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**EFFECT OF COMPUTER ASSISTED TEACHING  
STRATEGY ON STUDENTS MOTIVATION TO LEARN  
AGRICULTURE BY GENDER IN SECONDARY SCHOOLS  
IN THARAKA NITHI COUNTY, KENYA****Dr. Joyline Mugero Muchiri**Department of Agricultural Economics,  
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P.O Box 109 – 60400, Chuka.**Abstract**

*It is necessary to analyze academic motivation because of its significance in learning in schools. Gender differences in motivation to learn vary according to school subject. Motivation to learn is partly as a result of teaching strategies employed by the teacher. Motivation to learn is enhanced by the way in which instructional material is organized. In Computer Assisted Teaching (CAT) strategy learners are actively involved in the learning process and this increases their motivation to learn. There is limited information on the effect of the strategy on motivation to learn agriculture in relation to gender. The purpose of the present study was to examine whether there is gender difference in motivation to learn agriculture among students exposed to CAT strategy. The study employed Solomon Four-Quasi-experimental design. 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 Motivation Towards Agriculture (MTA) questionnaire with a reliability coefficient of 0.78. Descriptive statistics (means and standard deviation) and inferential statistics (t-test) were used for data analysis. Statistical significant values were accepted at a level of 0.05. The findings indicated that male and female students taught agriculture*

using CAT strategy were equally motivated to learn agriculture. It was concluded that the strategy was equally effective in both gender. The study concluded that CAT is an effective strategy in enhancing motivation to learn agriculture in both males and females and therefore agriculture teachers should be encouraged to incorporate CAT strategy in their teaching.

**Key Words:** Agriculture Subject, Computer Assisted Teaching, Motivation, Gender

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## Introduction

Agriculture is perceived to be an important academic subject in Kenyan schools. The reason for this is the fact that agriculture is the backbone of Kenya's economy. Agriculture is one of the subjects offered in secondary schools and at primary level it is integrated in the science subject (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 develop the necessary skills and abilities required in agricultural production (KIE, 2006).

Being an elective subject, the development of agriculture in secondary schools depends very much on the number of students studying it in secondary schools. The percentage of students taking agriculture in secondary schools in Kenya, however has been on decline for the years, 2008-2013 (KNEC, 2014). For the year 2013, only 40% of the total number of students enrolled for agriculture at KCSE level. This low enrolment can partly be attributed to the students' low interest in the subject, hence low motivation to learn the subject. As noted by Deci and Ryan, (2002) interest plays a central role in motivation.

Even with such low enrolment at KCSE level, female student enrolment has been lower as compared to that of male students. The male student's enrolment for the years 2011, 2012, 2013 were 95,561, 100,516 and 100,513 respectively. The female students' enrolment over the same period were 71,895, 77903 and 78,258 respectively. These differences in enrolment can partly be attributed to the male students' interest in learning agriculture. Interest is one of the factors that affect enrolment in any subject (Calvin, 1986).

Low motivation is partly as a result of the teaching strategies employed by the teacher. According to Weller, (2005), motivation to learn is enhanced by the way in which instructional material is organized. 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 motivation is necessary in learning, strategies that enhance motivation should be adopted in teaching agriculture. Zahorik (1996) argues that the key to maintain motivation is involvement.

Computer assisted teaching strategy involves the use of computers in the learning process. Learners are actively involved in the learning process and this increases motivation to learn. The novelty of computers arouses enthusiasm among learners and motivates them to learn (Meena, 2008). Use of computers has been shown to produce positive results in teaching where motivation is low in different subjects (Tanui, Kiboss & Nassiuma, 2008; Kiboss, Ndirangu & Wekesa, 2004). Research findings indicate that there is gender difference in motivation to learn in relation to the teaching strategy employed by the teacher (Hayward, Alty, Pearson & Martin, 2003; Passey, Rogers, Machell & McHugh, 2004). There is limited information on the effect of CAT strategy on

secondary school students to learn agriculture by gender. In an attempt to fill this gap, the present study investigated whether there is gender difference in motivation to learn agriculture among students exposed to CAT strategy.

### **Purpose of the Study**

The purpose of the study was to investigate the effect of CAT strategy on students' motivation to learn agriculture by gender in secondary schools in Tharaka Nithi County, Kenya.

### **Objective of the Study**

To examine whether there is gender difference in motivation to learn agriculture among students exposed to CAT strategy.

### **Hypothesis of the Study**

The following null hypothesis guided the study.

H<sub>01</sub>: There is no statistically significant gender difference in motivation to learn agriculture among students exposed to CAT strategy.

### **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 <sub>1</sub>	X	O <sub>2</sub>
Group II (C1)	.....	O <sub>3</sub>		O <sub>4</sub>
Group III (E2)	.....	X		O <sub>5</sub>
Group IV (C2)	.....	O <sub>6</sub>		

Key: O<sub>1</sub> and O<sub>3</sub> are pretests; O<sub>2</sub>, O<sub>4</sub>, O<sub>5</sub> and O<sub>6</sub> are posttests; X is the treatment.

Group I was the experimental group (E1) which received the pretest (O<sub>1</sub>), the treatment (X) and the posttest (O<sub>2</sub>). Group II was the control group (C1) which received a pretest (O<sub>3</sub>), no treatment and the posttest (O<sub>4</sub>). Group III was another experimental group (E2) which received treatment (X) and the posttest (O<sub>5</sub>) but did not receive the pretest. Group IV was another control (C2) that received the posttest (O<sub>6</sub>) only. Group I 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. The county has 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 a Motivation Towards Agriculture (MTA) questionnaire. Items on motivation 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 MTA questionnaire had 34 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 MTA. A reliability coefficient of 0.7 and above was accepted. The MTA 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 CAT strategy in teaching. Teachers in the experimental groups taught agriculture by use CAT 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 CAT strategy for groups I and III. After the intervention, MTA was administered to all the groups. Students' pretest and posttest responses were scored to generate data for analysis. Data was analysed using descriptive and inferential statistics.

## Results and Discussions

### Pretest Results on Motivation to Learn Agriculture by Gender

For the purpose of assessing the level of motivation to learn agriculture before exposure to CAT strategy, pretest mean scores on motivation to learn agriculture by gender were analysed. Each item in the MTA 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.

The mean scores reflected motivation of the two groups towards agriculture learning before the intervention. Table 1 shows the mean and standard deviations of the two groups on motivation towards agriculture learning.

**Table 1: Pretest Mean Scores Obtained by Students on MTA by gender**

Gender	N	Mean	Standard Deviation
Male	40	3.97	.53
Female	42	3.69	.41

Results in Table 1 show the mean score for male students was 3.97 and that of female students was 3.69. In order to determine whether there was a significant difference in the two means, an independent t-test was performed. Results from the t-test are shown in Table 2.

**Table 2: The t-test of Pretest Mean Scores on MTA by Gender**

	t	df	Sig. (2-tailed)
Equal variances assumed	2.744	80	.007
Equal variances not assumed	2.727	73.356	.008

Results presented in Table 2 shows a significant difference on motivation towards agriculture learning for the two groups,  $t(80) = 2.744$ ,  $p < 0.05$ . This indicates that motivation towards agriculture learning for male and female students was not equivalent at the start of the treatment. Male students had significantly higher mean scores than females. A study by Ayodapo (2013), on the attitudes of female students towards farm activities in tertiary institutions of Ogun State in Nigeria, observed that more boys than girls favoured the choice of agricultural science as a subject of study in senior secondary school. This probably explains why male students had a better motivation to learn agriculture than female students.

### Posttest Results on Motivation to Learn Agriculture by Gender

Posttest mean scores obtained from students exposed to CAT strategy were analysed based on gender. Table 3 shows the mean and standard deviation of male and female students on motivation towards agriculture learning.

**Table 3: Posttest Mean Scores Obtained by Students on MTA by Gender**

Gender	N	Mean	Standard Deviation
Male	81	4.11	.45
Female	82	3.94	.39

Results in Table 4 show the mean scores for male and female students was 4.11 and that for female students as 3.94. An independent t-test was performed to determine whether there was a significant difference in the two mean scores. Results are shown in Table 4.

**Table 4: The t-test of Posttest Mean on MTA by Gender**

	t	df	Sig. (2-tailed)
Equal variances assumed	2.650	161	.009
Equal variances not assumed	2.648	156.726	.009

Results in Table 4 show that there was a significant difference in the mean scores of the two groups,  $t(161) = 2.650$ ,  $p < 0.05$  in favour of the male students. These results imply that there was a significant overall treatment effect. The results suggest that administration of CAT strategy was more effective on male than on female students in improving motivation towards agriculture learning. However, a significant difference existed in the

pretest mean scores with male students having significantly higher mean scores on motivation than female students. The results, therefore, suggest no significant treatment effect on motivation to learn agriculture based on gender because the significant difference noted in posttest existed even before the treatment. This led to the acceptance of study hypothesis (Ho1) which stated that there is no statistically significant gender difference in motivation to learn agriculture among students exposed to CAT strategy.

Findings of the present study concur with the findings of Ronoh and Ndonga (2014) on the effects of computer based mastery learning on secondary school students' motivation to learn biology by gender in Kenya. The study reported no significant difference between the mean score for boys and girls after exposure to Computer Based Mastery Learning (CBML).

In consistence with findings of the present study, Karakas (2011) found no significant difference between male and female university students in Turkey in terms of being motivated to use computer application facilities of communication and writing. Findings of the present study concur with findings of Genc and Aydin (2010) on the students' motivation towards computer use in English as a Foreign Language (EFL). Findings from the study showed that EFL learners had a high level of motivation towards computer use. The study revealed no significant gender difference and motivational level of the students who had received computer assisted language learning.

Results obtained by Passey, Rogers, Machel and McHugh (2004) on the impact of using computers on pupil motivation are similar to the results of the present study. One of the aims of the study was to identify the impact of computers on pupil motivation and learning outcomes, behaviour and school attendance. The study also investigated how computers could best be used by teachers within the curriculum to motivate and engage pupils in learning. The study was carried out in primary and secondary schools in England. Teachers in both primary and secondary schools indicated that both boys and girls were motivated by use of computers. Results from that study showed evidence that motivation from computer use positively affected the work patterns of boys so that they worked in similar ways to the persistent pattern of girls. Primary and secondary school teachers reported that motivation of boys and girls using computers was the same and that all pupils benefited.

Results of the present study indicate no gender difference in motivation to learn agriculture among students exposed to CAT strategy. According to Wachanga (2002), in regular teaching, teachers give more attention to boys than to girls in secondary schools. Hence, teachers are more likely to use positive reinforcement on boys than they do on girls. This kind of practice makes girls feel that they are less capable compared to boys. The present study placed boys and girls in groups and all were treated equally by their teachers. Each individual student had an equal chance to contribute in the agriculture lessons during the period of the study. This probably could have made girls feel that they were also capable and raised their motivation. The effect of CAT strategy in raising motivation towards agriculture learning was therefore, equivalent for both male and female students.

### **Conclusion and Recommendation**

Results of the study showed that male and female students taught agriculture using CAT strategy were equally motivated to learn agriculture, meaning that the strategy was equally effective in both gender. Therefore gender does not affect students' motivation to learn agriculture when CAT strategy is used in teaching. When students were taught agriculture by use of computers, computers attracted and aroused the curiosity of male and female students alike. The study recommended that agriculture teachers should be encouraged to incorporate CAT strategy in their teaching as a way of improving motivation to learn agriculture.



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