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THE EFFECT OF PICTORIAL CONTEXTS ON READING COMPREHENSION OF IRANIAN HIGH SCHOOL STUDENTS: A COMPARISON BETWEEN PRE-VS. DURING READING ACTIVITIES

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ABSTRACT

This study was conducted to investigate the impact of colorful and black-white pictures on reading comprehension ability of Iranian high school students. To this end, 135 students studying in grade first at Imam Khomeini high School in Chamestan, Mazandaran, Iran participated in this study. Of the present population 100 students were selected as study sample by simple random sampling based on Morgan's sampling table. The members of the sample were assigned into five groups of 20 participants, one control group and four experimental groups. To make sure that they are homogenous, a standardized reading test was administered. Then all groups sat for a pre-test which was a reading comprehension test in order to check their ability in reading comprehension before the study. Afterwards they attended the reading comprehension course assigned for each of them for a period of ten sessions. Finally at the end of the course all groups sat for the post-test of reading comprehension. The obtained scores were fed into Statistical Package for Social Sciences (SPSS), using ANCOVA to calculate the variance among more than two groups, Paired Sample t-test and Independent t-test to calculate the variance of each pair. It was explored from the study that the colorful pictures had a considerable effect on reading comprehension of the learners. Moreover, the results revealed that presenting pictures in the Pre-reading phase had greater impact on reading comprehension of learners than presenting them during the reading phase. So, it is suggested EFL teachers use colorful pictures in the pre-reading phase in order to activate students' background knowledge and to provide them with interest in reading texts they use for reading comprehension.

Key Words: *Colorful and Black-White Pictures (Pictorial contexts), Pre-Reading vs during Reading Phase, Reading Comprehension*

INTRODUCTION

Reading comprehension has been always regarded as one of the major skills in learning a language. It is hoped that pictorial contexts will provide a better learning environment for students, and lead to the better reading comprehension. Reading means getting meaning from printed texts. Reading is not phonics, vocabulary, syllabification, or other skills as useful as these activities may be. Reading is not passive; it is not the absorbing of information through the eyes by cooking sequentially at each word on a particular text. Reading is a meaning-making process, an active, constructive, creative, highly ordered, thinking activity. It must be born in mind that reading is meaning oriented and in Smith's terms, the reader is not moving from words to meaning but rather is moving from meaning to words. In the last two decades, the accepted theory of EFL reading has undergone dramatic changes. The view of reading has moved towards a complex psycholinguistic, interactive model consisting of both bottom-up and top-down processes through an intelligent "guessing game" (Goodman, 1970). Widdowson (1979) has discussed reading in this light as the process of combining textual information with the information a reader bring to a text. In this view, the reading process is not simply a matter of extracting information from the text. Rather it is one in which the reading activates a range of knowledge in the reader's mind that s/he uses, and that in turn may be refined and extended by the new information supplied by the text. Reading is thus viewed as a kind of dialogue between the reader and the text. Texts written or spoken by them do not carry meaning. Texts only provide direction for readers as to how they should construct meaning from their own

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previously acquired knowledge. This previously acquired knowledge is called the reader's background knowledge, and the previously acquired knowledge structures are called schemata or internal organization of past personal experiences. According to schema theory, comprehending a text is an interactive process between the reader's background knowledge and the text. Efficient comprehension requires the ability to relate the textual material to one's own knowledge. Recently studies of EFL reading have ostensibly revealed that ESL readers may not efficiently utilize their schemata; specifically they may not utilize contextual information they are supplied with in order to facilitate comprehension. Thus they may face a considerable difficulty in comprehension foreign text when reading them for the first time. Many researchers suggest that the gap which exists between reader's prior knowledge and the knowledge in the text can be bridged by providing readers with some pre-reading activities in order to create and activate the appropriate background knowledge or schema. Pearson (1983) and Canning (2003) state that when teachers activate learners' background knowledge, they can use their own experience to predict and evaluate story characters, actions and problems. Different techniques can be used by teachers to assist students to activate the relevant schema. One of these techniques is using of pictures which pave the way for learners to get more from a passage, and fulfills the task of reading faster with high degrees of comprehension (Canning, 2003). Thus this study was conducted to investigate the effect of pictorial contexts as a pre-reading activity on reading comprehension of Iranian EFL readers.

Statement of the Problem

Throughout the history of language teaching, different approaches, methods, procedures have been utilized to help learners with comprehension of a reading passage. So, it has drawn the attention of second or foreign language practitioners and researches for so many years, and it has been studied from different perspectives. Reading comprehension is the inseparable part of teaching and the most important and irreplaceable skill in learning a foreign language. Reviewing the current English textbooks of Iranian high schools reveals that the passages in them lack pictures to motivate students, and those which contain pictures may not be very different from the passages with no pictures, because the pictures used are black and white. So these books will need the efficient techniques in reading comprehension as well as understanding the role and importance of visual features as the most important characteristics of obtaining face validity. The lack of applying various strategies and techniques in their development is undeniable. For instance, while visual features can be among the most important characteristics of such materials, their absence in current high school textbooks is evident. Visuals such as pictures, columns, tables, tree diagrams, charts and mind maps can be very helpful in extracting and reorganizing the information in English text books. Moreover, illustrations can be an integral part of English textbooks and its justification is that they make textbooks more tangible and understandable. Therefore, picture is a key variable in influencing EFL students' reading comprehension at high school levels. These findings have pedagogical implication in the EFL and ESL fields. So the present study is going to investigate the extent to which the presence of pictures in text benefits participants to comprehend a reading passage. We are also going to investigate the impact of colorful pictures and black and white pictures in the pre-reading phase and during reading phase on reading comprehension of Iranian high school students.

Research Questions

This study is going to provide an answer to the following research questions:

1. Is there any significant difference between the use of pictorial contexts and non- pictorial contexts?
2. Is there any significant difference between the use of colorful pictures and black and white ones in terms of their effects on reading comprehension?
3. What is the most effective timing of the use of pictures?

Hypotheses

The hypotheses of the research are as follow:

H01: There's no significant difference between the use of pictorial contexts and non-pictorial contexts.

H02. There is no significant difference between the use of colorful pictures and black and white ones in terms of their effects on reading comprehension.

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H03. There's no significant difference between the use of pictures in the pre-reading phase and during reading phase.

Review of Literature

This section consists of two parts. First a description of the dual coding theory (DCT), a theoretical framework for this study, which explores the connection between visual and reading comprehension is given. Second is a review of the empirical studies that use DCT as a theoretical framework to investigate the effects of visuals on reading comprehension.

1. Dual Coding Theory

A number of theoretical frameworks have been employed to describe, explain, and predict the effects of visuals on reading comprehension, among them, the theory of mental models (Johnson-Laird, 1983), the transmediation theory (Siegel, 1995), the repetition hypothesis (Gyselinck and Tardieu, 1999), and the dual coding theory (Paivio, 1971; Sadoski and Paivio, 2001). Perhaps the most comprehensive theory that elaborates upon the relationship between imagery and reading is the dual coding theory. According to Paivio's (1971) dual coding theory (DCT), words and images have different cognitive representations; hence, the human brain uses separate systems for different types of information: the verbal system and the imagery system.

The verbal system deals with linguistic codes, such as words, speech, or language; on the other hand, the imagery system primarily deals with visual codes, such as images, pictures, or concrete objects. Paivio (1971) indicated that when verbal information is acquired, it moves to the verbal system. Likewise, when visual information is acquired, it moves to the imagery system. The crucial point occurs when information in either system can activate information in the other system. For instance, it is confusing when students see the word "Shrek". However, those who have seen the movie of the same name may immediately refer to an image of green ogre by triggering the image processor. Consequently, an integration of both the verbal and imagery systems works better than one either one alone. In reading, DCT accounts for bottom-up and top-down processing. In terms of bottom-up processes, DCT assumes that readers organize parts of language and create mental images of them through different sensory methods. Based on the familiarity with the language components and the context in which they appear, readers may use the mental images to discover links between graphemes and phonemes and the sensory configurations of language components such as letters and words, as well as phrases/sentences. Regarding top down processes, DCT gives readers a broader and more specific account of meaning, coherence, and inferences drawn from the text. Activating both verbal and nonverbal mental images of the text helps readers create different contexts for drawing inferences and integrating text. This, in turn, allows them to better understanding the text, from simple perception of its components to inferring meaning from the text as a whole. DCT provides theoretical justifications for the use of visuals in instructional presentations. Human memory is composed of two independent but interconnected coding systems: the verbal system and the imagery system. Generally, each of the systems functions independently, but most information processing requires connections and reinforcement between the two systems. In other words, the pairing of verbal information with visual images has the potential to improve comprehension.

2. Empirical Studies on Reading Comprehension Facilitation through Visuals

Numerous researches have used DCT as a theoretical framework to examine whether or not visuals enhance reader comprehension of text. Purnell and Solman (1991) indicated in their study that students receiving both the text and the visuals performed better than those receiving the text alone. The findings are in accordance with DCT in that activation of both codes can have additive effects on comprehension (Paivio). Other findings also demonstrate consistency with DCT. An investigation conducted by Kullhavy, Lee, and Caterino (1985) revealed that fifth graders better understood information in maps and prose directions when it was presented in both spatial and elaborated verbal forms rather than either from alone. Another study proving DCT was carried out by Gambrell and Jawwiz (1993). Students who had access to both text and illustrations performed better than those who had studied text alone. Similarly, Mayer (1999) found that words and pictures together produced better recall and transfer than either did

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alone. Further evidence can be drawn from research conducted by Hudson (1982), which revealed that reading comprehension in lower proficiency students improved when the students first viewed pictures related to the passage, then were asked focus questions, and finally wrote down predictions before reading the passage. Based on his finding, Hudson concluded that the visuals may have facilitated reading comprehension because they offered additional contextual information to the students, confirming the value of DCT. Furthermore, Hall, Bailey, and Tillman (1997) conducted a study to examine the effects of illustrations on reading comprehension, and the findings showed that the with-illustration groups outperformed the text- only group. With DCT as the basis for their theory, the researchers demonstrated that there was a marked improvement in student comprehension when they were exposed to information presented and processed in both verbal and imagery systems. In conclusion, reading research studies with the DCT framework demonstrated that the combination of text and visuals elicits beneficial effects in terms of comprehension of the material. Visuals not only offer additional contextual information to comprehension, perhaps more importantly they trigger referential connections between verbal and imagery systems, providing an additional route to comprehension. It is believed that the use of visuals in the development of instructional materials will promote reading comprehension.

MATERIALS AND METHODS

Method

The population in this study consists of 135 students studying in grade first at Imam Khomeini high school in Chamestan, Mazandaran, Iran. Of the present population, 100 students were selected as study sample by simple random sampling based on Morgan's sampling table. The members of the sample were assigned into 5 groups: one control group and four experimental groups. To make sure that they were homogenous; a standard proficiency test was administered.

Then all groups participated in a pre-reading test to check their ability in reading comprehension before the study. After that they attended the reading comprehension course assigned for each of them for a period of ten sessions. In each session, they received one text followed by ten reading comprehension questions. In the beginning of each session, the teacher first presented an outline of the passage orally, and then the relevant reading passage was distributed among students. They read the text and answered the questions. The treatment in each group was different: The control group (CG) received no pictures, experimental group one (EG1) received colorful pictorial contexts in the pre-reading phase, that is, the pictures were put on the board, and then the teacher presented the outline of the passage. After that, the relevant texts were given to the students, and they answered the questions.

When they received the texts, the pictures were removed. Experimental group two (EG2) was exposed to black-white pictures in the pre-reading phase, experimental group three (EG3) was exposed to colorful pictures during the reading phase, while experimental group four (EG4) received black-white pictorial texts in the reading phase of the lesson. At the end of the course of 10-session instruction, a reading comprehension post-test was administered to check the performance of the all groups after the study. The obtained scores were fed into SPSS (Statistical Package for Social Sciences). Independent *t*-test was used to calculate if the means of the dual control and experimental groups were statistically significant. An ANCOVA was also run to calculate the variance among more than two groups.

Statistical Analysis

The data of the study was computed based on computer assisted program (SPSS) software. An ANCOVA was used to calculate the variance among more than two groups. As it was mentioned earlier, the purpose of this research is to study the impact of colorful pictures on reading comprehension of Iranian EFL learners.

The result of the research data for studying the hypotheses is based on descriptive statistics (mean & standard deviation), inferential statistics of *t*-test, and multivariate covariance analyses (MANCOVA). The multivariate covariance analysis (MANCOVA) allows us not only examine the effect of different

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dependent variables, their interaction, and rejecting the effect of other variables, but also shows the relationship between different dependent variables.

All of these can be done simultaneously. By studying the graph which was obtained from the relationship between dependent variables it is deduced that there is a linear relationship between dependent variables. To analyze the possibility of the linear relationship between auxiliary random variables and dependent variables, we will analyze the following graphs.

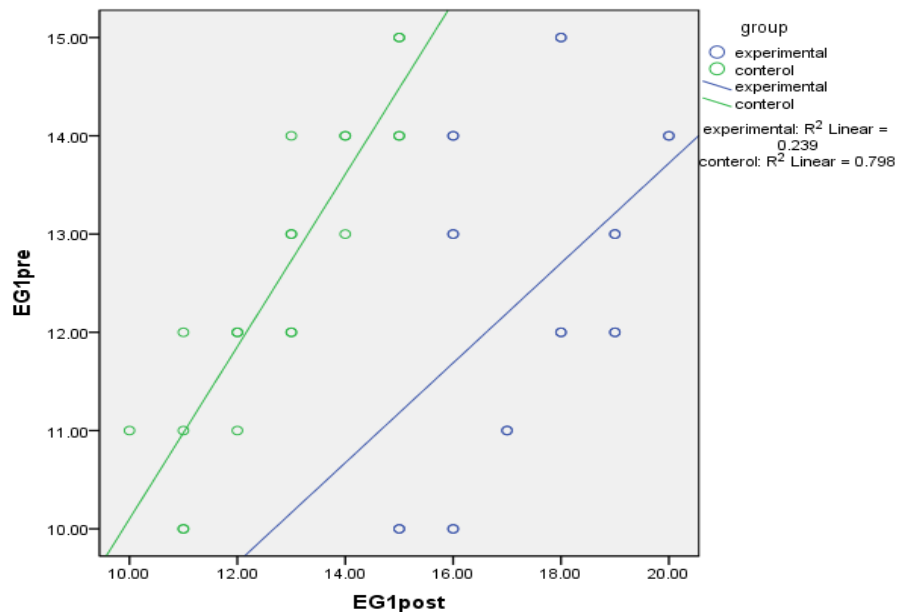


Figure1: Showing the effect of colorful pictures on reading comprehension of experimental group one in the pre-reading phase

As it is seen in the graph above, there is a linear relationship between auxiliary random variable (pre-test) and dependent variable (post-test) because the slopes of regression lines are parallel. The connection between two variables is alike.

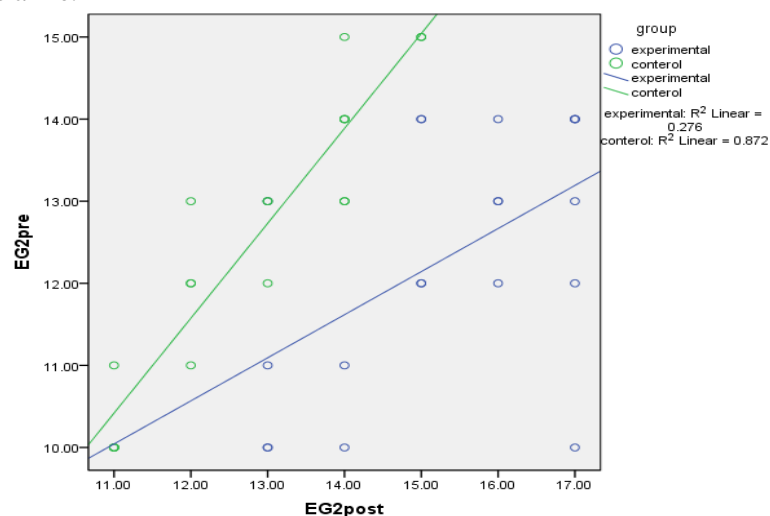


Figure 2: Showing the effect of black and white pictures on reading comprehension of experimental group two in the pre-reading phase

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As it is seen in the graph above, there is a linear relationship between auxiliary random variable (pre-test) and dependent variable (post-test) because the slopes of regression lines are parallel. The connection between two variables is alike.

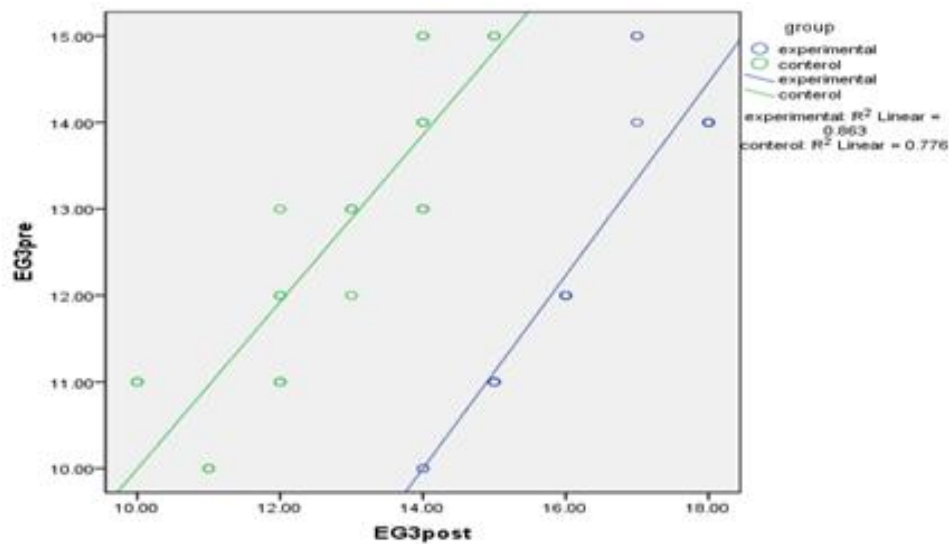


Figure 3: Showing the effect of colorful pictures on reading comprehension of experimental group 3 in during reading phase.

As it is seen in the graph above, there is a linear relationship between auxiliary random variable (pre-test) and dependent variable (post-test) because the slopes of regression lines are parallel. The connection between two variables is alike.

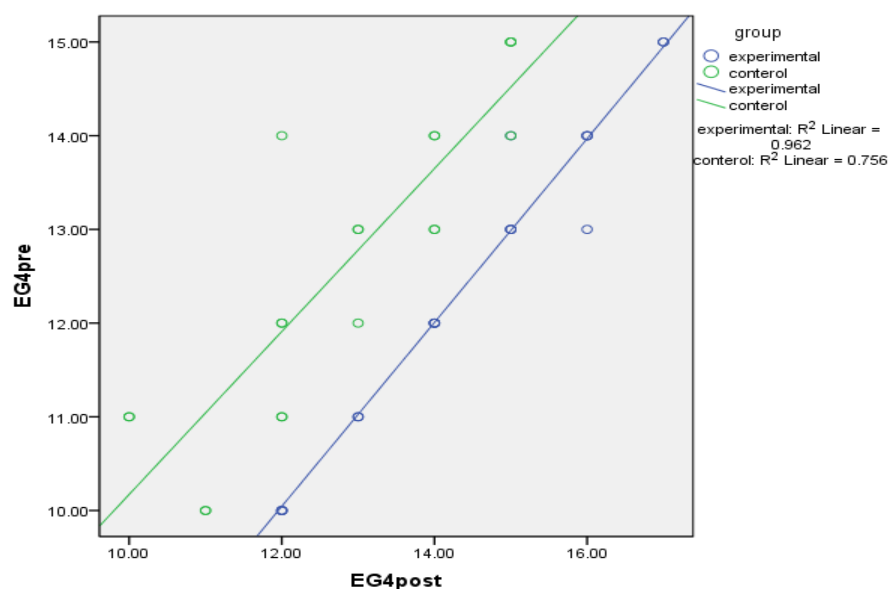


Figure 4: Showing the effect of black-white pictures on reading comprehension of experimental group 4 in during reading phase

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As it is seen in the graph above, there is a linear relationship between auxiliary random variable (pre-test) and dependent variable (post-test) because the slopes of regression lines are parallel. The connection between two variables is alike.

Table1: The rate of correlation between dependent variables

	P	r	variables
.039	.328*		EG1(pre-test & post-test)
.001	.506**		EG2(pre-test & post test)
.001	.517**		EG3(pre-test & post test)
.000	.798**		EG4(pre-test & post test)

Table 2: Summary of the results of paired sample t-test for the comparison between the means of pre-test and post test on the experimental groups and the control group

Paired Samples Statistics							
	group		Mean	Std. Deviation	Std. Error Mean	dm	T(19) Sig.(2-tailed)
experimental	Pair 1	EG1pre	12.40	1.667	.37276	-5.00	-13.516 .000
		EG1post	17.40	1.603	.35836		
	Pair 2	EG2pre	12.30	1.525	.34105	-3.00	-9.024 .000
		EG2post	15.30	1.525	.34105		
	Pair 3	EG3pre	12.40	1.667	.37276	-3.75	-26.259 .000
		EG3post	16.15	1.387	.31014		
	Pair 4	EG4pre	12.40	1.667	.37276	-2.00	-27.568 .000
		EG4post	14.40	1.667	.37276		
control	Pair 1	EG1pre	12.60	1.535	.34336	-.25	-1.561 .135
		EG1post	12.85	1.565	.35000		
	Pair 2	EG2pre	12.50	1.732	.38730	-.30	-2.042 .055
		EG2post	12.80	1.399	.31288		
	Pair 3	EG3pre	12.65	1.663	.37187	-.10	-.567 .577
		EG3post	12.75	1.517	.33931		
	Pair 4	EG4pre	12.65	1.631	.36473	-.20	-1.073 .297
		EG4post	12.85	1.631	.36473		

Seeing the statistics in the table 2, we come to this conclusion that there's a difference between the means of experimental groups and control group in the dependent variable (pre-test and post-test) and this difference is meaningful. In other words, we do not observe any differences in the pre-test and post-test of the control group because they didn't receive any treatment. While there were differences between pre-tests and post-tests of all experimental groups. Data in table 1 are related to the hypotheses test of slope homogeneity. This table is run before the presentation of ANCOVA in order to evaluate the interactive effectiveness between the auxiliary random variable (pre-test) and group variable (agent) in the prediction of dependent variable (post-test).

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Table 3: Summary of information analysis of ANCOVA on reading comprehension of both experimental and control groups for test of interactive effectiveness

Sig.	F	Mean Square	df	Sum of Squares	Source of Differences
.064	3.646	4.714	1	4.714	EG1: Pre-Test
.265	1.283	1.311	1	1.311	EG2: Pre-Test
.804	.063	.026	1	.026	EG3: Pre-Test
.374	.809	.322	1	.322	EG4: Pre-Test

According to the data in the table above the interactive effect between the pre-test of experimental groups and the control group is not meaningful. This means that data supports the hypotheses homogeneity of regression slopes.

So the use of ANCOVA is just concluded for the test of the effects of main variables of post-test and the control group. That means, are the means of the population in the experimental and control groups alike? The results of this analysis and t-test in both experimental and control groups were shown in the tables 2 and 3.

Table 4: Mean and modified mean of the dependent variable

Modified Mean			Post-Test		Source	Variable
<u>SE</u>	<u>M</u>	<u>SD</u>	<u>M</u>			
.263	17.467 ^a	1.603	17.40	Experimental	control	Colorful pictures in the pre-reading phase
.263	12.783 ^a	1.565	12.85	control		
.227	15.365 ^a	1.525	15.30	experimental	control	Black-White pictures in the pre-reading phase
.227	12.735 ^a	1.399	12.80	control		
.142	16.249 ^a	1.387	16.15	experimental	control	Colorful pictures in the during reading phase
.142	12.651 ^a	1.517	12.75	control		
.141	14.516 ^a	1.667	14.40	experimental	control	Black-White pictures in the during reading phase
.141	12.734 ^a	1.631	12.85	control		

In the table above, we see the modified mean of the dependent variables on reading comprehension, that is, the effect of auxiliary random variable has been omitted statistically.

These Means tell us that the Means of Experimental groups in comparison to the Means of control group are higher.

Summary of the results of ANCOVA in the groups of Experimental and Control with the omission of the contractive influence has been shown in the table 5.

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Table 5: Summary of the analysis of ANCOVA on reading comprehension in both experimental and control groups considering the omission of contractive effect

Eta	p	F	Mean Square	Sum of Squares	df	Source	Variable
.810	.000	157.752	218.543	218.543	1	Contrast	The effect of colorful pictures on reading comprehension in the pre-reading phase
			1.385	51.258	37	Error	
.644	.000	66.958	68.940	68.940	1	Contrast	The effect of black-white pictures on reading comprehension in the pre-reading phase
			1.030	38.095	37	Error	
.897	.000	320.924	128.627	128.627	1	Contrast	The effect of colorful pictures on reading comprehension in the during reading phase
			.401	14.830	37	Error	
.683	.000	79.733	31.551	31.551	1	Contrast	The effect of black-white pictures on reading comprehension in the during reading phase
			.396	14.641	37	Error	

As can be seen the ratio of F effectiveness in all four groups is meaningful. This means that there is a difference between the reading comprehension of both Experimental and Control groups. So we can conclude the results for hypotheses.

Results of Hypotheses Testing

Presentation of colorful pictures was useful on reading comprehension of high school students in the pre-reading phase. (Eta=.810), $P=...$, $F(1, 37) = 157/752$)

To clarify the information above, data relating to this part was shown in the graph5. In this graph, the dual level of variable of experimental and control methods is shown on the horizontal axis and the dependent variable of post-test on the vertical axis.

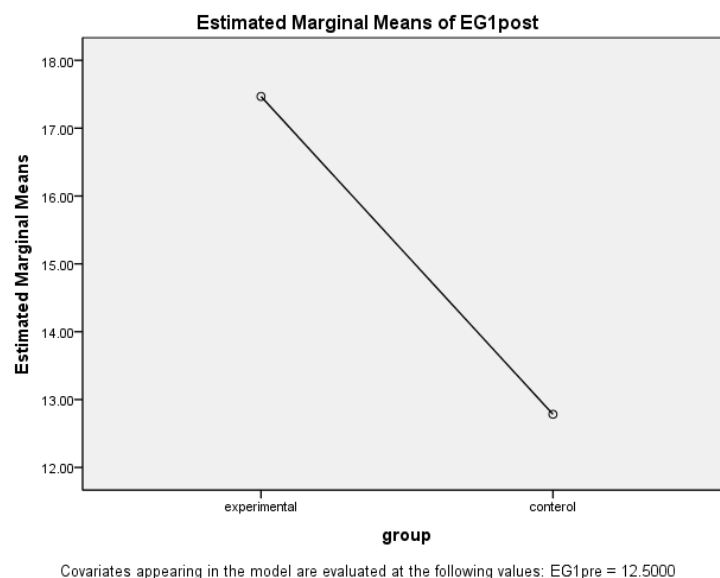


Figure 5: The graph of the means of post-test in the experimental group one and the control group

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This graph shows that there is a significant difference between the amount of reading comprehension of experimental and control groups. This diagram also shows that those participants that received colorful pictures had a higher comprehension rather than those who received black-White pictures.

Presentation of black-white pictures was also useful on comprehension of high school students. ($F(1, 37) = 66/958$, $P = ./. . .$, $Eta = .644$)

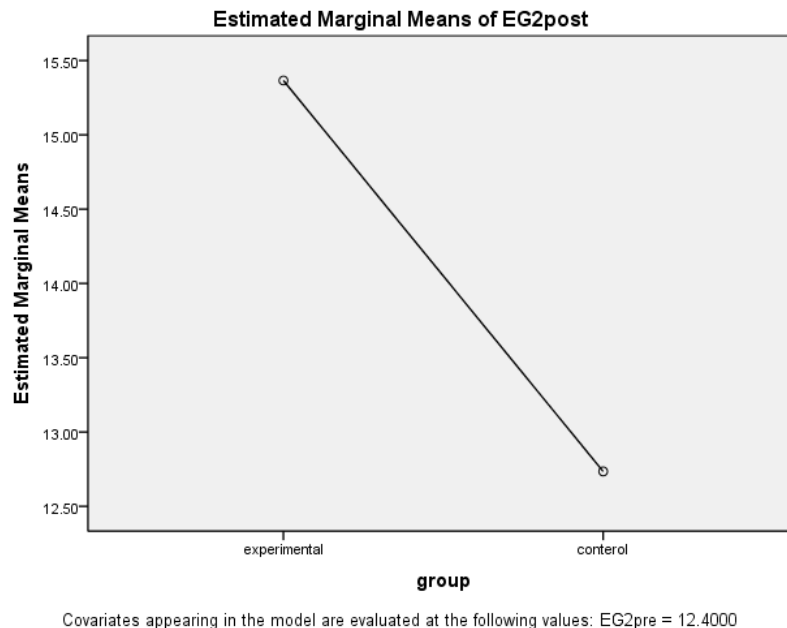


Figure 6: Graph of the means of post-test for experimental group two and the control group.

Presentation of colorful pictures in during reading phase was useful on reading comprehension of high school students. ($F(1, 37) = 320/924$, $P = ./. . .$, ($Eta = .897$).

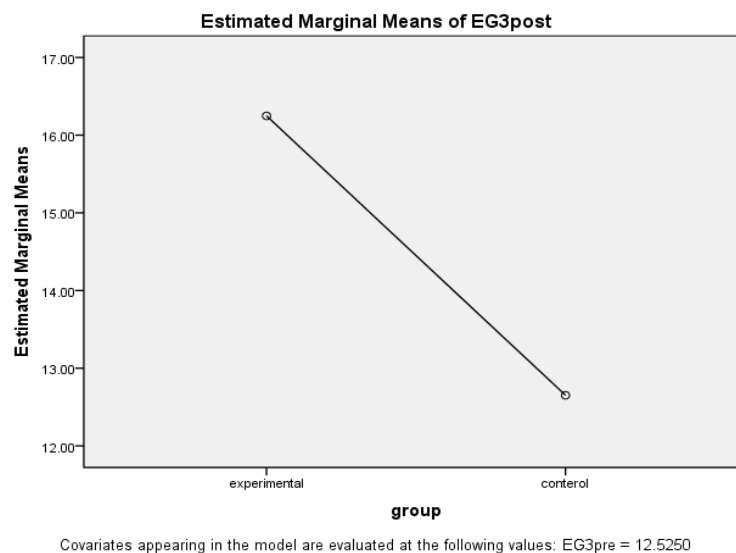


Figure 7: Graph of the means of post-test in experimental and control groups

Presentation of black and white pictures in during reading phase was useful on reading comprehension of high school students. ($Eta = .683$, $P = ./. . .$, $F(1, 37) = 79/733$).

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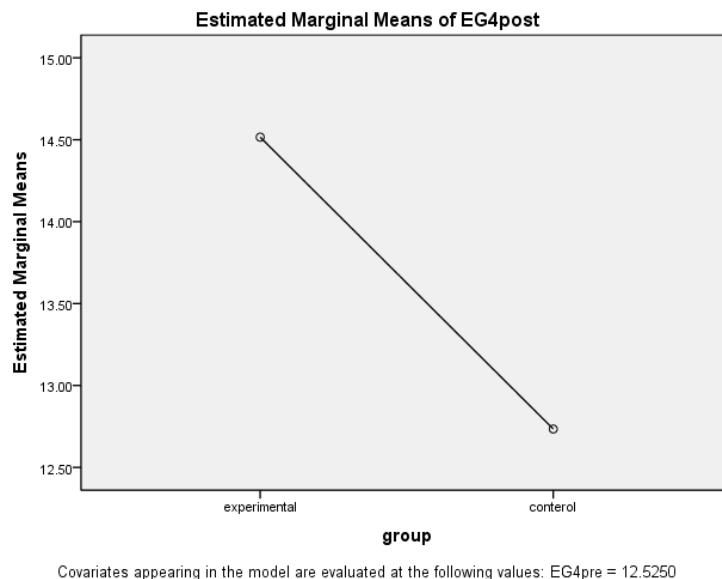


Figure 8: Graph of the means of post-test in experimental and control groups

The results of the above were also shown in the following:

There was a significant difference between the use of colorful pictures and black-white pictures on reading comprehension of high school students in the pre-reading phase. ($t=-13.516, P=0/000$).

There was a significant difference between the use of colorful pictures and black-white pictures on the reading comprehension of high school students in during- reading phase. ($t= -9.024, P=0/000$).

There was a significant difference between the use of colorful pictures in the pre-reading phase and during-reading phase. ($t= -26.259, p=0/000$).

There was a significant difference between the use of black-white pictures in the pre-reading phase and black-white pictures in during reading phase. ($t=-27.568, P=0/000$).

The results of the analysis of data revealed that there was a significant difference between the use of pictorial contexts and non-pictorial ones because the participants who exposed to pictorial contexts had better comprehension than those who encountered non-pictorial contexts. So the first null hypothesis can be rejected. Moreover the results showed that there was a significant difference between the use of colorful pictures and black-white ones. Therefore the second hypothesis will also be rejected. In addition there was a significant difference between the use of pictures in the pre-reading phase and during reading phase. Because the Mean scores of those who received colorful pictures in the pre-reading phase was higher than those who received them in during reading phase. And the same was true about those who received black white pictures. Thus the third hypothesis could also be rejected. So the ranking of the groups would be EG1, EG3, EG2, EG4 and CG.

RESULTS AND DISCUSSION

Results

The results of one-way ANCOVA on the means of the five groups in the sessions revealed that in all tests the mean differences were significant indicating the differential achievement of the groups. Paired sample t-test was used to show the differences of the pre-test and post-test for each group. And an independent t-test was also used to determine the mean differences of the scores of the two groups. The results showed the ranking of the groups as follows:

EG1, EG3, EG2, EG4 and CG. This result suggests that with respect to the use of pictures: first, the use of pictures is more effective than lack of pictures; second, colorful pictures are more effective than black-white ones; pictures presented in the pre-reading phase are more effective than those presented in the reading phase.

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Responses to the Research Questions

The first question can be answered by comparing the means of the control group with the means of the experimental groups. The comparison showed that pictures had a significant effect on reading comprehension. The findings revealed that pictures can improve reading comprehension. With respect to the second question, based on the results, it can be concluded that using colorful pictures led to more comprehension than black-white pictures. In addition, the results revealed that presenting pictures prior to reading is more effective than presenting them during the reading.

Conclusion

The result of the study asserts that pictorial contexts as a pre-reading activity can be an effective beneficial device and an important tool to be applied in a reading program in order to activate the students' relevant schemata necessary for the comprehension of the text, because one of the prerequisites for successful reading comprehension is to have an appropriate schema. According to schema theory, therefore, reading is an interactive process between the readers' background knowledge and the text. Thus, if a student lacks adequate schemata, s/he may be unable to process interactively and rely on bottom-up processing and focusing on each separate word in order to understand the meaning of a text. So application of colorful pictures seemed to be more effective than black-white ones. It can be hypothesized that colorful pictures attract readers' attention, make readers more interested in a text, and stimulate emotional reactions. Moreover, using visual aids in the pre-reading phase, pictures in this study, proved to have a more crucial impact on reading comprehension than presenting them during the reading. Based on the current study's result, it is recommended that teachers use colorful pictures as visual aids prior to reading to activate students' background, to make them more interested in reading, to arouse emotional responses, and to make comprehension of a text easier for them. Meanwhile, some of the passages in high school textbooks lack pictures and those which contain pictures may not be very different from the passages with no pictures because the pictures used are black-white. This research provides evidence supporting the use of colorful pictorial texts for enhancing the development of comprehension than black-white pictures. Thus, it is recommended that textbook designers consider this fact more carefully and plan interesting colorful textbooks for EFL/ESL learners.

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