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RESEARCH ARTICLE

The Influence of Class Size on Secondary School Students Access to the School Farm as a Facility for Teaching and Learning Practical Aspects of Agriculture in Masaba North Sub-County, Kenya

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Abstract

This paper examines influence of class size on secondary school students' access to the school farm as a facility for teaching and learning practical aspects of agriculture in Masaba North Sub-County, Kenya. Through proportionate random sampling, 15 secondary schools were selected to represent the four educational zones in the Sub-County. The sample size for students constituted of 200 respondents. In addition, 15 Agriculture teachers were purposively selected, each from the 15 sampled schools. Data collection instrument for the study was a semi structured questionnaire. Data collected was processed, organized and analyzed with the aid of the Statistical Package for the Social Scientists (SPSS) version 20 computer programme. The hypothesis was tested at alpha 0.05 set *a priori* using the chi-square test of independence and homogeneity. The result showed that; there was a significant statistical relationship ($p=0007$) between class size and its effect on the utilization of the school farm. On the basis of the findings, the researcher recommends that; (a) education stakeholders need to assist the public mixed schools to purchase land that is adequate for purposes of teaching, instruction and practicals. This can be done through the county government which understands the needs of each school.

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Introduction

The central aim of agriculture education at basic level is to train students in the basic principles of agriculture, provide avenues for the development of their skills and change the attitude of young children towards agriculture. Chikaire, Orusha, Okafor and Okoli (2011) while listing the basic prime movers which should work in a concerted manner to achieve sustainable agricultural development points out that one of the movers is human capital in the form of professional, managerial and technical skills produced by investment in school, agricultural colleges, faculties of agriculture and on the job training and experience. The investments in schools may be in terms of qualified teachers and availability of sufficient resources for acquisition of practical skills.

Harry and Deborah (2009) posit that in West Virginia, facilities and equipment in agriculture are moderate problems faced by beginning teachers. In Australia, 54% of teachers-in-charge of science and senior technicians rate the applied science teaching facilities at their schools as good or very good 15% rate them as poor or very poor (Hacklay, 2009). There is general indication from various researches that the developing economies have more challenges as pertains to facilities in schools as opposed to developed countries which have minimal or no challenges. Despite the tremendous efforts made by Sub-Saharan governments to improve agriculture teaching, constraints still exist at basic level (Annor, Zimah & Ibrahim, 2003). Additionally, teachers often use question and answer technique and read from textbooks while students copy notes when teaching agriculture. Few teachers use supervised practical lessons in the school garden; they neither use resource people nor visit to nearby farms. Yet, learners need to be involved in practicals that aim at assisting them to acquire useful agricultural skills (Nyang'au, Kibet & Ngesa 2011; Kilemi, 2002).

The school farm is used as a laboratory for teaching by demonstration of theoretical phenomenon in practical terms. With the laboratory experience, students will be able to translate what they have read in their texts to practical realities, thereby enhancing their understanding and retention of the learnt concepts (Yara, 2010).

The academic achievement of students is a major concern of formal education system in most countries. Resources such as finance, educational facilities, teachers and other personnel are considered crucial in facilitating the teaching process in schools. Funding of education is vital in order to provide the needed education facilities and the judicious utilization of these available facilities will lead to better standards and results. The high standard of education and high academic achievement of the students no doubt require a combination of variables such as school facilities, teacher quality, students' readiness to learn, the school climate and culture, size of classes and many other factors. These variables must be in the right quantity, quality and mix to have the desired effect.

Facilities are linking points from classroom instruction to problem solving and hands –on experience. Facilities must be furnished with equipment and modules that are highly correlated with the curriculum being implemented (Thomas, 2004). Alimi *et al.*, (2012), carried out a study to examine the relationship between education facilities, teacher qualification, school location and academic achievement. The major objective of the study was to investigate the analysis of productivity secondary education in Ondo state with a view to suggest measures that could further increase the level of productivity of secondary schools in the state. The study revealed that Secondary Education in Ondo State was productive with input increase of 30 percent and output increase range between 39 percent and 139 percent. The study further revealed that there is a significant difference in the distribution of teachers by qualification.

Nyanga'u *et al.* (2011) carried out research on perceptions of learners towards factors influencing implementation of secondary school agriculture project in Kisii District also established that practical activities on the school farm in the course of the four years of study enables students gain experience of necessary skills to carry out agriculture projects. It is not surprising, therefore, when emphasis is being put on the importance of adequate allocation of educational resources to schools in African countries.

Although many researches reveal that there is a relationship between school facilities and class performance the study by Picus, Marion, Calvo and Glen (2005) found out that there was essentially no relationship between the quality of school facilities and student performance when other factors known to impact student performance were accounted for. Researchers however do not suggest that the investment in school facilities is of no importance. Edward (2008) while trying to look at the number of programs with operating greenhouse, type of operating systems, how the facilities are used in the local program and the barriers to the use of greenhouse found out that 75% of agricultural education programs in Arizona have greenhouse for classroom instruction and less likely to use it for training and agricultural science research. He also found out that most teachers have little or no post-secondary preparation or previous work experience in horticulture prior to entering teaching and are not satisfied with quantity or quality of the use of their green house. Lack of funding and experience are perceived barriers to not having a greenhouse as part of the local agriculture education programs. Although the researchers looked at green house as a facilities for teaching agriculture, little attention has be paid on availability of school farm, adequacy of the farm and the facilities thereon for effective practical teaching of agriculture.

In Nigeria, Longshal and Usman (2009), attribute to low students' enrolment in agricultural sciences especially at secondary and tertiary levels of education as a reflective of poor methods of used in primary level where emphasis is laid on theory. They recommended teachers of agriculture to employ a more practical approach so as to stimulate the student and produce future dynamic farmers equipped with competent skills. Justine, Mark, Dawn, Kell and Pauline (2003) realized that school-age students' knowledge and understanding of various aspect of food and farming was poor. To improve the understanding of food, farming and land management amongst school-age children, they recommended school visit to school farms and the use of projects. This not only does it offer a wide range of learning opportunities in the affective and cognitive domain but also provide positive outcomes for young people, as well as develop a strong community.

Class size is generally regulated by the maximum number of students legally permitted to enroll in a single class (Jeff & Milenard, 2012). In their policy brief, they recommend;(a) state to maintain smaller classes where the research shows academic benefit; (b) if class size is increased at any grade level, state should require the school to monitor individual students; (c) state leaders need to study the relationship between class size teacher effectiveness and students performance to determine how to adjust class size and average academic gain. They also mentioned on student- teacher ratio where policy makers use the ration more to track class size and monitor trends. Orian, Valentino and Imran (2008) while carrying out a study on heterogeneous class size effects, they observed same students and faculty members exposed to a wide range of class size from less than 10 to 200. Using nonlinear class size estimate effect, they found out that;(i) at the average class size the effect was -108; (ii) the effect was negative and significant only for smaller and largest ranges of class size respectively; (iii) students at the top of the test score

distribution were more affected by changes in class size, especially when class size were very large. Monks and Schmidt (2010) also found out that class size and students workload negatively impact students assessment of the courses and instructors. Large classes and heavy students load appear to prompt faculty to alter their courses in ways deleterious to students. Although there is relationship between class size and achievement, little has been done to show how class size influences students' access to facilities for teaching and learning practical aspects of Agriculture in Kenya.

Materials and Method.

The study employed across-sectional survey research design. A cross-sectional survey studies the relationship between different variables at one point in time (John, 2011). This survey design was chosen because the study is carried out on subjects without affecting their normal behavior, economical and has a rapid turnaround in data collection. It also has the advantage of identifying attributes of large populations from a small group of individuals (Babbie, 1990; Fowler, 2002).

The study was undertaken in secondary schools in Masaba North Sub-county, Nyamira County, Kenya. The target population for this study consisted of 6487 agriculture students and 26 agriculture teachers (total = 6513 from all the 26 mixed public day secondary schools offering agriculture as an examinable subject in Masaba-North Sub-county).

The sampling unit of the study was the school. According to Mugenda and Mugenda (2003), in a descriptive research, a sample size of 10% - 50% of the target population is acceptable. Therefore, through proportionate random sampling, 15 secondary schools out of the 26 mixed public secondary schools (about 50%) in Masaba North Sub-County were sampled. A sample size of 200 students was selected for the study. A sample of 200 was considered the minimum appropriate size for the study. Kathuri and Pals (1993) indicate for a homogenous population, a sample size of 100 respondents would be appropriate; hence a sample of 200 is way above the minimum recommended sample size. Other factors that were considered in choosing the sample size were adequate representation of students from the sampled schools, resources in funds and time. In addition, 15 Agriculture teachers were purposively selected, each from the 15 sampled schools. Proportionate random sampling was used to select student respondents from each of the participating schools. Random sampling procedure ensures all subjects have equal chances of being selected (Joan, 2009).

According to Hale (2012) survey research can apply questionnaires (structured-closed or unstructured-open) and interview schedules for data collection. Two sets of self-administered questionnaires (one set in each case for the students and agriculture teachers) were developed by the researcher as the main research instruments that were used to collect data from the respondents. The questionnaire was semi-structured. The teacher questionnaire had seven main sections: the first section was seeking information on the respondents profile such as age, gender, education level, and teaching experience. The second section was addressing issues related to the study objectives availability of school farm, student's level of access to the school farm and influence of class size on students' access to school farm. The student questionnaire had four sections. The first section also addressing issues to do with respondents' profile (gender and class), while the other sections two-four were addressing issues on; availability of school farm, level of access and influence on class size on student access to the school farm respectively.

The content validity of the instruments was established using peers and research experts in Agriculture Education to ascertain the validity of the questionnaire items and gauge how well the instruments met the standards (Mugenda, 2008). Their comments and suggestions were used to adjust questionnaire items accordingly in improving instrument the instrument. The reliability of the questionnaire items was determined using the Cronbach alpha coefficient. Cronbach alpha provides a good measure of reliability because holding other factors constant the more similar the test content and conditions of administration are, the greater the internal consistency reliability (Chong, 2012). A pilot study with a sample of 30 agriculture student and two agriculture teachers was conducted from Gucha District where a reliability of 0.78 was obtained. The researcher therefore ensured that the instruments met the threshold for acceptable reliability of $\alpha \geq 0.70$.

Data was analyzed at $p \leq 0.05$ alpha level of significance, set *a priori*. Data was coded and entered in the computer. Data analysis was done using inferential statistic (Chi-square test of independence and homogeneity) by means of the Statistical Package for Social Sciences (SPSS) Version 20.

Results and Discussions

The objective of the study was to determine the influence class size on students' access to the farm as a facility for teaching/learning practical aspect of agriculture subject. The objective was translated into the following null hypothesis: *Class size has no statistically significant influence on students' access to the school farm in secondary*

schools in public day schools in Masaba North Sub-County. Chi-square test was used to establish whether there was a relationship between class size and students' access to the school farm as a facility for learning and teaching of agriculture subject. There was a statistically significant relationship ($p=0.007$) between class size and its effect on the utilization of the school farm (Table 1). Majority of the students who reported that it moderately affects was where the class size was above 31. Chi-square analysis also revealed that there was significant relationship ($p=0.05$) between class size and sharing of the school farm facilities (Table 2). There was also a significant relationship ($p=0.021$) between class size and plot allocation with the allocation decreasing with the increase in class size (Table 3). Significant relationship ($p=0.000$) was observed between class size and the use of school farm when learning agriculture with the increase in class size resulting to reduction in learning of students in school farm (Table 4).

Table 1**Relationship Between Class Size and Utilization of School Farm**

Class size	Does your class size affect the utilization of the school farm?			Total
	Not at all	Moderately affect	Highly Affect	
below 20	7	0	0	7
21-30	18	9	5	32
31-40	9	15	2	26
40 and above	10	18	7	35
Total	44	42	14	100

Chi-square = 17.85 df=6 p-value= 0.007

Table 2**Relationship Between Class Size and Sharing of Agriculture Facilities**

Class size	At any given time do you normally share some of the agriculture facilities?		Total
	Yes	No	
below 20	7	0	7
21-30	26	6	32
31-40	17	9	26
40 and above	33	2	35
Total	83	17	100

Chi-square = 12.60 df=6 p-value= 0.05

Table 3**Relationship Between Class Size and School Farm Plot Allocation**

Class size	Do you have individual plot for carrying out project since form one		Total
	Yes	No	
below 20	0	7	7
21-30	7	25	32
31-40	3	23	26
40 and above	0	35	35
Total	10	90	100

Chi-square = 9.75 df=6 p-value= 0.021

Table 4**Relationship Between Class Size and Use of School Farm For Practical Learning of Agriculture**

Class size	Do you normally use the school farm when learning agriculture?		Total
	Yes	No	

below 20	1	6	7
21-30	13	19	32
31-40	21	5	26
41 and above	3	32	35
Total	38	62	100

Chi-square = 43.991 df=6 p-value= 0.000

The result revealed that there is a relationship between class size and students level of access to the school farm. The p-values obtained for the relationship is less than 0.05 prior set for test of the significance.

Based on the foregoing findings, the study rejects the null Hypothesis: *Class size has no statistically significant influence on students' access to school the farm in secondary schools in public day schools in Masaba North Sub-County*. Eiseman (2004) found that many schools denied access to the school farm for other classes, in favor of the form four candidates. This is due to the fact that the form four students are a priority in terms of access to the school farm for purposes of demonstration and attendance to the form KSCE agriculture project exam, which makes it imperative for all the form four agriculture candidates to access the school farm. In fact this was especially so for schools with a high number of candidates undertaking agriculture.

Conclusion and Recommendation

Conclusion

- School farm as a facility for teaching/learning practical aspect of agriculture in public, mixed day secondary schools in Masaba North Sub-County, was not adequate thus limiting student access.

- Class size has a statistically significant influence on students' access to the school farm as a facility for teaching/learning practical aspect of agriculture subject in public, mixed day secondary schools in Masaba North Sub-County,

Recommendation

- Education stakeholders need to assist the public mixed schools to purchase land that is adequate for purposes of teaching, instruction and practicals. This can be done through the county government which understands the needs of each school.

- Investment in farm agricultural facilities should be made a priority by the school administration and other stakeholders. Students can only learn properly and gain increased agricultural skills when they have adequate facilities for practical learning of agriculture.

- Public schools have a higher number of enrollments, and therefore the land set aside for purposes of teaching and instructing in agriculture, should be larger and therefore more adequate for the increasing number of students expected to take agriculture as a course.

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