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The Effects of Computerized Instructional Program on Saudi High School Students' Academic Achievement in English

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Abstract

This study aims to investigate the effect of computer- assisted language learning program on Saudi high school students' academic achievement in English. The researcher prepared the computerized program used. The sample of the study consists of 100 students randomly selected from Al-Riyadh Directorate of Education and were assigned to experimental and control groups. An achievement test was used to collect data from the students who participated in this research. The findings of the study indicate the use of Computer-Assisted English Language Learning (CALL) has a positive effect on the experimental group students' achievement. This technology-driven method fosters their educational performance and achievements and somehow enhances their respective attitudes towards the interactive instructional process. It is deemed a stimulus, not an impediment, functioning to pave way to create a better quality interactive atmosphere. It, thus, fosters the students' immersion in the academic materials presented at the classroom, a bid in the right direction to achieve an integrated instructional process.

Keywords: Computer-Assisted English Language Learning (CALL), Computer-Based Instruction (CBI), English language instruction, Saudi high school students.

Introduction

Many countries worldwide place great emphasis on computer-based instruction in the educational curricula. One of the major aims of the said instruction is to empower students to keep in pace with the new developments, and concomitantly to utilize the latest technological discoveries in the relevant fields. Researchers have been so interestingly revealing of the effect of computer-based instruction, which has begun to be used with the invention of the computer, and which has become one of the most important technological devices of the time.

As a result of the rapid developments in the information and communication technology, the use of computers in education has become inevitable and provides students with a more suitable environment to learn; it serves to create interest and learning centered-atmosphere, and also helps foster students' motivation. The use of technology in this way plays an important role in the teaching and learning processes (Isman, Baytekin, Balkan, Horzum, & Kiyici, 2002) along with the technological advances and devices; in particular the computer, has been used in educational environments to develop audio-visual materials, namely animation and simulation that spearheaded development of computer-based instruction techniques.

The use of computers in teaching methodologies and learning activities is roughly defined as Computer-Based Instruction (CBI). The CBI is the integration of computers in teaching methodologies and learning activities (Brophy, 1999). It empowers students to learn by self-evaluation and to reflect on their learning process. It motivates children to learn better by providing them with prompt feedback and reinforcement and by creating an exciting and interesting game-like atmosphere. The relevant studies in the field reveal that the students' achievements increase when the CBI is more effective on less below-average students.

The reason for this is that the CBI empowers children to progress at their own pace and provides them with the appropriate alternative ways of learning by individualizing the learning process (Senemoglu, 2003). A familiar function of English education is to teach children English vocabulary in a meaningful way and to enable them to learn how they can make use of these words in their daily lives (Cepni, Tas, Kose, 2006).

Computer-based teaching has had a noticeable impact on the development of educational technology in the 21st century, which resulted in the production of the computer-based instruction software. The primary purpose of educational software is to solve learning problems in English courses encountered by the primary school students, to increase their motivation and achievements, and to fend off negative effects of the rote-memory-based educational system.

Technological developments give rise to new teaching and learning facilities. At present, human beings continue to find out how to use computer in educational activities in a more productive way rather than searching to reveal whether the use of computers in teaching and learning activities is effective (Yakar, 2008). Educational technologies, especially computers play an important role in facilitating teaching and learning.

Computer-based instruction makes teaching techniques more effective than those of traditional teaching methods as it is used for presenting information, practicing testing, and evaluating and providing feedback. It makes a great contribution to the differentiated instructions of education and motivates students and spurs them to take an active part in the learning process.

Further, it helps to bolster creativity and problem solving skills, as well as identity and to develop learners' self-reliance. The CBI provides drawings, graphics, animation, music and plenty of materials for students to proceed at their own pace and in line with their individual differences; it serves to control diverse variables that have an impact on learning, which cannot be controlled by means of traditional educational techniques (Kasli, 2000; Chang, 2002).

Liao (2007) finds that the computer-based instruction had a positive effect on individuals by comparing 52 research studies carried out in Taiwan in his meta-analysis study. Senteni (2004) also found the CBI empowered students to increase their motivation and achievement and to develop positive attitudes. According to related studies in literature, the use of the CBI fosters students' attitudes and achievements significantly (Berger, Lu, Belzer, voss, 1994, Geban, 1995). There is a lot of research on the CBI in Turkey; and different results were unraveled. Some of these studies reveal the CBI serves to establish more effective learning situations than traditional teaching methods, which involve teacher presentation, question-answer techniques, and discussions (Boblck, 1975; Hughes, 1974). It has been found that the CBI serves to develop students' meta-cognitive skills, helps them to learn in a meaningful way instead of rote-memory learning, and enables them to increase their achievements as well (Renshaw & Taylor, 2000). According to some studies, there is no significant difference between the CBI and traditional teaching methods (Bayraktar, 2001; Al Acapinar, 2003; Cetin, 2007).

This study, which aims to test effects of the use of CBI technology, is thought to be important as it will contribute to the wise use of educational software, which triggers active participation and enables students to make their own meaning. The research, carried out to this end, is intended to make English education more enjoyable, productive and functional.

Theoretical Background of the Study

With the use of computers in education, several terminologies have come into and gone out of use in education (Ownsu, Monney, Appiah, Wilmot, 2010). The overlapping terms related to the uses of computer associated with technologies in English education are categorized into three categories by Bybee, Poewll, and Trowbridge (2008) as follows: learning about computers, learning with computer and learning through computers.

- 1- Learning about computers involves the knowledge of computers at various levels such as knowing the uses of the computer and the names of the various parts, knowing how to use the keyboard and computer packages and so on (Owusu et al 2010).
- 2- Learning with computers, meanwhile, engages students' use of computers as a tool in the acquisition, analysis, and communication with other people, information retrieval and a myriad of other ways (Owusu et al 2010).
- 3- The term, "learning through computers," involves the use of the computer as an aid for the teacher to do his/her presentations, and/or to get the learners to practice and drill.

This study mainly involves learning through computer as well as learning about computers. Its theoretical basis derives from the operant conditioning by Skinner as described by Owusu et al (2010) in their research. Operant conditioning is a type of conditioning in which a learner achieves some outcome by producing an action, called the operant. If the operant is followed by something pleasant, the outcome is positively reinforced, but if it is ensued by removal of something unpleasant, the result is negatively reinforced. The theory, deemed influential during the heyday of the Audio-Lingual method and lost favor in the 1960s, was revived after the integration of computers into education. Skinner's reinforcement theory is

central to computerized learning, especially drill, practice and tutorial learning (Tabassum, 2004). In this computer-facilitated learning environment, students' behaviors are reinforced by being permitted to proceed to the next frame when they get the right answer (Bigge and Shermis, 2004). Tabassum (2004) indicates that Skinner illustrated how to develop a programmed learning sequence being used directly to design tutorial modules. Owusu et al. (2010) highlights the crucial role of the behaviorist view of tutorials attributing his approach to "the principle of practice and reinforcement," and advised tutorials' developers to integrate this orientation in their programmes.

The study makes use of the operant conditioning derived from the practices of Skinner's behaviorism. The materials and activities are presented in graded steps. Learners have three opportunities to be active in the learning process, receive immediate feedback and work at their own pace.

Statement of the Problem

The researcher noticed many Saudi high school students encounter diverse difficulties in learning English language. Moreover, they lack motivation to learn English and consequently develop negative attitudes towards English. The researcher thinks the use of technology in general and CALL in particular may help in changing the situation. As a result, the need arises to study the effect of using computers on the students' achievement in English. The researcher intends to investigate the effect of Computer-Assisted EFL Instruction alongside the traditional method on the high school students' achievement in English.

Purpose of the Study

The basic aim of this study is to investigate the effect of computer-based instruction (CBI) on the academic achievements of English Language among Saudi eleventh grade students.

Significance of the Study

It is common for teachers to use different techniques in the language class to help their students improve their language skills. The use of CALL programs to improve learners' academic achievement in English is widely recommended in the educational literature and its role in the foreign language classroom has been the concern of many teachers and scholars. In the current environment of research-based practices, many educators may be skeptical about allowing the use of a new educational tool until the effects of that tool have been clearly documented through quantitative research. It is important as its results would serve to compliment the previous studies conducted on the CBI and to provide a basis for further efforts in this field.

Therefore, it is hoped this study results in the advantages below:

- 1- It will help researchers involved in the educational process gain insights into CALL and seek to improve it over time.
- 2- It may encourage further research, which in turn, may lead to the enrichment of the field of CALL in general, and language teaching and learning in particular.
- 3- It will help teachers to better understand the issue and integrate CALL into their classroom routine.
- 4- The information gathered in this study will aid proponents of CALL in better understanding the educational effects of their craft.

5- The findings of this study may help expose importance of using CALL to improve to students to improve their performance in English.

6. The findings of this study and other research papers may help students to see difficulties in learning English they may encounter if they do not use CALL in acquiring this foreign language.

Question of the Study

The present study aims at answering the questions below:

The main research question of the study is stated as follows:

"Does computer-based English instruction have any effects on the academic achievements of eleventh grade students?"

Sub-Questions of the Study

The study also seeks to answer the sub-questions below:

- 1- Is there a significant difference between the means of the post-test achievements scores and the pre-test counterparts of the control group taught based on the traditional method and the experimental group taught based on the computer-based instruction program?
- 2- Is there a significant difference in retention rate between computer-based instruction and its traditional counterpart?
- 3- Is the amount of time spent in the course a significant factor in student's academic achievement and retention?

Hypotheses of the Study

The study supposes the following hypotheses in order to reach the findings.

- 1- Computer-Based English Instruction has many effects on the academic achievements of eleventh graders.
- 2- There is a significant difference between the means of the post-test achievement scores corrected according to the pre-test achievement scores of the control group taught according to the traditional method and the experimental group taught according to the computer-based instruction program.
- 3- There is a significant difference in retention rate between Computer-Based Instruction and the traditional one.
- 4- The amount of time spent in the course is a significant factor in students' achievement and retention.

Limitations of the study

The study is restricted to the topics: "vocabulary, grammar, and short test" of the English course and to the 100 eleventh graders studying in two high schools at AL-Riyadh, Saudi Arabia, during the academic year 2013-2014.

Review of related literature

The effect of CALL on learners' academic achievement in English triggers considerable emphasis in English as a first language; however teachers traditionally discourage it.

Al-Seghayer (2001) examines effectiveness of a hypermedia-learning program designed to provide users reading a narrative English text with a variety of glosses or annotations for

words in the form of printed text, graphics, video, and sound on aiding vocabulary acquisition. The findings of his study indicate that a video clip is more effective in teaching unknown vocabulary words than a still picture. This result can be explained as follows: video better builds a mental image, better creates curiosity leading to increased concentration, and embodies an advantageous combination of modalities (vivid or dynamic image, sound, and printed text).

Al-Makhzoumi and Abu Al Sha'r (2003) compare effects of using computer multimedia approach and context-based approach on EFL major university students' learning of English. The findings of their study reveal that students in the experimental group, who received instruction via computer multimedia, significantly outperformed their peers in the control group, who received instruction via context-based materials. The authors stress the need for more emphasis on the use of computer-assisted multimedia to promote instruction and learning of English among English major students and teachers.

Abu Seileek (2004) investigates effect of a computer-based program on Jordanian first high grade students' writing ability in English. The study reveal 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.

Al-Jarf (2004) tries to find out whether there were significant differences between EFL freshman students exposed to traditional in-class writing instruction depending on the textbook only, and those indulged in a combination of traditional in-class writing and web-based instruction in their writing achievement. The findings of the study show that the students in the experimental group taught using a combination of web-based writing instruction and traditional in-class writing instruction scored significantly higher than the control group taught using traditional in-class writing instruction depending on the textbook only. The findings of the study also indicate the use of technology had a positive effect on their attitude towards the writing process.

Al Bakrawi (2005) investigates effect of a computerized ESP program on the proficiency of secondary school hotel- stream students in English. The findings of the study indicate that the computerized ESP program has a measurable effect on the participants' proficiency in English. The researcher concluded that the high level of the proposed program apparently lead to an effective process of teaching and learning resulting in a significant improvement.

Al Qomul (2005) investigates effect of using an instructional software program on basic school students' achievement in English language grammar. It was found that there were significant differences in the means scores of students in the experiment group taught using computer-assisted instruction (CAI) and those in the control group taught using the traditional method. The findings of the study confirm the positive effects of the CAI in teaching English.

Almekhlafi (2006) investigates effect of CALL on elementary school students' achievement and their attitudes towards learning English in the United Arab Emirates UAE. The findings of the study show that the students in the experimental group had a positive attitude towards CALL. The findings of the study also reveal that CALL affected the students' achievement positively.

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

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

Bani-Hani (2009) investigates effectiveness of a computerized instructional program for teaching English as a foreign language in Jordanian basic schools and the teachers' and students' opinions about computer-assisted language learning (CALL). The findings of the study show that there were statistically significant differences in the students' achievement in favor of the experimental group. The findings of the study also indicate that teachers and students had the inclination to use computers in teaching and learning English as a foreign language.

Mahfouz and Ihmeideh (2009) finds out that using video and text chat can give English foreign learners more opportunities to make real-life communication and authentic interaction with native speakers and to widen perspectives of the learning environment beyond the boundaries of the classroom.

Al- Mansour and Al-Shorman (2009) investigate the effect of computer-assisted instruction on Saudi students learning of English at King Saud University. The findings of the study indicates that using computer-assisted English language instruction alongside the traditional method has a positive effect on the experimental group students' achievement.

Al-Abed Al-Haq & Al-Sobh (2010) investigate the effectiveness of a web-based writing instructional EFL program on Jordanian secondary students' performance. The findings of the study show that there were statistically significant differences in the students' mean scores of the overall English writing achievement post-test in favor of the experimental group. The findings of the study also indicate that there were statistically significant differences due to gender in favor of the female students compared with males. The findings finally show that there was a significant difference among the mean scores of the students' achievement post-test for the discorsal component "content" in favor of the experimental group.

Arishi (2011) tries to explore attitudes of English faculty toward computer-assisted language learning (CALL) in Saudi Arabia and to find out whether these attitudes are associated with factors like age, qualifications, teaching experience, general training in using computers, training on CALL, and the use of a language laboratory in teaching English. It was found that faculty teaching English in Saudi Arabia express neither positive nor negative attitudes toward CALL. It was also found that there was no clear correlation between their attitudes and the proposed variables listed above.

Eyadat (2011) investigates students' attitudes toward the use of computers in the classroom at "New Horizon" school. The findings of the study indicate that students generally

had positive attitudes toward technology and toward learning via technology. The findings of the study also reveal that neither gender nor grade level impacted student's attitude toward technology or their attitude toward learning using technology. Finally, the study provides a number of field suggestions, one states that the relevant data do not provide any conclusive evidence pertinent to students' attitudes toward the subject-specific learning as affected by their technology-based learning experiences.

Fageeh (2011) studies the use of a blog in an intermediate level EFL college writing class and its effect upon students as well as its impact on developing positive attitudes towards writing compared with oral presentation traditions of writing instruction. The findings of the study reveal that students perceived Weblog as a tool for the development of their English, in terms of their writing proficiency and the relevant attitudes. The findings of the study also show that students viewed Weblog as an opportunity for self-expression in English, writing for both a local and global audience, creating actively dualistic social exchanges in blogs, and maintaining an interactive relationship with a real-time readership. Generally, it was found that students have had positive attitudes towards the Weblog use.

Ezza (2012) explores integration of the Web resources into the EFL classroom activities at the University of Khartoum, Sudan. It was found that (1) most EFL teachers use web-based materials to enrich courses content; (2) most EFL teachers integrate their students' Internet skills in the classroom activities; and (3) there are no gender differences with respect to the integration of web-based materials into the EFL course content.

Method and Research Design

The pre-test/ post-test control group design (PPGD) was used in this study. The (PPGD) is a mixed design, which is widely used. A mixed design is a factorial design widely used in social sciences, especially in education and psychology. The (PPGD) as one of the mixed designs is one of the most widely used experimental designs. In PPGD, in order to determine effectiveness of the experimental process, whether the variation between the two groups is significantly different is tested by means of the "t" or "f" test (Buyukozturk, 2010).

Participants

The participants of the study were 100 eleventh graders from two public high schools in Al-Riyadh, Saudi Arabia, during the academic year 2013-2014. The targeted eleventh graders were put into two groups by lot, and later 50 eleventh graders in the control group by lot again in order to avoid effects of the gender variable. All male students were delivered in order to avoid effects of instruction environment variable. Each group from one school, so, the first school held the control group, and the second one comprised the experimental group. The students' ages in both groups ranged from (13-15) years. The average of which was from a middle-class rank as well as the same socioeconomic status.

Instruments

In order to determine the eleventh graders' comprehension levels of the topics in the English course materials, an achievement test of 25 items was designed. Before designing the achievement test, the behavioral objectives were determined by means of the content analysis. With the help of experts in the field, it was determined that there were 25 types of critical behavior to be tested, and 75 questions were prepared to test these behavior types. The tentative

form was administered to a group of 100 eleventh graders of another high school. The results of the administration were analyzed using Transition Assistance Program (TAP). 25 questions that test critical behaviors were included in the final test. On the basis of the items analysis, the achievements test was prepared with the item difficulty ranging from 0.25 to 0.90. This test was finalized with the KR-20 reliability as 0.72.

The Experimental Process and Collecting Data

The “computer-based English teaching program” was applied to the experimental group and not to its control counterpart. It was found that there was statistically no significant difference between the pre-test means of the experimental and control groups. Accordingly, it can be concluded that there is a no significant difference between the Achievement Test for Children, pre-test means of the experimental and control groups. In this case, it can be assumed that the achievements levels of the control and experimental groups were equivalent before the experiment began.

For the experimental group, the white board was not used while studying the unit in the English class. Instead, the interactive computer-based “learning package,” consisting of educational games that could be played when connected to the internet, was prepared with the Macromedia Flash 8 program.

The control and experimental groups were balanced gender-wise. Furthermore, care was taken that the individuals in the control and experimental groups did not interact with each other. Six sessions of teaching 12 hours was allocated equally to both groups. At the end of the three-week computer based English program, the experimental and control groups were again administered the “vocabulary, grammar, and short text Achievement Test” on the same date.

Analysis of Data

To analyze the data, the Kolmogorov-Smirnov single sample test was used to see if the data were suitable for normal distribution, and the “independent groups’ t-test” was used to test equivalence of the achievement and problem-solving skills of the experimental and control groups at the beginning of the study. At the end of the experimental process, and in order to test effectiveness of the experimental process, the co-variance analysis technique, (ANCOVA), was used to see whether there was a significant difference between the post-test score averages, which were corrected according to the pre-test results of the experimental and control groups (Bonate, 2000; Büyüköztürk, 2006). The significance level was taken as 0.05 in the study.

Findings

The Kolmogorov-Smirnov Z was used to find out whether the scores of the dependent variables followed a normal distribution within each subgroup, and whether the variances were equal in order to measure whether there was a significant difference between the means of the pre test and post test results of the control and experimental groups’ achievements by means of ANCOVA.

The measurements related to the experimental and control groups follow a normal distribution and the variances are equal. Moreover, when the correlations between the measurements related to the groups were studied, it could be seen that there was a correlation at 0.49 (the lowest) between the pre-test and post-test scores of the experimental group’s

Achievements. There was a correlation at 0.52 (the highest) between the pre-test and post-test scores of the experimental group's Achievements. All of the correlations are significant at the 0.05 level. The results can provide evidence to the fact that there is a linear correlation between the pre-and-post test scores. With respect to these results, the co-variance analysis was used to determine whether there was a significant difference between the means of the corrected post-test scores based on the control and experimental groups' achievements.

It was found that there is a statistically significant difference between the means of the students' post-test achievement scores in the control and the experimental groups corrected according to the pre-test. It can be seen that there is a significant difference between the means of the achievements post-test scores corrected according to the pre-test in favor of the experimental group. It has been found that the program (computer-based English teaching package) used with the experimental group had an effect on the success of the English course according to the research findings. When the eta-square values of the dependent variables are examined, it will be seen that the extent of effect is high and the 17.4 % of the variations in the achievements post tests can be accounted for attributed to being in different process groups.

It can be stated that the F values and significance levels related to the models are significant from the perspective of the achievements post test scores and the 23.9 % of the variances in the achievements post tests can be attributed to being in different process groups, whereas the 58.7 % of the variances in the achievements' post tests can be attached to being in different process groups.

Discussion and Suggestions

The fundamental aim of this study was to investigate the effects of computer-based instruction (CBI) on the academic achievements of English high school students. To this end, the scores obtained from the Achievement Test administered to the experimental and control groups were compared. The findings obtained from the results of the pre-and-post tests administered at the end of the computer-based English program reveal that there was a significant difference between the achievements post-test scores corrected according to the pre-test scores of the experimental and control groups. It can be stated that the use of CBI has positive effects on the learners' achievements; the high eta-square values obtained from the study indicate that the group and pre-test variables can provide an explanation for the variances in the post-test scores. The results of the research indicate that the use of the interactive learning package assists the learners in increasing their achievements.

The significant upsurge in learners' academic achievements in this study can also be seen in Olgun's research, entitled "The Effect of the Computer Assisted Instruction Given to Sixth Grade Primary School Students on the Students' Attitude toward Science and their Meta-Cognitive Skills and their Achievement," which show that the computer-assisted English instruction positively affected the students' attitude toward English and their meta-cognitive skills. Tekmen (2006) determines the effect of the Computerized Adaptive Testing (CAT) method on the students' attitude deemed significantly higher in comparison to the traditional techniques. Yildiz (2009), in her study, entitled "the Effect of Computer-Assisted Instruction on the Attitude and Achievement of 8th Grade Primary School Children in the Subjects of Geometrical Objects, their

Surface Areas and their Volume", concludes that the computer-assisted instruction positively affected students' attitudes.

Finally, the suggestion derived from this research findings can be presented as follows: this study is limited to the study of "vocabulary, grammar and short text" in the English course. Similar research can be carried out on diverse topics in different classes. Quantitative and qualitative studies can also be conducted on the achievements of high achievers and low achievers in the other school subjects. The duration of this research was limited to three weeks. In another study, more time should be allocated to find out effectiveness of the experiment of the teaching package used with the experimental group; teachers can be asked to take part in in-service training and can be taught how to use the programs such as macromedia flash, Adobe Photoshop, Macromedia Auth or ware. They can be encouraged to develop computer-based English software and similar research can be conducted in different primary and high classes.

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Appendix

Achievements Motivation Questionnaire

First: Socio-Psychological Domain

N	Items	Strongly agree	Agree	Disagree	Strongly disagree
1	The availability of suitable environment for studying				
2	Good economic level for student and his family				
3	Centering the students' attention				
4	The accessibility of mobile phone and other technologies				
5	The increasing of students motivation level toward learning				
6	The availability of time for student to study				
7	The comfortable family climate				
8	Positive attitudes among parents toward learning				
9	The clarity of the purpose of learning				
10	The positive influence of peers				
11	The amount of derivatives to motivate students intelligence				
12	Parents' attention paid toward their kids' levels				
13	Students interests in their lessons				
14	Pleasure taken in studying				
15	The various electronic resources				

Second: The School Domain

N	Items	Strongly agree	Agree	Disagree	Strongly disagree
1	Students liking teachers and the school system				
2	Teachers' positive treatment of students				
3	Students liking the instructional materials				
4	Teaching materials by specialized teachers				
5	The availability of instructional equipment				
6	Students preparing their assignments and homework				
7	The rapid intake of the information				
8	Acquiring the computer skills in addition to the material				
9	Scientific and educational preparation of teachers				
10	The small size of students in each class				