The Effect of Smart Board Technology on Iranian EFL Learners' Achievement Motivation and Willingness to Communicate

Abdolreza Pazhakh

Dezfool Branch, Islamic Azad University, Dezfool

pazhakh@gmail.com

Jaleh Baghaei Nanekaran

Ahvaz Branch, Islamic Azad University, Ahvaz

Jalehbagh aei@yahoo.com

Abstract

This study aimed at investigating the effect of using smart board technology on the EFL learners' achievement motivation and willingness to communicate (WTC). The participants were 65 second grade female students from Shahid Nazari girls' high school in Andimeshk, Iran, who were selected randomly. An OPT was administrated to the the participants to homogenize them. Other instruments were Hermans' achievement motivation questionnaire and McCroskey & Baer's WTC questionnaire to estimate the participants' achievement motivation and willingness to communicate, respectively. For data analysis, Levenetest, Kolmogorov-Smirnov, independent samples T test, paired sample T test, MANCOVA and ANCOVA were used. The findings indicated the experimental group outperformed the control group. Overall, the findings provided empirical support for the significant effect of using smart board technology on the EFL learners' achievement motivation and WTC.

Keywords: Smart Board, Achievement Motivation, WTC, EFL Learners

1. Introduction

Today, knowing a common foreign language is not only a necessity but also a compulsion for a successful career in international relations, media, trade, government, technology, and science. Our students would not be able to compete in the global marketplace if they do not acquire knowledge on foreign cultures and languages (Mirzaie Rizi, et al., 2014); therefore, a proper educational system should pay enough attention to English teaching. The educators must find the ways to motivate the students and enable them to get the highest possible level of language knowledge.

The importance of motivation in learning is to the extent that among all personal and psychological factors that have been the focus of researchers in education achievement area, motivation has gained the most popularity (Tella, 2007). Many studies indicated the positive effect of motivation on academic performance; as Vansteenkiste, Lens, & Deci (2006) confirmed the positive influence of motivation on academic achievement. McCormick and Scrimshaw (2001) stated that enhancement of permanent motivation in students is possible through using more attractive materials.

On the other hand, one of the main goals in learning second or foreign languages for many second language learners is the use of target language for communication. According to MacIntyre and Charos (1996, cited in Mahmoodi & Moazam, 2014), communication is an important goal in itself, which focuses on the authentic use of the L2 as an essential part of L2 learning. McIntyre, Baker, Clément & Donovan (2003) argued that a fundamental purpose of L2 instruction must be the creation of WTC. The importance of WTC in language learning process is to the extent it can be defined as an ultimate goal of English language teaching. One factor influencing WTC is the educational environment. Using technology may be one of the ways of creating a more

active environment for learning and may encourage the learners to participate in classroom activities or communications (cited in Oz, Demirezen & Pourfeiz, 2014).

The Iranian education system has placed little value on teaching foreign languages and cultures. As it is observable, the students do not have a satisfying English proficiency even after finishing their high school; according to MirzaieRizi et al., (2014), the majority of Iranian students learn English just with the aim of passing the exams. She also states that Iranian students are mostly weak in English speaking and listening. By the rapid improvement of technology and wide-range use of it, educators are willing to integrate the process of learning and teaching with these technologies, and mostly with interactive technology. (Bajoolvand, Mahmoodi & Vafaeeseresht, 2014).

In a research conducted in the United States, it was concluded that 73% of Americans believed that investment in innovation and technology for education was the key to countries' success (Harris, 2009). One of the technological tools that can be applied in English classrooms is smart board or interactive whiteboard (IWB). The potential applications of the IWB include its use for web-based resources in whole-class teaching, creation of digital flipcharts, video clips for explaining concepts, saving of notes written on the board, and quick and unlimited revision of materials (BECTA[1], 2003). Walker (2005) states that it is possible to use resources such as CD-ROMs, presentation packages, spread sheets, internet pages, websites, and audio visual materials on a computer from the board.

There are some studies that have examined the impact of smart boards on students' achievement (Swan, Schenker & Kratcoski, 2008; Hennessey, Deaney, Ruthven & Winterbottom, 2007; Dhindsa & Emran 2006; Zittle, 2004;

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[1] . British Educational Communications & Technology Agency

found a positive influence of smart boards on math and language learning in elementary schools in the United States.

In a study done by Rostami, Akbari and Ghanizadeh (2015) they investigated the effect of smart school programs on EFL reading comprehension in an academic context. The findings showed that Smart schools programs have a positive and significant impact on learners' reading comprehension ability.

Hassani, Behjat and Abdolrahim Zadeh (2014) conducted a study in which they investigated IWBs and Iranian male high school students' vocabulary breadth and concluded that using interactive whiteboards instead of traditional boards had no significant effect on the students' vocabulary learning; the number of studies that confirm the positive effect of smart board on learning is more.

Toscu (2013) studied the effect of IWB on classroom interaction concluded that IWBs greatly contribute to classroom interaction. Al-Saleem (2013) also studied the IWB use in EFL classroom and concluded that smart boards can facilitate some types of conversations in a way that all students in the classroom may focus on the same item at the same time and conversation can spring from that thus smart boards are crucial to be used by the teachers in the foreign language classrooms.

Finally, according to the importance of the issue and also the limited number of researches that has been done in the area, this study aimed to answer the following questions:

Q.1: Does smart board significantly affect Iranian pre-intermediate EFL learners' achievement motivation?

Q.2: Does smart board significantly affect Iranian pre-intermediate EFL learners' WTC?

2. Method

2.1. Participants

In the present study the population included the students of Shahid Nazari girls' high school in Andimeshk; two classes of overall 65 second grade high school female students were selected randomly. In order to make our sampling fairly homogeneous in terms of their level of proficiency, OPT was administered thereby 54 of them were selected as pre-intermediate. Their ages ranged from 14 to 15. Then the sample was divided into two groups of experimental and control groups. The research question was intended to determine if using smart board technology would affect the pre-intermediate EFL learners' achievement motivation and WTC.

2.2. Data Collection

The material of the study was the IWB. The study included a pre-assessment, the treatment; and a post-assessment. The study was of field research type. After getting the permission from the authorities of education department, the second graders of Shahed girls' high school were selected as the population. Two classes with overall 65 female students were selected randomly. Then The OPT was conducted to homogenize the participants at intermediate level. The sample was divided into control and experimental groups. One of the classes was equipped with IWB and the other one was not. The experimental group (the class with IWB) was taught English subject by IWB, while the other class was taught with the ordinary board. After 8 weeks (8 sessions) the post test was conducted including theWTC questionnaire and Hermans' achievement motivation questionnaire; and thus the effect of using smart board on the students' WTC and achievement motivation was observed.

2.3. Instrumentation

The instruments employed in this current research were an Oxford Quick Placement Test (2001), an achievement motivation questionnaire (Hermans, 1970) questionnaire of achievement motivation, a willingness to communicate questionnaire, a WTC questionnaire.

2.4. Data Analysis Method

To analyze the data, the following statistic methods were applied using SPSS:

- Descriptive statistic methods such as mean, standard deviation and bar graph
- Inferential statistics including Levene test, Kolmogorov-Smirnov, independent samples T test, paired sample T test, Multivariate Analysis of covariance (MANCOVA); One – way Analyses of Variance (ANCOVA)

SPSS software version 21 was used to analyze the collected data. The significance level of $P < 0.05$ was considered for all hypotheses.

3. Results

3.1. Descriptive Findings

The descriptive findings of the research included statistical indices such as mean, standard deviation and the number of sample respondents that are presented in the tables below for all variables of the research.

Table 1. *Descriptive Statistics of WTC and Achievement Motivation for Control & Experimental Groups*

			N	Mean	Std. Deviation
WTC	Control	Pre-test	27	81.5556	21.69426
		Post-test	27	81.0370	22.37526
	Experimental	Pre-test	27	80.8519	23.54816
		Post-test	27	105.7778	26.06697
Speaking	Control	Pre-test	27	22.4444	6.92450
		Post-test	27	23.6296	6.60506
	Experimental	Per-test	27	22.2963	6.85462
		Post-test	27	29.3704	6.59340
Reading	Control	Pre-test	27	19.7407	6.57263
		Post-test	27	19.2222	6.38709
	Experimental	Pre-test	27	18.8889	7.54134
		Post-test	27	23.1481	6.10614
Writing	Control	Pre-test	27	21.6667	6.82191
		Post-test	27	21.4815	8.49602
	Experimental	Pre-test	27	23.2593	7.80824
		Post-test	27	28.7778	7.36067
Comprehension	Control	Pre-test	27	17.7037	6.80393
		Post-test	27	16.7037	7.72018
	Experimental	Pre-test	27	16.4074	5.70600
		Post-test	27	24.4815	10.54795
Achievement motivation	Control	Pre-test	27	86.1852	7.11465
		Post-test	27	86.8148	6.37928
	Experimental	Pre-test	27	85.8148	8.94443
		Post-test	27	92.9259	9.63138

As it is indicated in Table 1, the mean (M) of control group's WTC pretest and post test scores were (M=81.5556) and (M=81.0370) respectively. As it is

observable from the data presented in the table above, there was not any significant difference between the mean of control group's WTC pretest and post test scores, while there was a significant difference between the mean of the experimental group's scores in pretest (M=80.8519) and posttest (M= 105.7778).

According to the mean of control group's achievement motivation scores in pretest 86.1852 and post test 86.8148 indicated in Table 1, no significant difference was observed between the mean of control group's achievement motivation scores in pretest and post test at P<0.05, while there was a significant difference between the mean of experimental group's achievement motivation scores in pretest 85.8148 and post test 92.9259 at P<0.05.

3.2. Inferential Findings

This section addresses the inferential statistics including Levene test, Kolmogorov-Smirnov, independent samples T test, paired sample T test, Multivariate Analysis of covariance (MANCOVA); One – way Analyses Of Variance (ANCOVA). First to explore the normal distribution of the data, the data will be plugged into the Kolmograov-Smirnov test (Table 2).

Table 2. *The Results of the Kolmogorov-Smirnov Test for Normality Hypothesis WTC and Achievement Motivation for the Control and Experimental Groups*

Variable		Test	One-Sample Kolmogorov-Smirnov Test	
			z	Sig
Willingness to communicate	Control	Pre-test	.616	.842
		Post-test	.670	.761
	Experimental	Pre-test	.634	.81
		Post-test	1.014	.25
Speaking	Control	Pre-test	.827	.501
		Post-test	.603	.861
	Experimental	Pre-test	.486	.97
		Post-test	.633	.81
Reading	Control	Pre-test	.714	.687
		Post-test	.540	.932
	Experimental	Pre-test	.795	.55
		Post-test	.854	.45
Writing	Control	Pre-test	.790	.560
		Post-test	.969	.305
	Experimental	Pre-test	.600	.86
		Post-test	.730	.66
Comprehension	Control	Pre-test	.545	.928
		Post-test	.550	.923
	Experimental	Pre-test	.844	.47
		Post-test	.772	.59
Achievement motivation	Control	Pre-test	.713	.689
		Post-test	.672	.758
	Experimental	Pre-test	.636	.81
		Post-test	.658	.78

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As it is observable in Table 2 to compare the gained data distribution and the normal distribution the Kolmogorov-Smirnov test was used. According to the data gained from the table above with emphasis on the gained Z value for the amounts of the research variables is not significant P< 0.05. So it can be concluded that data distribution related to the research questions is normal; and the presumption of data normality is observed. Then an independent samples t-test was used to compare the mean scores of the control and experimental group to see if they are homogeneous or not (Table 3).

Table 3. *The Results of Independent Samples T Test for Investigating the Homogeneity of the Pretest Scores of Control and Experimental Groups' WTC and Achievement Motivation*

Per-test		N	Mean	Std. Deviation	Mean Diff.	df	t	Sig. (2-tailed)	Test result
WTC	Control	27	81.5556	21.69426	.7037	52	.114	.910	H_0 accepted
	Experimental	27	80.8519	23.54816					
Speaking	Control	27	22.4444	6.92450	.1481	52	.079	.937	$H_{\cdot}$ accepted
	Experimental	27	22.2963	6.85462					
Reading	Control	27	19.7407	6.57263	.8519	52	.442	.660	$H_{\cdot}$ accepted
	Experimental	27	18.8889	7.54134					
Writing	Control	27	21.6667	6.82191	-1.5926	52	-.798	.428	$H_{\cdot}$ accepted
	Experimental	27	23.2593	7.80824					
Comprehension	Control	27	17.7037	6.80393	1.2963	52	.759	.452	$H_{\cdot}$ accepted
	Experimental	27	16.4074	5.70600					
Achievement motivation	Control	27	86.1852	7.11465	.3704	52	.168	.867	$H_{\cdot}$ accepted
	Experimental	27	85.8148	8.94443					

$^{**}p<0.01$ $^{*}p<0.05$

As Table 3 indicates the significance level (Sig (2-Tailed)) value gained in independent T-test is higher than the error level (P<0.05) the null hypothesis is not rejected and the test is not significant. Therefore, it can be concluded that,

with a 95% confidence interval, the difference between experimental group and control group's performance on the pre-test of WTC and achievement motivation was not significant; therefore, it can be claimed that the two groups were homogeneous. Then to compare mean scores on WTC and achievement motivation, a paired t-test was used (Table 4).

Table 4. *The Results of Paired Samples T Test for Investigating the Difference of the Control Group's Mean Scores in the WTC and Achievement Motivation*

		N	Mean	Std. Deviation	Mean Differences	df	t	Sig. (2-tailed)	Test result
WTC	Pre-test	27	81.5556	21.69426	.5185	26	.135	.894	$H._{accepted}$
	Post-test	27	81.0370	22.37526					
Speaking	Pre-test	27	22.4444	6.92450	-1.1852	26	-.743	.464	$H._{accepted}$
	Post-test	27	23.6296	6.60506					
Reading	Pre-test	27	19.7407	6.57263	.5185	26	.411	.684	$H._{accepted}$
	Post-test	27	19.2222	6.38709					
Writing	Pre-test	27	21.6667	6.82191	.1852	26	.126	.901	$H._{accepted}$
	Post-test	27	21.4815	8.49602					
Comprehension	Pre-test	27	17.7037	6.80393	1.0000	26	.728	.473	$H._{accepted}$
	Post-test	27	16.7037	7.72018					
Achievement motivation	Pre-test	27	86.1852	7.11465	-.6296	26	-.718	.479	$H._{accepted}$
	Post-test	27	86.8148	6.37928					

$^{**}p<0.01 \, ^{*}p<0.05$

The results of Table 4 indicate that since the significance level (Sig. (2-tailed)) is higher than ($\alpha=0.05$) it is concluded that the null hypothesis is not

rejected and the test is not significant; Therefore, it can be claimed that, with a confidence interval of the of 95%, the difference between the mean of the control group's scores in WTC and achievement motivation is not significant.

The insignificance of the difference between the pretest and posttest of WTC and achievement motivation indicates that without the treatment (using smart board technology) there is no difference between the scores. To compare the mean scores of the experimental group in WTC and achievement motivation, a paired samples t-test was used (Table 4.5).

Table 5. *The Results of Paired samples T-test for Investigating the Difference of the Mean Scores (smart board effect) of Experimental Group's Scores in WTC and Achievement Motivation*

		N	Mean	Std. Deviat	Mean Diff.	df	t	Sig. (2-tailed)	Test result
WTC	Pre-test	27	80.8519	23.54816	-24.9259	26	-4.129**	.001	$H.$ rejected
	Post-test	27	105.777	26.06697					
Speaking	Pre-test	27	22.2963	6.85462	-7.0741	26	-4.906**	.001	$H.$ rejected
	Post-test	27	29.3704	6.59340					
Reading	Pre-test	27	18.8889	7.54134	-4.2593	26	-2.316*	.029	$H.$ rejected
	Post-test	27	23.1481	6.10614					
Writing	Pre-test	27	23.2593	7.80824	-5.5185	26	-2.893**	.001	$H.$ rejected
	Post-test	27	28.7778	7.36067					
Comprehension	Pre-test	27	16.4074	5.70600	-8.0741	26	-3.988**	.001	$H.$ rejected
	Post-test	27	24.4815	10.54795					
Achievement motivation	Pre-test	27	85.8148	8.94443	-7.1111	26	-3.405**	.002	$H.$ rejected
	Post-test	27	92.9259	9.63138					

**p<0.01 *p<0.05

Table 5 shows that the results of a two-tailed dependent paired samples t-test. There is a significant difference between the experimental group's mean scores in WTC and achievement motivation pre-test and post-test (P<0.05). The significance means that using smart board technology could affect experimental group's WTC and achievement motivation. To explore the homogeneity of the variances in experimental and control group in terms of their scores on WTC and achievement motivation, Levene's test was used **(Table 6).**

Table 6. *The Results of Levene's Test for Presumption of Homogeneity-of-variance of Experimental and Control Groups' Scores in WTC and Achievement Motivation*

Variable	Test	Levene's Test of Equality of Error Variances			
		F	df1	df2	Sig.
WTC	Pre-test	.001	1	52	.974
	Post-test	1.509	1	52	.225
Speaking	Pre-test	.306	1	52	.583
	Post-test	.008	1	52	.929
Reading	Pre-test	1.398	1	52	.242
	Post-test	.038	1	52	.846
Writing	Pre-test	.393	1	52	.533
	Post-test	1.981	1	52	.165
Comprehension	Pre-test	.541	1	52	.466
	Post-test	3.401	1	52	.060
Achievement motivation	Pre-test	1.327	1	52	.255
	Post-test	3.448	1	52	.069

As Table 6 indicated, the F-value of Levene test (homogeneity-of-variances) of all variables is not significant at the level of P<0.05. This shows normal distribution of the data. Since the results of Levens test were not

significant, the null hypothesis was not rejected; and it was concluded that there was not any significant difference between the two groups' variances in pre-test and post-test. Therefore, the assumption of homogeneity-of-variances of the experimental and control groups' scores in the research variables is confirmed; and the presumption of homogeneity-of-variances is considered. Hence it is permitted to continue the analysis and execution of covariance analysis.

3.2.1. First Major Research Hypothesis:

Using smart board technology affects the female EFL learners' achievement motivation.

3.2.1.1. First Null Hypothesis:

Using smart board technology has no effect on the female EFL learners' achievement motivation.

$$H_\circ : \mu_1 = \mu_2$$

$$H_1 : \mu_1 \neq \mu_2$$

Table 7. *The Results of One-way Analysis of Variance (ANOVA) on Experimental and Control Groups' Scores in Achievement Motivation*

	Type III Sum of Squares	df	Mean Square	F	Sig.	Eta^2	Observed Power
Effect Pre-test	783.821	1	783.821	14.882**	.001	.226	.966
Between-Subjects Effects group	533.662	1	533.662	10.132**	.001	.166	.878
Error	2686.105	51	52.669				
Total	3974.093	53					

** $p<0.01$ $^{*}p<0.05$

As it is indicated in Table 7, the F-value (F=14.882) for the experimental and control groups' achievement motivation related to pre-test effect is significant because the obtained significance level in ANOVA -(0.001)- is lower than the significance level of the research P<0.05. It shows that if the means are not modified, there will be a significant difference between them i.e. the difference of the means is significant with and without modification.

3.2.2. Second Major Research Hypothesis

Using smart board technology affects female EFL learners' WTC.

3.2.2.1. Second Null Hypothesis

Using smart board technology has no effect on the female EFL learners' WTC.

$$H_{\circ} : \mu_1 = \mu_2$$
$$H_1 : \mu_1 \neq \mu_2$$

Table 8. *The Results of ANOVA on the Experimental and Control Groups' Scores in WTC*

	Type III Sum of Squares	df	Mean Square	F	Sig.	Eta^2	Observed Power
Effect Per-test	4274.999	1	4274.999	8.256**	.006	.139	.805
Between-Subjects Effects group	8450.618	1	8450.618	16.320**	.001	.242	.977
Error	26408.631	51	517.816				
Total	38947.037	53					

**p<0.01*p<0.05

According to Table 8, the significance level obtained from ANOVA on the experimental and control groups' scores in WTC for F-value 8.256 related to pre-test effect was smaller F-critical (P-value = 0.006 < α = 0.05). It shows that

if the means are not modified there will be a significant difference between them.

Table 9. *The Results of Multivariable Variance Analysis of MANOVA on the Experimental and Control Groups' Scores in WTC*

Test name	Value	F	Hypothesis df	Error df	Sig.	Eta^2	Observed Power
Pillai's Trace	.258	3.910	4.000	45.000	.008	.258	.868
Wilks' Lambda	.742	3.910	4.000	45.000	.008	.258	.868
Hotelling's Trace	.348	3.910	4.000	45.000	.008	.258	.868
Roy's Largest Root	.348	3.910	4.000	45.000	.008	.258	.868

**p<0.01 *p<0.05

As Table 9 suggests, the obtained significance level for all the tests is smaller than F-critical (P<0.05), so it shows that there is a significant difference between the two groups' scores at least in terms of one of the components of WTC.

For more emphasis and investigation of the mean scores of WTC components in the two groups, a one-way covariance was used in the context of MANCOVA which is reported in Table 10.

Table 10. *The Results of MANOVA on the Components of WTC in the Two Groups (exp. & cont.)*

		Type III Sum of Squares	df	Mean Square	F	Sig.	Eta^2	Observed Power
Speaking	Effect pre-test	55.278	1	55.278	1.317	.257	.027	.203
	Between-Subjects Effects group	397.722	1	397.722	9.472**	.003	.165	.854
Reading	Effect pre-test	.351	1	.351	.011	.918	.001	.051
	Between-Subjects Effects group	289.541	1	289.541	8.937**	.004	.157	.834
Writing	Effect pre-test	218.861	1	218.861	3.907	.054	.075	.491
	Between-Subjects Effects group	606.872	1	606.872	10.832**	.002	.184	.897
Comprehension	Effect pre-test	445.659	1	445.659	5.740*	.021	.107	.651
	Between-Subjects Effects group	872.840	1	872.840	11.242**	.002	.190	.907

3.3 Investigation of the First Subsidiary Research Hypothesis:

First subsidiary research hypothesis: Using smart board technology affects EFL learners' speaking (a component of WTC).

As it is indicated in Table 10, the F-value of speaking (one of the components of WTC) in the two groups related to pre-test effect is 1.317 that it is not significant at the level of $P<0.05$, indicating that if there is not any modification in the means there would not be any difference between them. i.e., the difference of the means is only significant with modification.

The between group F value – with control of pre-test for speaking scores - was 9.472 which is statistically significant at the level of $P<0.05$. So it can be claimed with confidence interval of difference of 95% that there is a significant difference between the means of the experimental and control groups' speaking scores. It means that using smart board technology could affect the experimental group's speaking scores, increasing them more than the control group's scores.

Also Eta Squared (Eta2) indicates that the covariance value or squares was calculated as 0.157 which means with removal of the pre-test effect from the post-test scores, 16% of individual differences in the post-test was because of the treatment (independent variable effect) and the difference between them. The observed power was gained as 0.854, i.e., there was not the probability of error type 2 or the mistaken confirmation of null hypothesis.

3.4. Investigation of the Second Subsidiary Research Hypothesis:

Second subsidiary research hypothesis: using smart board technology affects EFL learner's reading (a component of WTC).

As it is indicated in Table 10, the F value of reading related to the pre-test effect was 0.011 that it is not statistically significant at P<0.05; indicating that if there is no modification in the means concerned, there would not be any significant difference between them. i.e., the difference of the means is only significant with modification.

The between group F value – with control of pre-test for reading scores - was 8.937 which is statistically significant at the level of 0.05. So it can be claimed with confidence interval of difference of 95% that there is a significant difference between the means of the experimental and control groups' reading scores; and the difference is in favor of the experimental group i.e., using smart board technology affected the reading scores of the experimental group increasing them more than the control group's ones.

Also Eta Squared (Eta2) indicates that the covariance value or squares was calculated as 0.157 which means with removal of the pre-test effect from the post-test scores, 16% of individual differences in the post-test was due to the treatment (independent variable effect) and the difference between them. The observed power was 0.854, i.e., there was not the probability of error type 2 or the erroneous confirmation of null hypothesis.

3.5. Investigation of the Third Subsidiary Research Hypothesis

Third subsidiary research hypothesis: using smart board technology affects EFL learner's writing (a component of WTC).

As it is indicated in Table 10, the F value of writing (a component of WTC) was 3.907 that it is not statistically significant at the level of P<0.05. besides, the F value with the control of pre-test for writing (a component of WTC) was 10.832 which is statistically significant at the level of P<0.05.

So it can be claimed with confidence interval of difference of 95% that there is a significant difference between the means of the experimental and control groups' writing scores; and the difference is in favor of the experimental group. It means that using smart board technology could affect the experimental group's writing scores increasing them more than the control group's ones.

Also Eta Squared (Eta2) indicates that the covariance value or squares was calculated as 0.184 which means with removal of the pre-test effect from the post-test scores, 19% of individual differences in the post-test was because of the treatment (independent variable effect) and the difference between them. The observed power was gained as 0.897. i.e., there was not the probability of error type II or the erroneous confirmation of null hypothesis.

3.6. Investigation of the Fourth Subsidiary Research Hypothesis:

Fourth subsidiary research hypothesis: Using smart board technology affects EFL learner's comprehension (a component of WTC).

As it is indicated in Table 10, the F value of comprehension related to the pre-test effect was 0.740 that it is not statistically significant at $P<0.05$; indicating that if there is no modification in the means there would still be a significant difference between them. i.e., the difference of the means is significant with or without modification.

The inter group F value – with control of pre-test for comprehension scores - was 11.242 which is statistically significant at the level of $P<0.05$. So it can be claimed with confidence interval of difference of 95% that there is a significant difference between the means of the experimental and control groups' comprehension scores; and the difference is in favor of the experimental group. i.e., using smart board technology affected the

comprehension scores of the experimental group increasing them more than those of the control group.

Also Eta Squared (Eta2) indicates that the covariance value or squares was calculated as 0.190 which means with removal of the pre-test effect from the post-test scores, treatment (independent variable effect) and the difference between them accounts for 19% of individual differences in the post-test. The observed power was gained as 0.907. i.e., there was not the probability of error type II or the erroneous confirmation of null hypothesis.

4. Conclusion

This study has aimed to reveal the effect of smart board technology on Iranian EFL learners' achievement motivation and WTC. Although there is lack of studies investigating the issue; however, the positive influence of IWBs has also been found in the areas of math and language in elementary schools in the United States (Swan, Schenker, & Kratcoski, 2008), as well as in achievement in literacy, math, and science by elementary school students in England (Lewin, Somekh, & Stephen, 2008). Hall and Higgins (2005) also found that students learning via the IWB are more attentive and have greater motivation to learn.

The findings of this research indicated that there were major differences in the students' achievement motivation and WTC with and without using smart board; and the difference was in favor of the experimental group (using smart board); Therefore, it can be claimed that successful practices of IWB use can be recommended to be integrated into the curriculum by means of a careful adaptation of the materials and a systematic and intentional training in how to integrate technology into the classroom.

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