



Teachers' and Students' Perception on Functionality and Frequency of Equipment Utilization for Practical Agriculture in Colleges of Education in North-East, Nigeria

Abdulmumini Umar, Abubakar Shehu Umar, Abdullahi Usman, and Muazu Mohd.
Department of Agricultural Education,
Federal Collage of Education (Tech.) Gombe, Gombe State

ABSTRACT

The Decline in academic performance, and lack of necessary skills and farming techniques among agricultural education graduates, may be attributed to the inability of the students to frequently utilized functional equipment in teaching and learning agriculture in schools, functionality and utilization of equipment for teaching practical agriculture has not been determined in the study area This study was carried out to determine the functionality and frequency of utilization of equipment for teaching practical Agriculture in federal colleges of education in the north east zone of Nigeria. The survey research design was adopted for the study, two research hypotheses were formulated to guide the study, the population of the study comprised of 1, 038 NCE I and NCE II agricultural education students and their teachers in three federal colleges of education in the north east zone of Nigeria. A sample size of 363 respondents (72 teachers and 291 students) was used for the study. The instrument used for data collection was a structured questionnaire which was designed by the researchers based on the list of equipment provided in the minimum standard curriculum, the instrument was subjected to face and content validity by three experts and the reliability of the instrument was established by trial testing, a reliability coefficient of 0.81 was obtained using Spearman Brown Step up (Prophecy) formula. Data collected were analyzed using Z test. The finding of the study revealed that 52 % of the equipment for teaching practical agriculture were not utilized by teachers and also 35 % were not functional, the findings also reveal a significant difference between the mean rating of Agricultural education teachers and students on the functionality of equipment for teaching practical Agriculture. Meanwhile there is also a significant difference between the mean rating of Agricultural education teachers and students on the frequency of utilization of equipment for teaching practical Agriculture. The study recommended that colleges should start viable Agricultural projects which can generate funds that can be re-invested in the maintenance of the existing practical equipment for effective Agricultural practical

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INTRODUCTION

Instructional equipment for teaching agriculture are devices, designed specifically to provide ideas, knowledge and skills in order to enrich students experiences in better ways, this can be achieved through availability and utilization

of functional equipment in face to face teaching and learning process (Leohard, 2000), Similarly, Mkpa, (2008) stated that the best idea for enhancing performance is by subjecting the students to manipulating equipment in a practical situations during instruction. This would enable

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the teacher to delivered the intended idea or knowledge meaningfully and effectively to the student, so that the student understands, retain and apply the knowledge or experience acquired to meet the overall educational objectives (Ezegebe, 2013),

Equipment for conducting practical has significance role to play especially in impacting the needed farming skills and techniques, its availability, functionality and utilization is necessary for the implementation of agricultural science curriculum (Onyejemezi, 2009). Functionality and utilization of equipment enhance the rate at which students learn; enable teacher make adequate utilization of teaching times, increase and arouse students' interest and also facilitate the retention of knowledge. (Abdulmumini, *et-al*, 2017). However, Akinfe, Olofinniyi and Fashiku (2014) stated that the use of instructional equipment and materials in teaching process is less stressful for both teacher and students. Functionality of relevant facilities is necessary for effective instructional delivery especially practical classes like Agriculture, and it has always been major concern of Agricultural educators.

There is evidence of decline in academic performance and lack of practical skills among Agricultural education students due to many factors including availability, adequacy as well as utilization of required instructional material including practical equipment. (Abdulmumini, *et-al*, 2017). Equipment for teaching practical agriculture are devices which enable teacher transmitted the required skills, and farming techniques to the student in order to ease the process of teaching and learning. Agricultural or farming skills among youth is capable of reducing poverty and food insecurity as well as malnutrition (FAO 2019). Akanbi (2004) stated that equipment for practical Agriculture must be available and functional; it should also be designed to ease the teaching and learning processes and contribute to better learning.

Teaching agricultural subject needs focus on practical skills development at various stage of educational system, such skills must be develop at school level for inculcating of innovation, techniques and knowledge to address the challenges of food insecurity, malnutrition and

poverty among youth especially in developing countries (IFPRI 2006). Agriculture as a subject require practical oriented teaching strategies using equipment which result into transmission of required skills for development of mind toward food security (Njura, Kaberia & Taaliu, 2020) Farming skills encompass various aspects of agricultural production, food accessibility and security, food safety as well as nutrition (FAO 2008). Despite the availability of agricultural education teachers, teaching the subject at various level of educational system the students are faced with challenges of applying the skills needed to produced or secure enough food the present and next generation (Njura, Kaberia & Taaliu, 2020)

Agricultural education student needs to be guaranteed the functionality of adequate equipment; farm space, farm structures and all institutions offering Agriculture should have a farm, horticultural garden, animal production unit as well as crop production unit (NCCE, 2012). However, some institutions have no adequate and recommended materials for the effective teaching of Agricultural science, the needed materials have to be supplied (William, 2004)

According to National Commission for College of Education (NCCE, 2012) any institution offering Agricultural education at NCE level should provide adequate classroom, two standard laboratory for crop/soil science and for livestock studies which should be adequately equip with fictional facilities like tractor and its couple implement such as plough, harrow, ridger are also necessary. School farm should consist of mechanical tools workshop, livestock unit. Fishpond, individual student plot, and Experimental plot for research, crop farm and facilities for bee keeping. For NCE Agricultural education programme school farm should consist of adequate space for arable crop, horticultural guarding, orchard containing assorted fruit tree and permanent crop plantation and the equipment should consist of Nursery tools, Metrological tools and equipment, Survey equipment, Farm machineries, Fishery equipment, Food processing equipment and animal equipment, all these equipment should be provided at a ratio of 1:15 per student practical (NCCE, 2012). In view of this, there is no much research is available to



determine the availability, adequacy, functionality and frequency of utilization of this equipment in these colleges of education

Decline in academic performance and lack of necessary skills and farming techniques among Agricultural education students and graduates may be attributed to inability of students to identify, operate, manipulate and maintain agricultural equipment for practical. This means that Agricultural education students are not receiving proper attention as regard to practical Agriculture for the acquisition of competency in practical agriculture. It is also observed that graduate of NCE Agricultural education lack the needed skills to operate simple farm equipment such as sprayer for insect control, incubator for hatching of eggs, castrator for castration of farm animal. Similarly, Audu (2010) stated that many of the NCE graduates do not have the opportunity to make use of equipment and tools for agricultural practical especially when they were in school, they graduate without required practical experience. It was observed that the major teaching approaches used by teachers to teach the students are theoretical instead of being pragmatic. Therefore, if this situation is allowed to continue the NCCE objectives of equipping the students with adequate knowledge, attitude and skills to establish and manage farm would not be achieved

Teaching of practical subjects like Agriculture has degenerated into a theoretical exercise with emphasis continuing to be placed on only academic performance. Academic performance of Agricultural education students in Nigerian collages of education is always in declining (Abdulmumini et al, 2017) as Agricultural education students cannot be able to perform simple farm operation such as budding, grafting, castration and other activities that has to do with both crop and animal production This is because student's enrolment in to Agricultural education program is increasing annually and there is no proper and adequate arrangement as to ensure adequacy, functionality and effective utilization of practical equipment. It's in view of this the researchers investigated the functionality and frequency of utilization of equipment for teaching practical agriculture in Federal Colleges of Education in the North East Zone of Nigeria.

Research Objectives

The objectives of the research are to determine the

- 1- functionality of equipment for teaching practical Agriculture in Colleges of Education
- 2- frequency of utilization of equipment for teaching Practical Agriculture in Colleges of Education

Research Questions

1. How functional are equipment for teaching practical agriculture in Colleges of Education?
2. How frequently are agricultural equipment used for teaching practical agriculture in Colleges of Education?

Research Hypotheses

Ho1. There is no significant difference between the mean rating of Agricultural education teachers and students on the functionality of equipment for teaching practical Agriculture

Ho2. There is no significant difference between the mean rating of Agricultural education teachers and students on the frequency of usage of equipment for teaching practical Agriculture

METHODOLOGY

The research design was survey study which is a study that deals with both large and small population by selecting and studying sample chosen from the population to discover the relative incidence, distribution and interrelationship of sociological and psychological variables using questionnaire and interview (Toluhi, 2001). The target population of this study composed all students of National Certificate in Education (NCE) 1, and NCE 11 Agricultural Education students and teachers in the department of Agricultural Education in the three Federal Colleges of Education in north eastern Nigeria. The colleges include Federal Collages of Education (FCE) Gombe having a total number of 611 respondents, FCE (T) Potiskum 280 respondent and FCE Yola with 148 respondents, making a population size of 1039 students and teachers for 2018/2019 academic session. The reason for the use of NCE 1 and 11 is because it's at that level students are subjected to real



practical activities in respect of courses (AGE 218 and AGE 117).

A sample size of 363 respondents was used for the study, the sample was obtained through purposive sampling and proportionate stratified random sampling, purposive sampling was used to obtain all the 72 Agricultural education teachers, and this is due to the fact that the whole population of teachers is manageable. For students, a sample size of 291 students was randomly selected using proportionate stratified random sampling, where the number of groups within the population may not be the same and a simple random sampling would probably not reflect the correct population (Abdussalami, 2005). This is because there are three colleges from different state having different population, for each of these colleges to be represented, stratified random sampling was used, the Colleges were grouped in to three strata namely Gombe, Potiskum and Yola, Agricultural Education Students were selected from each stratum using simple random sampling, the selection of sample from each stratum was proportional to the number of population The sample size were determined using percentage where 30% of the population for

each strata were obtained as sample size. The instrument for collecting data for the study was structured questionnaire which was developed by the researcher. The questionnaire consists of 78 items, the items were generated based on the new NCCE minimum standard curriculum, and it was designed in accordance with the research hypotheses.

Despite the fact that, the items on the instrument are list of equipment, which is standardized and was obtained from the NCCE minimum standard curriculum for Nigerian collage of education, the instrument was still subjected to content and face validity by three experts. The reliability of the instrument was established by trial testing using twenty NCE 1, and 11 Agricultural education students from other collages which are out from the study area. Split halves method of determining reliability was employed, and the scores obtained was correlated, the reliability coefficient of 0.81 was obtained using Spearman Brown Step up (prophecy) formula which yielded reliability. Data collected was analyzed using Z-test to test the two null hypotheses at 0.05 level of significance.

RESULT AND DISCUSSIONS

Table 1: Functionality and Frequency of Utilization of Equipment

Equipment (52)	Frequency	Percentage	Mean	Standard Deviation
Functionality			2.6	0.59
Functional	34	65		
Not functional	18	35		
Utilization			1.99	0.68
Utilized	25	48		
Not utilized	27	52		

Table 1 reveals that 34 equipment representing 65% of the equipment for teaching practical agriculture in colleges of education in the north eastern Nigeria were functional, while 18 equipment representing 35 % of the equipment were not functional. Meanwhile 25 equipment representing 48 % of the equipment for teaching practical agriculture in collages of education in north eastern Nigeria were frequently utilized by

both teachers and students while 27 equipment representing 52 % of the equipment were not frequently utilized by Agricultural education teachers. Agricultural science being a technical and scientific subject (Mohammed, 2013) require manipulations of equipment and other facilities in its teaching, this would help in the reducing negative attitudes of students toward manual labor (Mohammed, 2013)



Table 2: z test table on the mean responses of teachers and students on functionality of equipment for teaching practical agriculture in COE n=363

S/N	Equipment for Teaching practical	n1	n2	mean 1	mean 2	Z cal	Remark
1	water pumping machine	72	290	1.46	1.22	4.00	Rejected
2	seed sower	72	280	1.62	1.38	4.80	Rejected
3	root pruner	72	290	1.48	1.32	4.00	Rejected
4	plant lifter	72	289	1.53	1.37	3.20	Rejected
5	Sprayer	72	289	3.98	3.90	0.26	Accepted
6	flame weeder	72	291	2.52	2.28	1.41	Accepted
7	water spraying machine	72	289	1.62	1.38	3.87	Rejected
8	water spraying sprinkler	72	290	1.59	1.55	0.95	Accepted
9	stevension screen	72	291	1.45	1.25	0.67	Accepted
10	thermo hydrograph	72	291	1.64	1.44	2.00	Rejected
11	max and min thermometer	72	289	3.40	3.20	1.00	Accepted
12	rain guage	72	290	3.62	3.38	0.39	Accepted
13	Anemometer	72	290	2.68	2.44	1.50	Accepted
14	Evaporometer	72	290	2.60	2.36	1.85	Accepted
15	Barometer	72	290	2.48	2.24	1.85	Accepted
16	Hygrometer	72	291	2.62	2.38	1.43	Accepted
17	prismatic compass	72	289	2.34	2.14	1.56	Accepted
18	Theodolite	72	289	3.60	3.40	0.92	Accepted
19	Planimeter	72	290	1.50	1.30	4.80	Rejected
20	Steteoscope	72	290	1.43	1.27	4.62	Rejected
21	functional tractor 1	72	289	3.62	3.38	1.29	Accepted
22	disc plough	72	291	3.56	3.3	1.11	Accepted
23	disc harrow	72	290	3.60	3.40	1.03	Accepted
24	disc ridger	72	290	3.41	3.19	1.24	Accepted
25	4 wheel trailer	72	290	3.47	3.23	2.08	Rejected
26	fertilizer sprayer	72	290	1.38	1.18	4.18	Rejected
27	mould board ridger	72	291	2.12	1.88	4.12	Rejected
28	mould board plough	72	291	2.45	2.23	2.73	Rejected
29	tractor pully	72	291	1.62	1.38	4.72	Rejected
30	seed cleaner	72	289	1.41	1.19	6.36	Rejected
31	seed greader	72	290	1.62	1.46	4.96	Rejected
32	cereal thresher	72	290	2.10	1.90	2.72	Rejected
33	incubator and hatcher	72	290	3.94	3.86	0.30	Accepted
34	egg handler	72	289	3.98	3.70	1.12	Accepted
35	de beaker	72	290	3.61	3.39	1.48	Accepted

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S/N	Equipment for Teaching practical	n1	n2	mean 1	mean 2	Z cal	Remark
36	Vaccinator	72	289	1.51	1.35	3.36	Rejected
37	weight scale	72	290	3.67	3.47	2.16	Rejected
38	inter row weeder	72	290	1.50	1.30	5.78	Rejected
39	fishing boad	72	291	1.60	1.40	3.85	Rejected
40	Sinker	72	291	1.47	1.37	2.72	Rejected
41	gari making machine	72	291	1.50	1.34	4.82	Rejected
42	cassava pelliting machine	72	291	1.32	1.16	2.42	Rejected
43	milling machine	72	290	1.31	1.13	5.86	Rejected
44	maize sheller	72	290	3.50	3.30	0.18	Accepted
45	oil screw press	72	289	1.54	1.36	4.99	Rejected
46	honey extractor	72	289	1.12	0.92	5.75	Rejected
47	surgical kit	72	290	1.13	0.95	0.15	Accepted
48	cattle hoof trmming set	72	291	3.14	2.94	1.40	Accepted
49	Castrator	72	289	3.31	3.15	0.94	Accepted
50	Sterilizer	72	289	1.60	1.40	3.57	Rejected
51	Candler	72	291	3.61	3.37	1.29	Accepted
52	bee keeping equipment	72	290	1.18	0.98	1.29	Accepted
	Grand mean	72	290	2.33	2.13	2.60	Rejected

Critical value = 1.96

Level of significance = 0.05

n1 = number of students

n2 = number of teachers

Mean 1 = mean for students

Mean 2 = mean for teachers

Z- cal = calculated z- value

In table 2 the finding of the study revealed that 28 out of 52 equipment for teaching practical Agriculture in Collages of Educations (COE) had z- calculated value greater than the z- critical value of 1.96. Also, 24 out of 52 equipment for teaching practical Agriculture in COE had the z-calculated value less than z- critical value of 1.96. Thus, the null hypothesis was accepted for 24 equipment. Table 2 also with a Grand mean/z- calculated value of 2.60 revealed that there is significant difference between the mean rating of Agricultural education teachers and students on the functionality of equipment for teaching practical Agriculture since

Therefore, the study reveals a significance difference between the mean responses of Agricultural education teachers and

students on functionality of 28 equipment for teaching practical Agriculture in COE, this is in line with the findings of Ukwetura (2012) who stated that there was significance difference between the mean responses of Agricultural science Teachers and students on the functionality on same identified equipment for practical agriculture. Meanwhile, 24 equipment had the z-calculated value less than the critical value of 1.96 therefore there was no significance difference between the mean responses of Agricultural education teachers and students on functionality of 24 equipment for teaching practical Agriculture in COE in the North east zone of Nigeria. Thus, the null hypothesis was accepted for 24 equipment and rejected for 28 equipment. This is also in line with the findings of Odebode (2000) who stated



that there was no significance difference in the functionality of equipment for teaching practical between urban and rural schools.

Table 3; z- test responses of teachers and students on frequency of utilization of equipment for teaching practical agriculture in COE n= 363

S/N	Equipment for Teaching practical	n1	n2	mean 1	mean 2	Z cal	Remark
1	water pumping machine	72	291	1.50	1.30	4.65	Rejected
2	seed sower	72	290	1.53	1.33	2.63	Rejected
3	root pruner	72	291	1.40	1.20	3.57	Rejected
4	plant lifter	72	289	1.53	1.33	3.51	Rejected
5	Sprayer	72	290	1.65	1.45	0.80	Accepted
6	flame weeder	72	290	2.50	1.30	6.16	Rejected
7	water spraying machine	72	290	1.55	1.35	1.41	Accepted
8	water spraying sprinkler	72	290	1.59	1.39	1.44	Accepted
9	Stevenson screen	72	289	1.40	1.20	1.81	Accepted
10	thermo hydrograph	72	290	1.55	1.35	1.03	Accepted
11	max and min thermometer	72	289	3.50	2.30	4.44	Rejected
12	rain guage	72	289	2.60	1.40	3.69	Rejected
13	Anemometer	72	291	1.44	1.24	0.78	Accepted
14	Everporometer	72	291	1.58	1.38	1.28	Accepted
15	Barometer	72	291	1.70	1.50	1.18	Accepted
16	Hygrometer	72	291	2.10	1.90	1.05	Accepted
17	prismatic compass	72	288	2.15	1.95	1.01	Accepted
18	Theodolite	72	290	2.59	1.39	4.62	Rejected
19	Planimeter	72	290	1.50	1.30	1.42	Accepted
20	Steteoscope	72	291	1.58	1.38	2.78	Rejected
21	functional tractor 1	72	289	3.70	3.50	1.18	Accepted
22	disc plough	72	288	3.50	3.30	1.05	Accepted
23	disc harrow	72	290	3.10	2.90	0.71	Accepted
24	disc ridger	72	291	3.15	2.95	0.42	Accepted
25	4 wheel trailer	72	289	2.60	2.40	1.06	Accepted
26	fertilizer sprayer	72	291	1.50	1.30	0.95	Accepted
27	mould board ridger	72	290	1.60	1.40	1.54	Accepted
28	mould board plough	72	288	1.66	1.46	1.25	Accepted
29	tractor pully	72	289	1.59	1.39	0.80	Accepted
30	seed cleaner	72	290	1.40	1.20	1.43	Accepted
31	seed greader	72	289	1.46	1.26	2.22	Rejected
32	cereal thresher	72	291	2.10	1.90	1.25	Accepted

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S/N	Equipment for Teaching practical	n1	n2	mean 1	mean 2	Z cal	Remark
33	incubator and hatcher	72	289	3.10	2.90	0.71	Accepted
34	egg handler	72	291	3.43	3.23	0.91	Accepted
35	de beaker	72	290	3.33	3.13	0.84	Accepted
36	Vaccinator	72	291	2.22	2.02	1.67	Accepted
37	weight scale	72	290	3.26	3.06	1.11	Accepted
38	inter row weeder	72	288	1.45	1.25	2.00	Rejected
39	fishing boad	72	290	1.59	1.39	3.34	Rejected
40	Sinker	72	289	1.46	1.26	1.82	Accepted
41	gari making machine	72	291	1.47	1.27	2.99	Rejected
42	cassava pellinging machine	72	289	1.30	1.10	0.24	Accepted
43	milling machine	72	290	1.45	1.25	1.43	Accepted
44	maize sheller	72	291	1.50	1.30	0.61	Accepted
45	oil screw press	72	289	1.44	1.24	1.25	Accepted
46	honey extractor	72	291	1.30	1.10	2.15	Rejected
47	surgical kit	72	291	1.42	1.22	1.06	Accepted
48	cattle hoof trimming set	72	291	3.58	1.38	0.23	Accepted
49	Castrator	72	291	3.44	1.24	0.83	Accepted
50	Sterilizer	72	291	2.10	1.90	2.78	Rejected
51	Candler	72	291	3.60	1.40	1.29	Accepted
52	bee keeping equipment	72	290	1.36	1.16	4.76	Rejected
	Grand mean	72	290	1.96	3.97	1.99	Rejected

Source: Field Trip 2021

Table 3 revealed that 16 out of 52 equipment for teaching practical Agriculture in COE had calculated z-value higher than the critical value of 1.96 thus, the null hypotheses was rejected for these 16 equipment. Meanwhile, 36 out of 52 equipment for teaching practical Agriculture in COE had the calculated z-value less than the critical value of 1.96. Thus, the null hypothesis was accepted for these 36 equipment.

Table 3 also with a Grand mean/z-calculated value of 1.99 revealed that there is significant difference between the mean rating of Agricultural education teachers and students on the frequency of utilization of equipment for teaching practical Agriculture, therefore the null hypotheses 2 was rejected

Therefore, the study also reveals that there was a significance difference between the mean responses of Agricultural education

teachers and students, on frequency of utilization of sixteen (16) equipment for teaching practical Agriculture in COE. This is contrary to the findings of Ukwetura (2012), who stated that there was no significance difference between the mean responses of Agricultural science Teachers and students on the extent of utilization of same equipment for practical Agriculture

Meanwhile, 36 equipment had the calculated value less than the critical value of 1.96 therefore there was no significance difference between the mean responses of Agricultural education teachers and students on frequency of utilization of 36 equipment for teaching practical Agriculture in COE in the North east zone of Nigeria. This is in line with the findings of Yusuf (2012) who stated that there was no significance difference in the level of utilization of equipment by male and female Teacher



CONCLUSION

Conclusively 35% of the equipment for teaching practical agriculture in colleges of education in the north eastern Nigeria were not functional, while 65 % of the equipment were functional. Meanwhile 52% of the equipment for teaching practical agriculture in colleges of education in north eastern Nigeria were not frequently utilized by teachers. Only 48 of the equipment were utilized by Agricultural education teachers. This indicate that agricultural education teachers are not making use of the available facilities for teaching the subject and many of the teaching equipment as recommended by regulatory bodies in minimum standard curriculum are not fully fictional and utilize by agricultural education teachers, this may be the reason for producing of graduate of agriculture that lack necessary skills to carry out many farming operations using equipment. It is also evidence that most of the teaching is conducted theoretically instead of practically.

RECOMMENDATIONS

1. Colleges should start viable Agricultural projects which can generate funds and such funds can be re-invested in the maintenance of the existing practical equipment for effective functioning during Agricultural practical
2. All stakeholder should ensure a good policy that would make it necessary for Agricultural education teachers make use of agricultural equipment and materials in conducting practical
3. Departments offering Agricultural education program should look beyond funds from the proprietors and authorities of Colleges of Education through sponsorship and partnership with industries, non-governmental organizations, philanthropists and international donors for assistance in terms of adequacy and functionality of practical equipment.
4. Agricultural education departments should regularly appraise and review the status of their instructional equipment vis-a-vis the students'

enrolment in their program to enable them adjust where needed

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