Institutional Factors Influencing Effective Teaching of Agriculture Subject in Public Secondary Schools in Tharaka Nithi County, Kenya

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Abstract
Effective teachers use a range of assessment data to differentiate the curriculum as needed and engage learners in purposeful learning through a range of media and resources. Therefore, for the agriculture teachers to be effective they must be accorded emotional, administrative and technical support. The purpose of this study was to identify institutional factors influencing effective teaching of agriculture subject in public secondary schools in Tharaka Nithi County. The study targeted a total of 136 public secondary schools in the County where a sample of 30 schools were selected by use of stratified random sampling. The study adopted a descriptive survey design. The study used a structured questionnaire to collect data from the sampled students and teachers. The data were analyzed using descriptive statistics and inferential statistics. The results indicate that teaching and learning resources were fairy adequate in most of the public secondary schools as stated by majority of the respondents (60%). Further, majority of the teachers (60%) taught between 14 and 28 lessons per week although a few were overloaded. Most of the teachers (40%) taught agriculture to between 45 and 74 students in a form one class. However, the number of students declined in form two because most of teachers (37%) taught a class of between 15 and 44 students. the results also indicate that most teachers handled very few students in form three and form four. The study also revealed a positive between adequacy of teaching/learning resources and effectiveness of teaching agriculture with a coefficient of 0.480, established a negative relationship between work load and the effectiveness of teaching agriculture with a coefficient of –0.257 and a positive correlation between class size and teaching effectiveness with a coefficient of 0.381. Overall, the effectiveness of agriculture teachers in public secondary schools in Tharaka Nithi County was fairly good however, it could have been better if the teachers were provided with adequate teaching and learning resources and a conducive work environment. In order to ease teacher overloading in form one and two TSC should be hired to reduce overload especially in form one and form two. This will as well minimize the work load of the teachers and therefore improve his/her effectiveness
***Key words*:** Institutional factors, teacher effectiveness, Agriculture subject, academic performance, teaching resources

Introduction

Teacher effectiveness is an issue that has received increased attention in recent years (Daniel, 2006). Teaching is not restricted to lecturing, instead teachers are expected to motivate, inspire, explain, engage, understand and guide the students for their all-round development. Teachers are expected to attract students towards content, concepts, attitudes, values, knowledge and skills under the set frame of pre-determined goals. They are also expected to possess professional proficiency, educational efficiency and social sufficiency. Teacher effectiveness can be said as the power to realize socially valued objectives agreed for teachers' work, especially, but not exclusively, the work concerned with enabling students to learn (Fatima & Nasreen, 2013). It has become an adage that the effectiveness of education is very much dependent on the effectiveness of its teachers (Fatima & Nasreen, 2013). Young (1990) identified the following characteristics as being those of an effective teacher: the ability to plan and execute lessons, monitor student learning and behavior, conduct interesting and focused lessons based on a variety of methods, and maintain rapport with students and peers.

Teachers are expected to be effective in their teaching job however, for them to be effective they must be accorded emotional, administrative and technical support. Agriculture teachers are no exception, they need to be supported so that their teaching takes place in an environment suitable for teaching the subject (Thoobega et al., 2011). According to Harper (2004) agriculture teaching generally takes place not only in a classroom and laboratories but also in the school farm hence they are required for effective teaching. Mastery of the subject matter to be taught is also one important aspect that is required for good teaching. Good skills in teaching are not important if the subject matter is not mastered by the teacher. Holmes and Group as quoted by Ornstein (1992) maintains that pedagogical knowledge, and skills are as important than subject knowledge, and is best illustrated by the recent emphasis on cognitive psychology, with its focus on teaching methods, thinking skills, and student learning strategies. Teachers' skills and strategies are very important in educative-teaching. True knowledge of teaching is achieved by practice and experience in the classroom.

Horward (2003) indicates that improving teaching effectiveness is not merely a function of effective reward system, but rather a collaborative function of several factors working together to improve not only what goes on in the classroom but to improve quality of faculty. Apprenticeship trainers must learn a body of knowledge essential for teaching, how to prepare for instruction, and how to deliver instruction to become effective. Moreover, lack of financial resources hindered the expansion of facilities which led to specific problems in vocational subjects like agriculture. Many studies on general teacher effectiveness exist, however, very few or none has focused on the influence of institutional factors influencing the effectiveness of agriculture teachers in secondary schools in Tharaka Nithi County. This study was therefore intended to help fill that gap.

Materials and Methods

Description of the Study Area

Tharaka-Nithi County borders the Counties of Embu to the South and South West, Meru to the North and North East, Kirinyiga and Nyeri to the West and Kitui to the East and South East. The County lies between latitude 000 07' and 000 26' South and between longitudes 370 19' and 370 46' East. The total area of the County is 2,662.1 square kilometres, including Mt Kenya forest which is estimated at 360 square kilometres. The County is divided into four administrative Sub Counties namely Tharaka North, Tharaka South, Meru South and Maara. The study mainly focused on effectiveness of teaching agriculture in public secondary schools in the County.

Research Design, Data Collection and Analysis

The study adopted a descriptive survey design to facilitate the collection of data regarding the institutional factors influencing effective teaching of agriculture subject in public secondary schools. According to Zikmund and Babin (2010) a survey is a research technique in which responses are collected through structured instruments from a sample in some form or the behaviour of respondents is observed and described in some way. The study targeted a total of 136 public secondary schools in the County where; 2 were National schools, 14 Extra County, 29 County and 91 Sub County. A sample of 30 schools was selected from a population of 136 schools by use of stratified random sampling technique. The sample is the minimum size recommended by Abdullah and Ismail (2008) who indicate that the sample size of institutions should range between 30 to 500 institutions. The study used a structured questionnaire to collect data from the sampled students and teachers. The data were analyzed using descriptive statistics and inferential statistics.

Results and Discussion

Respondents Characteristics

The study covered a total of 30 schools out of 136 public secondary schools in the County. The study engaged 30 agriculture teachers, 1 from national schools, 6 from Extra County schools, 7 from County schools and 16 from Sub-county schools. In addition, 300 form three students were engaged in the assessment of the teachers' effectiveness. 10 students were selected from each of the 30 secondary schools. Among the teachers 53% were male while 47% were female meaning male agriculture teachers were more than female teachers.

The results in Table 1 further revealed that 3% of the teachers were school heads, 7% were deputy heads, 40% were heads of department and 50% were had no positions. According to the results, 50% had a Bachelor of Science in Agricultural Education and Extension degree, 27% had a diploma in Agricultural Education and Extension, 13% had a diploma in education, biology/agriculture combination and 10% were untrained agriculture teachers. This shows that majority had the required professional qualification to teach agriculture in secondary schools. Majority of the teachers (57%) had between 2 and 8 years teaching experience and therefore they had the required experience to work effectively.

Table 1: Respondents characteristics

Position held	Freq	%	Professional qualification	Freq	%	Work experience	Freq	%
Principal	1	3.3	Bsc AGED	15	50.0	2 - 8 years	17	56.7
Deputy principal	2	6.7	Diploma AGED	8	26.7	9 – 15 years	3	10.0
Departmental head	12	40.0	Dip Educ agric/bio	4	13.3	16 – 22 years	2	6.7
Teacher	15	50.0	Untrained	3	10.0	23 – 29 years	8	26.7
Total	30	100.0	Total	30	100.0	Total	30	100.0

Teaching/learning Resources

The results in Table 2 indicate that all (100%) the public secondary schools in the County had a school farm and the required text books, however, 17% didn't have livestock, 13% had no gardening tools, 40% had no livestock tools and 90% didn't have agricultural workshop that serves as a laboratory for carrying out agriculture experiments.

Table 2: Availability of Teaching/learning resources

Availability of Teaching/learning resources	Yes		No	
	Freq	%	Freq	%
School farm	30	100.0	0	0.00
Livestock	25	83.3	5	16.7
Gardening tools	26	86.7	4	13.3
Livestock tools	18	60.0	12	40.0
Agriculture workshop	3	10.0	27	90.0
Agriculture text books	30	100.0	0	0.00

Adequacy of Teaching Learning/Resources

The result in Figure 1 indicate that 3% of the respondents felt that the resources were very inadequate, 13% stated that the resources were inadequate, 60% indicated that they were fairly adequate and 23% noted that the resources were adequate. This shows that teaching and learning resources were fairy adequate as stated by majority of the respondents (60%)

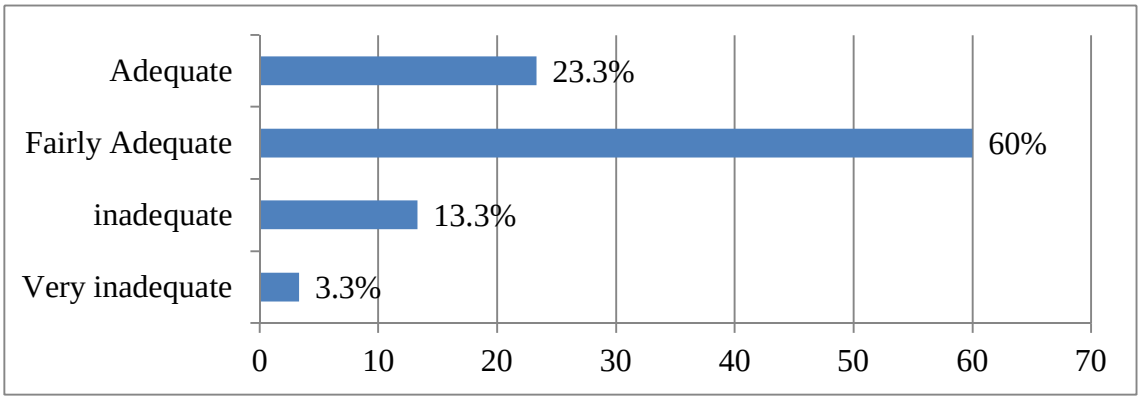

Figure 1: Adequacy of teaching learning/resources in Tharaka Nithi County

Hypothesis 1

Adequacy of teaching/learning resources does not significantly affect the effectiveness of teaching agriculture

Pearson's product moment correlation test was run to establish the relationship between adequacy of teaching/learning resources and the effectiveness of teaching agriculture. As shown in Table 3, there was a positive correlation between adequacy of teaching/learning resources and effectiveness of teaching agriculture with a coefficient of 0.480. The hypothesis was tested at a 0.01 significance level. The p-value was 0.000 and thus, less than the alpha of 0.01 hence establishing a significant relationship between the two variables. The findings are in line with those of Harper (2004) who contends that agriculture teaching generally takes place not only in a classroom and laboratories but also in the school farm hence they are required for effective teaching.

Table 3: Correlation analysis between adequacy of teaching/learning resources and effectiveness of teaching agriculture

		Adequacy of teaching/learning resources	Effectiveness of teaching agriculture
Adequacy of teaching/learning resources	Pearson Correlation	1	.480**
	Sig. (2-tailed)		.007
	N	30	30
Effectiveness of teaching agriculture	Pearson Correlation	.480**	1
	Sig. (2-tailed)	.007	
	N	30	30

**. Correlation is significant at the 0.01 level (2-tailed)

Work Environment

The study also assessed the influence of work environment on teaching effectiveness. Among the work environment aspects covered were number of lessons the teachers taught per week and the number of students per classroom.

Work load

Regarding work load the results indicate that 3% of the teachers taught between 11 and 17 lessons a week, 60% taught between 18 and 24 lessons per week, 23% taught between 25 and 31 lessons and 13% taught between 32 and 38 lessons per week as depicted in Figure 2. According to the Teacher Service Commission, the recommended number of lessons per week is 28. This show that majority of the teachers (60%) are within the recommended number of lessons.

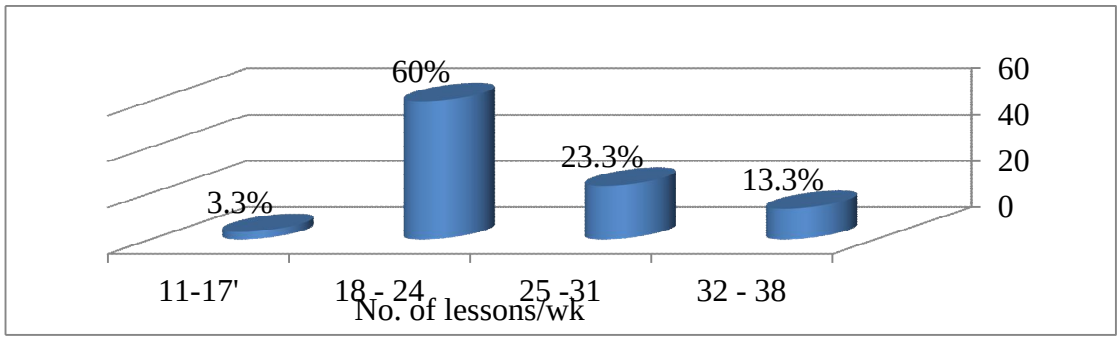

Figure 2: work load

Hypothesis 2: Teacher's work load does not significantly influence the effectiveness of teaching agriculture.

A Pearson's correlation test run to establish the relationship between work load and the effectiveness of teaching agriculture revealed a negative coefficient of –0.257 as presented in Table 5. This means that an increase in work load by one unit reduces the teacher's effectiveness by 0.257 units. The hypothesis was tested at a 0.01 significance level and therefore, the coefficient was not significant because the p-value was 0.154, thus greater than the alpha of 0.01. The findings confirm Kirimi et al., (2013) argument that teaching load has a significant effect on performance of agriculture teachers.

Table 4: Correlation analysis between work load and effectiveness of teaching agriculture

Variables		Work load	Teaching effectiveness
Work load	Pearson Correlation	1	-.267
	Sig. (2-tailed)		.154
	N	30	30
Teaching effectiveness	Pearson Correlation	-.267	1
	Sig. (2-tailed)	.154	
	N	30	30

Class Size

The results in Table 4 indicate that most of the teachers (40%) taught agriculture in classes of between 45 and 74 students in a form one. However, the number of students declined in form two because most of teachers (37%) taught a class of between 15 and 44 students. Since agriculture is an elective subject in Kenya, the number of students in form three and form four are fewer as

compared to form three and form four. This explains why 63% of the teachers taught between 15 and 44 students in form three and 60% of the teachers also taught between 15 and 44 students in form four respectively. According to the Teacher Service Commission, the recommended number of students per class is between 40 and 45. This shows those who taught more than 45 students in class were overloaded.

Table 5: Number of students

Number of students	Form one		Form two		Form three		Form four	
	Freq	%	Freq	%	Freq	%	Freq	%
Less than 15	0	0	2	6.7	2	6.7	5	16.7
15 - 44	7	23.3	11	36.7	19	63.3	18	60.0
45 - 74	12	40.0	10	33.3	9	30.0	5	16.7
75 - 104	7	23.3	4	13.3	0	0.0	1	6.7
105 - 134	2	6.7	1	3.3	0	0.0	0	0.0
135 - 164	1	3.3	1	3.3	0	0.0	0	0.0
165 - 194	1	3.3	1	3.3	0	0.0	0	0.0
Total	30	100.0	30	100.0	30	100.0	30	100.0

Teacher quality has, for some time, been recognized as the most important variable in the academic success of students. Recruiting and retaining effective teachers has become increasingly important as school districts impose mandates about student test scores and overall academic performance. Class size has an effect on the ability to retain effective teachers because those with large classes are more likely to seek other positions. Research indicates, however, that instead of rewarding effective teachers by decreasing their class size, administrators often increase the class sizes of the most effective teachers in order to ensure better student test scores (Barrett & Toma, 2013; Guarino, Santibañez, & Daley, 2006).

In order to establish the influence of class size on the effectiveness of teaching agriculture Pearson's correlation test was run. As shown in Table 6, there was a positive correlation between class size and teaching effectiveness with a coefficient of 0.381. The hypothesis was tested at a 0.01 significance level. The p-value was 0.038 and thus, less than the alpha of 0.05 hence establishing a significant influence between the two variables. Yodder & Symons (2010) argue that It seems likely that bigger classes will decrease the amount of time that can be spent on instruction and dealing with individual child and this was consistent with teachers' views.

Table 6: Correlation analysis between class size and teaching effectiveness

		Class size	Teaching effectiveness
Class size	Pearson Correlation	1	.381*
	Sig. (2-tailed)		.038
	N	30	30
Teaching effectiveness	Pearson Correlation	.381*	1
	Sig. (2-tailed)	.038	
	N	30	30

* Correlation is significant at the 0.05 level (2-tailed)

Teaching Effectiveness

The study also sought to establish the level of agriculture teachers' effectiveness in the County. Agriculture students were given a set of 10 statements relating to teaching effectiveness and they were asked to rate the effectiveness of their teachers using a scale of 1-5 where a mean score of 1 signified very poor and while a score 5 meant excellent. The results presented in Table 7 indicate that majority of the teachers met lesson objectives (4.0377), motivated students (4.200), gave a deeper understanding of the concepts (3.6092), provided quality notes to students (3.7300) and he/she is good at class management (3.4491). The results further show that the teachers' used relevant teaching aids such as real objects, audio-visual, audio, visual and projected media while teaching (2.1825), covered the syllabus adequately (4.0833), often exposed learners to practical work in agriculture (4.3712), took note of individual difference when teaching agriculture (3.7311) and set examination within the syllabus (3.7083). The standard deviations ranged from 0.9204 (which indicate that the scores were close to the mean score) to 1.9516 (indicates that the scores were scattered away from the mean).

Table 7: Teacher effectiveness

Item	Mean	Standard deviation
Teacher meets lessons objectives	4.0377	0.9204
Teacher motivates the students	4.2000	0.9931
Teacher gives deeper understanding of the concepts	3.6092	1.2312
Teacher provides quality notes	3.7300	1.2291
Teacher is good at class management	3.4491	1.9516
Teacher uses relevant teaching aids such as real objects, audio-visual, audio, visual and projected media while teaching	2.1825	1.3354
Teacher covers the syllabus adequately	4.0833	1.0964
Teacher often exposes learners to practical work in agriculture	4.3712	0.9935
Examinations are set within the syllabus by the teacher	3.7083	1.1244
Teacher takes note of individual difference when teaching agriculture.	3.7311	1.4327

Teaching Effectiveness Index

The overall teaching effectiveness was measured using an index. The index was computed by tallying the scores of the 10 items (Table 7) given by the 10 students per school and then computing the mean score. The mean scores are presented in Table 8. According to the results, most of the teachers (37%) got a score of between 2.6 and 3.0 which means that the effectiveness of the teachers was fair. Very few teachers (7%) got a score of between 4.1 - 4.5 which signifies that the teacher was very effective.

Table 8: Teaching effectiveness score

Teaching effectiveness score	Frequency	Percent
2.6 - 3.0	11	36.7
3.1 - 3.5	7	23.3
3.6 - 4.0	10	33.3
4.1 - 4.5	2	6.7
Total	30	100.0

Conclusion and Recommendations

The effectiveness of agriculture teachers in public secondary schools in Tharaka Nithi County was fairly good however, it could have been better if the teachers were provided with adequate teaching and learning resources and a conducive work environment. Among the institutional factors studied adequacy of teaching learning resources had the highest influence on teaching effectiveness followed by class size whereas teachers' work load had the least influence. Provision of teaching and learning resources was also fair in most of the public secondary schools however; some schools lacked essential resources specifically farm tools and equipment. Almost all the schools didn't have a workshop which is basically used for carrying out agriculture experiments however they all had a school farm.

Most of the agriculture teachers in the County taught fewer lessons than the recommended 28 lessons per week according to the Teacher Service Commission and therefore, they are under loaded. Although workload had the least influence on teaching effectiveness, it had negative correlation and therefore the effectiveness of the few teachers who taught more than the recommended number was compromised. Regarding the class sizes, most teachers taught more than 45 students in class in form 1 and 2, which is above the recommended number, thus they were overloaded. Nevertheless, the number of students were few (less than the recommended 45 students per class) in form three and form four because most students chose to drop the subject when they joined form three. It can therefore be argued that the agriculture teachers were more effective in form 3 and 4 as compared to form 1 and 2.

In order to improve the effectiveness of the agriculture teachers in the County, school managers should adopt the following recommendations;

- The administration must provide the necessary resources to initiate and sustain the effective teaching of agriculture.
- Smaller classes can benefit all students in terms of individual, active attention from teachers, but that the lower attaining students in particular can benefit from small classes at secondary level.

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