



The Effects of Motion Info graphics on Reading Comprehension of Iranian EFL learners

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Abstract

Improving reading knowledge has always been an important concern to EFL learners, so far much attempt, devoted to improve reading knowledge in various methods. Nowadays, it is time to forget the stereotypical methods of reading learning which rarely engage the readers' mind in the learning process and focus their attention on utilizing multimedia and visualizations in form of infographics in reading learning. The present study was designed to investigate the effect of using motion infographics on reading comprehension of Iranian EFL learners. Motion infographics are graphic visual representations of information, intended to present information quickly and clearly. This study carried out in the course of study at university level in order to achieve the purpose of the study of the probable significance of the effect of authentic materials over simplified materials and its effect on learners' reading comprehension. Accordingly, 60 learners, between 18 and 28 years old ($M_{age} = 23$), randomly selected from a larger group of 88 EFL learners based on their performance on Oxford Placement Test (OPT), attending Kish institute in Tehran, Iran. The selected participants assigned into two groups (control group and experimental group). The EFL learners in the experimental group had motion infographics as their treatment, whereas the EFL learners in the control group continued to learn the material through a conventional method. Both groups took a 40 reading items on a mock IELTS test in pre-and post-test. The T-test statistical procedure applied to the data and the result of the analysis showed that the experimental group significantly outperformed the control group in the reading comprehension. The results of this study can help all those who are engaged in language teaching and learning process to possess a better perspective into developing efficient instructions.

Key words: Motion, Infographics, Reading comprehension, Authentic Audio material

1. Introduction

What is it that makes reading difficult for EFL learners? Some linguists maintained that reading is the first language mode that children acquire. Also, it provides a foundation for all dimensions of language and cognitive development. Moreover, it plays a vital role in the processes of learning and communication necessary to productive participation in life.

As technologies are growing, English learners can use authentic reading materials like movie, news, podcast, and motion infographics that could be used as a language learning facilitator. These authentic reading materials are regarded as an indispensable learning tool, because they offer a more real language environment to ESL/EFL learners in any situations.

Some linguistic mentioned that reading as an important language component effect on other parts of language. According to Brown (2001), reading is an indispensable skill through which language learners internalize and understand linguistic information without which they cannot create language and it is the first step in the development of language communication.

On the other word, graphic visualizations are regarded as spatial representations of a linear text in which ideas, concepts, and the connections between them are visibly emphasized by graphic devices such as diagrams, charts and maps. Graphic visualizations vary in appearance even though they all visually represent complex information in simple and meaningful displays.

According to Atkinson, Herrnstein, Lindzey, and Duncan Luce (1988), visual text perceived by the biological processing system is change into linguistic information in the short-term memory and meaning is yielded after repeated transfer of the information between the short and long-term memory systems. Representational graphics have the potential to divide the workload more evenly between the cognitive, attentive, and perceptual systems (Ware, 2004). An infographic (information graphic) is a representation of information in a graphic format designed to make the data easily understandable at a glance (Tufte, 2001). Informational graphics, or infographics, are one type of data visualizations which are designed and presented to inform readers. They can be every graphics which is intended to show data in a meaningful way such as maps, charts, and graphs.

People use infographics to quickly communicate a message, to simplify the presentation of large amounts of data, to see data patterns and relationships, and to monitor changes in variables over time. Infographics abound in almost any public environment, traffic signs, subway maps, tag clouds, musical scores and weather charts are just a few examples, among a huge number of possibilities. In the enterprise, infographics are used by all levels of management for high-level views of data. Infographics include bar graphs, pie charts, histograms, line charts, tree diagrams, mind maps, and network diagrams. Such tools are often elements of business intelligence software. As the amount of data being amassed in the enterprise and elsewhere increases, infographics are being used more and more frequently to help people understand the information contained in that data. Infographics predate writing as a means of disseminating information, cave drawings are probably the earliest known example. In addition, individuals were creating and using maps before the advent of written language.

Through the long history of using infographics, very scarce number of studies have been done in order to measure their effectiveness in promoting learners' language learning. The present study gained insights from the previous studies and is going to investigate the effectiveness of infographics instruction on Iranian intermediate EFL learners' reading comprehension. Although the positive effects of infographics on learning is indispensable, "there is a lack of research to examine what learner and instructional variables can infographics influence student learning especially in academic settings" (Lim & Morris, 2009, p. 283). Therefore, the aim of this study is to investigate the influence of motion infographics on intermediate EFL learners reading comprehension. The following research question was posed:

Do motion infographics have any significant effect on improving listening comprehension of Iranian Intermediate EFL learners?

2. Review of Related Literature

2.1 Reading comprehension

Reading comprehension traditionally relates to a reader's complete understanding or full grasp of meaning in a text. However, according to Yang (2002), it is a broad definition and causes some

confusion. Scovel (1998) states that: “comprehension is not an absolute state where language users either fully comprehend or are left completely in the dark; rather, comprehension involves an active, dynamic, and growing process of searching for interrelationships in a text” (as cited in Yang, 2002; p.2).

He also defines comprehension as the reader’s understanding of proposition—the basic unit of meaning—in the text. Since the proposition consists of words, sentences, or paragraphs, readers’ cognitive levels of comprehension can be graded based on these propositions. That is, one person might only engage in lexical comprehension (words), while another may get involved in syntactic comprehension (sentences), the level of which is obviously higher than the former. According to the reader’s purposes in reading and the type of reading used, reading comprehensions are often distinguished. They are commonly referred to as: “literal comprehension” which is reading in order to understand, remember, or recall the information explicitly contained in a passage; “inferential comprehension” that is reading in order to find information which is not explicitly stated in a passage, using the reader’s experience and intuition, and by inferring; “critical or evaluative comprehension” takes place to compare information in a passage with the reader’s own knowledge and values; and reading to gain an emotional or other kind of valued response from a passage which is called “*appreciative comprehension*” (Richard, Platt, & Platt, 1992).

According to Resnick (1984), it is a process in which one uses external information to construct new knowledge. If the process is to occur, comprehension involves a complicated combination of skills in which students utilize their understanding of various elements. As Clark (1982) believed this type of active cognitive process of thinking and learning is accompanied by the reconstruction, interpretation, and evaluation of reading material. Therefore, reading plays a crucial role in all fields of studies and the learners can acquire a great deal of knowledge through reading activities (Carroll & Eisterhold, 1983).

2.2 Motion Infographics

Before the advent of electronic media, the history of motion infographics were developed. In the 1800s, early presentations through flip books or Zoetrope were by the definition used above, motion infographics. In the 1970s, Whitney was using digital processes, and modern motion infographics were born. Before computers were extensively accessible, motion infographics were time-consuming. However, the availability of desktop programs like Adobe Flash and After Effects have made motion infographics increasingly accessible. The leading program used by motion infographic designers is probably Adobe After Effects, which works a bit like Photoshop. Of course, new products come along every day. What they all have in common is the ability to combine video, text, speech, data visualization, special effects and even 3D to create animations.

The goal is to add the elements of time and space into the world of infographics, and to breathe life into otherwise static content. Motion graphics are not only created digitally. Traditional animation can also be used. But web-based data visualization tools are making it easier to build motion graphics and animated infographics cheaper and with less effort than ever. Motion infographics are the types of infographics (graphical videos that integrated with audio and designed for several purposes such as advertisement instrument or even educational purposes) and gives the viewer lots of information through pictures, graphical shapes or statistics, but according to Bertini (2013), we can use video footage or animation to build the illusion of motion.

Unlike interactive data visualizations, which allow users to manipulate the infographic and interact with a dataset, motion graphics tend to transform on their own and usually combined with

audio, which makes them closer to film than static infographics. Perhaps “multimedia” might also be an appropriate definition of this term.

3. Methodology

3.1. Participants

For carrying out this study, a number of learners were selected as the participants. The present research were conducted at Kish institute which was located in Iran with the range of 19 to 28 years old. The Oxford Placement Test (OPT) was applied to homogenize the EFL learners. For the homogeneity of the subjects, prior to the administration of the research, Oxford Placement Test (OPT) was administered to 88 EFL learners. Out of 88 EFL learner, 60 intermediate learners were selected as the members of the current research in two groups (one experimental and one control groups).

3.2. Instrumentation

In this study, some instrument was used.

3.2.1. Oxford Placement Test (OPT)

To tap participants’ level of English language proficiency level, an Oxford Placement Test (OPT) (2004, Allen) was utilized to homogenize the participants in the study. The test consisted of reading, vocabulary and grammar sections. The test comprised of 60 questions in two parts. The first part comprised of 40 multiple choice items in 4 subparts. Questions 1 to 5, the learners were asked to answer grammatical questions about prepositions. Questions 6 to 10, the learners were asked to read a cloze passage and selected one option out of three ones. Questions 11 to 20, they were also asked to read two cloze passages and select one option from four ones. Questions 21 to 40 checked the learners’ grammatical knowledge. In the second part of this examination, there was two sub-sections. For questions 41 to 50, the learners were required read two cloze passages and select the correct option. Questions 51 to 60 tapped learners’ vocabulary format. The participants were allotted 30 minutes to answer the questions. The results were classified based on OPT ranking rubric.

3.2.2. Two IELTS (International English Language Testing System)

Two IELTS (International English Language Testing System) in 4 section format with 40 items was used for pre- test and post- test in sample group of EFL learners.

3.2.3. Authentic Reading Material

For authentic reading material, 10 motion infographics that created by Adobe after Effect software or grabbed from YouTube website were used in several subjects. All of these materials’ lengths were at least 3 minutes. 10 short slides with same narration that exist in motion infographics used and all of this slides consist the same pictures that were used in motion infographics. For evaluating scores of EFL learners that participate in this study, the SPSS software (version 21) was conducted.

3.3. Design

Since random sampling method could not be used in this study due to different constraints, the method used in this study was a quasi-experimental one. The sampling type was convenience. A posttest-only design was used to investigate the effects of the independent variable (i.e., motion infographic) on dependent variables (i.e. reading comprehension).

3.4. Procedure

The present study was to examine the effect of using motion infographics on reading comprehension of Iranian EFL learners. First, a sample OPT was piloted to 10 learners bearing almost the same characteristics of the participants of the main study. This research used EFL learners' test scores as the data. The reliability of the test was calculated using Cronbach's alpha formula. Then, the test was administered to 88 intermediate EFL learners in order to homogenize them with respect to their language proficiency. Out of 88 EFL learner, 60 intermediate learners were selected as the members of the current research in two groups (one experimental and one control groups). All participants selected for treatment in this study were taught by 10 short slides that have the same narration as motion infographics and length of each of them is 3 minutes that were used in the study, were designed same as motion infographics content and other group taught by 10 motion infographics that consist of several interesting subjects.

Item analysis was also done with respect to both tests to identify the malfunctioning tests and modify or discard them. The EFL learners in experimental group had motion infographic videos as their treatment, whereas the EFL learners in control group continued to learn the reading content material in a conventional way.

3.4.1. Treatment

The treatment took 13 sessions, each taking 90 minutes. The control group was taught in a conventional way. The teacher provided them with the material of reading material (i.e. reading - authentic material) in the three traditional stages of preparation, presentation, and practice. In the experimental group, however, the group received motion infographic videos as its treatment. The four stages were implemented during the treatment. First, the teacher started to talk about the topic of each motion infographic video to warm up the EFL learners. She played motion infographic video that used in the situations of the topic. Then, EFL learners at first watched motion infographic videos carefully. Then, the teacher plays them again. During the first time of reading, the EFL learners were asked only to read and understand the reading content of motion infographic that include a unique subject.

During the second time of playing motion infographic videos, however, they were permitted to take notes from playing motion infographics that they hearing in class. Then, they were asked to restate what they heard and understand from these motion infographics. During this phase, the teacher walked among them trying to help them but not providing the answers. After they explained what they heard, the teacher helps the learner to diagnose those reading problems and try to correct them.

3.4.2. Operationalization

To evaluate the EFL learner's reading comprehension after pre-test that administered by researcher and consist of 40 multiple choice items about learners' background knowledge, the main reading material (chooses from 10 short slides and 10 motion infographics) was administered in the middle of session (all course take place in 13 sessions) to investigate the amount of reading comprehension of EFL learners that participate in this study. After the all session ends, a post test was administered to evaluate the rate of reading comprehension after main test and finally the scores that each EFL learners will be assigned in main test compared to pretest and posttest and analysis this scores with

SPSS software to make a compare table list of each group and design a graphical graph for compare the data collection.

3.5. Statistical Analysis

Item analysis was performed on the pre-test and post- test in order to recognize weak items and adjust them if necessary. In addition, the results of post-tests were compared to the pretest to make sure of the construct validity. Reliability of OPT and IELTS testswere calculated using Cronbach’s alpha formula. In order to answer the research questions, the researcher used one independent samples t-test procedure.

4. Results and Discussion

This study aimed at investigating the effects of motion infographics on enhancing reading comprehension of Iranian intermediate EFL learners. The data collection procedure was carefully performed and the raw data was entered into SPSS (version 21) to compute the required statistical analyses and deal with the research question and hypothesis of the study.

4.1. Analysis of the Research Question

The research question of this study sought to find out whether infographics affect reading comprehension of Iranian EFL learners. In order to answer this null-hypothesis stating that “motion infographics do not have any significant effect on improving reading comprehension of Iranian EFL learners”, two independent sample *t*-tests were conducted on both pre-test and post-test. Before presenting the results of the first *t*-test, the related descriptive statistics are given in Table 4.1.

Table 4.1: Descriptive Statistics of Two Group's Scores on the Pre-test of Reading Comprehension

Group	N	Mean	SD	Skewness	Kurtosis
Experimental	30	23.00	4.331	-.126	-.841
Control	30	22.10	3.916	-.412	-.503

Table 4.1 shows that the mean and standard deviation of the experimental ($\bar{x} = 23.00$, $SD = 4.33$) and control ($\bar{x} = 22.10$, $SD = 3.91$) groups are not far from each other on pre-test of reading comprehension. Besides, Table 4.1 indicates that Skewness and Kurtosis of the four sets of reading comprehension scores are not beyond +/- 1.96 and therefore enjoy normal distribution.

Table 4.2: Independent Samples Test to Compare Two Groups’ Scores on Reading Comprehension

Pre-test						
Levene's Test for Variances			T-test for Means			
Factor	<i>F</i>	<i>Sig.</i>	<i>t</i>	<i>df</i>	<i>Sig. (2-tailed)</i>	Mean Diff.
Equal variances assumed	.501	.482	.844	58	.402	.900
Equal variances not assumed			.844	57.421	.402	.900

The results of independent *t*-test (Table 4.2) showed that there was not any statistically significant difference ($t(58) = .84, p > .05$) in reading comprehension scores for experimental ($\bar{x} = 23$) and control ($\bar{x} = 22.10$) groups on the pre-test, in which the *t* observed was less than the *t* critical of 2.04. Therefore, we conclude that the EFL learners in the two groups have the same reading comprehension ability before experiencing any special instruction. Table 4.3 indicates the related descriptive statistics before discussing the results of the second *t*-test.

Table 4.3: Descriptive Statistics for Two Group's Scores on the Post-test of Reading Comprehension

Group	N	Mean	SD	Skewness	Kurtosis
Experimental	30	25.50	4.681	-.065	-1.004
Control	30	22.80	4.046	-.470	.045

As displayed in Table 4.3, the EFL learners in the experimental group ($\bar{x} = 25.50, SD = 4.68$) have acted considerably better than those in the control group ($\bar{x} = 22.80, SD = 4.04$) on post-test of listening comprehension. In addition, Table 4.3 reflects that Skewness and Kurtosis of the two sets of reading comprehension scores are not beyond ± 1.96 and therefore our data enjoy normal distribution assumption.

Further, the results of independent *t*-test that was performed to compare control and experimental groups' reading comprehension scores on the post-test are laid out in Table 4.4. A quick look at Table 4.4 hands on that the assumption of equal of variances is met ($p > .05$).

Table 4.4: Independent Samples Test to Compare Two Groups' Scores on Reading Comprehension Post-test

		T-test for Means				
Levene's Test for Variances						
Factor	<i>F</i>	<i>Sig.</i>	<i>t</i>	<i>df</i>	<i>Sig. (2-tailed)</i>	Mean Diff.
Equal variances assumed	1.667	.202	2.390	58	.020	2.700
Equal variances not assumed			2.390	56.810	.020	2.700

Independent *t*-test in Table 4.4 detected a statistically significant difference ($t(58) = 2.39, p < .05$) in reading comprehension scores for experimental ($\bar{x} = 25.50$) and control ($\bar{x} = 22.80$) groups on the post-test, in which the *t* observed was greater than the *t* critical of 2.04, with the mean difference of 2.70 out of 40. As a result, the null hypothesis of the current study that states, "Motion infographics do not have any significant effect on improving reading comprehension of Iranian EFL

learners” was rejected and we claimed that motion infographics improve reading comprehension of Iranian EFL learners.

For further analysis, a paired sample *t*-test (or matched test) was run to compare the reading comprehension means obtained on pre-test to post-test in each group. Because the two sets of scores did not violate the assumptions of Parametric Analysis in each group, we performed parametric paired sample *t*-test, or not nonparametric Wilcoxon Signed Rank Test was used. The results of this *t*-test are given in Table 4.5.

Table 4.5: Paired Samples Test to compare each Group's Means on the Pre-test and Post-test of Reading Comprehension

Group	Mean	SD	T	df	Sig. (2-tailed)	95% Confidence Interval of Difference	
						Lower	Upper
Experimental	2.50	4.65	2.94	29	.006	.763	4.237
Control	.700	2.27	1.68	29	.103	-.150	1.550

Paired samples *t*-test results, as shown in Table 4.5, showed that there was a statistically significant increase ($t(29) = 2.94, p < .01$ (two-tailed)) in reading comprehension scores from pre-test ($M = 23, SD = 4.33$) to post-test ($M = 25.50, SD = 4.68$) in the experimental group. In fact, the mean increase in reading comprehension scores was 2.50 out of 40, with a .95% confidence interval ranging from .76 to 4.23. Quite the reverse, paired samples *t*-test failed to find any statistically significant increase ($t(29) = 1.68, p > .05$ (two-tailed)) in reading comprehension scores from pre-test ($M = 22.10, SD = 3.91$) to post-test ($M = 22.80, SD = 4.04$) in the control group. In fact, the mean increase in reading comprehension scores was just .70 with a .95% confidence interval ranging from -.15 to 1.55.

5. Conclusion

To find out the answer to the research question, the formulated hypothesis was tested through independent sample *t*-tests. The results of test indicated that: Independent *t*-test detected a statistically significant difference ($t(58) = 2.39, p < .05$) in reading comprehension scores for experimental ($\bar{x} = 25.50$) and control ($\bar{x} = 22.80$) groups on the post-test, in which the *t* observed was greater than the *t* critical of 2.04, with the mean difference of 2.70 out of 40. As the result of this study shows, motion infographics improves reading comprehension of Iranian EFL learners. The result of present study provided more evidence on motion infographics improves reading comprehension of Iranian EFL learners. Therefore, it could be used as an authentic reading material for enhancing reading comprehension. In addition, it indicated that the motion infographics a visual and audio aid had strong impact on reading comprehension. It is worth to note that the present study faced some limitations and, as in all researches, some intervening variables were not to be controlled. Other researches need to be done in the matter to gain a comprehensive understanding of how the motion infographics may be used more appropriately and for what purposes it functions more effectively.

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