



SKILLS REQUIRED BY AGRICULTURAL EDUCATION STUDENTS FOR SUCCESSFUL OPERATION OF FARM WORKSHOPS IN RIVERS STATE TERTIARY INSTITUTIONS

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ABSTRACT: *The study investigated the skills required by agricultural education students for the successful operation of farm workshops in Rivers State Tertiary Institutions. The purpose of the study was to determine the mechanization, management, and crop and soil operation skill required by agricultural education students for the successful operation of farm workshops in Rivers State Tertiary Institutions. The study adopted a descriptive survey research design. The population of the study was all farm workshop technicians and agricultural education lecturers in the tertiary institutions in Rivers State. Due to the fact that the population was manageable, the study engaged all the population in the study. That is, census sampling was used. The instrument used in this study was a self-structured questionnaire. The instrument was validated by experts, the instrument was also tested for reliability using Kuder Richardson-20, which yielded a coefficient index of 0.89. The data collected through this instrument was analyzed using mean and standard deviation. The hypotheses were tested using a t-test at a 0.05 level of significance. Findings showed the ability to operate tractors properly, ability to fix farm implements on the power take-off shaft, ability to maintain workshop tools and machines, ability to observe tool and machine maintenance and care, communication and human relationship skills, ability to process local crops, ability to use farm machine for crop management activities among others are farm workshop skill required for the successful operation of agricultural workshops. It was recommended that the agricultural education curriculum should include students' workshop practice for students to properly acquire mechanization skills during their academic program.*

KEYWORDS: Skills, Agricultural, Education, Successful, Operation Farm, Workshops.

INTRODUCTION

Over the years' agricultural education has been a tool for sustainable agricultural productivity and innovation in the modern economy, especially in developing countries. Agricultural education is considered one instrument for developing human resources and improving rural livelihoods. Describing agricultural education, Osinem in Amadi and Nnodim (2018) noted that agricultural education is a process of imparting knowledge, skills, and attitudes in agriculture to the learner at any level through hands on experience and guidance to prepare students for entry-level jobs. In the view of Arokoyu and Ndeobi (2016), agricultural education is seen as the type of education that provides learners with the personal academic and career experience and competencies required for participation and entrepreneurship in Agriculture. It is therefore worthy to conclude that agricultural education is a system designed to equip learners with knowledge of agriculture so as to enable them to become producers of food and impart the skills to others.



The potentials of the agricultural education program are far-fetched especially in the sustainability of food security and encouraging agricultural innovations among rural farmers. This is essential because agricultural education programs enhance the improvement of traditional agriculture and concentrate on the training of essential skills that are crucial to the success of people entering a career in agriculture (Cajethan & Benardine, 2015). According to Amadi and Blessing (2016) encouraging youth and adults for agricultural education programs is one unique medium of meeting the challenges of food insecurity, poverty, and unemployment which has posed threats to corporate existence and stability. This is because it will equip graduates with the pre-requisite knowledge and skills needed to create jobs or fit into created jobs for their personal development and the nation at large. Having realized that a nation can scarcely succeed without making appropriate provision for food security, the Federal Government of Nigeria (2004) posited that agricultural education should be offered at all levels of education. The essence of this is to equip students with vital skills, principles, and knowledge involved in the production of food for the nation.

There are various skills in the agricultural education program that learners could acquire during the course of the program. Amadi and Nnodim (2018), Amadi and Allison (2017) correspondingly noted that cultivation of food crops, cash crops, bee farming, fish farming, processing of crops, production of livestock such as poultry, swine, cattle, rabbit, sheep, goat, among others are entrepreneurial skills that could be acquired in agricultural education program in tertiary institutions. Osinem (N.D) stated that agricultural education is capable of equipping students with skills such as skills in poultry, pest control, crop production, rabbit production, pig production, land/soil management practices, landscaping, and agribusiness. However, many authors fail to enlist that farm workshop skill is among the skills that are acquirable in agricultural education.

Farm workshop skills refer to competencies required to carry out farm workshop activities. According to Gramme in Amadi & Raji (2019), a farm workshop is a central point in the farm, set aside for the repair and maintenance of machines, implements, and structures. It is a place where farm tools, equipment, spare parts are orderly preserved for farm work (Amadi & Raji, 2019). They further noted that farm workshop embraces diverse kinds of agricultural works such as processing of agricultural produce, metal workshop, wood workshop, maintenance and repairs of farm implements, fabrication of indigenous agricultural equipment among others. Therefore, there is a need for agricultural education graduates to acquire appropriate skills to carry out farm workshop activities.

It is acceptable fact that farm workshop activities cannot be carried out without necessary farm tools and machinery. Farm workshop is operational with tools and equipment such as compressor, tractors, toolbox, drill press among others. In the study Amadi & Raji (2019), it was indicated through findings that chop saw, compressor, drill press, workbench, angle grinder, welder, bolt bins, hydraulic press, hand tools such as chisel screwdrivers, tee square e.t.c, saw, planes, grinding and sharpening angles, lathe machine, spark plug gauge, battery hydrometer, power timing light, engine analyzer, valve seat grinder, radiator, cap tester, valve spring compressor, cylinder ridge reamer, piston ring expander, and piston ring compressor are essential to machines in farm workshops. Graduates of agricultural education should be able to operate, maintain and also carry out simple repairmen in the machine.



Burkybile, Johnson, Lee, and Shelhamer (2005) noted that among the technical or mechanization skill required for the optimum practice of farm workshop activities are the ability to be able to service the battery, measure engine horsepower, assemble and set up a planter, remove and install a multicylinder engine, rebuild a multicylinder engine, tune-up a spark-ignition engine, measure crankshaft wear, change hydraulic fluid and filters, troubleshoot steering problems, diagnose poor engine performance and so on. They pinpointed that the development of these skills is so necessary to be obtained in tertiary institutions of learning but could be gradually be inculcated to learners starting from high school. In other to encourage entrepreneurship development in the field of agricultural workshops, it is essential to expose students to specialized training in agricultural power and technology. A graduate of agricultural education should possess skills and ability in the operation of tractors and farm implements, this competence will enable them to improve in their production capacity.

Likewise, in order to properly manage a farm workshop establishment, there are certain human relation, control, and management skill that needs to be acquired. The successful operation of the farm workshop does not only depend on the technical expertise of the manager but also requires a lot of management abilities. This is because the farm workshop enterprise cannot exist in isolation but will have a great deal with people and machines. It is in this wise that Burkybile et al. (2005) noted that farm workshop manager has to possess the ability to; greet people, introduce people to each other, shake hands properly, communicate effectively, think critically, train others, working without close supervision, maintain safety and work ethics, ensure proper general maintenance of tools and machinery.

According to Amadi and Solomon (2020), the outcome indicators of the agricultural education program is the extent to which learners are able to demonstrate skills for soil, crop, and livestock production. However, in the production of crop and livestock, so many activities are shrouded in the effective planting, harvesting, marketing, and processing of these agricultural products. Farm workshop enables the utilization of agricultural technology to carry out many of agricultural production processes. Agro-modern technology generation is to develop better techniques of land development, crop and animal management and achieve higher yields (Okon, 2008; Amadi & Okagwa, 2020; Nnodim & Raji, 2020). In the same vein, Amadi and Okagwa (2020) also noted that the application of mechanical, chemical, and biological inputs such as tractors, fertilizers, agro-chemicals, storage, and processing facilities improve food production. These production improving facilities are what Amadi and Raji (2019) enlisted as vital equipment needed for the effective operation of the workshop. Therefore, for the operation of farm workshop, the technician should be able to possess the ability to utilize farm machine for packaging of processed crops, ability to use farm machines for planting operation, ability to process local crops and use farm machines for essential pre-planting, planting and post-planting operations such as ploughing, harrowing, planting, weeding and harvesting.

Over the years, there has been an outcry of joblessness and unemployment not only among agricultural education graduates but also among other tertiary education graduates. For the purpose of amending this problem, many tertiary institutions tend to have imbibed the culture of introducing students to entrepreneurship training in line with their course of study. To inculcate entrepreneurship training in agricultural education is the major driver of this study.



The objective of the study

The purpose of the study is to determine the skills required by agricultural education students for the successful operation of farm workshops in Rivers State tertiary institutions. In specific terms, the study sought to determine;

1. mechanization skills required by agricultural education students for the successful operation of farm workshops in Rivers State tertiary institutions.
2. management skills required by agricultural education students for the successful operation of farm workshops in Rivers State tertiary institutions.
3. crop and soil operation skills required by agricultural education students for the successful operation of farm workshops in Rivers State tertiary institutions.

Research Questions

The following research questions guided the study

1. What are the mechanization skills required by agricultural education students for the successful operation of farm workshops in Rivers State tertiary institutions?
2. What are the management skills required by agricultural education students for the successful operation of farm workshops in Rivers State tertiary institutions?
3. What are the **Crop and soil operation** skills required by agricultural education students for the successful operation of farm workshops in Rivers State tertiary institutions?

Hypotheses

1. There is no significant difference in the mean responses of workshop technicians and agricultural education lecturers on mechanization skills required by agricultural education students for the successful operation of farm workshops in Rivers State tertiary institutions.
2. There is no significant difference in the mean responses of workshop technicians and agricultural education lecturers on management skills required by agricultural education students for the successful operation of farm workshops in Rivers State tertiary institutions.
3. There is no significant difference in the mean responses of workshop technicians and agricultural education lecturers on crop and soil operations skills required by agricultural education students for the successful operation of farm workshops in Rivers State tertiary institutions.



METHODOLOGY

The study was carried out in Rivers State. Rivers state is one of the thirty-six states of Nigeria that is notable for massive oil exploration activities. Consequently, mechanization and technical related profession is a booming sector in the area. The study adopted a descriptive survey research design. The population of the study was all farm workshop technicians and agricultural education lecturers in the tertiary institutions in Rivers State. According to departmental records (2020), it was found that there are 28 agricultural education lecturers and 13 farm workshop technicians in Rivers State tertiary institutions. Due to the fact that the population was manageable, the study engaged all the population in the study. That is, census sampling was used.

The instrument used in this study was a self-structured questionnaire which was titled "Skills Required by Agricultural Education Students for the operation of farm workshop". The instrument for data collection was designed in a four-point rating scale of highly Needed (4), Needed (3), Rarely Needed (2), Not Needed (1). The instrument was subjected to face and content validity by giving copies of the instrument to two experts in the agricultural mechanization field. The instrument was tested for reliability using Kuder Richardson-20, which yielded a coefficient index of 0.89. This index rate attested that the instrument for data collection is reliable. The data collected through this instrument was analyzed using mean and standard deviation. The hypotheses were tested using a t-test at a 0.05 level of significance.

RESULTS

Research Question 1: What are the mechanization skills required by agricultural education students for the successful operation of farm workshops in Rivers State tertiary institutions?

Table 1: Mechanization skills required by agricultural education students for the successful operation of farm workshops in Rivers State tertiary institutions.

S/N	Items	Workshop Technicians= 13		Agric. Edu. Lecturers= 28		t-test		
		Mean	S.D	Mean	S.D	t-crit	t-cal	R/mrk
1	Ability to operate tractors properly	3.67	0.43	3.84	0.54	1.96	0.99	NS
2	Ability to fix farm implements on the power take-off shaft	3.83	0.30	3.70	0.62	1.96	0.70	NS
3	Ability to maintain workshop tools and machines	3.02	0.62	3.56	0.70	1.96	2.38	S
4	Ability to operate essential farm engines	3.52	0.41	3.66	0.62	1.96	0.74	NS
5	Ability to use electronic test equipment	2.56	0.89	2.50	1.03	1.96	0.18	NS
6	Ability to service battery	3.67	0.92	3.02	0.77	1.96	2.37	NS
7	Ability to measure engine horsepower	3.30	0.84	2.54	0.93	1.96	2.51	NS



8	Ability to remove and install a multi-cylinder engine	2.64	1.08	2.64	0.92	1.96	0.31	NS
9	Ability to change hydraulic fluid and filters	3.01	0.82	3.45	0.79	1.96	1.64	NS
10	Turn up a spark-ignition engine	3.74	0.43	3.21	1.00	1.96	1.82	NS
11	Ability to perform engine troubleshoot	2.89	0.53	2.91	1.12	1.96	0.06	NS
12	Ability to diagnose poor engine performance	3.54	0.62	3.08	0.64	1.96	2.16	S
13	Ability to observe proper safety rules	3.84	0.73	3.73	0.56	1.96	0.53	NS
14	Ability to recognize the functions of each farm workshop tools	3.43	0.82	3.93	0.33	1.96	2.80	S
15	Understand simple farm machine principles	3.52	0.60	3.66	0.46	1.96	0.89	NS
16	Ability to carry out engine servicing procedures	3.64	0.52	3.54	0.84	1.96	0.39	NS

Field Survey, 2020 NS- not significant; S-Significant

Table 1 mechanization skills required by agricultural education students for the successful operation of farm workshops in Rivers State tertiary institutions. The mean of the item revealed that farm workshop technicians and agricultural education lecturers agreed that ability to operate tractors properly (3.67 & 3.84), ability to fix farm implements on the power take off shaft (3.83 & 3.70), ability to maintain workshop tools and machines (3.02 & 3.56), ability to operate essential farm engines (3.52 & 3.66), ability to use electronic test equipment (2.56 & 2.50), ability to service battery (3.67 & 3.02), ability to measure engine horsepower (3.30 & 2.54), ability to remove and install a multi-cylinder engine (2.64 & 2.64), ability to change hydraulic fluid and filters (3.01 & 3.45), turn up a spark ignition engine (3.74 & 3.21), ability to perform engine troubleshoot (2.89 & 2.91), ability to diagnose poor engine performance (3.54 & 3.08), ability to observe proper safety rules (3.84 & 3.73), ability to recognize the functions of each farm workshop tools (3.43 & 3.93), understand simple farm machine principles (3.52 & 3.66), ability to carry out engine servicing procedures (3.64 & 3.54) are mechanization skills required by agricultural education students for successful operation of farm workshops in Rivers State tertiary institutions. The findings also revealed that the difference in the mean of both groups of respondents on each of the items is not significant except that of items 3, 12, and 14. This hence suggested the uniformity of the respondents' opinions on the research question.

This finding is in collaboration with Amadi and Raji (2019) who stated that farm workshop embraces diverse kinds of agricultural works such as processing of agricultural produce, metal workshop, wood workshop, maintenance and repairs of farm implements, fabrication of indigenous agricultural equipment among others, therefore agricultural education students are expected to be skillful in these areas so as to enable them to be fit for farm workshop activities. Also, Burkybile et al. (2005) noted that among the technical or mechanization skill required



for the optimum practice of farm workshop activities are the ability to be able to service the battery, measure engine horsepower, assemble and set up a planter.

Research Question 2: What are the management skills required by agricultural education students for the successful operation of farm workshops in Rivers State tertiary institutions?

Table 2: Management skills required by agricultural education students for the successful operation of farm workshops in Rivers State tertiary institutions

S/N	Items	Workshop Technicians=13		Agric. Edu. Lecturers=28		t-test		R/mrk
		Mean	S.D	Mean	S.D	t-crit	t-cal	
17	Ability to manage waste	3.10	0.91	2.83	1.04	1.96	0.80	NS
18	Ability to observe workers safety practice	3.62	0.63	3.02	0.81	1.96	2.36	S
19	Ability to train workers	3.30	0.83	3.71	0.52	1.96	1.93	NS
20	Ability to observe tool and machine maintenance and care	3.21	0.71	3.60	0.40	1.96	2.25	S
21	Proper tool arrangement and storage	3.52	0.65	3.31	0.68	1.96	0.93	NS
22	Ability to perform general maintenance	3.62	0.49	3.37	0.64	1.96	1.25	NS
23	Ensure proper sanitation	3.21	0.92	3.81	0.43	1.96	2.87	S
24	Ability to keep proper farm workshop records	3.69	0.73	3.27	0.72	1.96	1.73	NS
25	Communication and human relationship skills	3.72	0.67	3.19	0.84	1.96	2.00	S

Field Survey, 2020 NS- not significant; S-Significant

Table 2 presents respondents' opinions on the management skills required by agricultural education students for the successful operation of farm workshops in Rivers State tertiary institutions. The mean of the items showed that ability to manage waste (3.10 & 2.83), ability to observe workers safety practice (3.62 & 3.02), ability to train of workers (3.30 & 3.71), ability to observe tool and machine maintenance and care (3.21 & 3.60), proper tool arrangement and storage (3.52 & 3.31), ability to perform general maintenance (3.62 & 3.37), ensure proper sanitation (3.21 & 3.81), ability to keep proper farm workshop records (3.69 & 3.27), communication and human relationship skills (3.72 & 3.19). The null hypothesis tested on the items showed that items 17, 19, 21, 22, and 24 were accepted while items 18, 20, 23 & 25 were rejected. The finding is in line with Burkybile et al. (2005) who wrote that farm workshop manager has to possess the ability to; greet people, introduce people to each other, shake hands properly, communicate effectively, think critically, train others, working without close supervision, maintain safety and work ethics, ensure proper general maintenance of tools and machinery.



Research Question 3: What are the crop and soil operation skills required by agricultural education students for the successful operation of farm workshops in Rivers State tertiary institutions?

Table 3: Machine or tool operation skills required by agricultural education students for the successful operation of farm workshops in Rivers State tertiary institutions

S/N	Items	Workshop Technicians=13		Agric. Edu. Lecturers=28		t-test		
		Mean	S.D	Mean	S.D	t-crit	t-cal	R/mrk
26	Ability to process local crops	4.00	0.00	3.79	0.51	2.02	1.47	NS
27	Ability to utilize the machine for crop harvesting	3.82	0.32	3.51	0.49	2.02	2.07	S
28	Ability to use farm machines for planting operation	3.89	0.48	3.42	0.43	2.02	3.14	S
29	Ability to use farm implement for soil tillage	3.72	0.65	3.50	0.56	2.02	1.11	NS
30	Ability to use farm machine for crop management activities	3.69	0.82	3.12	0.70	2.02	2.29	S
31	Ability to utilize farm machine for packaging of processed crops	3.60	0.69	3.87	0.42	2.02	1.55	NS

Field Survey, 2020.

Table 3 presents the respondents' opinions on crop and soil operation skills required by agricultural education students for the successful operation of farm workshops in Rivers State tertiary institutions. Findings revealed that the ability to process local crops (4.00 & 3.79), ability to utilize the machine for crop harvesting (3.82 & 3.51), ability to use farm machines for planting operation (3.89 & 3.42), ability to use farm implements for soil tillage (3.72 & 3.50), ability to use farm machine for crop management activities (3.69 & 3.12), ability to utilize farm machine for packaging of processed crops (3.60 & 3.87). The null hypothesis carried out on each of the items shows that items 26, 29, and 31 were accepted whereas items 27, 28 & 30 were rejected. Meanwhile, the rejection of the item doesn't imply a contradiction in the opinion of the respondents. These findings are in line with Amadi and Raji (2019) who stated that operators of farm workshops should be able to possess the ability to utilize farm machine for packaging of processed crops, ability to use farm machines for planting operation, ability to process local crops and use farm machines for essential pre-planting, planting and post-planting operations such as ploughing, harrowing, planting, weeding and harvesting.



CONCLUSION

The study concluded that ability to fix farm implements on the power take-off shaft, ability to operate tractors properly, ability to maintain workshop tools and machines, ability to observe workers' safety practice, ability to train workers, ability to process local crops, ability to utilize the machines for crop harvesting, ability to use farm machines for planting operation among others are skills needed by agricultural education graduates for the effective operation of farm workshop.

RECOMMENDATIONS

The study recommended that

- The acquisition of skills for farm machine operation should be involved in the agricultural education curriculum so as to equip students with farm workshop skills.
- Time should be allocated for agricultural education students to go to farm workshops to learn farm machine operations and maintaining this may imbibe workshop entrepreneurship mind in students.
- The government should equip farm workshops in Rivers State with sophisticated agro technologies so as to motivate students to venture into agricultural workshop training.

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