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The Effect of Multimedia-Based Instruction on Improving Iranian EFL Learners' Grammar Knowledge and their Attitudes

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Abstract

Applying technologies has recently caused language education to undertake influential modifications. Hence, this study tried to investigate the impact of using technology in form of multimedia on improving grammar knowledge of Iranian high school students and also examined their attitudes toward multimedia-based mode of instruction. To do so, three intact classes of lower intermediate students were randomly divided into three groups: multimedia, multimedia + textbook, and control group. After homogenizing the groups regarding their proficiency level, the pre-test was run and results indicated no significant difference. Treatment lasted for 8 sessions, during which the first experimental group was taught through using multimedia elements like cartoons, texts, and Power Point Presentation. The second group had their textbook besides multimedia, while the control group was instructed traditionally by means of the textbook. Comparing the groups' scores on the post-test revealed the superiority of multimedia + textbook group over the other groups in their grammar test performance. The questionnaire outcomes also showed more positive tendency of the students in this group in comparison to the multimedia only group toward application of multimedia programs. Findings of this study might open a novel way to assist EFL learners to increase their grammar knowledge more successfully.

***Keywords**:* computer assisted language learning (CALL), grammar knowledge, multimedia application, textbook

Introduction

The 21st century is accompanied by the universal trends of reform in many fields of education particularly language learning. Hence, to be attuned to these trends, teachers must involve themselves in the newest innovations which might results in promoting students' achievement and their preparation for global cooperation and competitiveness. The swift growth of technology provides teachers unique experiences and activities to dynamically promote the development of English teaching especially in the foreign language (EFL) contexts where learners have very limited chances to practice their language skills (Alsied&Pathan, 2013). Teachers must consider technology not because it is either a threat or boon, but because it unavoidably influences language use (Kern, 2015). Technology forms how language is used in particular contexts, not as a deterministic and autonomous force, but in relation with a wide range of factors comprising social conventions, individual volition, material constraints, and situational context (Kern, 2015).

The narrow definition of technology in terms of digital devices like computers rather than a wide-ranging continuum of mediational resources, makes it easy to overlook the great extent of relying on other technology forms, ranging from audio recordings to films and images by language teachers (Chun & Smith, 2016). As mentioned by Chun and Hsiu (2011), by using multimedia and other digital tools, learners can acquire new languages straight forwardly. The non-traditional approaches which use computer technology in learning and teaching unlike teacher-directed traditional approaches typically restricted to paper-based textbook can increase the quality of language learning in classroom context (Johnson, Sutton, & Harris, 2001). In this regard, Warschauer and Healey (1998) stated that emergence of multimedia has now changed into a major concern in language instruction throughout the world. By incorporating audio, text, graphics, real video, or animations into English lessons, multimedia can generate the encouraging conditions which bring about more autonomous learners (Stemler, 1997). At the same time, multimedia is able to provide learners with a personalized learning context in which they can develop their integrated English skills in listening, speaking, reading, and writing through Human-computer interaction (HCI) (Bitter & Hatfield, 1997). However, as Velleman and Moore (1996) have reported, for any multimedia system to be effective, integrated multisensory elements must be in balance by

using each one for what it does in the best way and not permitting one element govern the others.

According to Sharma and Pooja (2016), well-designed multimedia assists learners in creating more accurate and effective mental models than when they build them by using text alone. The main goal of multimedia is to increase learning by supporting contemporary approaches to teaching and learning where learners have active role in constructing their own knowledge and teachers are considered as the facilitators of learning processes (Fenstermacher, 1986). Two theoretical frameworks of multimedia in language teaching are cognitive psychology and constructivism. Based on cognitive psychology, mental activity or cognition encompasses the acquisition, storage, and retrieval of knowledge actively through initiative procedures depending on learners' demands, attitudes, habits, interests, and their own backgrounds. In this psychology, learner is considered as being constructive rather than inactive recipient of information. Regarding this theory, computer is a system for presenting information and features like animation and pictures can make the presented information more meaningful. As a result, those learners who favor visual approaches would benefit from this type of presentation (Mayer, 2009). Mayer's (2009) cognitive theory of multimedia learning includes three assumptions: there are two distinct channels (visual and auditory) for processing information, occasionally named dual coding theory; there is restricted channel capacity; and learning is the product of dynamic screening, choosing, organizing, and assimilating information based on background knowledge. On the other hand, in constructivism theory, learning relies on learners' vigorous engagement throughout studying. Constructivism promotes learners to learn via personal experiences accompanied by others' help as facilitator and appropriate learning materials. Consequently, one of the implications of this theory in language classrooms is providing multimedia resources required to encourage active involvement in learners and avoid being merely information repositories (Grabe&Grabe, 1998).

In traditional classrooms, teachers are considered as the chief source of knowledge by students and they rarely use their creativity in order to solve the problems. Nevertheless, the ever-growing need for self-regulated learning has resulted in new viewpoints in the teaching profession and traditional opinions

about teacher's roles (Sharma &Pooja, 2016). Self-study style can be implemented by using multimedia technology and learners can do many activities of their own. Consequently, the learners can actively combine their previous experience with the new ones by analyzing them based on their own strategies so that they can cope with the problems effectively and successfully (Sharma &Pooja, 2016). Instead of restricting themselves to the textbooks, learners try to use the plenty of online information available in the multimedia environment (Sharma &Pooja, 2016).

Based on the results of a study conducted by Vernadakis, Zetou, Tsitskari, Giannousi, and Kioumourtzoglou (2008), multimedia could improve language learners' motivation and their language skills, have effect on their learning attitude, and build their self-confidence via different interactive and communicative activities. Their findings showed that multimedia language courseware permits learners to evaluate their own learning confidently as well. More recently, Rostami, Akbari, and Ghanizadeh (2014) investigated the effect of technology-enhanced contexts on Iranian EFL learners' reading comprehension in smart schools. They exposed their experimental group to smart board, software program, power point presentation, and World Wide Web. The findings revealed that Smart Schools Programs have significant impact on learners' reading comprehension and the reading materials retention as well. On the other hand, Ruan (2015) examined the effect of using multimedia on enhancing multi-literacies and listening comprehension. His participants were 102 sophomores Chinese learners of English who were randomly divided into one experimental and one control group. The experimental group received multimodal-based autonomous listening teaching mode, while the control group was taught by pure audios in traditional teaching mode. In order to measure the learners' attitude towards these teaching modes and their effectiveness a questionnaire was run as the pre-test and the post-test. Results proved that the new model was more popular and was able to improve the participants' autonomous learning ability, their listening comprehension, and multi-literacies.

Despite the abundance of comparative studies on computer assisted instruction in improving various skills of language like reading and listening comprehension (e.g., Lysenko &Abrami, 2014; Rachal, 1995; Wenhong, 2016), studying the role of multimedia in L2 grammar instruction recently has

attracted the researchers' attention in the field (Koehler, Thompson, &Phye, 2011). Therefore, the need for doing more research in this domain is sensed and the present study has attempted to examine the effect of using multimedia on improving Iranian EFL learners' grammar knowledge. For this purpose, the following research questions were posed:

1. Do multimedia, combination of multimedia and textbook, and traditional mode of instruction have any statistically significant effect on improving EFL learners' grammar knowledge?
2. Are there any significant differences among the effects of multimedia, combination of multimedia and textbook, and traditional mode of instruction on improving EFL learners' grammar knowledge?
3. What are the learners' attitudes toward multimedia-based mode of instruction?

Method

Participants

To fulfill the objectives of this study, three intact classes including 100 third grade female students were selected from Nikan high school in Tehran city. They were in the age range of 14-16 and were non-randomly selected from low intermediate level classes. Then, they were homogenized through a piloted Oxford Language Placement Test (OPT). The participants whose scores were between 30-39 were selected according to the scoring guidelines offered in this test. It should be mentioned that the data belonging to 10 students were removed from final analysis because they were above or below this band score. Then, classes were randomly divided into three groups: experimental group1 (multimedia, n= 28), experimental group2 (multimedia + textbook, n=29), and control group (n=33). A group of 25 participants with almost similar characteristics to the target sample participated in the pilot study of proficiency test (OPT) and the pre and post-test as well.

Instrumentation

In order to carry out the aims of the present study, two groups of instrument were used including teaching and testing materials. The testing instruments consisted of:

(a) Language proficiency test: a sample of quick oxford placement test was used to check the homogeneity of the participants regarding their proficiency level which includes two parts with 60 items dedicated to test learners' grammar and vocabulary knowledge through multiple-choice items and cloze passages.

(b) Grammar test: this test contained 50 multiple choice items which were appropriate for students' level of language proficiency and was designed in two parallel forms administered as the pre and the post-test.

(c) Attitude questionnaire: this questionnaire included 16 items arranged to be answered in Likert Scale format (1-5) strongly disagree, disagree, unsure, agree, and strongly agree. The original questionnaire (developed by Nunan, 1991) contained 30 questions; however, after consulting with five English Language Teaching (ELT) experts, sixteen items were adopted since they were matched with the context of the study and the questionnaire was piloted to ensure its validity and reliability for being used in the new context.

The teaching materials consisted of:

a) Multimedia software: this software is designed by the educational technology office in ministry of education including a variety of animations, PowerPoint programs, graphics, videos, and sounds. The researchers added some more materials to it including videos and some tests (see Appendix A).

b) Textbook: the high school third grade English textbook is used nationwide in Iran and covers 6 lessons consists of reading passages, grammar digests, language functions, and pronunciation exercises.

Piloting

Both the pre and the post-test constructed for measuring the grammar knowledge in the present study were checked for reliability and validity. The reliability of the language proficiency test was checked through piloting as well. To ensure that interpretations of the test scores were valid, two experienced ELT teachers were asked to give comments on the tests and their suitability for the students. Their comments helped a lot in determining if content of each item measured what was intended to measure. It was also necessary to analyze the consistency of the tests with the instructional objectives of the treatments in this study. The experts found that the tests were consistent with the objectives and they were suitable for the learners' language

proficiency level (lower-intermediate level); however, some items were revised taking these comments into consideration.

For ensuring the reliability of the grammar test, it was piloted with 25 learners with characteristics similar to those of the real participants. KR20 analyses were performed to calculate participants' response consistency across two versions (A and B) of this test. The reliability of the language proficiency test was also calculated in the same way. The estimated values were 0.93, 0.87, and 0.95 respectively.

Furthermore, for determining if both forms of grammar tests were equivalent, the scores from both administrations were correlated to yield a coefficient of equivalence. The computed correlation coefficients showed a strong positive relationship between the two forms. The correlation between tests A and B was $r = .82$, $p < .0001$. The reliability of the questionnaire was determined through Cronbach alpha which turned out to be 0.83.

Procedure

The data collection procedure lasted for 12 sessions of 45 minutes. At first session, the learners in all groups received language proficiency test in order to ensure their homogeneity. In the second session, the pre-test was administered before starting the treatment. The data belonging to the students whose score were above 60% on the pre-test were removed from the final analysis because these students already had the average level of grammar knowledge related to the target structures before starting the treatment. The target grammatical structures were the grammar points of lesson two and three in the English book 3. These structures were infinitives, gerunds, and phrasal verbs. Then, in the next following 8 sessions, the students in the experimental group1 (multimedia group) received their instruction by the multimedia. First, the target structures were presented to them through some power point slides which contained explicit explanations related to the rules followed by some examples. The examples contained pictures, some sound tracks, and storyline programs. Then, they could see some animations and videos and perform different activities. The textbook materials and exercises were also presented through this software. Therefore, it was announced to the students that it was not necessary to bring their textbooks to the class during these sessions. Therefore, they could see texts and different exercises of their textbook on the screen.

On the other hand, participants in the experimental group2 (multimedia + textbook) received all the instructional materials of the first experimental group; however, they worked on their paper-based textbook as well and the participants in the control or traditional group did not receive any multimedia instruction. Their instruction was teacher fronted and the grammar points were taught deductively in their first language (Persian). They did all of their textbook exercises without being exposed to any animations, sound tracks, and power point slides like the other groups.

At the end of the instructional sessions, the students in all groups received post-test in order to examine the effect of multimedia on improving their grammar knowledge. For understanding their attitude towards learning English through multimedia-based materials, the participants in the experimental groups answered the attitude questionnaire. It must be mentioned that the control group (Textbook group) did not receive the questionnaire since they were not exposed to the multimedia-based materials.

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Results

Results

Before answering the research questions, Kolmogorov-Smirnov test was run on the groups' scores obtained from the pre and post-test to ensure the normality assumption and legitimacy of using parametric tests.

Table 1
Summary of One- Sample Kolmogorov-Smironov Test

Variable	Group	Pre-test		Post-test	
		K-S	**Sig**	**K-S**	**Sig**
Grammar Knowledge	Multimedia	.80	.55	.57	.90
	Multimedia+ Text	.61	.86	1	.26
	Control	.95	.33	.61	.85

As Table 1 shows, the probability values for both pre and post-test are larger than .05 which ensures the normality of the distributions. Moreover, the homogeneity of variances was checked through Levene test which showed that the groups' variances were homogeneous on both the pre-test ($F= 2.5$, $p=.21>.05$) and the post-test ($F= 2.5$, $p=.08>.05$).

In order to answer the first research question (Do multimedia, combination of multimedia and textbook, and traditional mode of instruction have any statistically significant effect on improving EFL learners' grammar knowledge?), the pre and post-test scores of each group were compared through running separate paired t-tests. Results revealed that in all three groups the significance values were smaller than .05, so the three instructions were effective in improving the participants' knowledge of the target structures. Table ۲ and ۳ show the descriptive statistics and the t-tests results.

Table 2
Descriptive Statistics of Grammar Scores before and after the Treatment

Variable	Pair	Group	M	SD	Variance	Min	Max
Grammar Knowledge	Pre-test	Multimedia	15.68	5.7	32.2	5	38
		Multimedia+ Text	15.34	4.5	20.04	7	22
		Control	13.86	5.3	28.5	2	26
	Post-test	Multimedia	29.19	7.8	60.4	15	40
		Multimedia+ Text	32.25	4.6	20.9	24	40
		Control	22.46	7.4	54.-3	12	37

Table 3
Paired t-tests on the Pre-test and Post-test Scores of the Three Groups

Group	N	Paired Differences	SD	Df	T	Sig
Multimedia	28	-12.86	.89	27	-14.4	.01
Multimedia+ Text	29	-17.76	.71	28	-24.9	.01
Control	33	-8.03	.70	32	-11.5	.01

For answering the second research question (Are there any significant differences among the effects of multimedia, combination of multimedia and textbook, traditional mode of instruction in improving EFL learners' grammar knowledge?), a one-way ANOVA test was conducted to ensure if all of the three groups were comparable at the pre-test. The findings revealed no significant difference among the groups, F (2, 88) = 0.30, p = 0.74> 0.05. The table below shows the results of this test.

Table 4
One-way ANOVA on the Pre-test Scores

	Sum of Squares	Df	Mean Square	F	Sig
Between Groups	12.07	2	6.03	.30	.74
Within Groups	1744.3	87	20.05		
Total	1756.4	89			

However, the findings of another one-way ANOVA conducted on the post-test scores revealed a significant difference among the groups, F (2, 88) = 20.50, p = 0.74, p < 0.05. Table 6 demonstrates these results.

Table 5
One-way ANOVA on the Grammar Post-test

	Sum of Squares	Df	Mean Square	F	Sig
Between Groups	1631.02	2	815.5	20.5	.01
Within Groups	3455.4	87	39.7		
Total	5086.4	89			

As the above table illustrates, there was a significant difference among the three groups (F= 20.5, p= .01<.05). In order to locate the exact point of difference among the three groups, the post hoc test of Scheffe was utilized. The following table shows the result:

Table 6
Results of Scheffe Test for Post-test Scores

Variable	Mean Difference		
	Group	Multimedia+ Text	Control
Grammatical Knowledge	Multimedia	-4.5*	5.7*
	Multimedia+ Text	-	10.2*
	Control	-	-

The mean difference is significant at the .05 level*

The table depicts that the difference among the three groups is significant. The post-test mean score of the multimedia + textbook was larger than the multimedia, and mean score of the multimedia was also greater than that of the control group. So it can be concluded that, although the three instructions were positively effective in improving the grammar knowledge of the learners, the effect of the multimedia + textbook was significantly larger than the other two groups. This difference is visually shown in the following graph:

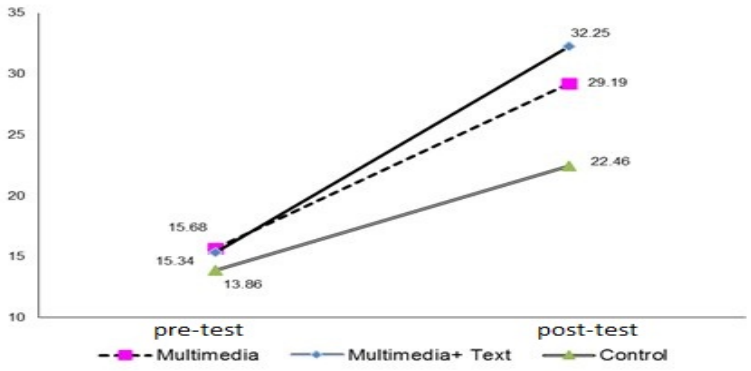

*Figure 1.*Line graph representing the pre and post-test means

In order to answer the third research question (What are the learners' attitudes toward multimedia-based teaching?), an independent t-test was run. Tables ۷ and ۸ represent the findings of this test:

Table 7
Descriptive Statistics of Attitudes toward Multimedia

Variable	Group	M	SD	Variance	Min	Max
attitudes toward multimedia	Multimedia	50.11	11.5	164.7	21	69
	Multimedia+ Text	55.52	16.2	263.5	28	85

As shown in the above table, the mean of the multimedia + textbook (55.52) was higher than that of the multimedia (50.11). The variance of the

scores of the multimedia + textbook group was also higher than the other group.

Table 8
Results of One-sample t- test for Attitudes of the Two Groups

Group	N	Test Value	Mean	SD	df	T	Sig
Multimedia	28	-12.86	50.11	11.48	27	.97	.34
Multimedia + Text	29	-17.76	55.52	16.23	28	2.49	.02

As depicted in the above table, the significance value of the multimedia + textbook is less than .05. The mean score is 55.52 while the mean score of the multimedia only group is 50.11. This shows that the attitude of multimedia + textbook is more positive than the other group which only received multimedia without text. The comparisons are illustrated in the following graph.

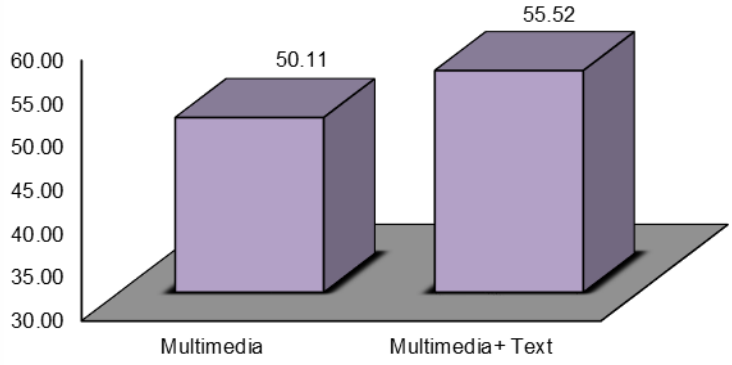

Figure 2. Bar graph representing the attitudes towards instructions

Discussion

The purpose of the current study was to investigate the effect of using multimedia and multimedia + textbook for teaching grammatical structures to the third grade high school students in Iran. The underlying assumption of this design was that learners with different learning styles would benefit from various modes of instruction like visual and aural which can be provided

through multimedia instruction. The findings offered preliminary confirmation of the capacity of multimedia in facilitating the learning of the target structures by the students. These results are consistent with findings of some related studies (e.g., Davoodi, 2014; Ghanizade&Razavi, 2015; Mehrgan, 2012; Mtebe, Mbwilo, & Kissaka, 2016) which approve that multi-modality of instruction can bring about more improvement in language learning. According to Brunvand (2010), multimedia can provide teachers with examples of classroom exercises and practices from multiple viewpoints and perspectives. Moreover, variety of tools which are offered by both textbook and multimedia might raise reflection among the learners to evaluate new information profoundly which might in turn help them to keep information in their memory. Moreover, using the tools such as onscreen titles, visual effects, arrows, freeze frame, slow motion, highlighting, or arrows might lighten the cognitive load that happens with simultaneous verbal and visual information.

The findings of the present study also revealed that the participants in the multimedia and textbook group had more positive attitude towards their instructional package than those in the multimedia only group. The result is in line with Al-Jarf's (2005) findings which revealed that students who are supposed to have a nationwide exam still feel they need their textbook in paper-based form.

Multimedia instruction generates the chance for learners to enhance their learning efficiently. Experienced teachers can employ cognitive theory of multimedia learning and achieve the aims of English teaching by using up-to-date education technology sensibly. By identifying these opportunities, teachers can incorporate various tasks and activities regarding their learners' preferred methods of instruction and considering their weaknesses and strengths. Multimedia also might help learners in becoming more attentive which eventually will expand their language learning success. An effective multimedia instruction doesn't merely include utilizing multiple media together. It requires combining media thoughtfully to make benefit from the features of each distinct medium and increase the teaching and learning experiences. Therefore, teachers should first define what results they are attempting to attain and then choose features well-matched with these goals. The present study suffered from some limitations like having access to only the

female participants with low intermediate proficiency level. Additionally the treatment time was not long enough to achieve in-depth findings of the advantages of using multimedia in classroom context. As a consequence, conducting further studies might be fruitful to probe the effectiveness of multimedia-based instruction in various groups of learners at different levels of education. Moreover, studying the effects of multimedia on other language skills and components of language is recommended.

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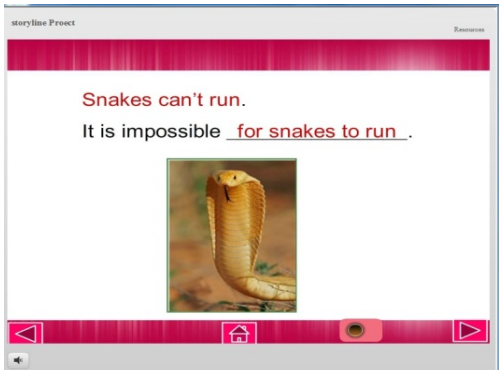
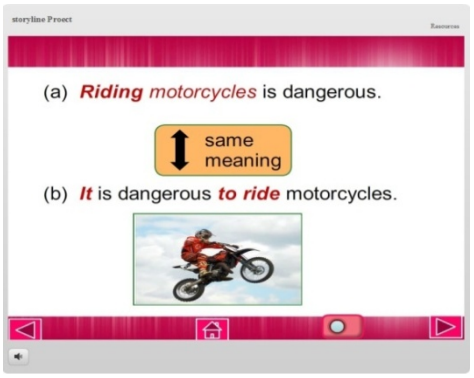
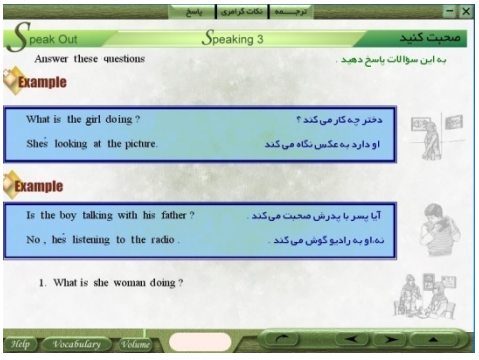
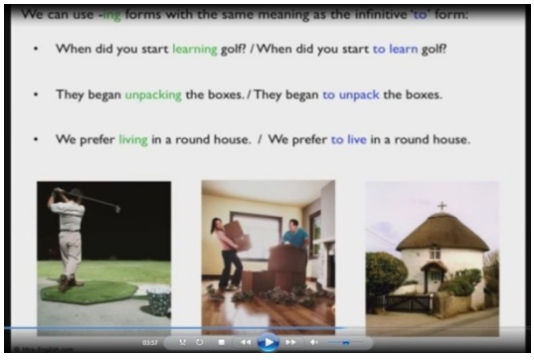
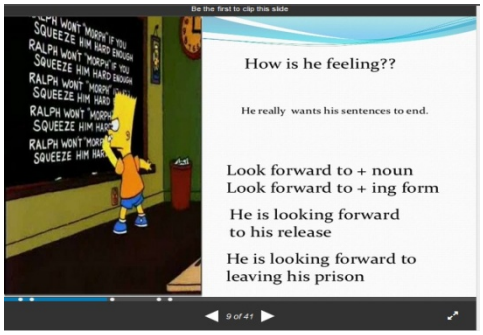
Appendix A: Multimedia Program

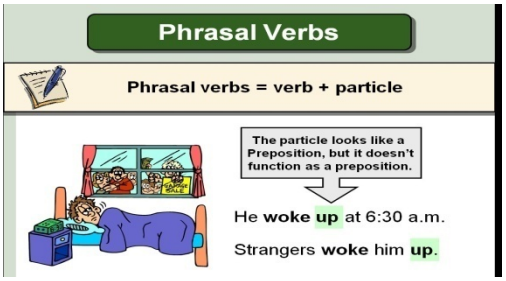












Biodata

Mehri Jalali: Ph.D in TEFL, MA in TEFL, BA in English translation; author of some papers in national and international journals; presentation in more than 10 international and national conferences; and 12 years of experience in teaching English as foreign language. Her areas of interest include task-based instruction and materials design and evaluation.

Seyedeh Fatemeh Taghavi Takyar: MA in TEFL, BA in TEFL; English teacher of ministry of education with more than 24 years of teaching experience in national high schools.