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THE EFFECTS OF COMPUTER ASSISTED ENGLISH INSTRUCTION ON HIGH SCHOOL PREPARATORY STUDENTS' ATTITUDES TOWARDS COMPUTERS AND ENGLISH

BİLGİSAYAR DESTEKLİ İNGİLİZCE ÖĞRETİMİNİN LİSE HAZIRLIK ÖĞRENCİLERİNİN İNGİLİZCE'YE VE BİLGİSAYARA YÖNELİK TUTUMLARI ÜZERİNDEKİ ETKİLERİ

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ÖZ

Bu araştırmanın amacı; bilgisayar destekli İngilizce öğretiminin, süper lise hazırlık sınıfı öğrencilerinin bilgisayara ve İngilizce'ye yönelik tutumları üzerindeki etkilerini saptamaktır. Araştırmada, önce-sonra ya da tekrarlı ölçümler deseni olarak da adlandırılan ve yarı deneysel bir desen olan zaman serileri deseni kullanılmıştır. 20 bayan ve 10 erkekten oluşan bir öğrenci grubu seçkisiz olarak atanmıştır. Araştırma; bilgisayar destekli İngilizce öğretimi (BDİÖ) öncesi geleneksel İngilizce öğretimi ve BDİÖ süreçleri olmak üzere 2 aşamalıdır. Veri toplama araçları; her iki aşamada, ikişer hafta aralıklarla, üçer kez uygulanan Bilgisayar ve İngilizce'ye yönelik tutum ölçekleridir. Edinilen bulgulara göre, bilgisayar destekli İngilizce öğretimi sonrası, öğrencilerin bilgisayara ve İngilizce'ye yönelik tutum puanları, anlamlı ölçüde artış göstermiştir. Ancak tutum puanlarındaki artış ile öğrencilerin cinsiyetleri ve aylık gelirleri arasında anlamlı bir ilişki bulunamamıştır. Bu araştırma deseni, belirli bağlamlarda yapılan ölçümlerde zamanla oluşan değişim ve eğilimi saptamak üzere araştırmacılara önerilmektedir.

Anahtar Sözcükler: Bilgisayar Destekli Öğretim, Bilgisayar Destekli İngilizce Öğretimi, Zaman Dizisi Deseni.

ABSTRACT

The aim of this research was to discern the effects of computer assisted English instruction on English language preparatory students' attitudes towards computers and English in a Turkish-medium high school with an intensive English program. A quasi-experimental time series research design, also called "before-after" or "repeated measures" design, was used in this research. As a sample, one group of students (20 female and 10 male) was randomly assigned. The research had two phases: traditional English instruction and computer assisted English instruction (CAEI). The instruments for data collection were a Scale for Attitudes Towards English and a Scale for Attitudes Towards Computers, which were given three times at intervals of two weeks. According to the findings, the students' scores of attitude towards computers and English after CAEI increased significantly. However, the correlations between the increases in the students' attitude scores, their gender, and their monthly income were found to be insignificant. This research design is advised for researchers to see the variation and trend of measurements, in particular contexts in time.

Keywords: Computer Assisted Instruction, Computer Assisted English Instruction, Time Series Design.

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INTRODUCTION

Computer-based instruction has been challenging traditional teaching and learning processes. The role of these technologies in language learning and teaching is called Computer Assisted Language Learning (CALL). CALL is a language learning and teaching approach in which the computer is used as a tool for presentation, assisting students, and evaluating learning material, and has an interactional element. As cited in Davies (2002), Levy (1997) emhasizes that CALL is more extensively defined as the search for computer applications in language teaching and learning and research on the matter. CALL adapts the research findings of second language acquisition, sociology, linguistics, psychology, cognitive sciences, culture examinations, and natural language processing to second language pedagogy and relates them to investigation into information processing, artificial intelligence, and telecommunication (CALICO, 2001). Thus, the progress of language learning and teaching processes is achieved.

From its beginning till today, CALL developed in parallel with the facilities provided by computer technology. As expressed by Jones (2001), the importance of computer technologies in foreign language learning and teaching has been established by many people. Language teachers and administrators realize the tendency towards CALL; also, students demand computers through the facilities provided them for language learning. CALL has been taking advantage of advanced technological facilities to create the highest interactive learning environments for activities that develop listening, speaking, reading, and writing skills. With the help of networks' high transmission capabilities, it has been possible to access authentic cultural resources and bring foreign language students together with native speakers of that language (CALICO, 2001). In the developed world, all language centers agree that it is impossible to make progress without high technology and computers.

THE PROBLEM

In parallel to advances in technology, computer and instructional technologies are becoming an indispensable part of the learning and teaching processes. The role assigned to instructional technologies in foreign language instruction has also changed with these advances. As cited in Spanou (2001), Levy (1997) mentions that for the past 40 years, in the era of mainframes in which high-level programming skill is required, computers had a startling nature. However, for the last 20 years, with more "user-friendly" interfaces, it has become possible for language teachers to make more complex applications for themselves. The computers which are used for drill and practice in language instruction nowadays; with advances such as integration of speech recognition programs with multimedia software, enrich students' language

learning experiences. The Internet provides numerous facilities for communicating via the target language, and accessing text-based and multimedia resources and globallized information. From the beginning till today, the effectiveness of various CALL materials has depended on pedagogical designs and the way teachers' use these materials. When computers are appropriately used, they will improve the learning process in a different way (Warschauer and Healey, 1998).

CALL has had several effects on the foreign language learning process. In their research titled "Language learning in cyberspace", Donaldson & Kötter (1999) designed a real-time MOO (Multiuser Object Oriented) system for second language learners from universities. The sample used this system once a week for collaborative tasks for five months. The researchers concluded that such CALL applications are interesting, help students learn more interactively, and motivate students in language learning. Kartal (2002) also agreed that computer use in foreign language teaching is motivating for students since computers can individualize learning, and help students learn faster and easier than before.

A qualitative research conducted by Oosterwegel, Littleton and Light (2004) examined female and male students' attitudes towards the computer. This research revealed no significant difference between gender and attitudes towards the computer, as others have done (Pope-Davis and Twing, 1991; Habjan, 1994; Jennings and Onwuegbuzie, 2001;).

During the integration process of computer technologies with the curriculum, it is very important to find out the effectiveness level of computer assisted instruction methods and technologies at different grades and in different lessons. Examining the effects of using computers in EFL instruction on high school preparatory students may contribute to the development of future CAEI applications.

STUDY

Aim of the study

CALL applications intend to meet students' individual learning needs and enrich their learning experiences by removing the limitations of traditional instruction. The primary aim of this research was to find out the effects of computer-assisted English instruction (CAEI) on high school preparatory students' attitudes towards computers and English. The research consisted of the following research questions:

1- Is there any significant difference between student attitudes towards computers before and after CAEI?
2- Is there any significant difference between student attitudes towards computers according to gender?

3- Is there any significant difference between student attitudes towards computers according to their monthly income?
4- Is there any significant difference between student attitudes towards English before and after CAEI?
5- Is there any significant difference between student attitudes towards English according to gender?
6- Is there any significant difference between student attitudes towards English according to their monthly income?

In this research, it is assumed that all participants honestly answered the questions in the attitude scales. Possible limitations of the research are as follows:

1- The number of computers in the laboratory in which the research was conducted was not equal to the number of participants. That may have discomforted some students while using the computers since they are unable to use them individually.

2- The number of computer assisted English lessons was 10. The length of the research period may be a disadvantage for validation of the research findings.

3- The sample consisted of a disproportionate number of female and male participants (20 female and 10 male). This may be a disadvantage for generallization of the research findings and research findings related to gender.

METHOD

The research design or model was a quasi-experimental time series research design, also called the "before-after" or "repeated measures" design. Gottman et al claim that the researcher can have control over the research by means of not only designs with control groups but also using supplementary control strategies (Christensen, 1971). In such circumstances, it is possible to conduct an interpretable experiment by letting all participants experience all experimental conditions. Such research designs are termed the "time series design", "repeated measures design" or "within groups design".

One group time series research design

G O1 – O2 – O3 – X – O4 – O5 – O6

G: Group; O: Observation; X: Experimental process

In this design, many measurements are made. It is intended to see the variation and trend of measurements in a particular context. This design is useful when the dependent variable will be measured in time naturally and periodically (Wiersma, 2000). It is intended to observe the same participants

in different conditions (Shaughnessy ve Zechmeister, 1997). The aim of the research is to evaluate the same students' attitudes towards the computer and English both before and after the experimental process, that is, computer assisted English teaching. This is the reason why one group research was conducted.

Population and Sample

To determine the school where the research would be carried out, the most appropriate intensive foreign language high school for computer assisted instruction was selected using the stratified random sampling method. According to Young (1997), there may often be factors which divide up the population into sub-populations and we may expect the measurement of interest to vary among the different sub-populations. This has to be accounted for when we select a sample from the population in order that we obtain a sample that is representative of the population. Therefore, the high schools with English preparation classes and with well-equipped computer laboratories in İzmir were investigated and one that was representative of the population was selected. After selection of the school, one group of ninth grade students was assigned randomly as before-after research required. The sample consisted of 30 students (20 female and 10 male).

Tools for Data Collection

1- Student personal information form: This form includes questions about students' families, financial situation, and level of computer use.

2- Computer Attitude Scale (CAS): The trial version of the CAS which was translated from English to Turkish by Berberoğlu ve Çalıkoğlu was administered to 282 students from Middle East Technical University, Ankara University and Bilkent University (Vural, 1999). The scale consists of 40 items:10 items for computer anxiety; 10 items for self-confidence in using computers; 10 items for enjoying computers, and 10 items for computer usage. The reliability coefficient of the scale is $\alpha = 0.90$.

3- English Attitude Scale (ETS): The trial version of the ETS developed by Altunay was administered to 120 preparatory students from İzmir Institute of Yüksek Teknoloji in December in 2002. The reliability coefficient of the scale is $\alpha = 0.96$.

Design of Experiment and Data Collection

Table1: Design of experiment

GROUP	Experimental Group	
Before experiment	CAS	ETS
	Traditional English instruction	
	CAS	ETS
	Traditional English instruction	
	CAS	ETS
During experiment (Experimental processes)	Computer-assisted English instruction	
	CAS	ETS
	Computer-assisted English instruction	
	CAS	ETS
	Computer-assisted English instruction	
After experiment	CAS	ETS

CAS: Computer Attitude Scale
ETS: English Attitude Scale

As Table 1 illustrates, the CAS and ETS were given three times at intervals of two weeks both in the traditional and computer-assisted English instruction phases.

In the traditional English lessons observed, the teacher writes on the blackboard, students copy what is written, read texts, answer questions about texts, listen to a cassette and repeat.There is limited learning opportunity for each student and the lessons sometimes lack motivational factors. In experimental CAEI, computers were used to overcome these limitations. During the computer-assisted English lessons, related grammar topics and exercises from "Active English" instructional software were presented by means of a projector in the laboratoary. Several free educational games were used. Before the main computer answered the question, the program had been occcasionally stopped and the teacher asked questions to the students; thus English grammar and vocabulary instruction was implemented too.

Data Analysis Techniques

As mentioned in the experimental design, after administration of both of the attitude scales, the collected data were analyzed statistically. The statistical techniques Mean, Standard Deviation, t-Test, Analysis of Variance (ANOVA), and Pearson Correlation Coefficient were used to analyze the data. The variance within the attitude scores is presented in the tables.

FINDINGS AND DISCUSSION

Differences in attitude towards computers before and after CAEI

Since the differences between measurements taken during traditional instruction were insignificant, the mean score of these measurements was computed and then only one computer attitude score, representing the traditional era of research (TCAS), was used for comparison.

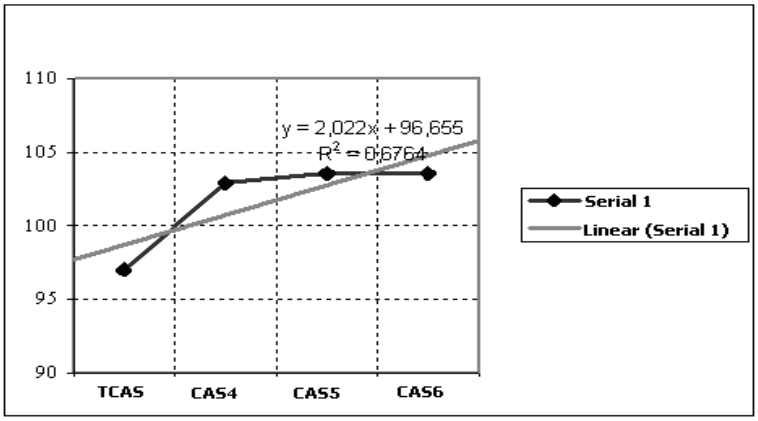

Figure 1: Student attitudes towards computers

According to Figure 1, there is a clear difference between the mean score of CAS in the traditional era (TCAS) and CAS4. The figure shows no clear difference between CAS4, CAS5, and CAS6. Figure 2 shows whether the differences between computer attitude scores are significant.

Table 2: ANOVA results for CAS Scores over Time

Source of Variance	Sum of Squares	f	Mean Square	F	P	Significance
Time	907.36	3.00	302.45	7.22	0.000	Difference is significant*

* ($p < 0.01$)

Table 2 shows that the difference between the CAS scores is significant [$F_{(3, 26)} = 7.22$, $p<0.01$]. It can be inferred that in regard to group interaction, CAS scores changed significantly over time. Table 3 shows in which CAS scores significant differences emerged.

Table 3: Pairwise comparisons of CAS Scores' mean differences adjusted with Bonferroni

	Measures	Mean Difference	Std. Error	P	Significance
TCAS	CAS4	-5.90	1.40	0.001	Difference is significant*
	CAS 5	-6.53	1.62	0.002	Difference is significant*
	CAS 6	-6.53	2.12	0.026	Difference is significant*
CAS4	CAS 5	-0.63	1.51	1.000	Difference is insignificant
	CAS 6	-0.63	1.91	1.000	Difference is insignificant
CAS5	CAS 6	0.00	1.31	1.000	Difference is insignificant

* ($p< 0.05$)

The comparisons in Table 3 show that the mean differences between TCAS and CAS4, between TCAS and CAS5, and between TCAS and CAS6 are significant ($p<0.05$). It is therefore clear that the differences between the mean score of CAS before CAEI, that is, TCAS, and each CAS score after CAEI (CAS4,CAS5, CAS6) are significant ($p<0.05$). However, the differences between each other of the measurements taken during CAEI are insignificant. After implementation of CAEI, it is possible to conclude that computer assisted English instruction had positive effects on high school students' attitudes towards computers. After beginning the experimental processes, observations of students' interest in computers and motivation for learning English with computers may have affected them to adopt more positive attitudes.

Differences in attitudes towards computer according to gender

According to the student gender, there are differences between the traditional CAS scores, represented by "1", and the other CAS scores taken in CAEI (see Figure 2). Females showed a more positive attitude towards computers than males. Table 4 shows whether these differences are significant or not.

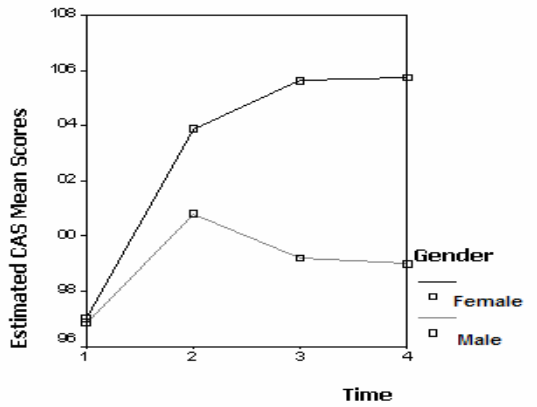

Figure 2: Student attitudes to computers according to gender

Table 4 shows that CAS scores differed significantly over time ($p<0.05$). Meanwhile, in regard to gender-time interaction, CAS scores differed insignificantly over time ($p>0.05$). It is clear that gender had no effect on change in CAS scores over time.

Before and after CAEI, there was no significant difference between student attitudes towards computers according to gender. This result was confirmed by other research findings (Habjan, 1994; Jennings&Onwuegbuzie, 2001; Kadijevich, 2000; Oosterwegel et al., 2004; Pope-Davis&Twing, 1991;) related to gender and attitudes towards computers.

Table 4: ANOVA results for CAS scores according to gender

Source of Variance	Sum of Squares	df	Mean Square	F	P	Significance
Time	592.31	3	197.44	4.80	0.004	Difference is significant*
Time-Gender	194.31	3	64.77	1.58	0.201	Difference is insignificant

* ($p< 0.05$)

Differences in attitudes towards computer according to monthly income

As Figure 3 shows, there are differences between the traditional CAS scores represented by "1" and the other CAS scores taken in CAEI. Students from the highest monthly income group showed the most positive attitudes towards computers in the sample. Table 5 shows whether these differences are significant

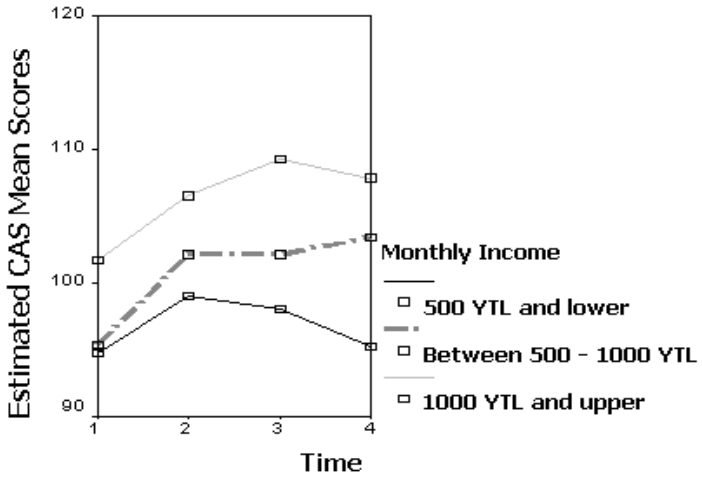

Figure 3: Changes in students' CAS scores according to monthly income

Table 5: ANOVA Results for CAS Scores according to monthly income

Source of Variance	Sum of Squares	df	Mean Square	F	P	Significance
Time	457.98	3	152.66	3.51	0.019	Difference is significant*
Time- Monthly Income	121.90	6	20.32	0.47	0.831	Difference is insignificant

* ($p < 0.05$)

Table 5 shows that CAS scores differed significantly over time ($p<0.05$). However, in regard to time-monthly income interaction, CAS scores differed insignificantly over time ($p>0.05$).

Differences in attitudes towards English before and after CAEI

Similar to the CAS scores, differences between measurements taken during traditional instruction were insignificant, thus the mean score of these measurements was computed and only one English attitude score representing the traditional era of the research (TEAS) was used for comparisons.

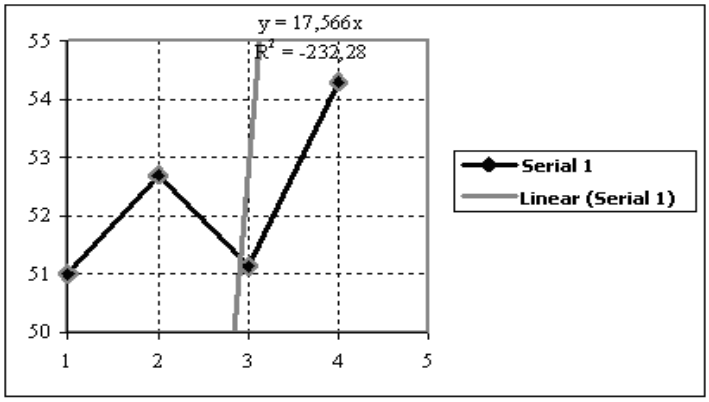

Figure 4: Student attitudes towards English

According to Figure 4, there is a difference between the mean score of EAS given in the traditional era (TEAS) and other EAS scores. The initial EAS score taken in the CAEI era decreased a little. Table 6 shows whether these differences between computer attitude scores are significant.

Table 6: ANOVA results for EAS scores over Time

Source of Variance	Sum of Squares	df	Mean Square	F	P	Significance
Time	216.30	3.00	72.10	5.65	0.001	Difference is significant*

* ($p< 0.05$)

Table 6 shows that the difference between EAS scores is significant [$F_{(3, 26)}= 5.65$, $p<0.05$]. It can be inferred that in regard to group interaction, EAS scores changed significantly over time. Table 7 shows between which EAS scores significant differences emerged.

Table 7: Pairwise comparisons of CAS scores' mean differences adjusted with Bonferroni

Measures		Mean Difference	Std. Error	p	Significance
TEAS	EAS4	-1.70	0.79	0.237	The difference is insignificant
	EAS5	-0.13	1.07	1.000	The difference is insignificant
	EAS6	-3.30	1.00	0.016	The difference is significant*
EAS4	EAS5	1.57	0.84	0.433	The difference is insignificant
	EAS6	-1.60	0.89	0.488	The difference is insignificant
EAS5	EAS6	-3.17	0.91	0.010	The difference is significant*

* ($p< 0.05$)

The comparisons in Table 7 show that the mean differences between TEAS and EAS6 and between EAS5 and EAS6 are significant ($p<0.05$). However, the differences with each other of the measurements taken during CAEI are insignificant ($p>0.05$).

Before and after CAEI, students' scores of attitudes towards English significantly increased at the end of CAEI. As the students' opinions revealed, CAE lessons were enjoyable and entertaining for them. This finding was consistent with the research findings of Donaldson&Kötter (1999) and Kartal (2002), that CALL applications are interesting and motivate students towards language learning with the help of multimedia options.

Differences in attitude towards English according to gender

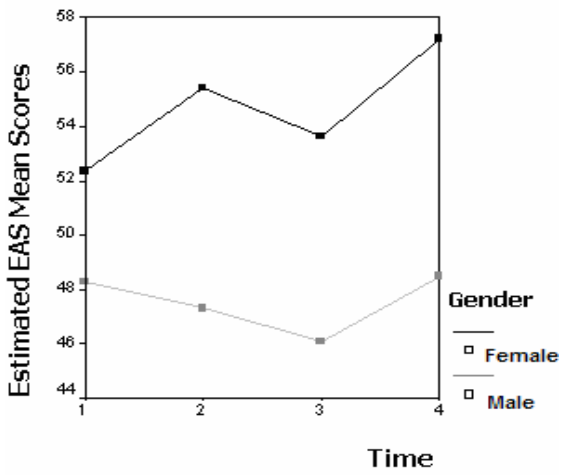

Figure 5: Attitude towards English according to gender

Figure 5 shows that according to the students' gender, there are differences between the traditional EAS scores represented by "1" and the other EAS scores taken in CAEI. Females showed more positive attitudes towards English than males. Table 8 shows whether these differences are significant or not.

Table 8: ANOVA results for CAS scores according to gender

Source of Variance	Sum of Squares	df	Mean Square	F	P	Significance
Time	1 39.37	3	46.46	3.81	0.013	Difference is significant*
Time-Gender	8 7.10	3	29.03	2.38	0.075	Difference is insignificant

* ($p < 0.05$)

Table 8 shows that EAS scores differed significantly over time ($p<0.05$). Meanwhile, in regard to gender-time interaction, EAS scores differed insignificantly over time ($p>0.05$). It is possible to say that gender had no effect on EAS scores' changing over time. According to Ok (2003), female students show more positive attitudes towards languge learning and they make use of language learning strategies more often than males. However, in this research gender did not affect attitude towards English significantly. It is estimated that the number of participants involved may be the reason for this finding, which needs to be further investigated in future research.

Differences in attitude towards English according to monthly income

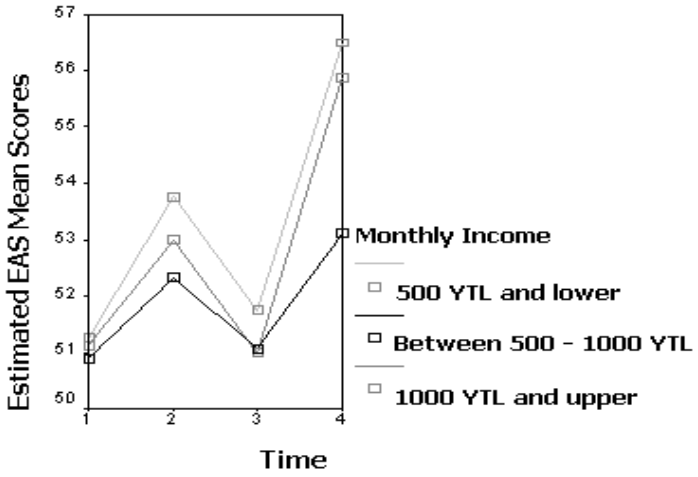

Figure 6: Changes in students' EAS scores according to monthly income

Figure 6 which shows the students' EAS scores according to their monthly income. It shows that there are differences between the traditional EAS scores represented by "1" and the other EAS scores taken in CAEI. The students with the lowest monthly income (lower than 500 YTL) showed the most positive attitudes towards English in the sample. However, students from the highest monthly income group (above 1000 YTL) had average EAS scores whereas students from the average monthly income group (500-1000 YTL) had the lowest EAS scores. Table 9 shows whether these differences are significant.

Table 9: ANOVA results for EAS scores according to monthly income

Source of Variance	Sum of Squares	df	Mean Square	F	P	Significance
Time	225.77	3	75.26	5.68	0.01	Significant*
Time- Monthly Income	36.96	6	6.16	0.46	0.832	Insignificant

* ($p < 0.05$)

Table 9 shows that EAS scores differed significantly over time ($p<0.05$). However, in regard to time-monthly income interaction, EAS scores differed insignificantly over time ($p>0.05$). As a result, it is possible to say that monthly income had no effect on EAS scores' change over time.

CONCLUSION

In this research, the main focus was on one group of students. In this design, it was intended to observe the same participants in different conditions (Shaughnessy and Zechmeister, 1997). The participants were administered questionnaires concerning attitude towards computers and English three times both before and after computer assisted English instruction. This research intended to study the variation in attitude before and after CAE lessons, not the performance. As Wiersma (2000) mentioned, in this design the dependent variable, attitude, was measured in time naturally and periodically. The aim of the research was to evaluate the same students' attitudes towards computers and English in regard to their gender and monthly income levels both before and after computer assisted English teaching.

According to the findings in the previous section, the following conclusions may be drawn:

After implementation of CAEI, it is possible to conclude that computer assisted English instruction had a positive effect on high school students' attitudes towards computers and English. After beginning the experimental processes, observations of students' interest in computers and motivation for learning English with interactive applications may have affected them to show more positive attitudes. As the students' behaviors revealed, CAE lessons were enjoyable and entertaining for them. This finding was consistent with the research findings of Donaldson&Kötter (1993) and Kartal (2002), that CALL applications are interesting and motivate students in foreign language learning.

Before and after CAEI, there was no significant difference between student attitudes towards computers according to their gender and monthly income level. This result was verified with other research findings (Habjan, 1994; Jennings&Onwuegbuzie, 2001; Kadijevich, 2000; Oosterwegel et al., 2004; Pope-Davis&Twing, 1991;) related to gender and monthly income interactions.

According to the results, the research implies that more research should be conducted about the role of computers in teaching and learning English; at what level, in which lessons, and how computers can assist learning and teaching English as a foreign language. In this research, the specific effects of the computer's multimedia elements (text, audio, video) were not distinguished, therefore which multimedia element is the most effective for students at different levels may be studied. Further research may question especially what type of computer applications provide the most valuable tools pedagogically. Another suggestion for researchers is investigating the relationship between students' other characteristics besides gender, monthly income, and attitudes toward computers and English.

Finally, as a research design, "time series" or "repeated measures" are recommended to educational scientists who intend to see the variation and

trend of measurements in particular contexts in time, and specifically investigate one group of students in different contexts using repeated measures.

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