Effectiveness of Computer Based Teaching in Enhancing Student's Interest to Learn Agriculture in Secondary Schools in Tharaka-Nithi County, Kenya

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Abstract

Interest plays a key role in learning. Interest motivates students and this enhances successful learning. Students' interest to learn is affected by the teacher's style of teaching. Students get interested in learning when they become engaged and actively involved in the learning process. In Computer Based Teaching (CBT), students have hands on activities and are actively involved in the learning process and this increases their interest to learn. Taking into account that agriculture is the backbone of Kenya's economy, students should develop an interest to learn the subject. The purpose of the present study was to investigate the effectiveness CBT in enhancing students' interest to learn agriculture. The study employed Solomon Four-Quasi-experimental design. Target population was the 1,779, 876 secondary school students in Kenya. The study was conducted in eight county secondary schools in Tharaka Nithi county, Kenya. Stratified random sampling technique was used in selecting participating schools. A sample of 327 Form One students participated in the study. The research instrument was Interest Towards Agriculture (ITA) questionnaire with a reliability coefficient of 0.78. Analysis of Variance (ANOVA) was used in data analysis. Statistical significant values were accepted at α level of 0.05. The findings indicated that CBT strategy improved students' interest to learn agriculture. The study concluded that CBT is an effective strategy in enhancing interest to learn agriculture and therefore agriculture teachers should be encouraged to incorporate CBT strategy in their teaching.

Key Words: *Agriculture Subject, Computer Based Teaching, Conventional Teaching, Interest*

Introduction

Agriculture is one of the subjects offered in Kenyan secondary schools (Mwiria, 2002; Ngugi, Isinika, Temu & Kitalyi, 2002). At the secondary school level, it is an optional subject right from form one. However, those who choose it in form one have an opportunity of dropping it in form three (KIE, 2002). The aim of teaching agriculture in secondary schools is to ensure that learners are exposed to basic principles necessary for agricultural production in the country. The teaching of agriculture is expected to promote the acquisition of skills for self reliance in agriculture (Mwiria, 2002). Learners are exposed and involved in various practical activities that will enable them to develop the necessary skills and abilities required in agricultural production (KIE, 2006). Bearing in mind the importance of agriculture to the economy of Kenya, students should be encouraged to have an interest in the subject.

Success of a subject is normally reflected by the number of students opting to study it (Tanui, Nassiuma & Kiboss, 2008). Being an elective subject, the development of agriculture in secondary schools depends very much on the number of students studying it. The percentage of students taking agriculture in secondary schools in Kenya, however has been on decline for the years, 2015-2019 (KNEC, 2019). For the year 2015, only 39% of the total number of students enrolled for agriculture at KCSE level. This low enrolment can partly be attributed to the students' lack of interest to learn the subject. Interest in the subject matter is one of the factors influencing enrolment (Calvin, 1986). It has been shown that interest influences academic choices. Interest plays a central role in motivation (Deci & Ryan, 2002). According to Silvia, 2006, interest is closely related to motivation.

Lack of interest to learn agriculture is partly as a result of the teaching strategies employed by the teacher. Teachers' teaching style affects students' interest in learning (Muhibin, 1999; Saswandi, 2004). Most of the teaching strategies practiced by agriculture teachers are expository and facts oriented, assigning the learners a passive role (Kathuri, 1990; Ngesa, 2006). Teachers usually act as the dispensers of knowledge while learners listen and take notes. Since interest is necessary in learning, strategies that enhance it should be adopted in teaching agriculture. The key to maintain interest in learning is engagement. Davis (2017) argues that students prefer to and get more interested in learning when they have hands –on activities and get to collaborate with their peers. Therefore, agriculture teachers should employ those strategies that make learners active in the teaching learning process.

Computer Based teaching strategy involves the use of computers in the learning process. Learners are actively involved in the learning process and this increases their interest to learn. The novelty of computers arouses enthusiasm among learners and enhances their interest to learn (Meena, 2008). According to Senemoglu (2003) computer based instruction motivates students to learn better by creating an exciting and interesting game-like atmosphere. Use of computers has been shown to produce positive results in teaching difficult topics or where motivation is low in different subjects (Tanui, Kiboss & Nassiuma, 2008; Kiboss, Ndirangu & Wekesa, 2004). A study by Akudolu (1996) revealed that students found computer assisted language learning interesting and stimulating. Despite the effectiveness of computers in enhancing interest in learning, research on this area in relation to secondary school agriculture is limited. In an attempt to fill this gap, the present study investigated the effectiveness of CBT in enhancing interest in learning agriculture.

Purpose of the Study

The purpose of the study was to investigate the effectiveness of computers in enhancing students' interest to learn agriculture in secondary schools in Tharaka Nithi County, Kenya.

Objective of the Study

To determine whether there is a difference in interest to learn agriculture between students exposed to computer based teaching and those exposed to conventional methods.

Hypothesis of the Study

The following null hypothesis guided the study.

H_01:   There is no statistically significant difference in interest to learn agriculture between students exposed to computer based teaching and those exposed to conventional teaching methods.

Method and Materials

Research Design

The study used quasi-experimental research design and in particular Solomon Four Group design. Quasi-experimental design uses natural assembled groups such as classes in research. The design allows the researcher to randomly select a sample from the population without the random assignment of individual cases to comparison groups. According to Ogunniyi (1992), Solomon Four-Group design is the most rigorous design that can be used in quantitative studies since it uses two control groups in comparison to other experimental designs. Solomon Four-Group design is as follows:

Group I (E1) .... O_1 X O_2
Group II (C1) .... O_3 .... O_4
Group III (E2) .... X .... O_5
Group IV (C2) .... O_6

Key: O_1 and O_3 are pretests; O_2, O_4, O_5 and O_6 are posttests; X is the treatment.

Group I was the experimental group (E1) which received the pretest (O_1), the treatment (X) and the posttest (O_2). Group II was the control group (C1) which received a pretest (O_3), no treatment and the posttest (O_4). Group III was another experimental group (E2) which received treatment (X) and the posttest (O_5) but did not receive the pretest. Group IV was another control (C2) that received the posttest (O_6) only. Group 1 and III were exposed to CAT strategy. Group II and Group IV were taught agriculture using the conventional teaching strategy.

The design controls major threats to internal validity except those associated with interaction of: maturity and history, selection and maturation and selection and instrumentation (Cook & Campbell, 1979). Random assignment of schools to experimental and control groups controlled selection and maturation. To control interaction between selection and instrumentation, the conditions under which the instruments were administered were kept as similar as possible across the schools.

Data Collection and Analysis

The target population for the study was the 1,779, 876 students in secondary schools in Kenya. The study was carried out in Tharaka Nithi County, Kenya. At the time of the study, county had a total of 136 secondary schools comprising of 2 national, 14 extra-county, 29 county and 91 sub-county secondary schools. County secondary

schools in possession of computers for teaching purposes were considered for this study. The accessible population was the 8,140 form one students in secondary schools in the county. Form ones were selected because the topic on Livestock Production I (Common livestock breeds) is taught at this level (KIE, 2006).

Stratified random sampling technique was used to select 4 girls' and 4 boys' secondary schools. A total of 163 boys and 164 girls participated in the study. Simple random sampling technique was used to select a particular stream for data analysis in cases where there was more than one stream in a participating school. However, for schools in the experimental groups, treatment was administered to all the streams.

Data was collected by an Interest Towards Agriculture (ITA) questionnaire. Items on interest were adopted from the scale developed by Vallerand, Petelleir, Blais, Bere, Senecal and Vallieres (1992) on measurement of intrinsic academic motivation. These items were slightly modified to suit agriculture. The ITA questionnaire items based on a 5 point Likert scale where students were required to state whether they Strongly Agree(SA), Agree(A), Undecided(U), Disagree(D) or Strongly Disagree(SD) with the given statements. To ascertain the reliability of the questionnaire, a pilot study was carried out in a school in the neighbouring Embu county. Cronbach's Coefficient alpha was used to estimate reliability of the ITA. A reliability coefficient of 0.7 and above was accepted. The ITA yielded a coefficient of 0.78, hence was suitable for the study.

Form one agriculture teachers in the experimental groups were trained for one day on the use of CBT strategy in teaching. Teachers in the experimental groups taught agriculture by use CBT strategy while their counterparts in the control groups taught agriculture by use of Conventional Teaching (CT) strategy. The topic of instruction was Livestock Production I (Common livestock breeds). All the teachers in the sampled schools used a common implementation schedule which was prepared by the researcher. Before commencement of the study, groups I and II were given a pretest. This was followed by a three weeks intervention of the CBT strategy for groups I and III. After the intervention, ITA was administered to all the groups. Students' pretest and posttest responses were scored to generate data for analysis. Data was analyzed using descriptive and inferential statistics.

Results and Discussion
Effectiveness of CBT strategy in enhancing Students' interest to Learn Agriculture
The objective of the study was to determine whether there was a difference in interest to learn agriculture between students exposed to Computer based teaching and those exposed to conventional teaching strategy. In order to measure interest to learn agriculture, students were asked to respond to items in the ITA questionnaire. The ITA had 14 items on perceived interest to learn agriculture. Each item in the questionnaire was rated on a five point Likert scale ranging from: Strongly Agree (SA) = 5, Agree (A)=4, Undecided (U)=3, Disagree (D)=2 and Strongly Disagree (SD)=1. Negatively stated items were scored in the reverse order. The mean rating score for all the responses was used to calculate the mean score for a particular group. This procedure was carried out for both the pretest and posttest.

Pretest Results on Interest to Learn Agriculture
In order to assess the level of interest to learn agriculture before exposure to CBT strategy, pretest scores on interest to learn agriculture were analyzed. Table 1 shows the pretest mean scores on interest to learn agriculture.

Table 1: Pretest Mean Scores on Interest to Learn Agriculture

Group	N	Mean	Standard Deviation
E1	82	4.08	.47
C1	83	3.93	.63

Results in Table 1, show that the mean score for the experimental group E1 was 4.08 and that of the control group C1 was 3.93. This shows that the mean scores for the two groups were different, with the experimental group E1 having a higher mean score. In order to find out whether there was a significant difference in the pretest mean scores for the two groups, an independent t-test was carried out. The results are presented in Table 2.

Table 2: The t-test of Pretest Mean Scores on Interest to Learn Agriculture

	t	df	Sig. (2-tailed)
Equal variances assumed	1.705	163	.090
Equal variances not assumed	1.708	151.849	.090

Results in Table 2 reveals that there was no significant difference in the mean scores of the two groups, t (163) =1.705, p>0.05. This implies that the level of student interest in learning agriculture in the two groups was equivalent before exposure to the treatment.

Posttest Results on Interest to Learn Agriculture

In order to determine the effect of CBT strategy on interest to learn agriculture, posttest scores obtained from ITA questionnaire were analyzed. The mean score was then calculated. Figure 1 shows the posttest mean scores on interest to learn agriculture.

Table 3: Posttest Mean Scores on Interest to Learn Agriculture

Type of group	N	Mean	Standard Deviation
E1	82	4.44	0.48
C1	83	3.78	0.60
E2	81	4.20	0.61
C2	81	3.50	0.51
Total	327		

Results in Table 3, show that the mean scores for the experimental groups E1 and E2 were 4.44 and 4.2, respectively. Mean scores for control groups C1 and C2 were 3.78 and 3.50 respectively. To determine whether there was any significant difference on interest to learn agriculture among the four groups, ANOVA was run. Results of this analysis are presented in Table 4.

Table 4: Analysis of Variance (ANOVA) of the Posttest Mean Scores on Interest to Learn Agriculture

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	18.625	3	6.208	23.994	.000
Within Groups	83.573	323	.259		
Total	102.198	326			

Table 4 shows that there was a significant difference between the means F (3,323) =23.994, P<0.05, in favour of experimental groups. The results imply that there was a significant overall treatment effect. To investigate which groups differed, *post hoc* test of multiple comparison tests using *Bonferroni* test was used. *Bonferroni* test was preferred for this study because it controls for the overall rate, hence the observed significance level is adjusted for the fact that multiple comparisons are being made. Results of the analysis are shown in Table 5.

Table 5: Comparisons of Posttest Mean Scores on Interest to Learn Agriculture

(I) type of Group	(J) type of group	Mean Difference (I-J)	Std. Error	Sig.
E1	C1	.66015(*)	.07920	.000
	E2	.22655(*)	.07968	.029
	C2	.27064(*)	.07968	.005
C1	E1	-.66015(*)	.07920	.000
	E2	-.43361(*)	.07945	.000
	C2	-.38952(*)	.07945	.000
E2	E1	-.22655(*)	.07968	.029
	C1	.43361(*)	.07945	.000
	C2	-.32136(*)	.08925	.002
C2	E1	-.27064(*)	.07968	.005
	C1	.38952(*)	.07945	.000
	E2	-.32136(*)	.08925	.002

* The mean difference is significant at the .05 level.

Results in Table 5, show that the mean differences of group E1 versus C1, E1 versus C2 and E2 versus C2 were significant. This suggests that CBT strategy improved students' interest to learn agriculture. This led to the rejection of the null hypothesis ($H_0 1$), which stated that there is no statistically significant difference in interest to learn agriculture between students exposed to CBT strategy and those exposed to CT strategy. According to Rieber (1999), Computers make school curriculum more interesting. Students like to use computers and are more likely to develop positive attitude towards their learning and themselves when they use computers (Schacter, 1999).

Results from the present study are in line with Akudolu (1996), who reported that students of languages in universities found computer assisted language learning interesting and stimulating. Similar findings were reported Nwanne and Agommuoh (2017) on the study of computer assisted instruction on students interest and achievement in Physics in Imo state, Nigeria. The study revealed that students taught physics with computer assisted instruction had a higher mean interest score than those taught using the lecture method. In addition, Singh (2008) reported a significance difference in interest in Mathematics between the experimental group and the control group in favour of the experimental group. The experimental group was exposed to computer assisted instruction while the control group was exposed to conventional teaching methods. Kadhiravan (2009) in the study of instructional media technology and services for special learners found that the adoption of any treatment as an instructional framework greatly improves students' academic interest.

Conclusion and Recommendation
Conclusion
Findings of the study demonstrated that CBT strategy enhances interest to learn agriculture better than the conventional teaching strategy. Therefore, students benefit more in terms of interest to learn agriculture when exposed to CBT strategy than the CT strategy.

Recommendation

Based on the findings of this study, it was recommended that agriculture teachers should embrace the use of CBT strategy as a way of motivating students to have interest in the subject especially in form one. This is necessary to ensure that students have interest in the subject by the time they are in form two. If interest of students to learn agriculture is enhanced, it may improve enrolment in agriculture at KCSE level.

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