

## The Effect of CALL Software on Iranian EFL Learners' Reading Comprehension

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### **Abstract**

The purpose of this study was to assess CALL software (AceReader) effectiveness in developing TOEFL reading proficiency of Iranian EFL learners in comparison to paper-based instruction and to investigate any significant difference in the TOEFL reading comprehension of the high and low proficient learners after receiving computer-assisted instruction. The 123 female participants of the study, who were 60 high and 63 low proficient learners, were randomly divided into four groups, two experimental groups and two comparison groups. Sample TOEFL reading comprehension passages were used as the material of the study during the 16 sessions of the instruction. Before the instruction began, the participants in the experimental groups were trained for about two hours in order to be able to use the software effectively. A sample TOEFL test of the reading section as the pretest and posttest was also administered. The findings of the study indicated that there was a significant difference in the TOEFL reading comprehension of the learners who received CAI (Computer-Assisted Instruction) in comparison to those learners who received paper-based instruction. Furthermore, there was a significant difference in the TOEFL reading comprehension of the high and low proficient learners who received CAI.

**Keywords:** CALL, reading comprehension, CAI, TOEFL

## **1. Introduction**

Computers have been used since the beginning of the 20th century; however, they were not used for learning purposes until the 1960s. “The 1970s witnessed the evolution of CALL [Computer Assisted Language Learning] as a result of development in research related to the use of computers for linguistic purposes and for creating suitable language learning conditions”(Gunduz, 2005, p. 198), and technology became a new trend in foreign language instruction. Several ESL/EFL studies (e.g., Chappelle, 2001; Egbert, 2002; LeLoup & Ponterio, 2003; Levine, Ferenz, & Reves, 2000; Williams & Williams, 2000) suggest that the use of technology in language learning can develop students’ academic performance, enhance learning, and increase motivation. As a result, Computer-Assisted Instruction (CAI) has recently been very popular and has become an increasingly significant element in English language teaching and learning, and several studies have been done to investigate the role of computer in English language teaching/learning (e.g., Bowles, 2004; Kilickaya & Krajka, 2010; AbuSeileek, 2011, 2012b; Yousefzadeh, 2011). Lowe and Holton (2005) believe that with the quick developments in technology, the need for lifelong learning, and the growth of non-traditional students, the use of computers as a means of instructional delivery seems to be necessary.

## **2. Review of Literature**

CAI has been shown to raise students’ academic achievement in the USA (e.g., Bangert-Drowns, Kulik, & Kulik, 1985; Kulik, Kulik, & Cohen, 1980). According to Kulik, Bangert, and Williams (1983), students are likely to benefit from CAI, and in comparison with teachers, students benefit more as they are able to work at their own pace of learning. Teachers benefit from CAI as well: They experience less work and repetition, are able to update instructional materials more easily, can keep a record of student achievement, and have more time to work directly with the students. Although there are some disadvantages of CALL, on the whole, as many researchers believe (e.g., AbuSeileek, 2012a; Lee, 2000; Riasati, Allahyar, & Tan, 2012), CAI is beneficial for both language learners and teachers, and its advantages outweigh its disadvantages.

According to Carrell (1987), English is considered as one of the important instruments for academic achievement, and reading comprehension and vocabulary can be the two primary elements to determine students’ English proficiency in their academic achievement. For a

## *The Effect of CALL Software on Iranian EFL Learners' Reading Comprehension*

long-term learning goal, reading seems the most important of the four language skills in learning English as a Second Language (ESL) or English as a Foreign Language (EFL), since as Gu (2003) remarks, reading exposes learners to the target language and provides valuable linguistic input for them. Richards and Renandya (2002) also provide a number of reasons for the significance of reading in ELT. They believe that reading is one of the most important goals for EFL learners, since they need to be able to read for pleasure, for information, for study purposes, etc. Reading can also improve the process of language acquisition by providing exposure to linguistically comprehensible input. Moreover, appropriate reading texts can be good models for writing; therefore, reading can lead to writing. Carrell (1987) also indicates that effective reading is critical for students in EFL contexts and for students with academic purposes. To cope with the competitive edge in the age of technology and information, as stated by Levine et al. (2000), an effective and efficient reading ability is the key to academic success. Hence, computers have also been used in reading instruction (e.g., Huang, Chern, & Lin, 2009; Labbo & Reinking, 1999; Leu et al., 1998; Liu, Chen, & Chang, 2010; Fox, 1990; Godwin-Jones, 2006; Lomicka, 1998; Lungberg, 1995; Marzban, 2011; Smith, 2009; Sung, Chang, & Huang, 2007, Tsai & Talley, 2013). According to Gunduz (2005), CAI is a strategy that can be used to develop student achievement in reading. MacArthur, Ferretti, Okolo, and Cavalier (2001) believe that CAI can enhance reading skills. Sung et al. (2008) also remark that computer-assisted instruction can reduce the difficulties of implementing reading instruction in classrooms, provide immediate feedback, allow students to control their pace of learning, give students more opportunities to learn independently, and increase students' motivation to read. Many studies (such as Kluger & DeNisi, 1996; Lim & Shen, 2006; Liu et al., 2010; Macaruso & Rodman, 2009; Marzban, 2011; Ross, Hogaboam-Gray, & Hannay, 2001; Soe, Koki, & Chang, 2000) also show that there is a positive link between the use of CAI and reading ability.

Kluger and DeNisi (1996) found that CAI programs that provide feedback interventions increase student performance through heightened motivation, and without feedback, student performance decreases; however, too much feedback can prevent learners from learning how to control their performance autonomously.

In Lim and Shen's (2006) study, the effect of CAI on Korean college students in an EFL reading classroom was compared with that of a traditional reading class in terms of learners' perception of learning environment and their reading performance. A group of 74 EFL learners were equally divided into two groups: An experimental group in which CAI was

practiced and a control group which was run in a traditional way and without CAI. A reading comprehension test was used as a pre-test and post-test to measure the students' performance. A written survey, classroom observations, and group interviews with students were also utilized to investigate students' perception of learning environment. The findings demonstrated no significant difference in students' performance on the pre-test and the post-test between the two classes. Yet, the students in the experimental group were more positive toward the learning environment especially in regard to learning tasks and materials, and interaction and collaboration with the instructor and other students.

Liu et al. (2010) explored the effect of a computer-assisted mind mapping learning strategy on reading comprehension of EFL learners. According to their English proficiency, one hundred ninety-four learners were divided into low-level and high-level groups. The learners in the experimental group were provided with a computer-assisted concept mapping learning strategy to develop their reading skill. The results showed that the mind map software had positive impacts on low-level EFL learners, and it increased their use of other English reading strategies like enforcing, listing, and reviewing. In a similar study, Marzban (2011) studied the effects of CAI on reading comprehension. Sixty Iranian female students were randomly divided into experimental and control groups, each of which included 30 subjects. The experimental group received CAI for reading comprehension and the control group was taught in the traditional way. The findings manifested that there was a statistically significant difference between reading comprehension scores of the two groups. It was thus concluded that the use of CAI can enhance learners' reading comprehension.

Macaruso and Rodman (2009) examined the benefits of CAI for middle-school students. Students in the experimental group were provided with a CAI program that works on improving phonics word identification skills. This group was compared with a control group in which no CAI support was provided. The results indicated that students in the experimental group gained greater reading achievements than control students especially in the area of decoding skills.

Ross et al. (2001) investigated the collateral effects of a particular software program (i.e., WiggleWorks) on reading instruction. In a cohort study, random samples of grade 1 and 2 students were compared before and after software application, and in a longitudinal study, students were tracked from kindergarten to grade 1. The results revealed that in addition to literacy skills, WiggleWorks increases computer skills and self-efficacy, and it has a positive effect on students' attitudes toward the computer use.

## *The Effect of CALL Software on Iranian EFL Learners' Reading Comprehension*

Soe et al. (2000) reviewed 17 studies done during 1982-1997 on the effect of CAI on reading achievement of K-12 students. The authors conclude that CAI has an overall positive effect on reading achievement, since computer applications to teach reading hold great promise as instructional tools to increase students' engagement in reading, promote reading comprehension, and improve reading skills. Teachers can also be empowered to vary the pace of instruction, teach and reinforce specific skills and strategies, improve motivation, and provide students with relevant and immediate feedback.

There are many options for computer assisted reading instruction, such as digital whiteboards, text to speech, digital storybooks, graphic organizers, and the Internet. Computers are a useful tool for pre-reading. For instance, WebQuests, online texts, search engines can be used and in this way, students can scan the text quickly, make associations with visual elements, and discuss their findings with each other, and these activities are more exciting and meaningful for the students than traditional pre-reading activities provided by the teacher (Gilbert, 2009). In addition, software programs can be used in reading instruction, like Reader Rabbit, Missing Link, Reading Blaster, Storybook Weaver, Accelerated Reader, Kid Pix, The Academy of Reading, Watch-Me!-Read, Waterford Early Reading Program, Read 180, etc. (Blanton & Menendez, 2006). However, Kulik (2003) emphasized that software programs, though useful, should not take the place of teachers.

Although a great deal of research was conducted during the 1970s, 1980s, and early 1990s on the effects of computer use on student achievement, the use of a reading software to improve learners' reading comprehension is still a relatively new domain for researchers to investigate and little research exists on the effect of using a software on learners' reading comprehension. In Iran, several studies (e.g., Hamidi, 2004; Hedayati, 2005) have been done to investigate the effect of Internet on reading comprehension of Iranian EFL learners, but just few studies have been carried out using a reading software as a computer-assisted instruction to improve reading comprehension. For example, Mokhtarnia (2007) compared the metacognitive awareness of hypertext (the text on Internet) reading strategies of Iranian EFL learners with its printed text counterparts. The results revealed that there was a statistically significant difference between metacognitive awareness of hypertext and printed text strategies of Iranian EFL learners. Therefore, the present study was an attempt to examine the effect of using a software on Iranian EFL learners' TOEFL reading comprehension.

Computer technology holds promise for improving student's achievement in educational programs at all levels (Vernadakis, Avgerinos, Tsitskari, & Zachopoulou, 2005). However, to what extent second language (L2) reading instruction using a computer-assisted language learning (CALL) software as a tool can facilitate reading comprehension is of major concern.

While many countries are using new technologies in language teaching, Iranian EFL learners' instructions are more text-book based and the students are less confronted with the new technologies in their classrooms. Moreover, in the third millennium in which mobility, time, and accessibility are of great importance due to the rapid increase in population, paper-based instruction would not suffice and cannot be considered as the only way of instruction.

It is worth noting that despite the impressive results of computer-assisted reading (e.g., Blok, Oostdam, Otter, & Overmaat, 2002; MacArthur et al., 2001), there are also some shortcomings. Most studies on computer-assisted reading have dealt with reading skills such as word recognition (e.g., van Daal & Reitsma, 2000; Wise, 1992) or phonological awareness (e.g., Farmer, Klein, & Bryson, 1992; Mathes, Torgesen, & Allor, 2001; van Aarle & van den Bercken, 1999). There are relatively few studies focusing on assessing higher-level text comprehension through computer technology, a gap which was intended to be filled in the current study.

Because of the great importance of TOEFL tests for language learners in pursuing their education abroad or participating in doctoral examinations in Iran, this study sought to see if the use of a reading software, which can even be used as an autonomous learning tool, can help to improve Iranian EFL learners' TOEFL reading proficiency in comparison to that of the paper-based instruction, and to investigate any significant difference in TOEFL reading comprehension of the high and low proficient learners after receiving CAI.

In the light of the foregoing discussion, the present study aims at answering the following research questions:

1. Is there any significant difference in TOEFL reading comprehension between the participants who receive computer-assisted instruction and those who receive paper-based instruction?
2. Is there any significant difference in TOEFL reading comprehension of the high and low proficient participants after receiving computer-assisted instruction?

### **3. Method**

#### **3.1. Participants**

The total participants of this study were 140 female volunteer learners, selected from among the high and low proficient learners of the Iran Language Institute (ILI), the Yazd branch. The high proficient learners had passed basic, pre-intermediate, and intermediate levels of the institute and the low ones were at the basic level. Though they were classified as high and low based on the ILI criteria, to have a more reliable criterion for calling the participants as high and low, a standard sample TOEFL test (1996) was carried out among them. The participants who scored one standard deviation above or below the mean (all 123) were considered as high (60) and low (63) respectively and the rest (17) were excluded from the experiment although they attended the classes. The high and the low proficient learners were each assigned randomly into two groups, the experimental group and the comparison group. So, there were four groups, two comparison groups (high and low) and two experimental groups (high and low), each with 30 learners except the low comparison group which consisted of 33 participants.

#### **3.2. Instrumentation**

Three kinds of instruments were used in this study:

(1) AceReader (<http://www.acereader.com/>) as a reading software which was used as a tool to investigate the effectiveness of CALL software on TOEFL reading proficiency. AceReader has several features such as reading improvement and assessment, reading fluency, speed reading and vision training. It can also assess the current reading ability and improve reading speed and comprehension. AceReader utilizes two technologies: (1) Rapid Serial Visual Presentation (RSVP) and (2) Tachistoscopic Scroll Presentation (TSP). When AceReader is in RSVP mode, text is displayed in the center of the text area. As a result, learners read faster than normal because the eyes do not need to move. When AceReader is in TSP mode, text is displayed in a manner that forces the eyes to move just like they do in normal reading. AceReader provides the learners with various options among which the learners can choose the ones that meet their own styles and preferences. The learners can set font and colors, the display mode, speed options (Appendix A), fine tune speed options, and burst options. AceReader also immediately provides the learners with the correct answers of the questions after they finish answering all the questions and also report their comprehension percentage.

They can also see the test result graph which is the indicator of their speed and their comprehension of the test.

(2) Sample TOEFL reading comprehension passages (Phillips, 1995, 1998, & 2001) which were used as the materials of the study during the 16 sessions of the instruction (Appendix B). Each session, two of the passages were chosen and the participants of the four groups were provided with the passages and their following questions. The questions were multiple-choice and the number of the questions varied from one passage to another. The passages and the questions were given on paper to the comparison groups while the experimental groups could access them via the AceReader software.

(3) Two sample TOEFL tests of the reading section (Phillips, 1996), one for the pre and posttest and the other for ensuring the homogeneity of the participants. It is worth noting that both the pre and the posttest were the same. It is worth pointing out that the questions of the pre and posttest were different from those that were used to ensure the homogeneity of the participants, although the year of the sample test was the same. The reading comprehension passages were taken from the book *Longman Preparation Course for the TOEFL Test* which includes five practice tests of TOEFL. The reliability of the sample TOEFL test for homogenizing the participants and the sample TOEFL reading test used as the pre and posttest was calculated using Cronbach alpha, and the result was .80 and .86 respectively.

#### **4. Procedure**

At first, permission was obtained from the StepWare Company, the producer of AceReader through E-mail correspondences, and the researchers were provided with a one-month, fully-functional version of the software. Then, permission was obtained from the Iran Language Institute for selecting the participants and conducting the research there.

Beginning the research, it was announced in the institute that a research is going to be conducted for high and low proficient learners for whom TOEFL classes will be conducted for the first 70 volunteers at both levels. After the selection of the first 70 in each group, a sample TOEFL test of reading comprehension (1996) was given to them to ensure the homogeneity of the participants in each of the high and low group, though they were considered high and low based on the ILI criteria. The participants with more than one SD below or above the mean of their own group were excluded from the analysis though not from the study. Thus, ten of the learners from the high proficient group were excluded; two of them were more than one SD above the mean, whereas eight of them were more than one SD

### *The Effect of CALL Software on Iranian EFL Learners' Reading Comprehension*

below the mean. The sixty remaining participants of the high group were randomly divided into two groups of thirty, the experimental and the comparison. Accordingly, seven of the low proficient participants were excluded. Six of them were more than one SD below the mean, whereas one of them was more than one SD above the mean. The sixty-three remaining participants were randomly divided into two groups, the experimental and the comparison. The low experimental group had thirty participants, whereas the low comparison group had thirty-three participants. A sample of the reading section of the TOEFL test (1996) was administered to the four groups as the pretest, and the scores were recorded. The comparison group class was held in the institute but the class of the experimental group was held out of the institute, in the Information and Technology Park, due the facilities required for conducting the classes with computer.

Before the instruction began, the participants in the experimental groups were trained by the instructor, one of the researchers, for about two hours in order to be able to use the software effectively. They were taught how to adjust the speed of text presentation, font color, font size, background color, number of words or lines, delays, and all other options to meet their needs. The researchers clarified everything for the participants, and they made sure that they had learned to use the software properly. The instruction was supposed to be twice a week, each session 2 hours, during eight weeks (16 sessions and 32 hours in total). However, as the researchers were only provided with one month, fully-functional version of the software, the same 16 sessions and 32 hours were conducted but intensively, i.e., instead of two-hour instruction a week during eight weeks, two sessions of two-hour instruction a week for four weeks were conducted. Therefore, the instruction was 16 sessions in total. The 16 sessions of the comparison groups were held at the Iran Language Institute and those of the experimental groups were held at the Yazd Science and Technology Park. Each session, the participants of the four groups (2 high and 2 low experimental and comparison groups) were provided with two sample TOEFL reading comprehension passages (Phillips, 1995, 1998, & 2001).

Every session, the researchers gave a warm up at the beginning of teaching any passages which was asking general questions related to the topic of the passages in the four groups. Then the participants were given time (the time varied based on the word count of each passage) to read the passages and to answer the following multiple-choice questions. The passages and the questions were given on paper to the comparison groups, while the experimental groups could access them on the AceReader software which provided the

learners with various options among which the learners could choose the ones that met their own styles and preferences, such as font and colors, the display mode, speed options, fine tune speed options, and burst options. AceReader also immediately provided the learners with the correct answers of the questions after they finished answering all the questions and also reported their comprehension percentage and test results graph. Thus, after the given time was finished, the correct answers were provided by the software. In this case, the difference between the comparison groups and the experimental groups was that the experimental groups had access to the correct answers immediately after answering all the questions, while the comparison group did not receive the correct answers immediately, and the teacher provided the answers at the end of the session. The participants of the experimental groups could also see the test results graph which was the indicator of their speed and their comprehension of the test.

After the given time was finished, the researchers started reading the passage, paraphrasing, teaching the new vocabulary or any grammatical structure that the students were not familiar with. Then the questions were discussed and reasons were given for selecting or rejecting any of the answers. As there were sixteen sessions of instruction, thirty-two samples of TOEFL passages were chosen randomly from years 1995, 1998, and 2001 and were worked on in the four groups. After the 16 sessions, the sample of the reading section of the TOEFL test (1996) was again administered to the four groups as the posttest.

## **5. Data Analysis**

First, the descriptive statistics such as the mean, standard deviation, and range were calculated in order to examine the central tendencies and variability of the scores. Due to having high and low proficient learners together in both experimental and comparison groups it was natural not to have a normal distribution. So Mann-Whitney U as the analog of an independent samples t-test was conducted to check if there was any significant difference between the experimental and the comparison groups. An independent samples t-test was conducted to check the difference between the high and low proficient learners of the experimental groups, too.

## 6. Results

As stated, the objectives of this study were to examine CALL software (AceReader) effectiveness in developing TOEFL reading proficiency of Iranian EFL learners in comparison with the paper-based instruction as well as any significant difference in TOEFL reading comprehension of the high and low proficient learners after receiving CAI.

One-Sample Kolmogorov-Smirnov Test was conducted to check the normality of distribution. Based on the results, the high group ( $z = 1.026$ ;  $p = .243$ ) and the low group ( $z = 1.187$ ;  $p = .119$ ) had a normal distribution.

In order to address the first research question, the descriptive statistics of the four groups were examined. The pretest and posttest contained 50 multiple-choice questions of the sample TOEFL reading comprehension (1996). Each question had 2 points; therefore, the total possible score for the reading comprehension was 100. Table 1 displays the descriptive statistics of the four groups.

Table1. Pretest and Posttest Descriptive Statistics for the Experimental and Comparison Groups

Groups	N Pretest	N Posttest	Pretest mean	Posttest mean	Pretest SD	Posttest SD
Experimental(High)	30	26	52.87	66.38	4.91	5.42
Comparison(High)	30	25	53.13	60.20	4.94	5.43
Experimental(Low)	30	27	16.67	24.59	3.97	4.78
Comparison(Low)	33	26	16.27	23.69	3.81	4.92

All the four groups showed an increase in scores after the instruction was completed. The high experimental group's mean increased by 13.51, while the high comparison group's mean by 7.16. As it is shown, the low comparison group's mean is lower than the low experimental group's mean. The low experimental group increased by 7.92, while the low comparison group's mean increased by 7.42. As Table 1 shows, the number of participants in the posttest in the four groups was less than the number of participants in the pretest, since some of the participants left the experiment after a few sessions.

Before comparing the means, the gain scores were calculated and the normality of distribution was checked. Based on the results ( $z = 1.805$ ;  $p = .003$ ), the normality of the distribution was not confirmed as it was expected, since comparison groups and experimental groups included both high and low learners. As a result, the gain scores were ranked and the Mann-Whitney U test was used as a nonparametric analog to the independent samples t-test to determine whether there was any significant difference of the performance between the experimental (including both high and low) and the comparison (including both high and low) groups.

The Mann-Whitney U test analysis (Table 2) indicated that computer-assisted instruction resulted in a significant difference in students' TOEFL reading comprehension when compared with paper-based instruction ( $z = 2.435$ ;  $p < 0.05$ ). Thus, in addressing research question 1, it appears that computer-assisted instruction did make a difference in students' TOEFL reading comprehension.

Table2. Mann-Whitney U Test for the Experimental and Comparison Groups on the Gain Scores

	Rank of Scores
Mann-Whitney U	983.500
Wilcoxon W	2414.500
Z	-2.435
Asymp.Sig.(2-tailed)	.015

Considering the second research question, investigating the probable difference in TOEFL reading comprehension of the high and low proficient learners after receiving CAI, at first the gain scores were calculated and the normality of distribution was checked. The results indicated a normal distribution for high experimental group ( $z = .963$ ;  $p = .312$ ) as well as for the low experimental group ( $z = 1.077$ ;  $p = .196$ ). An independent samples t-test was conducted to check the difference. Table 3 shows the descriptive statistics of the gain scores of these two groups.

*The Effect of CALL Software on Iranian EFL Learners' Reading Comprehension*

Table3. Descriptive Statistics of the Gain Scores of High and Low Proficient Learners in the Experimental Groups

	N	Minimum	Maximum	Mean	Std. Deviation
High Experimental	26	4	22	11.92	4.97
Low Experimental	27	4	14	7.78	2.50

The Levene's test indicated that the assumption for the equality of variances was not confirmed ( $F = 8.866$ ;  $p < 0.05$ ); but the t-test (see Table 4) indicated there was a significant difference between the high and low proficient participants' TOEFL reading comprehension gain score due to receiving computer-assisted instruction;  $t(36.551) = 3.807$ ;  $p < 0.05$ . In other words, CAI did not have the same effect on different language proficiency levels. In fact, high proficient learners benefited more from computer-assisted instruction as they demonstrated a higher gain score.

Table4. An Independent Samples t-Test for the Difference between High and Low Experimental Group Gain Scores on TOEFL Reading Comprehension after the Instruction

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Experimental	Equal variances assumed	8.866	.004	3.851	51	.000	4.145	1.076	1.985	6.306
	Equal variances not assumed			3.807	36.551	.001	4.145	1.089	1.938	6.352

## **7. Discussion**

The findings of this study suggest that CAI can enhance Iranian learners' TOEFL reading comprehension in both high and low groups. Moreover, the results show that there is a significant difference in the TOEFL reading comprehension of the high and low proficient learners after receiving CAI. It seems that high proficient learners benefit more from CAI than the low proficient learners due to their high language proficiency and maybe their great confidence confronting computers. In fact, the results reveal that, the mode of instruction does not make a big difference for the low proficient learners in their TOEFL reading comprehension, whereas it plays an important role for the high proficient ones.

The results of this study are in accordance with a number of studies which claimed that there are several advantages in incorporating computers, and that CAI can enhance reading comprehension (Huang et al., 2009; Liu et al., 2010; Lynch, Fawcett, & Nicolson, 2000; Marzban, 2011; Mathes et al., 2001; Smith, 2009). Yet, these studies do not take into account the importance of language proficiency. This study indicates that high proficient learners get a better result from computer-assisted instruction.

As mentioned before, computer-assisted instruction can help EFL learners to develop a higher TOEFL reading comprehension. As a result, due to the importance of TOEFL reading comprehension for EFL learners and the fact that computer-based TOEFL will take the place of paper-based TOEFL sooner or later, EFL learners should be trained to cope with the new technologies in ESL/EFL instruction. Moreover, since CAI was more beneficial for the high proficient learners, taking into consideration the importance of language proficiency is crucial before the implementation of CAI into classroom.

The findings of this study are in line with the opinion of those scholars who believe that the use of computer plays a significant role in teaching and learning and that CAI has been effective in developing reading achievement of the students, especially when used as supplementary to the traditional classroom instruction (Bangert-Drowns et al., 1985; Lungberg, 1995; Marzban, 2011). According to Soe et al. (2000), the use of computer to teach reading has the potential to enhance students' engagement in reading, develop reading comprehension and other reading skills. They claim that CAI will enable teachers to change the pace of their instruction to meet the needs of individual students and allow them to teach and emphasize particular skills and strategies as well. As stated by Soe et al. (2000), CAI can

## *The Effect of CALL Software on Iranian EFL Learners' Reading Comprehension*

also increase the possibility of improving students' motivation and will provide the students with immediate feedback.

Nevertheless, these findings are still inconsistent with the opinion of some other scholars who argue against the effectiveness of applying computers in education. According to Gulley (2003), teachers should be aware of the importance of human emotions and they should take it into consideration. She states that the students need human support and the rapid development of computer technology should not interfere with it. Many people with no doubt worry that the use of computers in the classroom will probably make the class emotionless.

### **8. Conclusion**

In closing, there is still much to be learned about using a software in L2 reading. It should not be forgotten that the computer's role in teaching is solely a teaching aid. What is of great importance is not the use of technology per se, but the quality of what is done with this medium. Therefore, the use of CAI alone may be insufficient in the teaching of reading. "While CAI as an instructional tool has been effective in raising reading achievement, especially when used to supplement paper-based instruction, other variables need to be considered in the teaching of reading" (Soe et al., 2000, p. 14).

According to Gulley (2003), education can nurture and develop students' imagination, curiosity, and creativity, and the use of computer technology plays an important role in education which can help students to reach their full potentials. Due to the enormous role of education in preparing students to go into the world, there should be obviously a link between the world and the classroom and the education should reflect the world in which it exists, otherwise it has no relevance for the students. In conclusion, the use of computer can be considered as a positive complement to bridge the gap between the world of education and the world of technology.

Finally, one can claim that softwares as a means for language learning can enhance autonomous learning in general and this specific software (AceReader) can be beneficial for autonomous learning of TOEFL reading, but mostly for those with high level of language proficiency rather than the low ones. It may be concluded that low level ones may need teacher's face-to-face support more. In other words, learners may need a specific "threshold level" of language proficiency to make the most use of computers/softwares in particular and in regard to autonomous learning in general.

This study is of critical importance for language teachers. They must be aware of the fact that reading instruction aligned with computer-assisted instruction can serve as a powerful teaching tool to assist teachers in helping students to reach their potential in reading. Teachers should not be afraid to be replaced by the computers as it is the teacher who decides what degree of control the computer will have in her/his classes. Hence, as Brierley and Kemble (1991) state, there is no need for teachers to feel threatened to lose their professions to the computer. Another implication of this study is for EFL learners. Reading, especially TOEFL reading comprehension, is of great importance for all L2 learners who want to pursue their studies. The EFL learners need to adopt the new technologies to cope with the age of technology. They should accept the fact that computer-based instruction will take the place of paper-based instruction sooner or later. The third implication of this study is for software designers. They should take into account the findings of such studies in identifying the most useful features which can improve the learners' performance so that the next generation of the software program can meet all the needs of the learners. Software designers should take into consideration the level of learners' language proficiency as this study showed that there is a difference between high and low proficient learners in terms of the use of this software.

Further research can address several issues left unresolved by this study. In future studies, one might consider the effect of computer-assisted instruction on TOEFL writing or TOEFL listening comprehension. The variables of age and gender can be investigated as well. Non-English major students and students of other languages such as French and Arabic can also be examined in this regard.

The present study had some limitations. Since the researchers were provided with a one-month fully functional version of the software, the 16 sessions of the instruction were held during one month that was four sessions in a week. It would be better, if it could have been held in a longer period of time. Another limitation was that the researchers had to select their participants from among the classes which were available for them. Moreover, the sample TOEFL tests were not piloted.

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## Appendix A

### Setting Speed Options of AceReader Software

Set Speed Options

Speed Units:

Characters per Second

Characters per Second: This unit of measure may be desired if you want longer words to display for longer periods of time than shorter words. Note: You may want to also refer to the Fine Tune Speed options.

Low, High and Current Speed Setting:

Low Speed: 8 CPS = Approximately 96 WPM

High Speed: 167 CPS = Approximately 2004 WPM

Current Speed: 71 CPS = Approximately 852 WPM

Note: Average traditional reading speed is approximately 250 Words/Minute.

Set to Default Cancel OK

## Appendix B

## A Sample of TOEFL Reading Comprehension Passages

### Questions 1–10

The hippopotamus is the third largest land animal, smaller only than the elephant and the rhinoceros. Its name comes from two Greek words which mean "river horse." The long name of this animal is often shortened to the easier to handle term "hippo."

*Line* The hippo has a natural affinity for the water. It does not float on top of the water; instead, it can  
*(5)* easily walk along the bottom of a body of water. The hippo commonly remains underwater for three to five minutes and has been known to stay under for up to half an hour before coming up for air.

*(10)* In spite of its name, the hippo has relatively little in common with the horse and instead has a number of interesting similarities in common with the whale. When a hippo comes up after a stay at the bottom of a lake or river, it releases air through a blowhole, just like a whale. In addition, the hippo resembles the whale in that they both have thick layers of blubber for protection and they are almost completely hairless.

- The topic of this passage is
  - the largest land animals
  - the derivations of animal names
  - the characteristics of the hippo
  - the relation between the hippo and the whale
- It can be inferred from the passage that the rhinoceros is
  - smaller than the hippo
  - equal in size to the elephant
  - a hybrid of the hippo and the elephant
  - one of the two largest types of land animals
- The possessive "Its" in line 2 refers to
  - hippopotamus
  - elephant
  - rhinoceros
  - horse
- It can be inferred from the passage that the hippopotamus is commonly called a hippo because the word "hippo" is
  - simpler to pronounce
  - scientifically more accurate
  - the original name
  - easier for the animal to recognize
- The word "float" in line 4 is closest in meaning to
  - sink
  - drift
  - eat
  - flap
- According to the passage, what is the maximum time that hippos have been known to stay underwater?
  - Three minutes
  - Five minutes
  - Thirty minutes
  - Ninety minutes
- The expression "has relatively little in common" in line 7 could best be replaced by
  - has few interactions
  - is not normally found
  - has minimal experience
  - shares few similarities
- The passage states that one way in which a hippo is similar to a whale is that
  - they both live on the bottoms of rivers
  - they both have blowholes
  - they are both named after horses
  - they both breathe underwater
- The word "blubber" in line 10 is closest in meaning to
  - fat
  - metal
  - water
  - skin
- The passage states that the hippo does not
  - like water
  - resemble the whale
  - have a protective coating
  - have much hair

GO ON TO THE NEXT PAGE 