

## **Effects of Co-Operative Learning Approach on Secondary School Students' Academic Achievement in Agriculture in Nakuru Sub-County, Kenya**

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**Abstract:** *This study aimed at investing the effect of Co-operative Learning Approach (CLA) on students' academic achievement in secondary school Agriculture. A non-equivalent control group design under quasi-experimental research was used. Four schools were randomly selected from the sub-county's co-education schools. One Form one class was selected from each school for the study. A total of 154 students were involved. Random assignment was done to place two of the selected schools in the experimental group and two schools in the control group. The instrument used was the Agriculture Achievement Test (AAT) which was pilot-tested and validated before use. The instrument had a reliability coefficient of 0.762. All the selected four classes were taught the topic 'Factors Influencing Agriculture' for four weeks. The teachers who used CLA went through an induction workshop prior to the treatment. The instrument (AAT) was then administered to all. After treatment, the data collected were analyzed using t-test of independent samples. The null hypothesis was tested at 0.05 level of significance. The findings of this study show an improved academic achievement in Agriculture among the students where CLA was used. Therefore the use of CLA enhances the learning of Agriculture and the researchers recommend its use in teaching of secondary school Agriculture.*

**Keywords:** *Co-operative Learning Approach, Secondary School Students, Academic Achievement, Agriculture*

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### **1. INTRODUCTION**

Agriculture practice in Kenya is important in enhancing food security in the nation. One way of doing this is by equipping the learners with knowledge and skills in agriculture that will enable them to function productively in agricultural production. It is important therefore to use teaching methods that will enable learners maximize on acquisition of knowledge and skills in agriculture.

Academic achievement in agriculture is a reflection of the extent to which the learners have acquired the intended knowledge and skills. Despite the importance of agriculture in Kenya's economy, academic achievement of secondary school students in agriculture is generally poor. According to Kenya National Examinations Council (2013), the students' mean scores in the subject were less than 50 per cent for the years 2007-2012 as shown in Table 1.

The poor performance could be attributed to the use of teaching methods that do not promote knowledge retention and acquisition of practical skills. The Kenya National Examinations Council (KNEC) has advised the Agriculture teachers to use teaching methods that encourage understanding and retention of the content taught. According to Kibett (2002), good teaching methods should provide the learners with information to be used now or in the future as well as guide learners to tackle problems. One of KNEC (2013) recommendation to agriculture teachers is that they should encourage students to study widely to understand the various agriculture

principles and their applications. The Agriculture teachers could probably achieve this by using instructional approaches that are interactive and more learner-centred.

**Table 1.** *Candidates overall performance in agriculture for the years 2007-2012*

Year	Number of Candidates	Mean Score (%)
2007	121,193	48.52
2008	134,039	37.27
2009	137,217	43.15
2010	140,237	37.76
2011	167,709	41.29
2012	178,419	38.87

**Source:** *KNEC, 2013, p 86.*

Teaching methods can broadly be categorized into two; expository and heuristic. The expository methods also referred to, as conventional methods are largely teacher centred. The learners passively acquire knowledge as the teacher teaches and the students take notes (Ayot & Patel, 1987; Wachanga & Mwangi, 2004). A number of problems have been identified concerning these methods of teaching such as passivity of students, lack of collaborative learning, and emphasis on theory. According to Ogunniyi, Polvi, & Telama (2000), when the teaching method is inappropriate for the level of students, the result is likely to be boredom and dislike of a subject.

The heuristic methods of teaching are learner-centred. These methods are such that the learners are actively involved in the learning process (Jones & Southgate, 1989; Oakley, Felder, Brent & Elhadj, 2004). Learning is through inquiry and it is where flexibility and creativity are encouraged.

Co-operative Learning (CL) is one such approach that is learner-centred. This approach has an interactive nature of learning which enables the learners to take a more active role in the learning process, take responsibility for their work, be highly effective and develop cognitive skills, and provide enjoyment to the learner (Dembo, 1994).

In co-operative learning approach, students are organized in small teams of three to five members. Each team member, from the fastest to the slowest learner, has a contribution to make (Sapon-Shevin & Schriedewind, 1990; Slavin, 2010). Rather than pitting the students against one another in competition for attention and grades, educators can select an appropriate CLA that effectively complements more conventional teaching styles and addresses their students' needs (Manning & Lucking, 1991). Using CLA as a teaching approach, the students tutor one another and are likely to acquire greater mastery of the material than in the common individual learning.

The current interest in co-operative learning stems from two broad forces; first, the recognition that some learning environments encourage students to compete with one another rather than learn in a co-operative fashion. Second, evidence that suggests that co-operative learning, when properly implemented, has the potential for contributing positively to academic achievement (Felder & Brent, 1999).

According to Johnson and Johnson (2009), the way students perceive one another and interact with one another is a neglected aspect of instruction. In co-operative learning, the learner is an active participant in knowledge construction.

Research studies done in different subjects and at different levels of learning using CLA have shown that the learning process is activity based and enhances performance (Wachanga & Mwangi, 2004, Haller, Gallagher, Weldon & Felder, 2000; Johnson & Johnson, 1989/1990; Kagan, 1990; Lampe & Rooze, 1996; Polvi & Telama, 2000). CLA has the potential for providing a learning environment where learners are engaged in appropriate learning experiences and consequently as aroused the interest of educators.

## **2. STATEMENT OF THE PROBLEM**

Students' academic achievement in the agriculture subject in Kenya Certificate secondary Education (KCSE) has been poor as indicated in the 2013 KNEC report. The mean scores for this subject for period covering years 2007-2012, were consistently less than fifty per cent. This has been attributed to the teaching methods that the teachers have continued to apply which are largely teacher centered among other factors. CLA is a student centered method of teaching and is known to be more superior to teacher centered methods but the influence of this method on performance in agriculture among secondary school students in Nakuru sub-county has not been established. This study sought to find out if CLA could improve academic achievement in secondary school agriculture.

## **3. PURPOSE AND OBJECTIVE OF THE STUDY**

The study was designed to investigate the effect of co-operative learning on academic achievement in agriculture of secondary school students in Nakuru sub-county, Kenya.

The objective of the study was to determine and compare the academic achievement in agriculture of learners who learnt secondary school agriculture through CLA and those who learnt agriculture through conventional learning methods.

## **4. HYPOTHESIS OF STUDY**

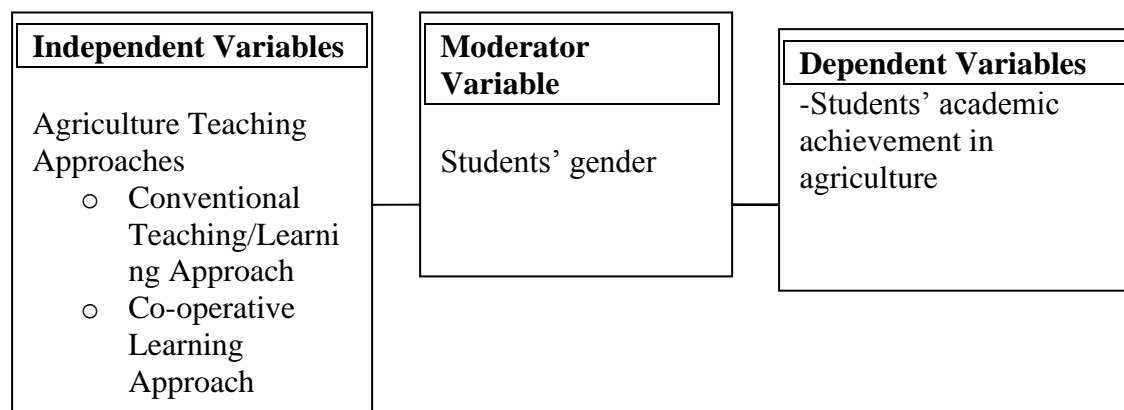
To achieve the above objective, the following null hypothesis was tested at 0.05 level of significance.

Ho<sub>1</sub>: There is no statistically significant difference in academic achievement in secondary school agriculture between students who learn the subject under CLA and those who learn the subject under conventional teaching/learning approach.

## **5. CONCEPTUAL FRAMEWORK**

In this study, constructivism and system approach theories provide the framework for investigating the use of CLA by teachers in real classrooms. The conceptual framework to be used in this study is based on the theories of the constructivism (Mergel, 1998) and systems approach to instruction (Saetler, 1990).

In constructivism, learners construct their own reality based upon their perceptions of experiences rather than having a teacher serve as a dispenser of facts and lower level cognitive information. Constructivists see the teacher as a facilitator who attempts to structure an environment in which the learner organizes meaning on a personal level. Constructivism promotes more open-ended learning experiences and the learner is able to deal with real life situations because of divergent thinking (Okumbe, 2001). This can be applied in teaching of agriculture in secondary schools. Learning by doing helps in the retention of knowledge and skills learnt in agriculture.



**Figure1.** Conceptual framework for determining the effects of using CLA on student's achievement in Agriculture.

Systems approach to instruction theory involves setting goals and objectives, analyzing resources, devising a plan of action and continuous evaluation. CLA being learner centred will allow the

learners to perform their tasks and help in accomplishing the aims and objectives for the topic. Assessment of the content covered is done to ascertain how much the learners have learnt and this provides feedback. The teacher's role is to establish conditions suitable for learning.

The independent variable in this study is the teaching method that was at two levels; the CLA and the conventional approaches. The teachers handling the CLA classes were given a workshop to control for any variance. Learning ability may be influenced by age and thus only Form One students who are within the same age bracket are considered. This is intended to control age effects. Figure 1 illustrates the conceptual framework.

## 6. METHODOLOGY

This study involved non-random assignment of subjects to the groups since the school authorities do not normally allow the classes to be dismantled so that they can be re-constituted for the purpose of research (Ary *et al.*, 1979; Gall, Gall & Borg, 2007; Wiersma, 1995) and, therefore, the students were left in classes as they were. This was, therefore, a quasi- experimental research.

A *post-test only non-equivalent control group design* was used in this study. The independent variables were the instructional strategies that is, CLA and conventional teaching/learning approach. The dependent variable was academic achievement in agriculture. The design was as follows:-



**Figure 2.** *Post-test only non-equivalent control group design*

Source: Ary, et al (1979) p250.

Key: X- experimental treatment in this case CLA

0<sub>1</sub> – Observations obtained from the experimental group

0<sub>2</sub> . Observations obtained from the control groups

## 7. SAMPLE SIZE AND SAMPLING PROCEDURE

The study had a total of four schools, two schools in the experimental and two in the control group. The sampling unit was the secondary schools but the individual students were the units of observation and the class the unit of analysis. The four schools had a total number of 154 students. One criterion used in sampling is the teacher factor whereby only those schools where the agriculture teacher is trained and has a teaching experience of more than three years were selected. The four schools sampled were randomly assigned to the control and the treatment groups.

## 8. INSTRUMENTATION

The instrument used in this study to provide data was the AAT based on the topic “Factors Influencing Agriculture” (K.I.E., 2002). The instrument was pilot tested using two schools with similar characteristics as the schools to be used in the research. Using Kuder-Richardson estimate (KR20), the reliability coefficient was found to be 0.762. The instrument provided the Agriculture Achievement Test Score (AATS) that was used in data analysis. The treatment was administered for a period of four weeks. The control group was taught through conventional methods while the experimental group was taught through CLA. The instrument (AAT) was administered soon after the treatment period was over. This study was a non-participant observation type thus teachers who were to use CLA were trained on how to conduct CLA lessons.

## 9. RESULTS AND DISCUSSION

The hypothesis of the study was tested using t-test. Tests were carried out at significance level of 0.05.

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**Table 2.** Scores in agriculture achievement test by learning approaches

Treatment	Mean	n	Std. Deviation	Std. Error of Mean
Co-operative Learning Approach	49.74	76	16.61	1.91
Conventional Teaching/ Learning Approach	38.14	78	16.42	1.86
Total	43.86	154	17.46	1.41

The Agriculture Achievement Test Score for the post-test administered to both treatment groups is summarized in Table 2. The findings show that the experimental group had a higher mean score of 49.74% compared to that of the control group (38.14%). CLA seems to improve the academic achievement of the students in secondary school agriculture.

In order to determine the relative effect of CLA on students' achievement in agriculture, an analysis of the students' post-test AATS was carried out to test the hypothesis.

Ho<sub>1</sub>: There is no statistically significant difference in academic achievement in secondary school agriculture between students who learn the subject under CLA and those who learn it under conventional teaching/learning approach.

The results of the independent sample t-test based on the mean achievement scores are shown in Table 3 which reveals that there is a significant difference between the means of the two groups,  $t(df=152) = 4.357, p < 0.05$

**Table 3.** T-test of the agriculture achievement post-test scores by learning approaches

Group	n	df	Mean	Std Deviation	t	P value
Co-operative Learning Approach	76	152	49.74	16.61	4.357	.000 *
Conventional Teaching/Learning Approach	78		38.14	16.42		

\* significant at  $p < 0.05$

The results indicate that the use of CLA resulted in higher students' achievement than the conventional teaching/learning approach since the experimental group obtained scores that were significantly higher than the control group. Therefore, the null hypothesis is rejected. This then implies that CLA was more effective in enhancing students' academic achievement than the conventional teaching/learning approach.

**10. DISCUSSIONS OF THE RESULTS**

The results indicate that students who were taught through CLA achieved higher scores than those taught through the conventional teaching/learning approach. This then implies that CLA was more effective in enhancing students' achievement than the conventional teaching/learning approach. The results agree with those of other researchers like Wachanga & Mwangi, (2004), Wambugu, Changeiywo & Ndiritu (2013) in their studies on the effect of Co-operative Learning in academic achievement in chemistry and physics respectively.

Positive interdependence is an aspect of CLA that is very important since it benefits both the weak and the bright students. The weak students benefit from the interaction with the brighter ones. When the brighter students explain the ideas to others, they learn the material they are explaining in greater scope and remember it longer. The bright students in the group are seen as resources and are valued by the teammates. CLA exhibited these qualities hence the improved achievement reported. Therefore, achievement in agriculture is likely to improve in secondary schools if this teaching/learning approach is adopted.

**11. CONCLUSION**

Based on the results obtained from this study, the students who were taught through co-operative learning approach achieved higher scores than those taught under conventional learning

approaches. Thus, co-operative learning approach improves achievement in secondary school agriculture.

## 12. RECOMMENDATIONS

The results of this research indicate that co-operative learning approach can be an effective instructional method for attaining higher students' achievement in agriculture. Thus co-operative learning approach can be used to supplement other teaching methods used in teaching agriculture.

The teacher training programs should have regular in-service training to build the capacity of agriculture teachers in secondary schools to be able to apply it when teaching agriculture. Curriculum development in teacher education programmes should consider inclusion of co-operative learning approach in their teacher education syllabi.

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