The Impact of Using Infographics on Improving Grammar Learning for Primary Stage Pupils and Their Attitude Towards It

By

Abeer Abdelsamea Meatty

Supervisors

Prof.Dr:Aly Abdel-Samea Qoura

Professor of ELT

Ass.Prof.Dr. Samah Rizk Hassan

Associate prof of ELT

The Impact of Using Infographics on Improving Grammar Learning for Primary Stage Pupils and Their Attitude Towards It

Abstract

The present study aimed at investigating the effect of using Infographics on teaching grammar for 6th grade primary stage pupils and their attitude towards it. Thequasi- experimental design was used for conducting this research. A group of sixty 6th year primary stage pupils were randomly selected from Mansoura official Language School in the academic year 2018-2019, and divided equally into an experimental and a control groups. The instruments of the study were: 1) A grammar achievement test; and 2) An attitude scale. Results of the study indicated that Infographics- based program proved to be effective in improving thepupils'grammar achievement, besides improving their attitude towards learning it. Based on the findings, a set of recommendations and suggestions for further research were highlighted.

Key Words*: Inphograplics, teaching grammar, attitu*

Introduction:

Mastering the language involves mastering its skills: listening, speaking, reading, and writing, grammar is the heart of the language and it has a great effect on the accuracy of writing, reading, and speaking. Grammar has been a very serious matter in the refinement and production of students. It is not only a set of rules that clarify how words are used to construct sentences, but it is also the way to communicate. This means it is a method for communication that helps the speaker understand the language and produce proper utterances. On the other hand, when practicing reading skills, it is noticed that if learners do not know grammar, they cannot understand the text at the sentence level, even if they know the vocabulary. For writing skill, Professor David Mulroy believes that proper grammar improves writers' expressions. He argues that "a scholar or student who does not know the part of speech is like a surgeon who does not know the parts of the body" (Cited in Reedy, 2003, p.4). This means that learners may know about the language, but not the language itself. For example, they may use or produce the passive voice sentences but without being aware of the passive voice and without knowing the form and the rules of passive voice. In addition, understanding grammar will help learners to get meanings while watching movies, using the internet or during daily conversation. Upon this, teaching grammar becomes a crucial issue.

Teaching grammar is considered a very serious stage of teaching the English language. It occupies a distinctive place in language curriculum. Language teaching professionals (e.g. Batstone and Ellis, 2009; Ellis, 2006; and Nassaji and Fotos, 2004) assured that grammar is too important to be ignored, and that without a good knowledge of grammar, learners' language development will be severely constrained. So, it is an urgent necessity that English teachers must pay attention to grammar and help students understand it because most students do not know grammar rules or how to use them while reading or writing. That's because if students have a high level of grammatical mastery, they can easily master the language. But, without good knowledge of grammar, students will face many difficulties in communicating (Albalawi, 2014). Accordingly, mastering grammar rules enhances learners' use of the language, enhances their performance, and helps them construct well-formed sentences.

While educators agree that knowledge of grammar is a necessity, teachers face many problems, such as students' poor knowledge of grammar, improper traditional methods, and the lack of modern and suitable aids. To overcome these difficulties, it is time to get use of modern technical and instructional approaches in the learning process. Thus, teachers should use effective and attractive approaches rather than boring and common ones to teach grammar. Among the various kinds of instructional grammar approaches, graphic visualizations of materials are supported by both teachers and learners. Stokes (1997) believes that visualization continues to gain ground against traditional textbooks and it helps individuals to have greater transparency in previously unintelligible data. Hoffler and Leutner (2011) state that "in recent years, the role of individual differences in learning with visual representations has been more and more focused on" (p. 209).

Thus, as Chung (1996) states, "there were increasing numbers of EFL teaching programs which begin to integrate video materials into their curricula and more attention is being focused on how to make the viewing experience profitable" (p. 61). Concerning the role of technology, in general, and visualization, in particular, there has been a complete shift from traditional approaches to technical instructional approaches in recent years. Accordingly, visualization is considered one of the constructive instructional approaches, which paves the way for more beneficial language learning.

The exploration of media has created the opportunity for the users to intensively create, view, download and share an unlimited number of visuals

in various and amazing forms. Therefore, in this complex visual field of technology, it has become a must to teach students not just to be textually literate, but also to be visually literate. According to the Social Science Research Network, around 65% of the world's population is visual learners (McCue, 2013). In addition, research has shown that 70% of the receptors in our body are in our eyes (Krauss, 2012). Therefore, researchers have investigated the use of various visuals that have the ability to sufficiently visualize information. One of these visuals that has gained popularity is "Infographics". Since, Infographics are regarded as one of the most effective approaches of teaching grammar, they help learners achieve a high level of grammar mastery. Besides, they help learners understand compound and complex sentences. They also improve their academic writings, as well. (AlHosni, 2016).

People use Infographics to: convey messages quickly; simplify the presentation of large amounts of data; view data patterns and relationships; and monitor changes in variables over time. Infographics exist early in any public environment, traffic signs, subway maps, tag clouds, musical scores, and weather. In the enterprise, Infographics are used by all levels of management for high level views of data. They include bar graphs, pie charts, histograms, line charts, tree diagrams, mind maps, and network diagrams. As the amount of data being accumulated, Infographics are being used more and more frequently to help people understand the information embedded in these data. Infographics precede writing as a means of disseminating information, and cave drawings as possibly the earliest known example (Rezaei,2015).

Review of Literature

Rezvani and Ketabi (2011) investigated the effect of using websites vs. textbooks as instructional materials to enhance learners' knowledge and ability to use certain grammatical rules.The sample consisted of Ninety homogenous adult Iranian intermediate EFL learners. They were randomly divided into three groups: Textbook Group (TG), Website Group (WG) and Control Group (CG). The study instrument was a pre and post achievement test. The results indicated that websites were as effective as text books in teaching grammar.

In their study, Kutluayet, et al. (2012) studied the probable effects of using videos toteach grammar explicitly in an ESP grammar class.The researchers used action research as the methodology of the study. The Participants were four adult learners taking English courses for business purposes at a private language school. The results revealed thatusing videos

for teaching grammar motivated thestudents to participate in the lessons, and they asked for uploading new videos. In addition, it leads to more permanent learning.

The main purpose of Adam's study (2016) was investigating the impact of teaching grammar through the direct method. The researcher adopted the quantitative analytical method. The study instruments were a test and a questionnaire. There were two samples: 45teachers of English from various universities who responded to questionnaire, and 56learners (females) at Jeddah Secondary Schools who responded to the test. The results assured the effectiveness of the direct method in teaching grammarand in increasing students' motivation for learning and encouraging them to speak English.

Roshsan and Elhami (2016) conducted a study to examine the effect of teachers' meta-language on learners' noticing of grammatical points. The sample of the research were 24 elementary students divided into two groups; experimental and control group, and 26 intermediate students divided into experimental and control group. The study paced at Tehran Institute of Technology.The instruments were Oxford Quick Placement Test, Voice Recording, and Noticing Task. The result indicated that the meta-language had positively affected the learners' noticing, of grammatical points.

Ali (2017) examined the effect of a proposed CALL program in developing EFL prep stage students' vocabulary and grammar learning and their motivation. The sample consisted of 80 2nd prep stage students. The instruments were a pre/post vocabulary and grammar achievement test, and a pre/post motivation scale. The results of the study revealed the effectiveness of the proposed CALL program "Hot Potato'' in developing EFL prep stage students' vocabulary and grammar learning and motivation.

Yoshidaet al. (2018) investigated the impact of applying the flipped classroom approach in teaching English on Japanese EFL junior high school students' performances, attitudes and perceptions toward learning English. The participants were 160 7^{th}grade students divided equally into experimental and control groups.The instruments were, pre and post grammar and speaking tests, a questioner, and an interview. Study results illustrated the effectiveness of flipped strategy in enhancing the students' grammar and speaking performances. The positive attitude for both teachers and students towards flipped classroom strategy.

The purpose of Akkoyunlu and Kibar's study (2013) was exploring the usage of Infographics as a learning tool in order to equip students with visual literacy. The researchers discussed how to use infographics as a

learning tool. Participants of the study were64second year students, enrolled in the Computer Education and Instructional Technology Department of the Faculty of Education at Hacettepe University. The results assured that using Infographics in the learning process is a vital thing in enhancing students' comprehension and increases their motivation to learn more. Besides, infographic present information in a beautiful and organized way.

In his study,Rezaei(2014) sought to analyze the effect of Infographics on Iranian EFL learners' grammar learning. Population of this study were 60 Iranian EFLlearners in language institutes located in the city of Boushehr, Iran. The study instrument was a pre-posttest. The results showed the effectiveness of an infographic instruction,as an interesting way, in improving grammatical knowledge of EFL learners. It also provides the best conditions for learners to learn grammatical points profoundly and to extend their knowledge of grammar.

Some studies assured the importance of   Infographic in helping students achieve better understanding and facilitate good retention of what was learned through the visuals, videos as well as the layout of the infographic. For example, Al Hosni (2015) investigated the effectiveness of using Infographics as a learning tool in enhancing learners' comprehension and memory retention in the Foundation Program of the English Language(FPEL) in the Language Center at Sultan Qaboos University. The samples were 27 students (randomly chosen) from the College of Economics and Political Sciences divided by experimental group and control group. Both groups were given a comprehension 15-minute quiz after both teachers explained the new vocabulary, discussed the text with the students, and highlighted the main ideas. One week later, both groups took a retention quiz in the first 15 minutes of the class.

In his study, Alotiabi (2016) investigated the effect of using Infographics on developing students' grammar achievement. The sample of the study was pupils in the first grade in Riyadh, divided into control experimental groups. The two groups received pre- and post-administration of the study instruments. The instrument used in this study was a pre/post grammar achievement test. The results assured that using infographic as a learning tool enhanced pupils' learning for grammar and increase their achievement.

Toraman and Akay (2015) conducted a descriptive study to identify English language learners' attitudes towards grammar and analyzed these attitudes in the framework of several variables (gender, age, faculty, time spent on learning English, and proficiency level). The participants were 293

students who have English language education in preparatory school of Anadolu University in six different proficiency levels (beginner, elementary, pre -intermediate, intermediate, upper-intermediate, pre-faculty). The instrument was an attitude scale. The analyses assured that gender, age, time spent on learning English, and proficiency level variables did not create significant differences in the attitudes. However,findings of the study indicated that students in faculties like Science, Humanities, Education, and Engineering have more positive attitudes towards learning grammar than Economics, Business Administration, and Communication Faculty students.

Azimi(2016)investigated Iranian EFL students' attitudes to the techniques used for teaching English grammar. The participants (Iranian female language learners) were selected by non-random sampling. They were chosen purposefully. To identify the Iranian EFL students' attitudes to teaching English grammar, a series of observations was done. And after observation, some interviews with language learners were planned to know their attitudes towards teaching grammar. The results suggested that language learners believed that teaching grammar was boring and was not useful, hence they did not estimate it.

Durrani's research (2016) aimed to assess female students' attitudes towards grammar translation approach in Quetta, Baluchistan, Pakistan. Participants of the study were 150 students. Overall, the results of this study showed the students' positive attitudes towards Grammar Translation Method in teaching grammar.

Hmedan and Nafi(2016) investigated the impact of using the inductive and deductive methods on enhancing students' achievement in grammar and their attitudes toward EFL. The design was quasi-experimental design and the used Analysis of Covariance (ANCOVA) for measuring the contrast between the experimental and control groups. The sample was 7th grade students' in Bethlehem District.The instruments used in this study were pre and post-tests and a questionnaire which was designed to measure students' attitudes toward English as foreign language (EFL). The findings showed statistical significant differences between the mean scores of 7th grade students' achievement in grammar, due to interaction between teaching method and gender and the differences were in favor of the male students in the experimental group. Also, the results showed that there are no statistical significant differences between attitudes towards EFL, due to interaction between teaching method and gender.

The pilot study:

In order to explore the problem of the study, the researcher conducted a pilot study to determine the pupils' grammar achievement level. This test was applied on a sample of primary six at Mansoura Official Language School.

Table (1)

Pupils' mean score in the pilot study exam and SD on the Grammar Test

Sub-skill	Max. Score	Mean	S. D.	Percentage%
Grammar	24	14.2	4.6	47.5%

Results in table (1) indicate that the mean score of the sample in grammar is 47.55% which indicates that the pupils need improvement in grammar performance.

Statement of the problem

Based on the literature review, researcher's experience, and the results of the pilot study, it is clear that pupils have difficulties in understanding and using grammar, as teaching grammar in the traditional way may be not useful for them. So, this study will investigate the effect of using infographics in teaching grammar for 6th grade primary stage pupils and their attitude towards it.

Questions of the study:

This study was conducted to answer the following questions:

1- What are the components of the Infographics-based program to improve grammar learning for 6th primary stage pupils?

2- What is the impact of the Infographics-based program on improving grammar learning for 6th primary stage pupils?

3- What is the impact of the Infographics-based program on improving 6th primary stage pupils' attitudes towards learning grammar?

Hypotheses:

The hypotheses of this study were formulated as follows**:**

1) There is a statistically significant difference at 0.01 level between the mean score of the control group and the experimental group on the post administration of .the grammar achievement test in favor of the experimental group.

2) There is a statistically significant difference at 0.01 level between the mean score of the experimental group on the pre and post administrations of the grammar achievement test in favor of the post administration.

3- There is a statistically significant difference at 0.01 level between the mean score of the experimental group and the control group on the

post administration of the attitude scale in favor of the experimental group.

4-There is a statistically significant difference at 0.01 level between the mean score of the experimental group on the pre and post administrations of the attitude scale in favor of the post administration.

Purpose:

The current study aimed at:

1- Enhancing primary school pupils' knowledge and use of grammar.

2-Designing a proposed Infographics program for developing Primary stage pupils' EFL grammar learning. .

3- Measuring the effectiveness of the proposed Infographics program in developing EFL Primary stage pupils' grammar learning.

4- Measuring the effectiveness of the proposed Infographics program in developing EFL Primary stage pupils' attitude towards grammar learning.

Delimitations:

This study will be delimited to:

This study was delimited to:

1- A sample of 60Primary six pupils at Mansoura Official Language School.

2- Enhancing grammar included in Jump aboard (advanced level) for 6th primary stage pupils.

3- Infographics of grammatical rules included in Jump aboard (advanced level).

Research Design

This study adopted the quasi-experimental design. Two classes were randomly selected, and divided into an experimental and control groups, to investigate the impact of using Infographics on improving grammar achievement of grade six primary stage . The experimental and control groups were subjected to a pre-post grammar achievement test and an attitude scale prepared by the researcher to find out any differences between the mean scores of the experimental and control groups in the grammar achievement test and attitude scale. The experimental group was taught using Infographics as a learning tool, whereas the control group was taught using the traditional method.

Participants and Setting of the Study

Participants of the present study were grade 6 primary stage pupils selected from Mansoura Official Language School, in Mansoura, Al-Dakahlia Governorate, during the first semester of the academic year

2017/2018.Sixty pupils were randomly chosen as the sample of the study. The researcher chose a language school because they study the advanced level book that contains more grammar rules than the ordinary schools. The participants were divided into two groups; experimental and control. Each group consisted of 30 6th year primary stage pupils. The participants of the study were homogenous to a great extent: their age ranged from 13 -14 years. The results of the pretest proved that they were almost equal.

Setting

The experiment took place in Mansoura Official Language School, Mansoura, Al-Dakahlia Governorate. Two intact classes of sixth year primary pupils were chosen for the experimentation of the study. This was done during the second semester of the academic year 2017/2018 for ten weeks. The study was carried out at school, inside the class and the language lab.

Instruments

The following instruments were designed and used by the researcher for developing primary stage pupils Grammar achievement by using Infographics approach:

1‒An EFL Grammar Achievement Test for 6th year primary stage pupils to measure pupils' achievement before and after the treatment.

2-An attitude towards grammar to measure pupils' attitude toward learning grammar by using Infographics approach before and after the treatment.

Results and Discussions

The results of the study are reported according to the hypotheses.

-Verifying the first hypothesis:

The first hypothesis stated that "There is a statistically significant difference at 0.01 level between the mean score of the control group and the experimental group on the post administration of the grammar achievement test in favor of the experimental group''. To verify this hypothesis, *t-* test was used to measure the differences between the control and the experimental groups on the grammar achievement posttest and the results were shown in the table (9).

Table (9)

A comparison between the mean score , of the control and experimental groups on the post administration of the grammar achievement test

Variables	Groups	Mean	Std Dev	T value	Sig
Present simple	Control	7.933	1.43	13.11	0.01
	Experimental	13.0	1.55		0.01
Present continuous	Control	5.93	1.22	11.01	0.01
	Experimental	9.26	1.1		
Past continuous	Control	4.53	1.04	11.07	0.01
	Experimental	7.60	1.10		
Reported Speech statement	Control	1.13	1.00	3.55	0.01
	Experimental	1.86	.50		
Reported speech questions	Control	2.33	.86	5.21	0.01
	Experimental	3.53	.96		
Subjunctive mood	Control	2.13	1.00	3.55	0.01
	Experimental	3.13	1.16		
Prepositions of times	Control	4.33	1.49	4.66	0.01
	Experimental	5.73	.69		

Table (9) clarifies that there is a statistically significant difference between the mean score of the control group and the experimental group on the post administration of the achievement test in all targeted grammatical rules where the *t*- value was 13.11, 11.01, 11.078, 3.559, 5.211, 3.553, 4.660 and this significant value at 0.01 was in favor of the experimental group. This result indicates the effectiveness of the Infographics program in pupils' grammar learning. In other words, pupils in the experimental group outperformed the control group pupils in EFL grammar learning. So, the first hypothesis of the study was accepted.

2- Verifying the second hypothesis:

The second hypothesis stated that "There is a statistically significant difference at 0.01 level between the mean score of the experimental group on both the pre - and post administration of the achievement test in favor of the post administration". *t*- test for dependent samples was used to test the second hypothesis which handled the differences between the experimental group on the pre – andpost administration of the grammar achievement test. The results are shown in table (10).

The differences between *the experimental group on the pre- post grammar achievement test*

Variables	Groups	Mean	Std Dev	T value	S.g
Present simple	Pre	8.0333	1.58	12.90	0.01
	Post	13.0000	1.55		
Present continuous	Pre	5.4667	1.22	12.31	0.01
	Post	9.2667	1.11		
Past continuous	Pre	4.60	1.00	11.61	0.01
	Post	7.60	1.10		
Reported Speech statement	Pre	1.23	.97	3.73	0.01
	Post	1.86	.50		
Reported Speech questions	Pre	1.93	1.28	5.75	0.01
	Post	3.35	.86		
Subjunctive mood	Pre	1.86	1.19	4.91	0.01
	Post	3.13	1.0		
Prepositions of times	Pre	4.66	1.18	5.25	0.01
	Post	5.73	.69		

Table (10) illustrates that there is a statistically significant difference between the mean score of the experimental group on the pre- and post-administration of the grammar achievement test in all targeted grammatical rules where the *t*-values were 12.90, 12.31, 11.61, 3.73, 5.75, 4.91, 5.26 in this order and these values are significant at 0.01 level. These significant differences are in favor of the post administration of the grammar achievement test in the experimental group. This indicates the effectiveness of Infographics program in developing grammar learning. Thus, the second hypothesis was accepted.

The Effect size (η2):

To estimate the effect size of the proposed program on improving grammar achievement, Eta square was calculated. Table(11)illustrates the effect size of the proposed program on the experimental group pupils' grammar achievement

Table(11)
The Effect Size of using infographic program on the Experimental group's Grammar   achievement

Variables	T-value	T 2	Df	N+12	Eta square	Level of effect size
Present simple	12.9	166.41	29	195.41	0.85	High
Present continuous	12.3	151.54	29	180.54	o.84	High
Past continuous	11.6	134.79	29	163.79	0.82	High
Reported speech statement	3.7	13.91	29	42.91	0.32	High
Reported speech questions	5.7	33.06	29	62.06	0.53	High
Subjunctive mood	4.9	24.11	29	53.66	0.45	High
Prepositions of times	5.2	27.56	29	56.56	0.49	High

Results in table (11) illustrate the eta square for all targeted grammatical rules . The effect size values are (0.85,0.84, 0.82, 0.32, 0.53, 0.45, and 0.49). This indicates respectively a high effect size for all Grammar achievement rules of the experimental treatment. The results of the *t*-test for paired samples indicatethat there were statistically significant differences at level <0.01 between the mean scores of the experimental group on the pre – posttest administration, and that the effect size was high. So, each variable of the pupils' grammar achievement has been improved after administrating the program.

Verifying the third hypothesis

The third hypothesis stated that "There is a statistically significant difference at 0.01 level between the mean score of the experimental group and the control group on the post administration of attitude scale in favor of the experimental group''.*t*-test was used in order to compare the results, table (12)shows the results of pupils' attitude scale of the experimental and the control groups.

Table (12)
Comparing the performance of the control and experimental groups on the post administration of attitude scale towards learning grammar

Variables	groups	mean	Std. Deviation	T- value	Sig.
Total attitude	Control	13.9	2.1	3.05	0.01
	Exp	15.9	1.5		

Results in table (12) illustrate that there was a significant difference in the experimental and control groups' scores on the post administration of the attitude scale in favor of the experimental group, as this group had the higher mean (15.9) and *t-* value was 3.05. This indicates that there is a significant difference between mean scores of the two groups in the post attitude scale at significant level (0.01), which proves that Infographics-based program had a great effect on improving pupils' attitude. Therefore, te third hypothesis was accepted.

Verifying the fourth hypothesis

The fourth hypothesis stated that "there is a statistically significant difference at 0.01 level between the mean score of the experimental group on both pre-and post-administrations of the attitude scale in favor of the post administration".

Table (13)
Comparing the performance of the experimental group on the pre/post administration of *attitude scale*

Variables	groups	Mean	Std. Dev	T Value	Sig
Attitude scale	Pre	9.8	3.2	9.27	0.01
	Post	15.4	1.5		

Table (13) clarifies that the *t-* value in the total score is significant at 0.01 level. Thus, there is a statistically significant difference between the experimental group pupils' mean score on the pre- and post-administration of the attitude scale in favor of the post administration. Consequently, the fourth hypothesis was accepted.

The Effect Size of the proposed program on the attitude towards grammar learning:

Table (14)
The effect size of the proposed program on the attitude towards grammar learning scale

Variables	T-value	T 2	df	N+12	Eta square	Effect size
Attitude scale	9.2	85.93	29	114.93	0.75	Large

Results in table (14) indicate that *t*-value of the experimental group was (9.2). Moreover, Eta square was0.75 and this is considered a high effect.

Based on the above analysis, it could be stated that Infographics-based program was effective in enhancing grammar achievement of sixth year primary Language school pupils and their attitude towards grammar.

The Results of the Study

The present study led to the following findings:

  1-The Infographic-based program was effective in developing EFL primary stage pupils' grammar learning. This could be assured by these points:

- The experimental group pupils outperformed the control group Pupils in the post grammar achievement test.
- The experimental group pupils' mean score in the post administrationof the grammar achievement test was much higher than their mean score in the pre- administration of the test.

  2- The proposed Infographics-based program was effective in developing EFL primary stage pupils' attitude towards learning grammar. This could be assured by these points:

- The experimental group pupils outperformed the control group pupils in the post administration of the attitude scale.
- The experimental group pupils' mean score in the post administrationof the attitude scale was much higher than their mean score in the pre-administration of the attitude scale.

Commentary

Results of the study were consistent with the findings of many studies, such as Al Hosni(2016), Schulten (2010), Clark (2014), Islamoglu, Ay, Ilic, Mercimek, Donmez, Kuzu, &Odabasi (2015), and Vanichvasin (2013), which assured that: Infographics as a learning and teaching tool are worth trying in EFL classrooms. Using infographics would save much time that students usually need to process tens of pages in their books. So, it is obvious that using Infographics in classrooms can lead to the enhancement of pupils' comprehension and memory retention.

Also, the findings of the present study were in line with a number of previous studies done by Hasler, Kersten, and Sweller, (2007), Mayer and Chandler (2001) Ghaderi and Afshinfar (2014) and Moreno (2007), who proved the superiority of animation visualization graphics in multimedia learning and its role intake and retention of English idioms**.**

The result of the current study assured Razi's research that extracted the impact of Infographics, providing interesting facts, on how teachers can influence the lives of pupils and connect learning with their real life by giving examples related to their real life and making them interactive in the learning process.

The results of current study proved that teaching grammar items through using infographic instruction would lead to better comprehension among EFL learners.Infographic instruction increased the motivation of learners to improve their grammatical knowledge. In addition to the fact thatinfographic instruction was innovative for the participants of the study, it could provide opportunities for them to be more successful in their grammar learning.

The findings of this study would help EFL teachers to get insights to design and adapt language learning materials for enhancing grammatical knowledge of participants.Presenting grammar learning activities through infographic instruction framework saves much time for both teachers and pupils.

Results of this study, which investigated the impact of infographic as an alternative tool for teaching and learning, were similar to the results of Cifçi(2016),Williams(2002),Akkoyunlu&Yılmaz,(2005),and anichvasin(2013), which indicate that Infographics have a good impact on learners with different thinking styles, Besides, they present strong arguments; address to more than one sensory organs; help learners get actively involved in the learning process; lead to permanent learning, and help teachers develop learning activities with an effective presentation and attracts learners' attention, and this leads to learners' success.

This research corresponded with Yıldırım(2016), who stated that Infographics facilitate learning and are an attractive and effective approach. Infographics can be used to teach basic information about a subject, present new information, or confirm the information currently available.

Infographics, in particular, and visual aids, in general, help teachers drew pupils' attention, and this leads to a friendly and interesting atmosphere for the pupils to learn and makes pupils completely concentrate on lessons. Furthermore, the implementation of visual aids in teaching EFL is less time-consuming. As a result, the teachers will have more ample time to create enjoyable classroom activities and conduct an effective teaching and learning process.This result assured the results of Melor, Yunus, Hadi Salehi, Dexter,SiganAnak, John, Pillai and Vengadasamy (2010),and Gaikwad(2013).

The results of this research agree with the researches for Rezaei(2014), Ozdaml, et al. (2016), Al Hosni (2015), Yildirim (2015), Alshehri, Ebaid&Cifçi (2016), Akkoyunlu&Kibar (2013), Alrwele (2017), and Alotiabi (2016)which indicated that Infographics play an important role in improving pupils' attitude and increase their motivation towards learning the subjects.

Conclusion

With reference to the results of the study, the following points were concluded:

Using Infographics in teaching grammar made it easy for pupils to learn grammar rules. Besides, pupils were interested in this learning tool, as young learners like pictures a lot. Pupils were active and motivated to practice grammar rules and answer the exercises.

Using Infographics improved the pupils' attitude towards learning grammar, in particular, and learning English, in general. Students enjoyed learning using technology, and their opinions about this way of learning were positive.

The current study presented empirical evidence that primary stage pupils can be motivated to practice grammar and their level could be enhanced through using Infographics as a teaching and learning tool. Based on results of the study, it became clear that Infographics-based program is an effective and attractive tool for improving EFL grammar achievement and pupils' attitude.

- **Recommendations of the study:**

Based on the results and conclusions of the current study, the following recommendations were offered:

1- It is highly necessary for EFL teachers to develop their technological abilities and make use of modern approaches as Infographics in the teaching process.

2- Multimedia should be used to attract students' attention.

3- Well-equipped computer facilities, language labs and appropriate technical and administrative support should be provided in schools.

4- Continuous and up-to-date training for teachers to adapt the technical teaching aids should be provided.

5- The ministry of education should adopt and support the idea of designing Infographics programs for the instructional curriculum.

6- Infographics as a learning tool may be useful for all stages not only the primary one.

7- Teachers should use effective and attractive teaching and learning tools specially the visual aids to develop and enhance students' attitude towards learning the subject.

- **Suggestions for further Researcher**

The following ideas may be considered for further researches:

1-Investigating the effectiveness of Infographics programs in developing pupils' EFL grammar learning at other primary stage grades.

2-Investigating the effectiveness of using Infographics programs in developing primary stage pupils' EFL vocabulary learning.

3-Investigating the effectiveness of using Infographics programs in developing Preparatory stage pupils' speaking and reading skills.

4-The role of interactive Infographics programs in developing primary and preparatory stage students' language skills.

5-Investigating the effectiveness of using interactive and animated Infographics programs in developing students' pronunciation.

6-Investigating the impact of using Infographics programs on developing students' story comprehension and increasing their retention ability.

References

Abilock, D.,& Williams, C. (2014). *Recipe for an Infographic. KnowledgeQuest Achievement of Seventh Grade Students In a sustained Silent Reading Program.* (Published Doctoral Dissertation), University of Mississippi.

Adam, E.(2016).Investigating the impact of teaching grammar through the direct method. Sudan University of Science and TechnologyCollege of Graduate Studies.

Ahmed, S. (2015). Attitudes towards English language learning among EFL learners at UMSKAL. University Malaysia Sabah, Labuan International Campus, Jalan Sungai. Journal of Education and Practice, 6(18). ISSN 2222-1735 (Paper). ISSN 2222-288X (Online).

Ajzen, I. (1993). Attitude Theory and the Attitude-Behavior Relation. In D. Krebs & P. Schmidt (Eds.), *New directions in attitude measurement*. Berlin: De Gruyter.

Ajzen, I. (2012). Martin Fishbein's legacy: The reasoned action approach. The Annals of the American Academy of Political and Social Science, 640(1), 11-27.

Akay, E.,&Torman,C.(2015). Students' attitudes towards learning English grammar: A study of scale development. CanakkaleOnsekiz Mart University in Turkey. *Journal of Language and Linguistic Studies,*

11(2), 67-82; 2015. ISSN: 1305-578X   .Available online at www.jlls.org

Akdag, et al. (2016). Statistical reasoning of impact of infographics on education.

Albalawi, S.(2014).Using media to teach grammar in context and UNESCO values: A case study of two English teachers and students from Saudi Arabia. *EWU Masters Thesis Collection*. 258. Retrieved April 4, 2018, from: http://dc.ewu.edu/theses/258

Al Hosni,J. (2016). The power of image in English language teaching.*The Journal of Teaching English For Specific AndAcademic Purposes, 4*(1), 229-235.

Al Mamun, S., et al.(2012). Students' attitudes towards English: The case of life science school of Khulna University. International Review of Social Sciences and Humanities, 3(1), 200-209. Retrieved March 15, 2018 from:https://pdfs.semanticscholar.org/52af/c769617f5445f3fddd5a842 771611646ed24.pdf

Al-Harbi,S., &Alshumaimeri,A. (2014). The flipped classroom impact in grammar class on EFL Saudi secondary school students' performances and attitudes. King Saud University, Riyadh, Saudi Arabia. *English Language Teaching, 9*(10). doi: 10.5539/elt.v9n10p60

Ali,E. (2017). The effectiveness of a proposed (CALL) program in developing the preparatory students' EFL vocabulary and grammar learning and motivation. (Unpublished master's thesis), Mansoura University, Egypt.

Al-Jarf, R. (2005). The effects of online grammar instruction on low proficiency EFL college students' achievement. *Asian EFL Journal Quarterly, 7*(4), 166-190.

Al-Mekhlafi, A., &Nagaratnam, R. (2011). Difficulties in teaching and learning grammar in an EFL Context. *International Journal of Instruction, 4*(2), 69-92.

Al-Mekhlafi, A., &Nagaratnam, R. (2011). Attitudes towards EFL Grammar Instruction: Inductive or Deductive?   Sultan Qaboos University. *International Journal of Instruction*

Al-Mohammadi,N.(2017). Effectiveness of using Infographics as an approach for teaching programming fundamentals on developing analytical thinking skills for high school students in the City of Makkah in Saudi Arabia. University of Jeddah, Saudi Arabia. *Global Journal of Educational Studies, 3*(1), 22.42. ISSN 2377-3936.

Alotiabi, W. (2016). *The impact of using instructional infographics on students' achievement in English language grammar of first grade in Riyadh.* (Published master's thesis). *Al- Imam Muhammed bin Saud Islamic University, 43*(2), 45-55.

Al-Ruhaily, A. (2011). *The effectiveness of a suggested program based on using oral communicative activities in developing EFL students' speaking proficiency and their attitude towards it.*Taibah University

Alrwele,N.(2017). Effects of Infographics on Student Achievement and Students' Perceptions of the Impacts of Infographics.*Journal of Education and Human Development, 6*(3), 104-117. ISSN: 2334-296X (Print), 2334-2978 (Online)

Alshehri,M., &Ebaid,M.(2016).The effectiveness of usinginteractiveinfographics at teaching Mathematics in elementary school.Najran University, Saudi Arabia.*British Journal of Education, 4*(3), 1-8.

Al-Tamimi,A. (2007). Motivation and attitudes towards learning English: A study of petroleum engineering undergraduates at Hadhramout University of Sciences and Technology.*GEMA Online Journal of Language Studies*, *9*(2), 29-55. Retrieved April 12, 2018, from: http://www.ukm.my/ppbl/Gema/pp%2029_55.pdf

Al-Tamimi, A., &MunirShuib. (2008). The English Language Curriculum for Petroleum Engineering Students at Hadhramout University of Science and Technology. In Z. Moris, H. Abdul Rahim, &S. Abdul Manan(Eds.), *Higher education in theAsia pacific: Emerging trends in teaching and learning (pp. 115-125).*Malaysia:PenerbitUniversitiSains Malaysia.

Altman, I., & Taylor, D. (1973). *Social penetration: The development of interpersonal relationships*. New York: Holt, Rinehart and Winston.

Ampa, A. (2015). The implementation of interactive multimedia learning materials in teaching listening skills. English Language Teaching, 8(12), 56-62. http://dx.doi.org/10.5539/elt.v8n12p56.

Anichvasin, P. (2013). Enhancing the quality of learning through the use of infographics as visual communication tool and learning tool (pp. 135-142). In the Proceedings ICQA 2013: The International approach. *The Annals of the American Academy of Political and Social Science, 640*(1), 11-27.

Aripin, R. Mahmood, Z. Rohaizad, R. Yeop U. &Anuar. M. (2008). Students' Learning Styles and Academic Performance. 22nd Annual SAS Malaysia Forum. Kuala Lumpur.

Atkinson, R., Herrnstein, R., Lindzey, G., Duncan Luce, R. (1988). *Stevens' handbook of experimental psychology: Learning and cognition.* New York, NY: John Wiley and Sons.

Azim,M. (2016). Iranian EFL students' attitudes to the techniques..University of Malaya, Malaysia. EUROPEAN ACADEMIC RESEARCHVol. III, Issue 10.

Bade, M. (2008). Grammar and Good Language Learners. In C. Griffiths, C. (Ed.) *Lessons from good language learners.* Cambridge: Cambridge University Press.

Baleghizadeh, S., &Farshchi, S. (2010). An exploration of teachers' beliefs about the role of grammar in Iranian high schools and private language institutes. *Journal of English Language Teaching and Learning, 52*(212), 17-38.

Ball, C., Bowen, T., &Fenn, T. (2013). Genre and Transfer in a Multimodal Composition Class. In T. Bowen & C. Whithaus (Eds.), *Multimodal literacies and emerging genres (*15-36). Pittsburgh, PA: University of Pittsburgh Press.

Balliette, A. (2011). The do's and don'ts of infographic design. Smashing Magazine. Retrieved April 20, 2017, from:http://www.smashingmagazine.com/2011/10/14/the-dos-and-donts-of-infographicdesign.

Batstone, R., & Ellis, R. (2009). Principled grammar teaching. *System: An International Journal of Educational Technology and Applied Linguistics, 37*(2), 194-204.

Beeland, W. (2002). Student engagement, visual learning and technology: Can interactive whiteboards help? *Action Research Exchange, 1*(1), 1-6. Retrieved March 12, 2017, from:http://chiron.valdosta.edu/are/Artmanscrpt/vol1no1/beeland_am.pdf.

Berg, C. (2005). Factors related to observed attitude change toward learning chemistry among university students. Chemistry Education Research and Practice, 6(1), 1-18.

Berinato, S. (2013). The power of visualization's "Aha!" Moments.*Harvard Business Review*.Retrieved July 11, 2018, from http://blogs.hbr.org/2013/03/power-of-visualizations-aha-moment/

Bertini, E. (2013). What's the best way to teach visualization? Retrieved August 2, 2017,from:http://fellinlovewithdata .com/ reflections/teach-visualization

Borg, S. (2003). Teacher cognition in language teaching: a review of research on what language teachers think, know, believe, and do.*Language Teaching, 36*, 81-109.

Borg, S. (2006). *Teacher cognition and language education*. London: Continuum.

Borg, S. (2007). Research engagement in English language teaching.*Teaching and Teachers Education, 23*,731-747.

Borkin, M., Azalea, A., Bylinskii, Z., Isola, P., Sunkavalli, S., Oliva, A., &Pfister H.(2013).What makes a visualization memorable? *IEEE Transactions on Visualization and Computer Graphics, 19*(12), 2306-15.

Brill, J., Kim, D., & Branch, R. (2007). Visual literacy defined: The results of a Delphi study – can IVLA (Operationally) define visual literacy? *Journal of Visual Literacy 27*(1), 47–60.

Brown, H. (2006). *Principles of language learning and teaching* (5[th]ed.). White Plains, NY: Pearson Education.

Buck, S. (2012). For brand engagement, visuals rule [infographic]. Mashable.com. Retrieved January 12, 2018, from:http://mashable.com/2012/08/24/visual-storytelling-brands

Burgess, J.,&Etherington, S. (2002). Focus on grammatical form: Explicit or implicit? *System,* 30, 433-458.

Cairo, A. (2012). Instructor's guide.Retrieved April 13, 2018, from:http://www.thefunctionalart.com/p/instructors- guide.html.

Cairo, A. (2012). Infographics and visualizations as tools for the mind. Cambridge: Cambridge University Press.

Card, S., Mackinlay, J., &Schneiderman, B. (1999). *Readings in information visualization: Using vision to think*. San Diego, CA: Academic Press.

Celce-Murcia, M. (2001). *Teaching English as a second or foreign language* (3[rd]ed.). Boston: Heinle&Heinle Publishers.

Celce-Murcia, M. (1991). Grammar pedagogy in second and foreign language teaching.*TESOL Quarterly, 25*, 459-480.

Celce-Murcia, M. (2014). An Overview of Language Teaching Methods and Approaches. In M. Celce-Murcia, D. Brinton, & M. Snow (Eds.), *Teaching English as a second or foreign language* (4[th]ed.) (pp. 2-14). Boston, MA: HeinleCengage Learning.

Chamber, G. (1999). *Motivating language learners*. Clevedon: Multilingual Matters. Ltd.

Chandler, P. (2004). The crucial role of cognitive process in the design of dynamic visualization.*Learning and Instruction, 14*, 353-357.

Chawhan, L., & Oliver, R. (2000). What beliefs do ESL students hold about language learning? *TESOL in Context, 10*(1), 20-26.

Chen, G., & Fu, X. (2003). Effects of multimodal information on learning performance and judgment of learning. *Journal of Educational Computing Research. 29*(3), 349-362.

Chomsky, N. (1957). *Syntactic structures*. The Hague/Paris: Mouton.

Chomsky, N. (1965). *Aspects of the theory of syntax*. Cambridge, MA: MIT Press.

Chong, A. (2012). Aligning trends in mainstream media and data visualization with teaching practice. Paper presented at the Professional Communication Conference (IPCC), IEEE International, pp. 1-5. doi:10.1109/IPCC.2012.6408633.

Cifçi,T. (2016). Effects of Infographics on students' achievement and attitude towards geography lessons.Cumhuriyet University, Sivas, Turkey. *Journal of Education and Learning, 5*(1). doi:10.5539/jel.v5n1p154

Clark, C. (2014). Turn your syllabus into an infographic. Retrieved April 21, 2017, from:https://ltlatnd.wordpress.com/2014/08/26/turn-your-syllabus-into-an-infographic/.

Conner, M., & Browne, M. (2013). Navigating the information-scape: Information visualization and student search. *Reference Services Review, 41*(1), 91-112. doi:10.1108/00907321311300901.

Cook, G. (Ed.). (2014). *Thebest American infographics*. New York, NY: Houghton Mifflin Harcourt.

Cooper, C. (2014). Millennials and the explosion of visual learning. Retrieved March 25, 2018, from: https://www.propointgraphics.com/blog/millennials-explosion-visual-learning/.

Cooper, Y. (2016). The creation of data visualization and synthesizing process. Washington State University, Tri-Cities, USA. *Wikicreation*. Retrieved June 12, 2018, fromhttp://wikicreation.fr/upload/Yichien_Cooper_The_Creation_of_Data_Visualization_and%20Synthesizing_Process.pdf

Cotterall, S. (1995). Readiness for autonomy: Investigating learner beliefs. *System, 23*(2), 195-205.

Cotterall, S. (1999). Key variables in language learning: What do learners believe about them? *System 27*(4), 493-513.

Cowan, R. (2008). *Teachers grammar of English with answers*. Cambridge: Cambridge University Press.

Crivos, M.,&Luchini, P. (2012). Pedagogical proposal for teaching grammar using consciousness- raising tasks. *MJAL, 4*(3).

Cuban, L. (1986). *Teachers and machines: The classroom use of technology since 1920*. New York: Teachers College Press.

Dalil,Z.(2013). The importance of grammar in second language teaching. University Hassan 2 .Mohammedia Casablanca

Dalziel,F.(2013). The role of grammar in EFL instruction: a study on secondary school students and teachers.UniversitàdegliStudi di Padova

David, A., &Glore, P. (2010). The impact of design and aesthetics on usability, credibility, and learning in an online environment. *Online Journal of Distance Learning Administration, 8*(4).

David. (2012). Aboutinfographics. InfographicsLabs.com. Retrieved June 3, 2017, from: http://infographiclabs.com/infographic/what-is-an-infographic/

Davidson, R. (2014). Using Infographics in the science classroom. *Science Teacher, 81*(3), 34-39. doi:10.2505/4/tst14_081_03_34.

Davis, M., & Quinn, D. (2013). Visualizing text: The new literacy of infographics. *Reading Today, 31*(3), 16-18.

DeCarlo, D. & Stone, M. (2013). Technical perspective: Visualization, understanding, and design. *Communications of the Acm. 56*(1), 105. DOI: 10.1145/2398356.2398378.

DeKeyser, R. (1995). Learning second language grammar rules: An experiment with a miniature linguistic system. *Studies in Second Language Acquisition*, *17*, 379-410.

DeKeyser, R. (1998). Beyond Focus on Form: Cognitive Perspectives on Learning and Practicing Second Language. In C. Doughty, & J. Williams (Eds.). *Focus on form in classroom second language acquisition* (pp. 42-63). Cambridge: Cambridge University Press.

Deng,F.,&Lin,Y.(2014). A Comparative Study on Beliefs of Grammar Teaching between High School English Teachers and Students in China. Foreign Languages College, Jiangxi Normal University, China. *English Language Teaching, 9*(8). doi: 10.5539/elt.v9n8p1

Dick, H. (2004). *The Future of multimedia: Bridging to virtual worlds.* Englewood --Clifts, N. Jersey. Education Technology Publication.

Dick, M. (2014). Interactive Infographics and news values. *Digital Journalism, 2*(4), 490-506.

Doughly, C. (2003). Instructed SLA: Constrains, Compensations, and Enhancement. In M. Long & C. Doughty (Eds.). *The hand book of second language acquisition* (pp. 256310). New York: Black Well.

Doumont, J. (2002). Verbal versus visual: A word is worth a thousand pictures, too. *Technical Communication, 49*(2), 219.

Drobot,I. (2014) Teaching English reported speech to engineering students. *American Journal of Educational Research, 3*(6), *749-752.*

Duarte, A. (2007). Conceptions of learning and approaches to learning in Portuguese students. *Higher Education, 54*, 781-794.

Durrani, H. (2016). Attitudes of undergraduates towards grammar translation method and communicative language teaching in EFL context: A case study of SBK Women's University Quetta, Pakistan. Advances in Language and Literary Studies, 7(4).   ISSN: 2203-4714

Dwyer, F. 2008). Effect of knowledge of objectives on visualized instruction. *Journal of Psychology, 77*, 219-221.

Edilian, L. (2009). *A study of attitudes toward grammar instruction in an academic English program*. Saarbücken: VDM Verlag.

Eickhoff,L.(2016). *Attitudes about prescriptive grammar in ESL and EFL teachers and students*. (Unpublished master's thesis), Michigan State University.

Eilam, B. (2012). *Teaching, learning, and visual literacy: The dual role of visual representation*. Cambridge: Cambridge University Press.

Ellis, R. (2006). Current issues in the teaching of grammar: An SLA perspective. *TESOL Quarterly, 40,* 83–107.

Ellis, R., &Barkhuizen, G. (2005). *Analyzing learner language*.Oxford: Oxford University Press.

Ellis, R. (2008). Grammar in Language Teaching. In E. Hinkle, & S. Fotos (Eds.), *New perspectives on grammar* teaching *in second language classrooms* (pp. 13-15). New York: Routledge.

Ellis, R., Loewen, S., Elder, C., Erlam, R., Philp, J., &Reinders, H. (2009). Implicit and Explicit Knowledge in Second Language Le.

Farjami, H.(2011). The effect of academic study on Grammar attitude, Grammar motivation, and perception of grammar relevance.Semnan University, Semnan,   Iran. *Modern Journal of Language Teaching Methods (MJLTM), 1*(2).

Farrell, T., & Patricia, L. (2005). Conceptions of grammar teaching: A case study of teachers' beliefs and classroom practices teaching English as a second language. *E-Journal, 9*(2).

Fazio, R. (1986). How Do Attitudes Guide Behavior? In R. M. Sorrentino, & E. T. Higgins (Eds.), *The handbook of motivation and cognition: Foundations of social behavior*, (204-243). New York: Guilford Press.

Felder, R., &Soloman, B. (2000). Learning styles and strategies. Retrieved April 16, 2018, from: http://www.Engr.Ncsu.edu/learningstyles/ilsweb.html

Fernando, A. (2012). Killer infographic! But does it solve TMI? *Communication World, 29*(2), 10-12.

Festinger, L. (1957). *A theory of cognitive dissonance*. Evanston: Row Peterson.

Few, S. (2007). Data visualization: Past, present, and future. Retrieved August 27, 2017, from: http://www.perceptualedge.com/articles/Whitepapers/Data_Visualization.pdf.

Fishbein, M. &Ajzen, I. (1975). *Belief, attitude, intention, andbehaviour.* Boston: Addison-Wesley.

Fleming, N. (2001). VARK -- A guide to learning styles. Retrieved July 17, 2017, from:http://www.vark-learn.com/

Flemming, M., &Levie, W. (Eds.). (1993). *Instructional message design: Principles from the behavioral and cognitive sciences.* Hillsdale, NJ: Educational Technology Publications.

Freeman, D. (1991). Teaching Grammar. In M. Celce-Murcia (Ed.) *Teaching English as a second or foreign language*. Boston: Heinle&Heinle Publishers.

Freeman, D. (2004). *Techniques and Principles in Language Teaching*. New Delhi: Oxford University Press.

Larsen-Freeman, D. (2003). *Teaching language: From grammar to grammaring*. Heinle: Newbury House.

Fu, J. (2009). A study of learning styles, teaching styles and vocabulary teaching strategies in Chinese primary school- How do they differ and how can they be integrated? Retrieved March 25, 2017, from:http://hkr.diva-portal.org/smash/get/diva2: 228945/FULLTEXT01.pdf

Gaikwad,V.(2013). The Impact of a Visual Approach Used in the Teaching of Grammar When Embedded into Writing Instruction: A Study on the Writing Development of Chinese First Year University Students in a British University in China. (Unpublished doctoral dissertation), University of Exeter, China.

Gardner, H. (2010). Five Minds for the Future. In J. Bellance, & R. Brandt (Eds.). *21ˢᵗ Century skills: Rethinking how students learn*. Bloomington, IN: Solution Tree Press.

Gebre, E., &Polman, J. (2014). Collaborative infographics for developing young adults' meta-representational competence. Paper presented at the Annual Meeting of the. Philadelphia, PA: AmericanEducationalResearch Association.

Gebre, E., &Polman, J. (2015). Collaborative infographics for supporting the development of meta- representational competence of young adults. Manuscript submitted for publication.

George, S. (2013). Teaching the smartphone generation: How cognitive science can improve learning in law school. *Maine Law Review, 66*(1), 164 – 190.

Ghaderi, V. &Afshinfar, J. (2014). A comparative study of the effects of animated versus static funny pictures on Iranian intermediate EFL students' intake and retention of idioms. *Procedia - Social and Behavioral Sciences, 98*, 522–531.

Goktepe, F. (2014). Attitudes and motivation of Turkish undergraduate EFL students towards learning English language.*Studies in English Language Teaching, 2*(3).

Golombisky, K.,& Hagen, R. (2013). White space is not the enemy a beginner's guide to communicating visually through graphic, web and multimedia design. Burlington, MA: Elsevier Inc. DOI:10.1016/B978-0-240-81281-6.50018-1.

Graham, S. (2006). A study of students' meta-cognitive beliefs about foreign language study and their impact on learning. *Foreign language annals, 39*(2), 296-309.

Grimley, M. (2007). Learning from multimedia materials: The relative impact of individual differences. *Educational Psychology, 27*(4), 465-485, DOI: 10.1080/01443410601159795.

Halsanova, J., Holmberg N. &Holmquist, K. (2005). Tracing integration of text and pictures in newspaper reading. Retrieved April 25, 2018, from: http://www.lucs.lu.se/LUCS/125/LUCS125.pdf

Hammer, R., &Kellner, D. (1999). Multimedia pedagogy for the new millennium. *Journal of Adolescent& Adult Literacy, 42*(7), 522.

Hankey, S., Longley, T., Tuszynski, M., & Ganesh, M.(2013). Visualizing information for advocacy. Bangalore, India: The Tactical Technology Collective.

Hart, G. (2013). Effective Infographics: Telling stories in the technical communication Context. Retrieved April 22, 2018, from:http://techwhirl.com/effective-infographics-telling-stories-in-the-technical-communication-context/.

Hasler, B., Kersten, B., &Sweller, J. (2007). Learner control, cognitive load and instructional animation. *Applied Cognitive Psychology, 21*, 713-729.

Hattwig, D., Bussert, K., Medaille, A., & Burgess, J. (2013). Visual literacy standards in higher education: New opportunities for libraries and student learning. *Portal: Libraries and the Academy, 13*(1), 61-89.

Hawk, T., & Shah, A. (2007). Using learning style instruments to enhance student learning. *Decision Sciences Journal of Innovative Education, 5*(1), 1-19. doi:10.1111/j.15404609.2007.00125.x

Hedge, T. (2000). *Teaching and learning in the language classroom.* Oxford:OxfordUniversity Press.

Hegarty, M. (2004). Dynamic visualizations and learning: Getting to the difficult questions. *Learning and Instruction, 14*(3), 343–351.

Heidari,F. &Mansourzadeh, N. (2014). Grammar consciousness-raising activities and Iranian EFL learners' attitudes toward English Language. University of Sistan and Baluchestan, Iran. *Journal of Education and Learning,8*(3), 257-272.

Hill, S. & Grinnell, C. (2014). Using digital storytelling with infographics in STEM professional writing pedagogy. Professional Communication Conference, 1-7.

Hmedan,H., &Nafi,J. (2016). The effect of using inductive and deductive methods on 7th grade students' achievement in grammar in Bethlehem District and their attitudes toward EFL. Al-Quds University.*International Journal of Education and Social Science, 3*(9), 38-53.

Hoffler, T., &Leutner, D. (2010). The role of spatial ability inlearning from instructional animations- Evidence for ability as-compensator hypothesis. *Computers in Human Behavior, 4*(2), 56-62.

Holsanova, J., Holmberg, N., &Holmqvist, K. (2009). Reading information graphics: The role of spatial contiguity and dual attentional guidance. *Applied Cognitive Psychology, 23*(9), 1215-1226. Retrieved March 4, 2018, from: http://dx.doi.org/10.1002/acp.1525

Holtze, T. (2006). The web designer's guide to color research. *Internet Reference Services Quarterly, 11*(1), 87-101. DOI: 10.1300/J136v11n01_07.

Hyerle, D. (2008). *Thinking maps: Visual tools for activating habits of mind. Learning and leading with habits of mind: 16 essential characteristics for success.* Alexandria, IL: Association for Supervision and Curriculum Development.

İncecay, V., & Dollar, Y. (2011). Foreign language learners' beliefs about grammar instruction and error correction. *Procedia - Social and Behavioral Sciences, 15*, 3394–3398. Retrieved April 23, 2018, from:http://dx.doi.org/10.1016/j.sbspro.2011.04.307

Islam,A.,&Shuch,I. (2016). Teachers' and students' attitudes towards L1 use in EFL classrooms in the contexts of Bangladesh and Saudi Arabia. King Khalid University, Abha, Kingdom of Saudi Arabia. *English Language Teaching, 9*(12). ISSN 1916-4742 E-ISSN 1916-4750.

Islamoglu, H., Ay, O., Ilic, U., Mercimek, B., Donmez, P., Kuzu, A.,&Odabasi, F. (2015). Infographics: A new competency area for teacher candidates. *Cypriot Journal of Educational Sciences, 10*(1), 32-39.

Johnson, J. (2014). Infographic: How to get the most out of your transactional emails. Janet E. Johnson: Social media trainer, consultant & speaker. Retrieved June 11, 2018, from: http://www.janetejohnson.com/transactional-emails/

Joss, M. (2013). Book reviews: Infographics: The power of visual story telling. *The Seybold Report, 13*(3), 8-12.

Kara, A. (2003). *The effect of a curriculum based on the affective dimension to the affective development and academic achievement of students*. (Unpublished doctoral dissertation), Institute of Social Sciences, Firat University.

Katsioloudis, P. (2010). Identification of quality visual-based learning material for technology education. *Journal of Industrial Teacher Education, 47*(1), 71-99.

Kay, R. (2012). Exploring the use of video podcasts in education: A comprehensive review of the literature. *Computers in Human Behavior, 28*(3), 820-831. doi:10.1016/j.chb.2012.01.011

Kenner, S. (2014). Infographics best practices. GrasshopperMarketing.com. Retrieved January 11, 2018, from:http://grasshoppermarketing.com/infographics-best-practices/.

Kern, E. (2013). Three truths about the visual web we can learn from "We heart it." Retrieved July 4, 2018, from: http://gigaom.com/2013/07/02/three-truths-about-the-visual-web-we-can-learn-from-we-heart-it/

Kessell, A. (2006).*Cognitive methods for Information visualization:Linear and cyclical events*. (Unpublished doctoral dissertation), Stanford University, London.

Kibar,P.&Akkoyunlu,B. (2014). A New Approach to Equip Students with Visual Literacy Skills: Use of Infographics in Education. European Conference on Information Literacy ECIL2014 Dubrovnik/Croatia 20-23 October, 2014.

Kosara, R. (2007). Visualization Criticism: The Missing Link between Information Visualization and Art. IV '07 Proceedings of the 11th International Conference Information Visualization, Washington: IEEE Computer Society.

Kutluay,A., et al.(2012). Using videos for teaching grammar in an ESP class. *Procedia - Social and Behavioral Sciences, 70*, 272 – 281. doi: 10.1016/j.sbspro.2013.01.065

Krauss, J. (2012). More than words can say: Infographics. Retrieved March 10, 2017, from:http://files.eric.ed.gov/fulltext/EJ982831.pdf.

Krum, R. (2013). *Cool infographics: Effective communication with data visualization and design*. NJ. USA:John Wiley & Sons.

Lamb, A. &Johnson, L. (2014). Infographics part 1: invitations to inquiry.*Teacher Librarian, 41*(4), 54-58.

Lamb, G., Polman, J., Newman, A., & Smith, C. (2014). Science news infographics: Teaching students to gather, interpret, and present information graphically. *The Science Teacher, 81*(3), 25-30.

Lambert, J., &Cuper, P. (2008). Multimedia technologies and familiar spaces: 21st Century teaching for 21st century learners. *Contemporary Issues in Technology and Teacher Education, 8*(3), 264-276.

Lambert, M., & Carpenter, M. (2005). Visual learning: Using images to focus attention, evoke emotions, and enrich learning. *Internet@Schools, 12*(5), 20–25.

Lankow, J., Ritchie, J., & Crooks, R. (2012). *Infographics: The power of visual storytelling*. Haboken, NJ: John Wiley & Sons.

Larsen-Freeman, D. (2000).*Techniques and principles in language teaching* (2nded.). Oxford: Oxford University Press.

Lazard, A. & Atkinson, L. (2015). Putting environmental infographics center stage: the role of visuals at the elaboration likelihood model's critical point of persuasion. *Science Communication, 37*(1), 6-33.

Lee, V. (2010). Adaptations and continuities in the use and design of visual representations in US middle school science textbooks. *International Journal of Science Education, 32*(8), 1099–1126.

Lester, P. (2013). *Visual communication: images with messages* (5ed.). Mishawaka, Indiana: Independence, KY: Wadsworth, Cengage Learning.

Li, A. (2013). Rise of infographics: Marketing in the social-media age. Mashable.com. Retrieved January 11, 2018, from:http://mashable.com/2013/01/26/infographics-marketing/

Lightbown, P., &Spada, N. (1999). Instruction, first language influence, and developmental readiness in second language acquisition.*The Modern Language Journal, 83*, 1-22.

Lim, D., & Morris, M. (2009). Learner and instructional factors influencing learning outcomes within a blended learning environment. *Educational Technology & Society, 12*(4), 282–293.

Linn, M., Lee, H., Tinker, R., Husic, F., & Chiu, J. (2006). Teaching and assessing knowledge integration. *Science, 313*, (5790), 1049-1050.

Little, D., Felten P.,& Berry, C. (2010). Liberal education in a visual world. *Liberal Education, 96*(2), 44-49.

Loewen, S., Li, S., Fei, F., Thompson, A., Nakatsukasa, K., Ahn, S., & Chen, X. (2009). Second language learners' beliefs about grammar instruction and error correction. *The Modern Language Journal, 93*, 91–104. http://dx.doi.org/10.1111/j.1540-4781.2009.00830.x.

Lowe, R. (2004). Interrogation of a dynamic visualization during learning. Learning and Instruction.doi: 10.1016/j.learninstruc.2004.06.003.

Matrix, S.&Hodson, J. (2014). Teaching with Infographics: Practicing new digital competencies and visual literacies. . *Journal of Pedagogic Development*, *4*(2), 17-27.

Mayer, R.,& Moreno, R. (2002). Aids to computer-based multimedia learning. *Learning and Instruction, 12*, 107-119.

Mayer, R., & Moreno, R. (2003). Nine ways to reduce cognitive load in multimedia learning. *Educational Psychologist, 38*(1), 43–52.

Mayer, R. (2001). *Multimedia learning*. Cambridge University Press, New York.

Mayer, R. (2008). Applying the science of learning: Evidence-based principles for the design of multimedia instruction. *American Psychologist, 63*(8), 760–769.

Mayer, R., & Anderson, R. (1992). The instructive animation: Helping students build connections between words and pictures in multimedia learning. *Journal of Educational Psychology, 84*(4), 444-452.

Mayer, R., & Johnson, C. (2008). Revising the redundancy principle in multimedia learning. *Journal of Educational Psychology, 100*(2), 380–386.

Mayer, R., & Massa, L. (2003). Three facets of visual and verbal learners: Cognitive ability, cognitive style, and learning preference. *Journal of Educational Psychology, 95*(4), 833–841.

Moreno, R., & Mayer, R. (2000). A learner-centered approach to multimedia explanations: Deriving instructional design principles from cognitive theory. Interactive multimedia electronic. Journal of Computer-Enhanced Learning. Retrieved August 25, 2018, from: http://imej.wfu.edu/articles/2000/2/05/index.asp

Mayer, R., & Sims, V. (1994). For whom is a picture worth a thousand words? Extensions of a dual-coding theory of m*ulti-media learning.* Journal of Educational Psychology, 86, 389– 401.

Mayer, R., Heiser, J., &Lonn, S. (2001). Cognitive constraints on multimedia learning: When presenting more material results in less understanding. *Journal of Educational Psychology, 93*(1), 187–198.

McCue, T. (2013). Why Infographics rule. Retrieved March 5, 2018, from: http://www.forbes.com/sites/tjmccue/2013/01/08/what-is-an-infographic-and-ways-to-make-it-go-viral

Meeusah, N., &Tangkijviwat, U. (2013). Effect of data set and hue on a content understanding of infographic. Retrieved March 10, 2018, from: http://www.repository.rmutt.ac.th/xmlui/handle/123456789/1263. Accessed: 20.01.2015.

Merkt M., Weigand S., Heier A. & Schwan S., (2011). Learning with videos vs. learning with print: The role of interactive features. *Learning and Instruction, 21*(6), 687-704.

Metros, S. (2008). The educator's role in preparing visually literate learners. *Theory into Practice, 47*(2), 102-109. doi:10.1080/00405840801992264.

Michelle A., Azalea A., Zoya B., Phillip I., Shashank S., Aude O. &Hanspeter P., (2013). What makes a visualization memorable?*IEEE*

Transactions on Visualization and Computer Graphics, 19(12), 2306-2315.

Midraj, S. (1998). *ESL students' attitude and communicative competence. (*Unpublished doctoral dissertation). The School of Graduate Studies, Indiana State University. Terre Haute, Indiana.

Mocek, E. (2012). Visual literacy and higher education's syllabus. Paper presented at the Society for Information Technology & Teacher Education International Conference, (1), 2977-2982.

Mol, L. (2011). The potential role for infographics in science communication. (Unpublished master's thesis), BiomedicalSciences,Vrije University, Amsterdam.

National Research Council. (2012). *A framework for K-12 science education: Practices, crosscutting concepts, and core ideas.* Washington, DC: National Academies Press

Moreno, R. (2007). Optimizing learning from animations by minimizing cognitive load: Cognitive and affective consequences of signaling and segmentation methods. *Applied Cognitive Psychology, 21*, 765-781.

Murphy, R. (2011). English grammar in use (3rded). Cambridge: Morgan Kaufman Publishers.

Nagaratnam,R., & Al-Mekhlafi,A.(2013) Attitudes towards EFL Grammar Instruction: Inductive or Deductive?

Nassaji, H. &Fotos S. (2011). *Teaching grammar in second language classrooms: Integrating form-focused instruction in communicative context.*London: Routledge Taylor &Francis Group.

Newsom, D., & Haynes, J. (2004). *Public relations writing: Form & style* (7thed.). Belmont, CA: Wadsworth Publishing.

Nrdquist,R. (2016). Grammar. Retrieved June 5, 2017, from: http://grammar.about.com/od/fh/g/grammarterm.htm

NuhoğluKibar, P., &Akkoyunlu, B. (2014). A New Approach to Equip Students with Visual Literacy Skills: Use of Infographics in Education. In S. -Kurbanoğlu, S. Špiranec, E. Grassian, D. Mizrachi,& R. Catts (Eds.), *Information literacy. Lifelong Learning and Digital Citizenship in the 21stCentury* (Vol. 492, pp. 456-465): Springer International Publishing.

Osterman, M., ReioJr, T., &Thirunarayanan, M. (2013). Digital literacy: A demand for nonlinear thinking styles. Sferc 149.

Parkinson, M. (2012). The power of visual communication. [Earticle]. Retrieved April 3, 2018, from:http://www.billiondollargraphics.com/infographics.html

Perry, M. (2012). The age of the infographic. *Reason, 44*(5), 60-61.

Phetteplace, E. (2012). Effectively visualizing library data. *Reference & User Services Quarterly, 52*(2), 93-97.

Piktochart. (2012). Structuring a story for your infographic. Retrieved July 12, 2017, from:http://piktochart.com/structuring-a-story-for-your-infographic/

Polat, M. (2015) Teachers' attitudes towards teaching English grammar: A scale development study. Anadolu University, Turkey. *International Journal of Instruction, 10*(4),379-398.

Puchta, H. (1999). Creating a Learning Culture to Which Students Want to belong: The Application of Neuro-Linguistic Programming to Language Teaching. In J. Arnold (Ed.),*Affect in language learning*. Cambridge: Cambridge University.

Purpura, J. (2004). *Assessing grammar*. Cambridge: Cambridge University Press.

Ragland, D. (2008). *Attitude variables affecting students' achievements: An assessment of the relationship between student attitudes and achievement among Hispanic High School Students.*(Unpublished doctoral dissertation). College of Education, TUI University. Cypress, California.

Rainie, L., Brenner, J., &Purcell, K., (2012). Photos and videos as social currency online. Retrieved June 12, 2017, from: http://www.pewinternet.org/Reports/2012/OnlinePictures.aspx.

Reed, S. (2010). *Thinking visually*. New York: Psychology Press.

Rendgen, S. (2012). *Information graphics*. New York: Taschen.

Rezaei, N. (2015). The Impact of Infographics on Iranian EFL Learners' Grammar Learning. *Journal of Applied Linguistics and Language Research,2*(1), 78-85.

Rezvani,E., &Ketabi,S. (2016) On the effectiveness of using web- and print-based materials in teaching grammar to Iranian EFL learners. *Procedia Social and Behavioral Sciences 15*, 376–381. Available online at www.sciencedirect.com

Richards, J., & Rodgers, T. (2001). *Approaches and methods in language teaching*. Cambridge: Cambridge University. Press.

Rieber, L., Tzeng, S., &Tribble, K. (2004). Discovery learning, representation, and explanation within a computer-based simulation: finding the right mix. Learning and Instruction.doi: 10.1016/ j.learninstruc.2004.06.008.

Rockenbach, B., & Fabian, C. (2008). Visual literacy in the age of participation. *Art Documentation, 27*(2), 26-31.

Roshan, A., &Elhami, A. (2016). The Effect of Metalanguage on Grammar Noticing of the Iranian EFL Learners. Tehran, Iran. *International Journal of English Linguistics, 6*(3), 194-199.

Ross, A. (2009). Infographics designs: Overview, examples and best practices.Retrieved April 12, 2018, from:http://www.instantshift.com/2009/06/07/infographic-designs-overview-examples-and-best-practices

Sadeghi, K., &Farzizadeh, B. (2013). The Effect of visually-supported vocabulary instruction on beginner EFL learners' vocabulary gain. *MEXTESOL Journal, 37*(1), 1-12.

Saracaloglu, A. (2004). The relationship between students' attitudes toward foreign language and foreign language achievement. Approaches to the study of language and literature. (Paper Presentation), First International Conference DokuzEylulUniversity,Buca Faculty of Education.

Saurbier, A. (2014). Using infographics as an integrative higher-order skill development assignment in undergraduate leadership instruction. *Business Education Innovation Journal, 6*(1), 13-22.

Schnotz, W., &Bannert, M. (2003). Construction and interference in learning from multiple representation. *Learning and Instruction, 13*(2), 141–156. doi: 10.1016/S0959-4752(02) 00017-8 .

Schrock, K. (2014). Infographics as a creative assessment. Retrieved September 29,2017,from: http://www.schrockguide.net/infographics-as-an-assessment.html

Schroeder, R. (2004). Interactive info graphics in Europe--added value to online mass media: a preliminary survey. *Journalism Studies, 5*(4), 563-570.

Schulten, K. (2010). Teaching with infographics: Places to start. Retrieved April 21, 2018, from http://learning.blogs.nytimes.com/2010/08/23/teaching-with-infographics-places- to-start/?_r=0

Schultz, R., (2001). Cultural differences in student and teacher perceptions concerning the role of grammarinstruction and corrective feedback: USA– Colombia. *Modern Language Journal, 85*, 244–258.

Schwan, S., &Riempp, R. (2004). The cognitive benefits of interactive videos. Learning to tie nauticalknots learning. *Learning and Instruction, 14*(3), 293-305.

Segel, E. &Heer, J. (2010). Narrative visualization: Telling stories with data. Retrieved March 16, 2017,from:http://vis.stanford.edu/files/2010-Narrative-InfoVis.pdf.

Shah, P., & Freedman, E. (2003). Visuospatial cognition in electronic learning. *Journal of Educational Computing Research 29*(3), 315-324.

Shahzadi,A., &Janjua,F. (2016). Pakistani ESL student's attitude towards English language grammar: A case study of University of Education, Lahore. *Journal of Literature, Languages and Linguistics, 20*, 17, 23.

Sims, E., O'Leary, R., Cook, J., &Butland, G. (2002).Visual Literacy: What is It and Do We Need It to Use Learning Technologies Effectively? Paper presented at Australasian Society for Computers in Learning in Tertiary Education (ASCILITE 2002), Auckland, New Zeland, December 8-11 (2002).