Effect of agricultural teaching workshop use on agricultural skill acquisition among Certificate in Agriculture trainees in technical institutions in Western Kenya

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ABSTRACT

The quality of agricultural education offered in training institutions influences the development of agricultural skills required for effective agricultural production and extension services. This study examined the effect of agricultural teaching workshop use on agricultural skill acquisition among Certificate in Agriculture trainees in technical training institutions in Western Kenya. The study adopted a correlational research design with a mixed-methods approach. A stratified random sample of 269 Certificate in Agriculture trainees was selected proportionately from 12 TVET institutions from a sampling frame of 890 trainees. Data were collected using a pretested structured questionnaire administered to trainees and key informant interview guides administered to 28 agricultural tutors. The quantitative data were analyzed using descriptive statistics, Chi-square tests and bivariate linear regression, while qualitative data were analyzed thematically. The reliability coefficient of the data collection instrument was 0.782. The findings showed that the level of use of agricultural teaching workshops was moderate (M = 2.94, SD = 0.29) on a scale of 0 to 5. Agricultural teaching workshop use had a statistically significant positive effect on agricultural skill acquisition ($\beta = .457$, $t = 8.395$, $p < .001$), explaining approximately 20.6% of the variation in skill acquisition. The major challenge affecting effective use of agricultural workshops was inadequate workshop implements and equipment (M = 4.64, SD = 0.49). The study concludes that agricultural teaching workshops are important in enhancing the acquisition of agricultural skills among Certificate in Agriculture trainees. The study recommends increased opportunities for practical training, improvement and equipping of agricultural workshops, curriculum enhancement to strengthen practical learning, and increased use of appropriate technology to support agricultural skills development.

Keywords: Agricultural teaching workshops; agricultural skill acquisition; Certificate in Agriculture trainees; TVET; practical training; Western Kenya

I. INTRODUCTION

One of the means by which agricultural productivity can move from subsistence to commercial productivity is by adoption of new technologies through provision of modern agricultural education and skills (Yeboah & Jayne, 2017). Many countries in Africa have made agricultural-related subjects and courses mandatory starting from primary schools through secondary (high schools) to higher institutions of learning. This is in effort to improve agriculture skills to the learners and ultimately the quality and quantity of produce in the agricultural sector (Ghosh and Braun, 2020).

The agricultural sector is the backbone of Kenya's economy, contributing significantly to the Gross Domestic Product (GDP), employment, and food security. Despite its importance, the agricultural sector still faces a myriad of challenges, including low productivity attributed mainly to outdated farming practices. One of the main strategies to increase agricultural productivity has been in training of agriculture extension officers and the adoption of technologies by farmers (Williams et al, 2019). This training is carried out in the technical training institutes partly in workshops and partly in the field. The technical institutes are collectively referred to as Technical and Vocational Education and Training (TVET) institutions and are regulated by Technical and Vocational Education and Training Authority (TVETA). Technical institutions are expected to train the certificate of agriculture trainees to offer modern agricultural knowledge and skills to farmers. Specifically, the Certificate in Agriculture trainees is expected to acquire practical skills that enable them to train farmers on modern agricultural practices as extension officers.

The use of agriculture training workshops to train agriculture students has been shown to be invaluable (Recha et al., 2024). Workshops are widely used in agricultural extension to transfer practical techniques (planting, pest management, post-harvest handling) and to increase trainees' ability to apply those techniques on their farms, especially when workshops include demonstrations and hands-on practice. The skills gained should translate into changed on-farm behaviour if trainees can practice skills during training. Multiple program reports and field studies report increased productivity or more efficient input use among trainees who adopted workshop-taught methods, though effect sizes vary

and are context dependent. However, not all workshops succeed; some programs find one in four trainings may be ineffective without good design, relevance to trainees, or post-training reinforcement (Paul et al., 2024).

There appears to be a gap between the knowledge and skills imparted by use of the agriculture workshops and the examination performance by Certificate in Agriculture trainees in Western Kenya Region, potentially affecting contribution to improvement in the agricultural sector. This gap could be due to insufficient exposure to practical, hands-on learning experiences, which agricultural workshops are designed to provide. While technical institutions offer agricultural curricula, the effectiveness of teaching approaches, particularly the integration and utilization of practical workshops, in fostering genuine skill acquisition among trainees is still not clear. This deficiency in practical skills could be due to various factors, including inadequate workshop facilities, limited practical sessions, or a disconnect between workshop content and current agricultural industry demands.

Western Kenya is made up of four Counties (Kakamega, Bungoma, Busia and Vihiga). Western Kenya has a rich agricultural potential (Suitable soils and rainfall amounts) that can support the Kenya Governments' aspiration of attaining food security for the country. However, the food productivity of the region has not substantially changed over the past 10 years. The four counties have a total of 71 TIVET institutions (both private and public) of which, TVET institutions offering agriculture courses at Certificate and Diploma level are 36, with an estimated population of 1,300 diploma students and 3000 certificate students, with 600 instructors (NCA, 2016). There are an estimated 600 certificate trainees who graduate annually from these institutions.

1.1 Statement of the Problem

The Government of Kenya seeks to equip Certificate in Agriculture trainees in TVET institutions with practical skills necessary to contribute effectively to the agricultural sector. Agricultural teaching workshops provide trainees with opportunities to apply theoretical knowledge through hands-on use of agricultural tools, machinery, implements and other practical resources (Osagiede et al., 2024).

Despite investment in agricultural training facilities, KNEC examination results for Certificate in Agriculture trainees between 2016 and 2019 indicated a downward trend in performance. More than 90% of candidates obtained pass grades in the examined units, while about 12% were either referred or failed some units (KNEC, 2016–2019). These results raise concerns about the extent to which trainees acquire the practical agricultural skills required for effective performance after training.

The acquisition of practical skills may be influenced by trainees' exposure to and use of appropriate teaching resources, including agricultural workshops (Yator, 2026). However, the extent to which agricultural teaching workshops are used during training and their contribution to trainees' skill acquisition in technical institutions in Western Kenya remains unclear. It is therefore necessary to establish whether the use of agricultural teaching workshops is associated with the level of agricultural skills acquired by Certificate in Agriculture trainees.

This study therefore examined the effect of agricultural teaching workshop use on agricultural skill acquisition among Certificate in Agriculture trainees in technical institutions in Western Kenya.

1.2 Research Objectives

To determine the effect of agricultural teaching workshop use on agricultural skill acquisition among Certificate in Agriculture trainees in technical institutions in Western Kenya.

II. LITERATURE REVIEW

2.1 Theoretical Review

2.1.1 Methodological Behaviorism Theory

This study was guided by Methodological Behaviorism Theory, which is associated with behaviorists such as J. B. Watson and B. F. Skinner (as cited in Moore, 2011). The theory emphasizes observable and measurable behaviour and explains learning in terms of relationships between stimuli, responses and reinforcement. From this perspective, learning occurs when appropriate responses to particular stimuli are developed and reinforced through repeated practice (Deegan et al., 2016). Behaviorists therefore emphasize observable performance, practice, repetition and reinforcement as important conditions for learning. Knowledge is viewed in terms of demonstrated behaviours or appropriate responses to particular situations (Hermans et al., 2015).

The theory is relevant to this study because agricultural teaching workshops provide trainees with practical stimuli and opportunities to observe practise and repeat agricultural activities. Through interaction with tools, machinery, implements and other workshop resources, trainees can develop and reinforce appropriate practical responses. Repeated hands-on practice can therefore contribute to the development and acquisition of agricultural skills. The theory consequently provides a basis for examining whether greater use of agricultural teaching workshops is associated with higher levels of agricultural skill acquisition among Certificate in Agriculture trainees.

However, Methodological Behaviorism Theory has a limitation in the context of this study. It assumes that appropriate stimuli and opportunities for practice are available to learners (Burton et al., 1996). In TVET institutions, however, agricultural workshops may have inadequate or outdated equipment, limited working space or insufficient resources, which may restrict trainees' opportunities for practice. The theory therefore provides a useful framework for explaining the relationship between workshop use and skill acquisition while also recognizing that the availability and adequacy of workshop resources may influence the learning process.

2.2 Empirical Review

2.2.1 Difference in Mathematics Attitude by Instructional Method

Skill can be defined as the learned ability to perform an action with determined results with good execution often within a given amount of time, energy, or both (Meciej, 2021). Skill is viewed as the ability to do a particular task well, and a skilled individual is one who has acquired much competency in performing a particular task. Agricultural Skills or expertise can be acquired through training and experience. Training is the process of organization of opportunities for participants to acquire necessary understanding and skill (Lynton and Pareek, 1990).

Agricultural education farm workshops are essential teaching resources for students to be able to acquire practical skills in operating and servicing of agricultural equipment and implements (Bakker, 1999). Agricultural education farm workshop gives students access to hands-on-experience on the production of indigenous mechanized technologies for farming activities, improves students' skills in construction and installation of agricultural indigenous mechanized tools and provides students with the required skills in maintenance of indigenous mechanized farm equipment and aid students access to industrial workshop activities (Aleru and Lazarus, 2021). According to Olatoye (2017), among the duties of a teacher in the agricultural sciences sections of radiation is to relay content to the learners in a manner that is not only friendly but which the learners can relate with. This involves the use of charts, illustrations, and any other features in workshops which can aid the learner‘s comprehension of taught content. This is, for instance, displayed in the appropriateness of the formation of artifacts for learning such as handicraft groups and basket making, local cage making.

Balta *et al* (2017) evaluation study focused on cadaver use in the teaching of anatomical sciences. There were respondents with various qualifications in anatomical fields. A large fraction of the respondents gave a positive response on the use of hard formalin based cadavers in the teaching of anatomy and its effectiveness therein. This depicts the role of deviating from theoretical expositions of studies such as anatomical dispositions on paper only. While 21.6 % of the respondents in the research above did not give positive feelings of the essence of cadavers, their reasons included fright and not directly related to the null relationship to one's studies.

Azer and Azer (2016) sought to determine three-dimensional (3D) anatomy models and focused majorly on medical and dental schools. Given that the human body is in three dimensions, having 3D models in the classroom under this field is essential compared to other instruments of learning. The researchers reviewed thirty studies to inform their inferences. The studies used covered various aspects of the 3d use of objects in anatomy. Comparing the 3d instruments with traditional teaching, which entails drawings in books and explanations, the researchers' focus, was on the effectiveness of deviating from the conventional approach of education and subsequently determining if there were variations.

Schoenfeld et al (2017) laid their focus on 3D Additively Manufactured (3D AM) models and their effect on the learners who were instructed using the models. In this research, there were subject groups with the same questions, after one group was exposed to the 3D tools, and the other one was only instructed on the traditional approach. The students who were instructed through technological tools showed high performance when compared with those who were only instructed on traditional approaches. The use of secondary learning tools and resources is more effective and relates better with the imagination and the memory of the learners. In this regard, individuals who are instructed through graphical means, multimedia means as well as any other tools which deviate from the traditional trajectory are more helpful in relating content to the learners and the learners also remembering the content learned.

Adeoye and Abimbola (2016) investigated the effects of senior secondary school students' use of demo kits on their achievement in biology in Omu-Aran, Nigeria. Some students learned biology through a demo kit while others without using it. There existed no differences regarding gender in the examination performances. A significant difference was indicated in the achievement of students in the various score levels in favour of the high scorers. As per the findings, the researcher recommended that biology teachers should consider exposing their students to the use of demo kits to enhance meaningful learning and retention of information by the students.

Ilomo and Mlavi (2016) researched the availability of learning facilities and how they influence performance among students in Secondary School levels in Muheza District, Tanga in Tanzania. The findings revealed that inadequate infrastructure, including labs, libraries, as well as adequately furnished classes and lecture halls contributed to students' poor performance in the schools which were studied. The study also showed that there were enough textbooks. The researchers concluded that school administrators should put more emphasis on equipping the school with infrastructures that affect academics performance. For this study, laboratories are key because they provide all the

models and specimens used in the learning of sciences. The study found that lack of equipped laboratories leads to academic failure, especially in science subjects, including agriculture.

Konyango *et al* (2018) looked at the availability of the resources in learning, which led to poor performance among students in Ugenya. Among the inferences were that physics students failed to post-high grades due to inadequacy of teachers and laboratory apparatus for adequate practices prior to the examinations. There was enough evidence that inappropriate resources in learning rendered most of the learned content hard to comprehend and, therefore, shifted to dismal performance in the students' examinations. The research also established a significant positive link between requisite resources and inappropriate instructional techniques and students' academic performance in physics.

Although there is some substantive literature on workshop learning facilities for certificate in agriculture trainees in the Technical Institutes, this literature fails to establish a clear link between the availability and use of these workshops with Agricultural skill acquisition by certificate in Agriculture trainees in technical institutes. The current study seeks to establish the relationship between the availability and use of workshops in the technical training Institutes and Certificate in Agriculture trainees' performance/ agricultural skill acquisition.

III. METHODOLOGY

3.1 Research Design

The study adopted a correlational research design with a mixed-methods approach. The design was appropriate because the study collected both quantitative and qualitative data to examine the relationship between agricultural teaching workshop use and agricultural skill acquisition among Certificate in Agriculture trainees and to obtain tutors' perspectives on the use of workshop resources.

3.2 Study Area

The study was conducted in Western Kenya, comprising Kakamega, Bungoma, Busia and Vihiga counties. The region receives adequate rainfall and has fertile soils that support agricultural production. Smallholder farming is predominant, with major food crops including maize, beans, bananas, sorghum, millet, cassava and sweet potatoes. Major cash crops include sugarcane, tea, tobacco and cotton, while livestock production includes cattle, sheep, goats, pigs and poultry.

3.3 Target Population

The study population comprised Certificate in Agriculture trainees and agricultural tutors in public and private technical institutions in Western Kenya. A sample of 269 trainees was determined using the Krejcie and Morgan (1970) formula. Western Kenya was stratified into four counties, from which three TVET institutions were randomly selected from each county, giving a total of 12 institutions. The 269 trainees were proportionately allocated to the selected institutions and selected using systematic random sampling based on class lists as shown in Table 1.

Table 1

Proportional Allocation of the Study Sample to the Different TVET Institutions Offering Certificate in Agriculture in Western Kenya

Institution (Strata)	Number of Agriculture Students	Proportional Allocation	Number of Trainees
Sigalagala NP	120	269 (120/890) = 36.2	36
Shamberere TTI	100	269 (100/890) = 30.2	31
Kaimosi TTI	80	269 (80/890) = 24.1	24
Kongoni TTI	40	269 (40/890) = 12.0	12
Kisiwa TTI	120	269 (120/890) = 36.2	36
Sangallo TTI	160	269 (160/890) = 48.3	48
Webuye West TTI	20	269 (20/890) = 6.0	6
Webuye North TTI	60	269 (60/890) = 18.1	18
Musakasa TTI	30	269 (30/890) = 9.0	10
Bunyala TTI	60	269 (60/890) = 18.1	18
Amakoro TTI	60	269 (60/890) = 18.1	18
Sabatia TTI	40	269 (40/890) = 12.0	12
Total	**890**		**269**

A further 28 agricultural tutors were purposively selected as key informants because of their involvement in teaching, use of agricultural teaching resources and assessment of trainees' practical skills.

3.4 Data Collection and Analysis

Data from the trainees were collected using structured questionnaires, while data from tutors were collected using key informant interview guides. The data collection instruments were pretested in a neighbouring TVET institution in Kisumu County, and a reliability coefficient of 0.782 was obtained.

Quantitative data were analysed using descriptive statistics, chi-square tests and regression analysis with SPSS Version 27. Qualitative data were analysed thematically using NVivo Version 14. The findings were presented using tables, figures and narrative descriptions.

3.5 Ethical Considerations

The study received approval from the Directorate of Postgraduate Studies of Masinde Muliro University of Science and Technology, and a research permit was obtained from the National Commission for Science, Technology and Innovation (NACOSTI), Permit No. 939024.

IV. FINDINGS & DISCUSSION

4.1 Findings

4.1.1 Sociodemographic factors of the Trainees

The Sociodemographic characteristics of the 269 Certificate in Agriculture trainees are presented in Table 2. Males constituted 55.4% (149) of the respondents, while females accounted for 44.6% (120). The distribution by sex was not statistically significant, $\chi^2(1) = 3.126$, $p = .077$.

Most trainees (83.3%) were aged 20–25 years, followed by 12.6% aged 26–30 years. Those aged 31–35 years accounted for 3.0%, while 0.4% and 0.7% were aged 36–40 and 41–50 years, respectively. The age distribution was statistically significant, $\chi^2(4) = 686.40$, $p < .001$.

Regarding previous academic achievement, 50.9% of the trainees had attained a KCSE grade of D, 47.2% had D+, 1.5% had C−, and 0.4% had D−. The distribution of KCSE grades was statistically significant, $\chi^2(3) = 250.18$, $p < .001$. Most trainees (90.0%) had previously studied Agriculture as an examinable subject, while 10.0% had not. This distribution was also statistically significant, $\chi^2(1) = 171.84$, $p < .001$ as shown in Table 2.

Table 2

Sociodemographic Characteristics of Certificate in Agriculture Trainees

Variable	Category	n	%	χ^2	df	p
Sex	Male	149	55.4	3.126	1	0.077
	Female	120	44.6			
	Total	269	100			
Age	20–25 years	224	83.3	686.4	4	<.001
	26–30 years	34	12.6			
	31–35 years	8	3			
	36–40 years	1	0.4			
	41–50 years	2	0.7			
	Total	269	100			
KCSE grade	D−	1	0.4	250.18	3	<.001
	D	137	50.9			
	D+	127	47.2			
	C−	4	1.5			
	Total	269	100			
Prior Agriculture knowledge	Yes	242	90	171.84	1	<.001
	No	27	10			
	Total	269	100			

4.1.2 Sociodemographic Characteristics of Agricultural Tutors

The study also included 28 agricultural tutors who participated as key informants. Table 3 shows their selected socio-demographic characteristics of them. Most of the tutors were male (71.4%; $n = 20$). Their ages ranged from 26 to 49 years, with a mean age of 36.6 years (SD = 7.58). Their teaching experience ranged from 2 to 7 years, with a mean of 4.3 years (SD = 1.47). The differences in tutors' age and teaching experience were not statistically significant ($p > .05$).

The tutors' experience was relevant to the study because they were directly involved in the delivery of practical agricultural training and the use and management of agricultural teaching workshops.

Table 3

Sociodemographic Characteristics of Agricultural Tutors

Characteristic	Category/Statistic	Frequency (*n*)	Percentage/
Sex	Male	20	71.40%
	Female	8	28.60%
		Value	
Age (years)	Range	26–49	
	Mean	36.6	
	Standard deviation	7.58	
Teaching experience (years)	Range	2–7	
	Mean	4.3	
	Standard deviation	1.47	

4.1.3 Level of Agricultural Teaching Workshop Use among Certificate in Agriculture Trainees

The first aspect of the study was to establish the level of use of agricultural teaching workshops by Certificate in Agriculture trainees. Workshop use was measured using 24 statements rated on a six-point scale ranging from 0 (no use) to 5 (very high use). Individual ratings were combined and averaged to generate an overall workshop-use index.

The results indicate considerable variation in the use of individual workshop resources. Tractors recorded the highest mean level of use (M = 4.15, SD = .573), followed by implements such as ploughs, harrows and planters (M = 3.50, SD = .500), workshop tools (M = 3.26, SD = .625), models (M = 3.01, SD = .222), and workshop machines (M = 2.71, SD = .720).

In contrast, irrigation equipment recorded a low mean level of use (M = 0.46, SD = .499), followed by storage equipment (M = 1.11, SD = .773), welding tools (M = 1.19, SD = .749), weather stations (M = 1.30, SD = .461), harvesting equipment (M = 1.56, SD = .497), and farm tools (M = 1.86, SD = .109).

The overall workshop-use index had a mean of 2.94 (SD = .293), with scores ranging from 2.21 to 3.58. Based on the study's classification, this represented a medium level of agricultural teaching workshop use. The index demonstrated acceptable internal consistency, with a Cronbach's alpha of .777.

Table 4

Level of Agricultural Teaching Workshop Use among Trainees

No.	Activity/Component	Rating in terms of use		
		Sum	**Mean**	**SD**
1	Wall hanging (maps, diagram, charts, picture)	656	2.44	.102
2	Models	810	3.01	.222
3	Weather station	351	1.30	.461
4	Workshop tools	879	3.26	.625
5	Workshop machines	729	2.71	.720
6	Chemicals (herbicides, acaricides)	617	2.29	.456
7	Tractors	1119	4.15	.573
8	Implements (ploughs, Harrow, planters)	941	3.50	.500
9	Farm tools (digging, cutting, maintenance)	500	1.86	.109
10	Harvesting equipment	420	1.56	.497
11	Drying equipment	621	2.31	.560
12	Storage equipment	301	1.11	.773
13	Irrigation (lines, sprinklers)	125	.464	.499
14	Carpentry	551	2.05	.741
15	Welding tools	320	1.19	.749
	Index of use of agricultural workshops	792.29	2.94	.293

The medium level of workshop use suggests that although trainees had access to and used agricultural teaching workshops; the use was not consistently high across all workshop resources. The particularly low use of irrigation,

storage, welding and weather-station facilities may indicate limitations in the availability, accessibility or functionality of some practical training resources.

These findings are consistent with Othoo et al. (2022), who reported variations in workshop adequacy among TVET institutions in Kenya, with workshop space averaging at a medium level while serviceability and adequacy of facilities were relatively low. The findings may also be related to curriculum limitations, as Thwala (2017) observed that older curricula may provide insufficient agricultural skills for addressing contemporary agricultural challenges.

4.1.4 Distribution of Trainees by Level of Workshop Use

The workshop-use index was further categorized as follows: 0 = no use; 0.01–1 = very low; 1.01–2 = low; 2.01–3 = medium; 3.01–4 = high; and 4.01–5 = very high. The results showed that 161 trainees (59.9%) were in the medium-use category, while 108 (40.1%) were in the high-use category. A chi-square test indicated a statistically significant difference in the distribution, $\chi^2(1) = 10.44$, $p = .001$. Thus, the majority of trainees reported a medium level of agricultural teaching workshop use.

Table 5

Distribution of Trainees by Level of Agricultural Teaching Workshop Use

Score	Level	Observed N	Expected N	Residual	Statistics
2.01-3	Medium	161	134.5	26.5	χ^2 =10.44
3.01-4	High	108	134.5	-26.5	*df*=1
Total		**269**			***p*=.001**

4.4 Effect of Agricultural Teaching Workshop Use on Agricultural Skill Acquisition

A bivariate linear regression analysis was conducted to determine whether agricultural teaching workshop use significantly predicted agricultural skill acquisition among Certificate in Agriculture trainees. Agricultural teaching workshop use was entered as the independent variable, while agricultural skill acquisition was the dependent variable. The regression model produced a correlation coefficient of R = .457 and an R^2 = .209, with an adjusted R^2 of .206. This indicates that agricultural teaching workshop use explained approximately 20.6% of the variation in agricultural skill acquisition among the trainees.

Table 6

Regression Model Summary

R	R Square	Adjusted R Square	Std. Error of the Estimate
.457[a]	.209	.206	.22546

The ANOVA results showed that the regression model was statistically significant, $F(1, 267) = 70.483$, $p < .001$. This indicates that the regression model provided a statistically significant prediction of agricultural skill acquisition.

Table 7

ANOVA for Regression Model

	Sum of Squares	*df*	Mean Square	*F*	*p*
Regression	3.583	1	3.583	70.483	.001
Residual	13.572	267	.051		
Total	17.154	268			

The regression coefficients further showed that agricultural teaching workshop use had a positive and statistically significant association with agricultural skill acquisition (B = .392, SE = .047, β = .457, t = 8.395, p < .001).

Table 8

Regression Coefficients for Agricultural Teaching Workshop Use and Skill Acquisition

	Unstandardized Coefficients		Standardized Coefficients		
	B	**Std. Error**	***Beta***	***t***	***p***
(Constant)	1.981	.138		14.323	.001
Agricultural teaching workshop use	.392	.047	.457	8.395	.001

The regression analysis shows that the use of agricultural workshops in TVET institutions in western Kenya by agricultural trainees had a statistical significant (β=.457, *t*=22.33, *p* <.001) positive effect on the acquisition of agricultural skills.

The effect of the use of workshops by TVET trainees in the acquisition of agricultural skills was found to be positive, that the higher the use of the workshops the higher was the level of skill acquisition. The finding of Aleru and Lazarus (2021) in River's state Southern Nigeria is in agreement with the finding of this study; where they found out that the use of agricultural education workshops enhanced student's hands-on-experience in the use of mechanized technologies, improved student skills in construction and installation of agricultural indigenous mechanized tools, and provided them with the required skills in maintenance of farm equipment and experience in industrial workshop activities.

Adequate working space within the facility for effective practical sessions is factor that can affect the TVET programmes. Othoo *et al*. (2022), in a study on adequacy of workshop space among TVET institutions in Kenya realized a varied score which averaged (*M*=2.65, *SD*=1.34) indicating that in some institutions the space was inadequate, though in others it was adequate. This could have a negative effect on the learning of agriculture (Aholi *et al.,* 2018).

4.5 Challenges Affecting the Effective Use of Agricultural Teaching Workshops

The qualitative component of the study sought to identify challenges that affected the effective use of agricultural teaching workshops. Information obtained from the 28 tutors identified four major challenges. The most severe challenge was lack or inadequate numbers of workshop implements and equipment (*M* = 4.64, SD = .487). This was followed by lack of staff with expert knowledge in the maintenance of workshop machinery and equipment (*M* = 2.42, SD = .920). Few workshop benches for students to undertake practical activities recorded a mean of 1.46 (SD = .507), while lack of charts was rated as the least severe challenge (*M* = 1.39, SD = .497).

Table 9

Challenges Affecting Effective Use of Agricultural Teaching Workshops

	Statement on the level of challenge in Effective use of workshops	**Instructors Rating in terms of the level of challenge**		
No		**Total**	**Mean**	**Std. Dev**
1	Lack or few workshop implements and equipment	130	4.64	.487
2	Lack of staff with expert knowledge on the maintenance of the machinery and equipment in the workshop	68	2.42	.920
3	Few workshop benches for students to perform their experiments or innovate	41	1.46	.507
4	Lack of charts	39	1.39	.497

The findings indicate that the availability of adequate workshop equipment is an important challenge to effective practical training. This finding is consistent with Twenter and Edwards (2017), who reported that inadequate agricultural mechanical workshop spaces can affect agricultural skill acquisition despite the importance of such facilities in enabling students to learn, apply and develop knowledge, attitudes and practical skills.

V. CONCLUSION & RECOMMENDATIONS

5.1 Conclusion

The study concluded that the use of agricultural teaching workshops among Certificate in Agriculture trainees in technical institutions in Western Kenya was at a medium level (*M* = 2.94, SD = .29) on a scale of 0–5. Agricultural teaching workshop use had a statistically significant positive association with agricultural skill acquisition among the trainees (β = .457, *t* = 8.395, *p* < .001). The study therefore rejected the null hypothesis and concluded that higher use of agricultural teaching workshops was associated with higher levels of agricultural skill acquisition.

The finding demonstrates the importance of practical exposure and effective use of agricultural teaching workshops in developing the practical competencies required by Certificate in Agriculture trainees.

5.2 Recommendations

Based on the findings of the study, there is need to increase the time spent on practical to allow increased use of the teaching resources for the transfer of skills by certificate in agriculture trainees in TVET institutions in western Kenya. The curriculum could be reviewed to enhance the increase in the use of these practical teaching resources and facilities. This can be complemented with acquisition and use of electronic technology in the use of the teaching resources to enhance the effectiveness of skill transfer to the Certificate in Agriculture trainees in TVET institutions in western Kenya.

5.3 Future Research

Future research should consider an expanded scope that includes more agricultural teaching resources and materials than the workshops covered in this study.

Declaration of Interest

The authors declare that they do not have any known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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