

EFFECTS OF COMPUTER-BASED COOPERATIVE LEARNING METHOD ON STUDENTS' ACHIEVEMENT IN ENGLISH GRAMMAR IN SECONDARY SCHOOLS IN NJORO DISTRICT, NAKURU COUNTY, KENYA

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ABSTRACT:

The performance of English Language at the Kenya Certificate of Secondary Education (KCSE) has remained poor over the years. Among the three papers done at KCSE, Paper two which tests comprehension, literary appreciation and grammar is the worst performed. Prepositions, which is part of grammar have been singled out as a major challenge to the mastery of English language. This may be attributed to lack of proper syllabus coverage, inadequate teaching materials, students' attitude towards English, and poor teaching methods among others. This study was therefore aimed at investigating the effect of use of Computer-Based Cooperative Learning Method (CBCLM) on students' achievement in prepositions in order to enhance student's achievement in English Grammar. Solomon four non equivalent control group design was used. The accessible population was all form two students in co - educational schools in Njoro district. A sample of 176 students was selected through purposive sampling technique. English Achievement Test (EAT) was used to collect data. The instrument was validated and pilot tested before use. The reliability coefficient of EAT was 0.84. Data was analysed by the use of T-test, ANOVA and ANCOVA. The results revealed that Computer-based cooperative learning method helped the students to improve their achievement in English Grammar. The findings of this study indicate that CBCLM is an effective teaching method which teachers of English should be encouraged to use in their teaching/learning process in order to address the current poor performance in English grammar.

KEY WORDS: Computer-based cooperative learning, Students' Achievement, English Grammar, Secondary Schools, Njoro District

Introduction

Language being a tool of communication is important because it gives stimuli and frees an individual from the constraints of not only dealing with appearances but provides a more complex yet flexible cognition too. It also gives one the ability to deal with abstract things (Brunner, 1978). Language teaching has been found to be necessary and needs to be properly attended to if 'ideal' language learning, especially in second language situation is to be enhanced. Brunner (1966), states that there are four main features which can be considered when teaching a language. He puts them under the following headings: predisposition to learning, the structure and form of knowledge, sequence and reinforcement. In learning, the teacher is

expected to arouse the learners' curiosity to learn and also specify how the structured knowledge should be disseminated and evaluated.

According to Olorundare and Medahunsi (2004), the basic assumptions that are usually made about the concepts of instructions are; association of behavioural change with learning, functional essence of instigating acquisition of concepts and development of independent thinking and its definition of goals with the necessary guidance and facilitation from the teacher.

English Language is an important subject since it is the official language and mode of communication in all learning institutions in Kenya. However achievement in English Language in Kenya Certificate of Secondary Education (KCSE) has been poor over the years. Earlier, English and Literature were taught as separate subjects and examined separately. Today, the two subjects are intergrated and this may have been one of the causes of poor performace in English Grammar (Kamau, 2002). Negative attitude towards English among others contributes to poor performance (Akuka, 2013, Balcazar, 2003 Kiptanui & Mbugua, 2009).

In the school setting, proficiency in English makes learning of other subjects much easier and therefore, the acquisition of communicative competence should be emphasised in the process of teaching and learning. Mastery of grammar is important because it tends to influence children's use of language to conform to the conventions of education use (Jack & Theodore, 2001). English Language is compulsory in both Kenyan primary and secondary schools and all pupils are expected to acquire a sufficient command of English at the end of their primary education (KIE, 2008). This implies that students should be competent in both spoken and written forms to enable them communicate fluently, follow the subject courses and read for pleasure as well as information gathering. A good foundation in grammar is therefore required in order to ease communication difficulty and ensure better achievement in English. To achieve this, a learner should be exposed to rules of the language as early as possible and the frequency of use of English Grammar needs to be enhanced to ensure fluency and competence (Kamau, 2002).

Computer- based cooperative learning Method is a combination of computer- based learning and Cooperative learning. Research has been done on CBCLM in different fields and the findings has shown that it is an effective method as compared to traditional methods. Peris (2000) researched on the effects CBCLM on the problem solving skills of grade six students and discovered that students abilities to solve problems significantly improved by participation in in computerised problem solving game as part of cooperative leraning pair. Research carried out by Maarrie et al (2001) in Science proved that learners who were taught using CBCLM yielded better results than when CBL and CL methods were used separately.

High equipment and material costs, limited access to computers for instruction in many schools, and the success of cooperative learning strategies in traditional classroom instruction have prompted researchers to examine the potential of (CBCLM) on students' attitude and achievement. Akour, (2006), carried out a research on the effect of (CBCLM) on students achievement in a science course and discovered that the students taught using this method developed positive attitude towards science and perfomed significantly better than those taught using the traditional methods.

The combination of CBL and CL may have the following advantages; it promotes peer interaction, makes the students develop higher order thinking skills, students take personal

responsibility for the content of learning while the teacher adopts the role of facilitator (Bruffen, 1995; Johnson & Johnson, 2002). While evidence indicates that students' learning can be enhanced by CBL, its potential will be realized only if it is consistently used. Successful infusion requires compatibility between the instructional objectives required by the teacher and the purpose for which the software is designed. Without such a match, it is unlikely that there will be transfer from the software to long-term learning and retention. In order to have effective cooperative learning Johnson et al. (1994), advanced five essential elements: Positive independence, direct interaction, individual and group accountability, training in small group skills,time processing and the value of group work. In this tsudy, among the cooperative learning strategies, Student-Teams-Achievement Division (STAD) was used. Students were grouped in small working groups and presented within a lesson then tested. They were then graded on the teams achievement.

Statement of the Problem

Despite the fact that English is an important subject taught and used from pre-primary to secondary schools and in higher institutions of learning, the performance in English grammar at KCSE continues to be poor over the years. Poor teaching methods have been blamed for the poor performance among others. Although studies have been carried out on how to improve English performance, the effect of CBCLM on Enlish grammar achievement in secondary school students in Njoro district of Nakuru county in Kenya has not been done. This made it necessary to carry out this research in order to enhance students achievement in English Grammar.

The Purpose Objectives of the study

The purpose of the study was to investigate the effects of Computer - Based Cooperative learning Method on students'achievement and the study was guided by the following specific objective ;

To determine the effect of CBCLM on students achievement in English Grammar in Secondary schools in Njoro District.

Research Hypothesis

H₀₁: There is no statistically significant difference in achievement between students taught English Grammar using CBCLM and those taught using traditional methods.

In this study, independent variables were Computer - Based Cooperative Learning Method and traditional teaching methods.While achievement in English grammar was the dependent variable. The extreneous variables were teacher experience, teachers training and gender. The extreneous variables were controlled as follows: teacher experience was controlled by making sure that those that handled English Language in these classes had taught the same for at least more than three years. The same teachers had diploma or degree in education. Gender as an extreneous variable was controlled by taking co- educational schools and at the same time treated as an independent variable as voiced by (Fraenkel & Wallen, 2000). Figure 1 represents the

diagrammatic Framework for determining the effect of use of Computer- Based Cooperative Learning.

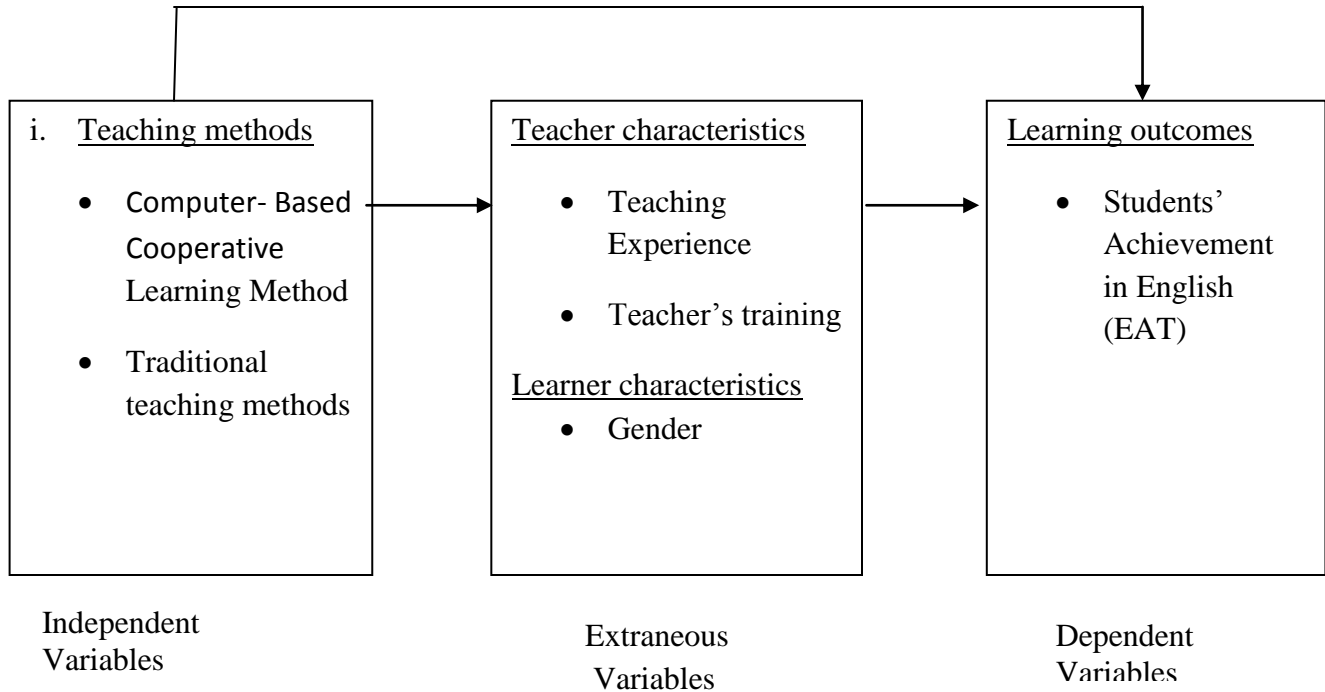


Figure 1: Conceptual Framework for Computer-Based Cooperative Learning Method

Research Method

The study adopted Solomon Four Group Design under quasi-experimental research. The design was used in order to assess the effect of treatment, effect of pre-test, and the interaction between pre-test and treatment conditions because it is able to take care of threats to internal validity. The four groups were divided into two experimental and two control groups. Two schools were used as experimental groups and two others as control groups. Pre-tests were given to one experimental and one control group then treatment to the two experimental groups after which post-test was administered to all the groups.

Figure 2 shows the four groups that participated in the study. The experimental groups E₁ and E₂ received treatment X while control groups C₁ and C₂ were taught using traditional methods. E₁ and C₁ received pre-test 0₁ and 0₄, then all groups 0₂, 0₃, 0₅ and 0₆ received Post-test.

Group	Pretest	Treatment	Post-test
E ₁	O ₁	X	O ₂
E ₂	-	X	O ₃
C ₁	O ₄	-	O ₅
C ₂	-	-	O ₆

Figure 2: Solomon Four Non-Equivalent Control Group Design under Quasi Experimental Research

Key

X = Experimental treatment

O = Observation (pretest-posttest of dependent variable)

E₁ = Experimental group 1 which receives treatment and pretest variable.

E₂ = Experimental group 2 which receives treatment and no pretest.

C₁ = Control group 1 which receives pretest but taught using regular methods.

C₂ = Control group 2 does not receive pretest but taught through regular methods.

O₁, O₄ = pre test groups

O₂, O₃, O₅, O₆ = post-test groups

(----) = Use of Non-equivalent groups

The sampling unit was the secondary schools and not individual students since schools operate as intact groups. The researchers used purposive sampling to select four district co-educational secondary schools in Njoro District, which had at least five functional computers for the students to use. A total of 176 students from two students were involved in study. The schools were randomly assigned to each of the four groups in the study, that is Experimental and control groups.

The research instrument used for data collection in the study was English Achievement Test (EAT). EAT consisted of twenty structured questions which were based on Kenya Institute of Education (KIE) (2008) English syllabus, and the form two English course book. The focus of the questions in the instrument was the three main classes of prepositions namely simple, compound and phrase prepositions. The instrument was then pilot tested using two secondary schools with similar characteristics as the sampled schools in the study. The reliability coefficient was calculated using Kuder-Richardson method and was 0.84.

A pretest was done by experimental group and one control group before treatment. The experimental groups E₁ and E₂ were taught using CBCLM while the control groups C₁ and C₂ were taught using traditional teaching methods. The post-test was done by all the groups after treatment. Data was analyzed using One-way ANOVA and ANCOVA. ANCOVA was used to statistically cater for initial differences among the groups (Ary, Jacobs, & Razavieh, 1979;

Fraenkel & Wallen, 2000). All tests of significance were performed at a significant level of alpha equal to 0.05.

Results and discussions

The experimental groups (E1) and (C1) sat for the Pre-test and the results were as shown in Table 1.

Table 1

Pre-test EAT Mean Scores

SCALE	GROUP	N	MEAN	STD DEVIATION
EAT	C ₁	46	46.67	12.83
	E ₁	42	51.31	14.32

The results in Table 1 show the pre-test mean scores of EAT. E₁ = (M = 51.31, SD = 14.32) which was greater than C₁ = (M = 46.67, SD = 12.83). Since these were raw scores, a t-test was undertaken to determine whether the difference between the sets of scores for experimental and control groups were statistically significant. The results are shown in Table 2.

Table 2

Independent Samples t-test of the Pre-test Mean Scores on EAT

SCALE	df	t- value	p - value	Significant Level
EAT	86	1.602	0.113	NS

* Not Significant

The results of Table 2 indicate that the difference between the mean score on EAT of students in the experimental group and that of the students in the control group were not statistically significant at the 0.05 level. It shows that the calculated t-value was 1.602 with a df of 86 while the critical t was 1.663 with a df of 80. When the critical t is higher than the calculated t the findings are not statistically significant at $\alpha = 0.05$. This further show that the groups were similar therefore suitable for the study.

Effects of CBCLM on Student's English Achievement

To determine the effect of CBCLM on students' achievement in English Grammar as stated in the hypothesis HO₁, a mean gain analysis was done on pre and post-test means on EAT as shown in Table 3 below.

Table 3
EAT Mean Gain Analysis

SCALE	E ₁	E ₂	C ₁	C ₂
Post-test means	62.62	65.12	50.33	58.07
Pre-test mean	51.31	-----	46.67	-----
Mean Gain	11.31	-----	3.66	-----

Table 3 shows the mean gain analysis for E₁ and C₁. These results show that the mean gain for E₁ EAT post-test is more than that of C₁ pre-test. This may have been as a result of the treatment that was given to E₁. However, the results above did not show whether the difference was statistically significant therefore, a t-test was done. Table 4 shows the results after performing a t-test to compare the two groups.

Table 4
EAT t-test for post and pre-test mean gain Analysis

SCALE	df	t-value	p-value	Critical t
EAT	86	3.655	0.000*	1.989

Key * Means difference is significant at 0.05

The results in Table 4 indicate that the mean gain between the groups; E₁ and C₁ are statistically significant at t = 3.655, df = 86, Critical t = 1.989 and p-value = 0.000 which is less than 0.05 level of significant. Table 5 shows the EAT post-test mean scores obtained by students in the four groups.

Table 5
EAT Post-test mean scores obtained by the Students in Four Groups

GROUP	N	MEAN
E ₁	42	62.02
E ₂	42	65.12
C ₁	46	50.22
C ₂	46	58.07

The results in Table 5 indicate that experimental groups E₁ and E₂ (62.02, 65.12) achieved higher mean scores. This alone did not reveal whether the results were statistically significant. Therefore, ANOVA was carried out in order to ascertain whether there was any statically significant difference. The results are shown in Table 6.

Table 6
ANOVA Post-test EAT means by Learning Method

SCALE	SS	df	Critical t	MS	F- ratio	P- value
Between Groups	5438.592	3	2.353	1812.864	9.822	0.000*
Within Groups	31746.294	172	1.654	184.571		
Total	37184.886	175	1.654			

* Mean difference is significant at 0.05

Table 6 shows that there was a statistically significant difference between the mean scores since p - value $F(3,172) = 9.822$, $p = 0.000$ is less than 0.05. This finding however did not indicate the groups which were similar and those that were different. A post hoc multiple comparisons was done so as to establish this as shown in Table 7.

Table 7
Post hoc Multiple Comparisons of CBCLM post - test Means for the Four Groups

GROUPS	MEAN DIFFERENCE	P-Value
C ₁ v/s C ₂	7.74	0.062
C ₁ v/s E ₁	11.70	0.001*
C ₁ v/s E ₂	14.79	0.000*
C ₂ V/S E ₁	11.81	0.000*
C ₂ V/S E ₂	10.85	0.000*
E ₁ V/S E ₂	3.10	0.780

* Mean difference is significant at 0.05

Table 7 shows the results after comparing different groups. It indicates that there was statistically significant difference in the groups C₁ and E₁, C₁ and E₂, C₂ and E₁ and finally C₂ and E₂. This means that Ho₁ was rejected. It was also necessary to carry out the analysis of covariance. The results of the adjusted means are shown in Table 8.

Table 8

Adjusted Post-Test means on EAT

GROUP	MEAN
C ₁	51.31
C ₂	52.15
E ₁	60.17
E ₂	61.41

The adjusted post - test means on EAT in Table 8, shows that there is a difference in mean score between experimental and control groups. ANCOVA was conducted to show whether there was statistically significant difference among the four groups. This was done using the students Kenya Certificate of Primary Education (KCPE) as covariate.

Table 9

ANCOVA of the Means for the Four Groups with KCPE as covariate

SCALE	SS	DF	MS	F- RATIO	P- VALUE
CONTRAST	3455.32	3	1151.774	10.035	0.000*
ERROR	19626.621	171	114.776		

* Mean difference is significant at 0.05

The results indicate that there is statistically significant difference among the four groups (3,171) = 0.000 which is less than 0.05. It was necessary to carry out pair wise comparison to establish where the differences were. Table 10 shows the Pairwise Comparison of EAT pos-test mean score of the four groups.

Table 10

Pairwise Comparison of EAT Post-test means scores

Group	Mean difference	P- value
C ₁ v/s C ₂	10.84	0.402
C ₁ v/s E ₁	8.86	0.000*
C ₁ v/s E ₂	10.10	0.000*
C ₂ V/S E ₁	1.98	0.000*
C ₂ v/s E ₂	9.76	0.000*
E ₁ v/s E ₂	1.24	0.597

* Mean difference is significant at 0.05

The pairwise comparison of EAT post - test mean scores on Table 10 shows that there was statistically significant difference in the following groups: C₁ and E₁ , C₁ and E₂ , C₂ and E₁ and

C_2 and E_2 . The difference between the groups E_1 and E_2 and groups C_1 and C_2 were statistically significant. The results agree with those of ANOVA. Therefore, the null hypothesis that there is no statistically significant difference in achievement between students' taught by CBCLM and those taught by traditional methods was rejected.

Discussions

The results of analysis of the data collected indicate that there was no significant difference in the pre-test scores on EAT between E_1 and C_1 , the post-test scores showed that there was significant difference after treatment. This means that the learners that were exposed to CBCLM (E_1 and E_2) on EAT improved significantly as compared to those taught using the traditional method. The findings concur with those of (Marlet, 2000), in his study on the effects of lexical and semantic previews on comprehending a computerized illustrated dialogue which indicate that semantics previews improved informal recall. This also is in agreement with Chang (2002), who found out that computer based learning has a positive effect on students' achievement. Kiboss (1997), in his research on relative effects of computer based instruction in physics on students' attitude, motivation and understanding also found that computers have positive effects on students thus improving performance.

The high achievement in English may also have been so because of combination of CBL and CL. In groups, each member of the team is responsible for helping teammates to learn, thus creating a good atmosphere for achievement (Kagan, 1989). When CBCLM method is used the achievement is improved as both are sources of motivation to the learners and therefore, learning is enhanced (Omoshin, 2003; Tiwari, 2007). The use of more than one method when teaching also helps to improve the achievement. Akour (2006), in his research with college students discovered that students taught using traditional instruction combined with the use of computer achieved significantly better than the students taught using traditional instruction. Peris (2000) used CBCLM on the problem solving skills of grade six students and his results were in line with the findings of this study in support of better performance. He confirmed that the students' abilities to solve problems significantly improved. Therefore, it can be concluded that the use of CBCLM helped to improve the students' achievement in English grammar.

From the study, it was noted that the use of CBCLM led to proper acquisition of English prepositions which in turn resulted into better achievement in English grammar. Cooperative learning also helped the learners to work cooperatively in groups. The learners shared ideas during the lessons thereby enhancing students' achievement towards English Grammar. The learners enjoyed working in groups and sharing ideas as they helped one another. Teachers should therefore use child centered approaches where learners would work cooperatively in order to enhance performance the subject. This was seen when the learners stuck to their groups and worked cooperatively.

Conclusion

The learners that were exposed to CBCLM (treatment) (E_1 and E_2) on EAT improved significantly as compared to those taught using the traditional method. This means therefore the

use of CBCLM had an impact on students' performance since it helped to improve their achievement in English Grammar.

Recommendations

The results from the study show that the CBCLM led to better achievement than the traditional methods. It is therefore recommended that:

- Teachers to consider CBCLM as one of the new methods that can help to improve performance in English Grammar.
- That the curriculum developer's should consider CBCLM as one of the important teaching methods which can help in acquisition of knowledge in English Grammar.

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