White Board on learning English vocabulary in an international female school in Tehran, Iran. The results revealed that there was a significant difference among the three video, audio, and picture annotation groups in that the video group outperformed the other groups significantly and auditory group put up a better performance than pictorial group in post-test. The results of this study are in line with the results of the study conducted by Glover and Hardaker (12) who examined the effectiveness of using different modes of annotation on reading comprehension and vocabulary learning. Their study was on the basis of generative theory of multimedia learning (13) and demonstrated that the participants performed better on the post-tests where visual and textual information were presented in learning English, especially when they could choose their own preferred gloss mode of presentation.

The findings also support the previous findings of similar studies that have demonstrated that the inclusion of annotations, whether multimedia or traditional, significantly affects students' reading comprehension (14). The results of this study is partly in line with the results of Shams and Dabaghi (1) who found that video annotation group performed better in using IWB than pictorial and auditory annotation groups. In the present study, the auditory

annotations aided learning L2 vocabularies more than pictorial annotations and the video-annotation group significantly outperformed the audio-only and image-only annotation groups. It shows that in the video-annotation group, students receive a combination of sound and pictures that explain the lesson through smart board. Presenting sound and moving pictures on smart screens in the classroom (via multimedia) appeared to have a cognitive influence on learning while presenting picture-only and sound-only contents does not produce such effect.

The findings are also consistent with the results of Ishtaiwa's study (15), which found that using different multimedia modes through IWB could facilitate teaching process and improve EFL reading comprehension. In his study, Ishtaiwa concluded that EFL students nowadays would prefer receiving authentic and concrete information in their classes. The findings of this study and students' willingness to receive concrete materials indicate that better understanding of online vocabulary through IWB occurs when both visual and verbal channels are employed. This finding and also Shams and Dabaghi's (1) results confirm Dual-coding Theory of Paivio (3).

In addition, the finding of this study is also consistent with the results of Al-Saleem (7), Yohon, and Zimmerman, (16), Javidi Jelyani, Janfada, & Soori (17), and Marzban (18). They found that using smart boards such as IWB facilitates and expedites learning process with high efficacy, since it provides authentic and real material and activates dual channels of understanding (visual and audial). Furthermore, the results of this study confirm a study by Winzenried (19), which established that IWBs can be applied as a helpful aid in language teaching and students can benefit from them significantly.

Conclusion

This study aimed at investigating the effectiveness of video, pictorial, and auditory annotations through IWB on English vocabulary learning among international

students at intermediate level in an Iranian international school. The results were in conformity with dual-coding theory, and indicated that IWB in general, and video presentation in particular, affect learning English vocabulary considerably. As discussed earlier, exposure of English learners to online video annotations via IWB can have a positive impact on second language learning due to providing real materials and activating different intelligence and absorbing channels (audio, visual, verbal, and productive). Interactive White Board is regarded as a part of "main technology" which is able to provide available online annotations to support specific components of learning materials.

One of the limitations of this study is that all participants were female because it was a female international school and it is recommended to conduct another research comparing male and female schools. In addition, as it was noted earlier, due to the importance of the subject in Iranian education, it duplicates another study on the Iranian educational system but in a different context, i.e. an international school where teaching English is an essential part of the curriculum. The results were relatively different due to the different contexts and ages, necessitating more research in this area in Iran in different contexts, ages, and genders to achieve more general results.

Acknowledgments

Conflict of interests

The author declares that they have no conflict of interests.

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