IMPACT OF TECHNICAL/SUPPORT STAFF IN THE EFFECTIVE TEACHING AND LEARNING OF AGRICULTURAL SCIENCE IN SECONDARY SCHOOLS IN NIGERIA

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Abstract

The study adopted quasi-experimental research design whereby intact class which constitute naturally arranged groups of students was used. *It was conducted in Port Harcourt Rivers State. The population for the study was 100 JSS II students of Newlife Baptist School a private school and Community Secondary School Mgbuosimini a public school in Agip, Port Harcourt, Obio/Akpor Local Government Area, Rivers State. Simple random sampling was used to select the students into treatment and control groups. The instrument for data collection was a Teacher-Made Achievement Test (TMAT) which was developed by the researchers and validated by three experts from University of Nigeria Nsukka. It consisted of 20-items.* The data collected for the study was analyzed using Mean to answer the research questions while the hypothesis was tested at 0.5 level of significance using Analysis of Co-variance (ANCOVA) while the pretest was used as covariate. In using the mean, the data collected from the administration of pretest and posttest were analyzed. The pre-test, post-test mean gain of each of the treatment and control group were computed to determine students' achievement in soil profile. *The result reveals that the use of technical/support staff had a positive impact in the effective teaching and learning of agricultural science in secondary schools in Port Harcourt, Rivers State and thus it should be encouraged. It was therefore recommended that the government and private school owners should provide all the needed facilities and enabling environment for practical excises including the engagement of a technical support staff for effective teaching of agricultural sciences.*
Key Words: Technical/Support staff, Effective Teaching, Learning, Agricultural Science.

Introduction

Before independence, not too many government secondary schools offered rural science as one of the school subjects. A mode of agriculture was concentrated more in elementary schools as the colonial educator felt that students should be given bas foundation for the secondary level of education. Agriculture was preserved basically for higher institutions, visa-vis, schools of agriculture and the universities (Umoh & Etuk, 2003). Not minding the situation, with the introduction of the Advanced Teacher Colleges (ATCs), the educational policy makers realized that Agriculture could be very vital in the secondary school curriculum. In order for its implementation, well trained agriculture teachers were needed. The ATCs were now given this responsibility. Subsequently, Agriculture was made a core subject in the secondary school curriculum at the emergence of the 6-3-3-4 system of education (both in the Junior and Senior Secondary school curriculum).

The underlying objective as documented by (Okorie, 2001), states as follows: To stimulate and sustain students' interest in agriculture, to enable students acquire basic knowledge and practical skills in agriculture, to enable students integrate knowledge with skills in agriculture, to prepare students for further studies in agriculture, to prepare and expose students to occupations and opportunities in the field of agriculture.

In the implementation of the curriculum, learning by doing is emphasized, so that the students would be able to produce food and other agricultural products for themselves and the society at large.

The emphasis above confirms the social learning theory that says that "learning occurs in a social milieu where the learner observes others, identifies with them, imitates their actions or behaviours and eventually reproduce what he has seen others do" (Ngwoke, 2010). For proper implementation, most of their learning were to be done to make them have improved skills in the psychomotor domain. According to Esu, (2009),'The Nigerian society needed a more pragmatic, dynamic, and job oriented curriculum which should be seen as the "master key" to individual and group capacity building' hence the above. The intended occupations could be found in the industries, business, agriculture, research and other areas. The workers in these occupations who possess the needed skills in line with the above kind of learning are called technical/support staff who were fully trained in different skills such as in vocational agriculture. These staff are meant to guide others in learning from them what they have been taught.

Practical work forms the basis for preparing students for agriculture and the world of work, but the agricultural science teacher who supposedly has been exposed to all necessary theoretical and vocational training is over burdened with a heavy workload as he has to teach, manage the school farm, give attention to students, carry out action researches and do other duties that may be assigned to him by his superiors thereby, leaving him with little or no time to attend to the practical expected of him for his students. The most unfortunate aspect of this is seeing fresh graduates come out of school who have no initiative of agricultural science practical. Hence, the worries of the researchers were to

probe into the problem and seek a solution by encouraging technical/support staff be brought in to bridge the gap created by helping to enhance the practical skills of the agricultural science students.

The Federal Government had established the National Board for Technical Education (NBTE) by Act 9 of January 1977; in response to the acute shortage of technical manpower which was a major constraint towards the actualization of the Third National Development Plan on Education in 1975-1980.

The NBTE was given a mandate with overseeing the training of, and accreditation of academic programmes in all Technical and Vocational Education (TVE) institutions. These institutions were to train middle-level technical manpower, and providing practical training (NBTE, 2012).

Right now, there are 110, technical institutions in Nigeria, among which are the Colleges of Agriculture. From the information available, almost all of these schools graduate, not less than 70-250 students from the various branches of agriculture annually. This gives an indication that the availability of agricultural technology graduates is guaranteed. Instead of allowing them to room the streets for lack of job or inability to start their own businesses for want of finance/collateral to obtain loans, they could be incorporated into the teaching system to help in reducing the woes of unemployment, insecurity, arm robbery, militancy, insurgency among others, that have taken over the nation (NBTE, 2011). Nonetheless, it is vital to say that a very small percentage of the agricultural technologist get employed by the government and the private sector

and an infinitesimal percentage of them become self-employed, which is the major reason for their training. They might have been linked up to the bank by high profile people in the society or that they are from rich homes, so their parents are able to afford, the initial start-up capital for the business which they may choose. Therefore, engaging them in the teaching profession and making them useful becomes imperative as that will take them off the street.

.   In education, teaching is the concerted sharing of knowledge and experience, which is usually organized within a discipline and, more generally, the provision of stimulus to the psychological and intellectual growth of a person by another person or artifact (InfoSci-OnDemand 2017). It is also an interaction between a teacher and a learner under the teacher's responsibility in order to bring about the expected change in the learner's behaviour. Ezeani (2006) sees it as an activity that anybody, professional or non-professional, who aims at influencing another individual to change his behavior engages in. This buttresses the facts that once someone can spend his time with another and is able to help the individual develop new positive attributes that result in a change of behaviour from the former, then, teaching has been done not minding the facilitators educational qualification.

Learning on the other hand as described by Ngwoke (2010), is a process that includes purposing, planning, executing, judging, eliciting the trial response, correcting the trial response, and eliciting the test response. He added that learning indicates progress and betterment in human conduct among others. Learning means to prompt changes in the behaviour of an individual,

accounting for difference in behaviour which are not due to such factors as maturation, and other phenomenon that can make for changes in the activities of a person. The changes can be effective through vocational and technical education by incorporating theory and practice during teaching.

Technical education is that type of education which deals with practical skill acquisition and application of basic scientific knowledge (Nwokolo, 2012). Okorie (2001) noted that technical education is designed to prepare and upgrade persons for occupation after university gradation. Some of the objectives of technical education are stated in the National Policy on Education (FRN, 2013) which include to: provide trained manpower in the applied sciences, technology and business particularly at craft, advanced craft and technical levels. Technical education is education for

vocation or training in technical skills, knowledge and ability required for use in an occupation.

Therefore, if its concern is the acquisition of skills and competencies, then its recipients are equipped to perform effectively in whatever skill, goal and competencies acquired. Furthermore, because these technicians have been fully prepared for business and vocation, then they must be the first to be recommended when it comes to technical know-how in such field. Thus, the question of the educational level of the recipients of technical education becomes of little value, rather, their ability to perform well should be what occupies our minds.

A technical/support staff is a person who works at a job which requires applied technical knowledge and applied skills. His work can be likened to that of an engineer,

agronomist, soil scientist, agricultural economist but narrower in scope, (Okorie, 2001). An Agricultural technical staff according to Australian and New Zealand Standard of Occupation (ANZSC), (2009), performs tests, and experiments, and provide technical support to assist the agricultural scientist in areas such as research, production, service and marketing. This confirms the functions needed of an agricultural technical staff. In the same vein, the University of Nigeria Nsukka has farm managers and agricultural superintendents that take students for field practical after the lecturers are done with the students on the theoretical aspect of the courses that are offered in the classrooms. This makes it easier for the lecturer to be able to have time to do other things like research, attend to student matters, attend meetings that may benefit the department and faculty or even the institution in general. Therefore it will not be out of place to involve the technical/ support staff in teaching practical in secondary school.

The researchers through their visit to collages of agriculture, observed that the services and guidance of a farm manager (agricultural technician) helps the students to perform well in terms of the practical aspect of the course more in line with the theories to which they have been exposed in the lecture room. Farm manager perform other functions such as: testing the effects of various treatment on growth and yield, record and interpret experimental data in field experiments. Identifying pathogenic micro-organisms and insects, parasites, and weeds harmful to crops and livestock, and assisting in devising methods of control, analyzing producers to set and maintain standard of quality, planning slaughtering, harvesting and other

aspects of production processes. They may advise producers on farming techniques and management (ANZSCO, 200). So having accepted that teaching and learning results in change in behavior and that both a professional or non-professional could be involved in it, there is need for the introduction of technical support staff in the secondary school to enhance agricultural teaching and learning using appropriate instructional materials.

In the view of, Azikiwe (2006) instructional materials could be classified into human and material resources and these human resources are made up of the teacher, the learner, and the resource persons and the tutorial and non-tutorial staff. So the above is a confirmation of the fact that anyone can assume the position of a teacher or a resource person without him/her necessarily undergoing the training of a professional teacher so long what is to be taught will be relevant to the learner and the society at large in the context of use, hence the need to include technical support staff to impact agricultural practical's. Furthermore, the functions of agricultural technical/support staff can be akin to that of a technical instructor that is employed in training centers, training workshops or in industrial or commercial enterprises, (Okorie, 2001). In further lending support, Nwafor (2007) has said that when learners embark on a field trip that the services of an agricultural officer becomes handy especially when the teacher is indisposed and/or not familiar with the equipment that the students will be shown and some schools even use them as vocational counselors. These individuals provide counseling services on various occupations to the students by analyzing the different jobs to find

their requirement, remunerations and opportunities for advancement in the students' chosen careers.

The major purpose of the study is to determine the impact of technical/support staff in the effective teaching and learning of agricultural science in secondary schools in Nigeria.

Specifically the study sought to:

1. Compare the mean achievement score of students exposed to the technical skills of technical/support staff and that of those not exposed to the technical skills in a private secondary school.

2. Compare the mean achievement score of students exposed to the technical skills of technical/support staff and that of those not exposed to the technical skills in a public secondary school.

Research Questions

1. What are the mean achievement score of students exposed to the practical skills of technical/support staff and that of those not exposed to the technical/support staff in private secondary school?

2. What the mean achievement score of students exposed to the technical skills of technical/support staff and that of those not exposed to the technical skills in a public secondary school?.

Hypothesis

Ho: There is no significant (P<0.05) difference in the mean achievement score of JSS II

student exposed to the practical skills of a technical/support staff and those of the students who were not exposed to the technical/support staff .

Method

The study adopted a quasi-experimental research design whereby intact classroom which constitute naturally arranged groups of students was used. A quasi experiment according to Nworgu (2006) is an experiment where random assignment of subject to experimental and control group is not possible rather intact or pre-existing groups are used. The author stated further that quasi-experimental design is used when a researcher uses two groups/streams of classes as experimental and control groups respectively.

The study was carried out in Obio/Akpor local government area of Rivers state. The population for the study was 100 JSS II students of Newlife Baptist School Rumueme, Port Harcourt a private school and Community Secondary School Mgbuosimini a public school, and both are mixed schools. Simple random sampling technique was used to draw the JSS II students into two groups in each school as treatment and control (A & B) of 25 students each in each school. The instrument for data collection was a multiple choice Achievement Test on soil profile design for the students. This contained twenty multiple choice questions developed from soil profile. Each of the questions contained four options in which one of them is the correct answer.

The instrument was content validated by three experts; two from the Department of Vocational Teacher Education (Agricultural Education Option), and one from the

Department of Science Education, all from University of Nigeria Nsukka. The experts were requested to identify ambiguous statements and make suggestions that will be utilized to produce the final version of the Achievement Test on soil profile.. Kuder-Richardson formula was used to determine the reliability of Achievement Test on soil profile and 0.83 was obtained. The data were collected through the help of two research assistants one for the treatment and the other for the control group.

The researchers sought for the permission of the Principals of the schools to carry out the research. After the approval, the researcher was introduced to the Heads of Department for information and to seek their cooperation and support. This presented an endearing platform to interact with the subject teachers which afforded the researchers the opportunity to give explanation on the mode of research

Before the treatment, students in both groups (experimental and control) were given the pre-test. After the pre-test, Both groups in each school were taught soil profile but only group A (treatment) was exposed to the practical skills of a technical/support staff that carried out the experiment. The experiment on soil profile was done on the schools' lands. The sites were cleared, marked out for the experiment and the diggings were done 2m deep down the soil a day before the students were exposed to the experiment and covered to avoid anything or anybody falling into it.

After the teaching was done in the classroom, the students in group A in each school were brought to the site of the experiment. The surface of the hole was scratched off to make

visible the various horizons for the observation of the students as identified by the technical/support staff in-charge. Afterwards, the students took turn to go down the step into the hole for the observation of the horizons. While group B remained in the classroom. Thereafter, the students returned to the classroom where a teacher made achievement test (TMAT) was administered to the groups under the same condition though at different times in the same week to the schools involved.

The data collected for the study were analyzed using Mean $\left(\bar{X} \right)$ to answer the research questions while the hypothesis was tested at 0.5 level of significance using Analysis of Co-variance (ANCOVA) while the pretest was used as covariate. In using the mean, the data collected from the administration of pre-test and post-test were analyzed. The pre-test post-test mean gain of each of the treatment and control group were computed to determine students' achievement in soil profile

Results

Research Question 1

What are the mean achievement score of students exposed to the practical skills of technical/support staff and that of those not exposed to the practical skills in a private secondary school?.

Table 1: Means and Standard deviation (SD) of achievement score of students exposed to the practical skills of technical/support staff and that of those not exposed to the practical skills in a private school

Variable		Pre-test		Post-Test		Gain Score
Learning Strategy	N	Mean	Std. Dev.	Mean	Std. Dev	
Technical/support staff	25	15.2	1.98	18.9	1.71	3.7
Convectional method	25	11.1	2.10	13.5	1.35	2.4

Table 1 shows the mean achievement scores of students exposed to technical/ support staff and conventional method in teaching soil profile. From the table, it was revealed that the mean achievement score of 15.8 and 11.1 with standard deviation of 1.98 and 2.10 were recorded for students exposed to practical skills using technical/support staff and conventional method respectively at the pre-test. However, at the post-test, the mean scores of 18.8 and 13.5 with standard deviation of 1.71 and 1.35 were recorded for mean achievement score of students exposed to the practical skills using technical/support staff and conventional method respectively From the mean and standard deviation values obtained as shown in table 1, the students exposed to the practical skills using technical/support staff performed better than those not exposed to the practical skills using technical/ support staff.

Ho: There is no statistical significant (P<0.05) difference in mean achievement score of JSS II student exposed to the practical skills using technical/support staff and that of the students who were not exposed to the practical skills.

Table 2: Analysis of Covariance (ANCOVA) for mean achievement score of JSS II student exposed to the practical skills using technical/support staff and that of the students who were not exposed to the practical.

Source	Sum of Squares	Df	Mean square	F	Sig.
Corrected Model	5084.510[a]	2	2542.255	291.222	.000
Intercept	3167.946	1	3167.946	362.896	.000
Pretest	3986.200	1	3986.200	456.629	.000
Method	134.657	1	134.657	15.425	.000
Error	1047.555	120	8.730		
Total	141535.000	123			
Corrected Total.	6132.065	122			

The data presented in Table 2 shows that with respect to the mean achievement scores of students taught soil profile by exposing them to practical skills using technical /support staff and conventional, an f-ratio of 15.425 was obtained with a significance of F at 0.000 which is less than 0.05 level; of significance, the null hypothesis is therefore rejected. With the result there was a significant difference between the mean achievement scores of students taught soil profile by exposing them to practical skills using technical/support staff and those taught using conventional method.

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Research Question 2.

What are the mean achievement score of students exposed to the practical skills of technical/support staff and that of those exposed to conventional method in a public secondary school?

Table 3: Means and Standard deviation (SD) of achievement score of students exposed to the practical skills using technical/support staff and that of those not exposed to the practical skills in a public school

Variable		Pre-test		Post-Test		Gain Score
Learning Strategy	N	Mean	Std. Dev.	Mean	Std. Dev	
Technical/support staff	25	16.8	2.08	20.9	1.09	4.1
Convectional method	25	12.1	1.12	12.5	1.33	3.4

Table 3 shows the mean achievement scores of students exposed to soil profile using technical/ support staff and conventional method. From the table, it was revealed that the mean achievement score of 16.8 and 12.1 with standard deviation of 2.08 and 1.12 were recorded for students exposed to practical skills using technical/support staff and conventional method respectively at the pre-test. However, at the post-test, the mean scores of 20.9 and 12.5 with standard deviation of 1.09 and 1.33 were recorded for mean achievement score of students

exposed to the practical skills using technical/support staff and conventional method respectively From the mean and standard deviation values obtained as shown in table 3, the students exposed to the practical skills of a technical/support staff performed better than those not exposed to the practical skills using technical/ support staff.

Discussion of the Findings

For hypothesis 1 that there is no significant difference between the mean achievement score of the students exposed to the practical skills of a technical/support staff and those not exposed, the results in table 1 and 2 showed that there is significant difference in the achievement mean score of the students exposed to the technical skills of a technical/support staff which is higher than that of those not exposed which confirms the assertion of Azikiwe (2006) that the

technical/support staff as a human instructional material enhances learning in schools. The findings are in line with Nwafor (2007) that the support of the technical/support staff to the teacher increases performance among students.

The findings on the hypotheses 2 tested showed that there is significant difference between the mean achievement score of the students exposed to the skills of a technical/support staff and that of those not exposed as showed in table 3 and 4.This is a confirmation of the findings of Okorie (2001) that the presence of technical/support staff in schools ensures proper transfer of learning. The findings further affirms the findings of ANZSCO (2009) that the use of technical/support staff in schools builds motivation in the students.

Conclusion/ Recommendations

The study reveals that the teaching and learning of agricultural science in secondary schools should not only end in the classrooms but a step taken further to carry out practicals involved as this will enhance proper learning. Furthermore, motivation and interest which are key to proper learning are cultivated using technical/ support staff in delivery lessons to student. Since the treatment group (A) gave a higher achievement value irrespective of the fact that the achievement test was given under the same classroom condition,

1 The researchers therefore, recommended that the technical/support staff be incorporated for the effective teaching and learning of

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agricultural science in secondary schools

2 The government and private school owners should provide all the needed facilities and enabling environment for practical exercises including the engagement of a technical/ support staff for effective teaching of agricultural science.

3 The Federal Ministry of Education should develop and enforce a policy that makes it mandatory for every school to employ a technical/support staff to support the agricultural science teacher.

4 All policies formulated towards learning by doing should be enforced to the latter by the Federal and states ministries of education

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