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## ORIGINAL ARTICLE

# The effect of computer-assisted instruction on Saudi University students' learning of English

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**Abstract** This study aims at investigating the effect of computer-assisted language instruction on Saudi students learning of English at King Saud University. The software used was prepared by the researchers. The sample of the study consisted of 60 students randomly selected from King Saud University and assigned to experimental and control groups. Data were collected within an eight-week period via a pre-posttest design for equivalent groups. The findings of the study indicated that using computer-assisted English language instruction alongside the traditional method has a positive effect on the experimental group students' achievement.

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## 1. Introduction and background

Computer-assisted EFL Instruction has been one of the main objectives of King Saud University for several years. A new computing language unit has been introduced recently to integrate computer-assisted language learning (CALL) into the curriculum for teaching and learning language skills. Moreover, the College of Languages and Translation has built a number of e-learning laboratories which have been equipped

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with the most up-to-date hardware and software. These labs are also connected with intranet and internet. They are equipped with a control system that enables the instructor to show his screen to the students, send files to them and receive files from them. In addition, these labs have several electronic dictionaries, instructional software, tool and authoring programs and testing software.

Computer-assisted language learning (CALL) is an approach to teaching and learning foreign language where the computer and computer-based resources such as the Internet are used to present, reinforce and assess material to be learned. It usually includes a substantial interactive element. It also includes the search for and the investigation of applications in language teaching and learning. Except for self-study software, CALL is meant to supplement face-to-face language instruction and not replace it. In recent years, CALL researchers have investigated the advantages of using computers as teaching/learning tools in improving different language skills. Many studies indicate that CALL provides an innovative and effective alternative for language instructors (Warshauer and Healey, 1998). In addition, many studies indicate that there has been an increase in emphasis on computer technology and its

integration at all level of education (Stepp-Greany, 2002). Furthermore, computer would allow learners to progress at their own pace and work individually to solve problems, provides immediate feedback, allows learners to know whether their answers are correct or not, and provides them with the correct answers if their answers are not correct.

Moreover, there are many more advantages of CALL. Motivation is one such advantage. Motivation can be promoted in students by personalizing information, having animated objects on the screen, and providing practice activities which incorporate challenges, curiosity and providing a context. Adapting to the learning of students is a second advantage of CALL. This means that the student controls the pace of learning and makes choices in what and how to learn, which in turns makes students feel more competent in their learning. The third advantage of CALL is authenticity, the opportunity to interact in one or more of the four language skills by using or producing texts meant for an audience of the target language, not the classroom evaluation. Students feel less stressed and more confident in this language learning situation, in part because surface errors don't matter so much. The fifth advantage of CALL is development of critical thinking skills. It is found that the use of computer technology in classroom generally improves self-concept, mastery of basic skills and more active processing resulting in higher-order thinking skills and better recall.

As educational decision-makers face the challenges of maintaining and expanding the instructional computing movement, they need current information about the past and potential impact of computer implications to help them invest their resources wisely. Very few researches on the effect of this move have been conducted in Saudi Arabia. Therefore, this study aims at investigating the effect of using computers in English language instruction on the achievement of the university students.

## 2. Statement of the problem

The College of Languages and Translation intends to integrate computer in the teaching-learning process. The new building of the college was equipped with computers for this purpose. As a result, the need arises to study the effect of using computers on the students' achievement in English. The researchers intend to investigate the effect of Computer-Assisted EFL Instruction alongside the traditional method on the university students' achievement in English.

## 3. Significance of the study

As Computer-Assisted EFL Instruction is going to be applied for the first time in the Faculty of Languages and Translation, this study will be one of the first of its kind in the kingdom. Almost all of the reviewed studies were conducted on learners of the native or second language. This study is on learners of English as a foreign language. Therefore, it is hoped that it will help those who are involved in the educational process in gaining insights into the new Saudi computer-assisted EFL instruction experience and seek to improve it over time. Moreover, it may encourage further research in this field, which may, in turn, enrich the area of Computer-Assisted Instruction in general.

## 4. Objectives of the study

The present study attempts to investigate whether using computers in teaching English alongside the traditional method to university students is significantly different from teaching English without the aid of computers. The purpose is to compare using Computer-Assisted EFL Instruction alongside the traditional method with using the traditional method alone and decide which is more suitable for the students under investigation.

## 5. Question of the study

The present study attempts to answer the following question:
Does Computer-Assisted EFL Instruction have a positive effect on the Saudi University students' achievement?

## 6. Review of related literature

The review of the literature on Computer-Assisted EFL Instruction revealed that most of the studies in this field were conducted in the Western countries where English is the first language, whereas very few studies were conducted in countries where English is the second or foreign language. The researchers reviewed some of the most related studies to the topic of this study.

Fletcher and Atkinson (1972) carried out one of the earliest studies in which the students of the experimental group received eight to ten minutes of computer-assisted language instruction per day for five months; the remainder of the day was the same for all students. The findings of the study revealed that the performance of most students who received computer-assisted instruction was better than the performance of those who did not.

Cook (1985) determined whether there were significant differences between the growth of writing performance of seventh grade students who received computer-assisted writing instruction and those who did not. He found that the students who received computer-assisted writing showed better performance in writing than those who did not.

Orndorff (1987) implemented a course at Duquesne University in Pennsylvania, which combined the teaching of reading skills with computer aids that provided different kinds of support. He employed two computer programs focusing on critical reading and thinking. The first one was designed to teach students how to analyze a work of literary genre and structure and to be used with a book. The second one allowed teachers to create tutorials which featured different types of question and answer formats, an on-line dictionary, screen manipulations. These two programs also included different activities such as summary writing and short essay questions. The findings showed that because of such programs, the students' levels of achievement and retention increased.

Arroyo (1992) studied the effect of using computers on reading achievement of seventh grade students. The findings showed a statistically significant increase in reading achievement of the subjects who used computers. Moreover, Arroyo stated that, in addition to the improvement in reading scores, the use of computer appeared to increase the subjects' motivation to learn.

AbuSeileek (2004) investigated the effect of a computer-based program on Jordanian first secondary grade students' writing ability in English. The study revealed that there were statistically significant differences between the mean scores on the writing task of the experimental group who received instruction via computer and the control group who received instruction via the traditional method in favor of the experimental group.

Avent and Joseph Harmon (1994) investigated the language learning achievement differences between students using computer-assisted language learning courseware and students using the traditional language laboratory. The findings of the study revealed that the mean scores were significantly higher for computer taught items than for non-computer taught ones.

Chen (1996) studied the differences between male and female Taiwanese students using the same software and receiving the same type of feedback in a Business English class. The findings showed that computer application improved the students' writing ability in punctuation, grammar and spelling.

Pigg (1996) investigated the effect of the computer-assisted language instruction program Paragraph Builder on fifth grade students' topic sentence identification. The results of the post-test showed that the program significantly increased the mean score of the posttest. The results also showed that the students who worked with computer enjoyed learning about topic sentences by using the program.

Cantos-Gomez (1997) carried out a study to investigate the use of computer-assisted language learning activities in English and their effect on the students' motivations to learn. She found that the students in the experimental group, who used computer, showed more motivations to learn English than those in the control group.

Machado (1997) investigated the effect of computer-based technology on the language acquisition rates of sixth, seventh and eighth grade second language students in writing and speaking. The study revealed that the experimental group showed a faster rate of second language acquisition than that of the control group students.

Blankenship (1999) compared between computer-assisted instruction and the lecture-based instruction of college-level composition courses. The findings of the study showed that the performance of the students who received computer-assisted instruction was better than those who did not.

Tozcu (1998) investigated the impact of teaching sight vocabulary with computer-frequent word recognition and reading comprehension. He found that the experimental group presented significantly greater gains than the control group.

Campion (1999) investigated the effect of CALL on learning and transfer of vocabulary in primary stage pupils. The researcher tackled two issues: motivation and the role of educational technology in learning and transferring of passive vocabulary into the active. The findings of the study showed that the pupils who learned via CALL improved their results in both types namely in active vocabulary.

AbuSeileek (2007) investigated the effectiveness of two-mediated techniques – cooperative and collective learning – designed for teaching and learning oral skills, listening and speaking. He also investigated students' attitudes toward using a CALL approach and techniques for teaching oral skills. The findings of the study showed that the cooperative computer-mediated technique is a functional method for learning and teaching oral skills. The survey conducted in the study also showed that students react positively to both the CALL approach and the cooperative computer-mediated technique.

Chiu et al. (2007) applied an application of Automatic Speech Recognition technology for assisting learners to engage in meaningful speech interactions. The researchers developed a web-based conversation environment called Candle Talk, which allows learners to talk with the computer, to help EFL learners receive explicit speech acts training that leads to better oral competence. The findings showed that the application of Automatic Speech Recognition was helpful for college freshmen in teaching of speech acts, namely for the non-English major students. It was also found that most learners perceived positively toward the instruction supported with speech recognition.

It is argued that user actions need to be monitored to understand what has happened during the learning process. Monitoring on its own is not enough; user actions also need to be controlled so that users can receive the guidance they need to help them to the successful completion of the learning tasks in CALL programs. Ma (2007) conducted one such study to investigate both learning outcome and learning of two versions of a computer-assisted vocabulary learning program for Chinese learners. The results of the study showed that both the learning outcome and the learning process were more satisfactory in the controlled condition than the uncontrolled condition.

Al-Menei (2008) studied the effect of computer-assisted writing on Saudi students' writing skill in English. The findings of the study showed that computer-assisted writing has a significant effect on EFL Saudi students' writing ability in two areas: paragraph writing and correcting grammar.

Romeo (2008) studied the comprehension of relative clauses in audio prompts using online listening exercises implemented in a classroom. He assessed the reaction time to short and long sentences containing subject and object relative clauses in subject attending an intensive ESL course for graduate students. The results of the study indicated the possibility that learner shift recourses when processing more syntactically complex audio prompts such as those with object relatives.

## 7. Method, sample, instrument and procedures

The present study was carried out with King Saud University students following a randomized control-group pretest-post test design. The subjects were randomly assigned to two groups. Each group was then assigned at random to either the control group or experimental group. The treatment consisted of two levels: using computers alongside the traditional method and the traditional method alone. The experimental group undertook the first level of the treatment and the control group undertook the second level. The experimental group used the computers for three 30-min periods a week for the eight-week duration of the experiment. Both groups were subjected to a pretest immediately before starting the experiment and the same test was administered as a posttest immediately after it.

The population of the study consisted of all students who studied the English language course (Najem 101) in the second semester of the academic year 2007–2008. The sample of the study consisted of 60 students who were chosen randomly through the random sampling techniques in the statistical package SPSS. Then the 60 students were randomly assigned into experimental and control groups of 30 students each.

In order to answer the question of the study, the present researchers developed instructional software. The instruction software consisted of two main parts. The first part contains reading texts, explanation of the grammar items and presentation of the vocabulary items. The second part of the instructional software consists of exercises and drills on the reading passages and the grammar and vocabulary items. The instructional software was developed depending on the textbooks of Najem 101.

Moreover, the researchers also developed a 20-item-multiple choice test. Test items had 4 choices, only one of which is correct. The students were instructed to answer the questions by circling the correct choice. The test included items dealing with reading texts, vocabulary questions and understanding certain grammatical constructions. In scoring, students' achievement was computed out of 100, allotting 4 points for each correct answer and 0 for each wrong answer. The time interval between the pretest and the posttest was 8 weeks; a period long enough to minimize the effects of the pretest on the results and the conclusions of the experiment. The test was designed and administered by the researchers. The researchers themselves conducted the study. An independent-samples $t$ test was used to measure the gain scores of both groups on the pretest and then on the posttest. A One-Way Analysis of Covariance (ANCONA) was used to measure the gain scores of the subjects in order to eliminate any possible differences between the two groups on the pretest.

The usability of the test was tested through a pilot study of 25 students who were excluded from the sample. The reliability coefficient of the test was calculated using Cronbach-Aalpha and was found at 0.92. The test was also given to a jury of six professors at King Saud University, two from the Department of English language and four from the Language Unit Department, to elicit their views as to the accuracy, clarity, and appropriateness of the instrument. Then the test was reviewed and modified according to their recommendations. The instructional software was also given to the same jury to make sure that it suits the level of the students.

## 8. Findings and discussion

This study investigates the effect of computer-assisted instruction on Saudi University Students' learning of English. It compares using the computer alongside the traditional method with using the traditional method alone. The researchers hypothesize that the students who were taught through computer-assisted English language instruction alongside the traditional method show better achievement than those who were taught through the traditional method alone. This hypothesis was tested at the 0.05 level of significance. The data were collected through a pretest-treatment-posttest design for equivalent groups and analyzed via the statistical package SPSS. An independent-samples $t$ test was carried out to determine whether there are any statistically significant differences between the achievements of the two groups on the pretest. Table 1 represents the results.

Table 1 shows that the difference between the achievement of both groups on the pretest is not statistically significant at $\alpha = 0.05$. Thus, since there is no statistically significant difference between the control and experimental groups on the pretest, the two groups were assumed equivalent. Another independent-samples $t$ test was conducted to determine whether or not there is a statistically significant difference between the two groups' achievement on the posttest. Table 2 shows the results.

Table 2 shows that there is a statistically significant difference at $\alpha = 0.05$ between the achievement of the experimental group and that of the control group on the posttest in favor of the experimental group. This indicates that using the computer in English language instruction to the university students has a

**Table 1**  Results of the $t$ test of the means of the achievement of the two groups on the pretest.

| Group | N | Mean | Standard Deviation | T | Sig. |
|---|---|---|---|---|---|
| *PRETEST* | | | | | |
| Control group | 30 | 68.75 | 14.84 | −0.158 | 0.851 |
| Experimental group | 30 | 69.47 | 12.71 | | |

**Table 2**  Results of the $t$ test of the means of the achievement of the two groups on the posttest.

| Group | N | Mean | Standard deviation | T | Sig. |
|---|---|---|---|---|---|
| *POSTTEST* | | | | | |
| Control group | 30 | 69.85 | 14.34 | −2.058 | 0.045 |
| Experimental group | 30 | 81.65 | 10.67 | | |

**Table 3**  Results of the test of between-subjects effects.

| Source | Sum of Squares | df | Means of Squares | F | Sig. |
|---|---|---|---|---|---|
| Pretest | 7834.111 | 1 | 7834.111 | 267.558 | 0.000 |
| Group | 408.907 | 1 | 408.907 | 13.965 | 0.000 |
| Error | 3367.204 | 115 | 29.280 | | |
| Corrected total | 16987.167 | 118 | | | |

positive effect on students' achievement. The mean score for the experiment group on the posttest was 81.65 while that of the control group was 69.85.

Moreover, in spite of the fact that the difference between the achievement of the experimental group and the control group on the pretest was not statistically significant, to eliminate initial differences, a one-way ANCOVA was carried out. Table 3 shows the results.

Table 3 shows that there is a statistically significant difference between the experimental group and the control group on the posttest. The achievement of the experiment group, measured by the difference between the pretest and the posttest, was significantly better than that of the control group.

The researchers believe that the difference in the achievement of the students was attributed to using computer in English language instruction. Furthermore, the differences between the two groups may be attributed to many other reasons. First, using computer in English language instruction is a novelty. This novelty may have encouraged the students to deal with the computer enthusiastically, which may have been reflected in better achievement. Second, computers depend on programs that are based on individual learning and consider the level and pace of the individual. This may enhance learning as the learner may feel that s(he) is in control of the whole learning process. Third, using computers allows the students to repeat the same piece of information or drill as many times as necessary for them to understand. Moreover, they are able to refer to the learning material any time they want. Fourth, using computers in instruction makes the students become less shy of committing mistakes, which encourages them to learn much better and then improve their achievements. Fifth, students using the computers might have felt that they were not being watched or judged and, thus, that the work they did was their own private property. Therefore, they were relaxed about pooling information and seeking help from other students. Finally, computers have many positive characteristics such as speed, accuracy, variability of presentation and flexibility of use and control, which explains why it outdoes other presentation modes such as books.

The results of this study are consistent with studies conducted by Fletcher and Atkinson (1972), Cook (1985), Orndorff (1987), Arroyo (1992), AbuSeileek (2004), AbuSeileek (2007), Avent and Joseph Harmon (1994), Chen (1996), Pigg (1996), Cantos-Gomez (1997), Machado (1997), Blankenship (1999), Tozcu (1998), Campion (1999), Chiu et al. (2007), Ma (2007), Al-Menei (2008) and Romeo (2008). All of these studies showed that using computer in English language instruction has positive effects that helped students improve their language skills.

## 9. A final word

This study represents a preliminary effort to empirically examine the effect of CAI on university students' learning of English in the Kingdom of Saudi Arabia. Further research is needed for a thorough understanding of this issue and for the confirmation of its findings. This is especially true when conducting research with more variables than those in the present study. It is also recommended that this study be replicated with a larger number of participants and over the whole semester or the whole year. In addition, it would be interesting to compare results across levels of proficiency as well as gender. Researchers are further recommended to study the effect of using computer on the school students' learning of English.

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