TEACHING-LEARNING RESOURCES AND STUDENTS' ACADEMIC PERFORMANCE IN AGRICULTURAL SCIENCE IN SENIOR SECONDARY SCHOOLS IN OTUKPO METROPOLIS OF BENUE STATE

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Abstract
The study investigated the perception of students on the effect of Teaching and Learning Resources such as Libraries, Laboratories, and School Farms on their academic performance in Agricultural Science in Otukpo Metropolis of Benue State. The study adopted the descriptive survey research design. The Sample comprises 40 students each from 10 recognized secondary schools from a population of 875 students. Random sampling technique was used to select two hundred (200) male and two hundred (200) female respondents delimited to SS-3 students. Data was collected using a questionnaire which consisted of twenty items built around the three research variables under investigation. Hypotheses were tested using t-test analysis at 0.05 alpha level. The results indicated that a majority of the respondents strongly perceive that availability of learning resources enhances students' academic performance in Agricultural Science. All null hypotheses were accepted as respondents' perceptions on the research variables were homogeneous. Appropriately, workable recommendations were made; the Government, Parents Teacher Association (PTA) and other stakeholders should assist in providing needed resources such as Land for school farm/garden, animal farm, demonstration plots, well equipped laboratories and ICT compliant libraries to facilitate the teaching and learning of Agricultural Science in the schools.

Key words: Agricultural Science, laboratory, performance, school farm, library.

Introduction

The major goal of science education is to develop scientifically literate individuals that are concerned with high competence for rational thoughts and actions. The objectives of science education in this country according to Maduekwe (2006) include the need to prepare students to observe and explore the environment, explain simple natural phenomena, develop scientific attitudes including curiosity, critical reflection and objectivity, apply the skills and knowledge gained through science to solve everyday problems in the environment, develop self-confidence and self-reliance through problem solving activities in science.

Agricultural science is one of the core vocational curricular subjects taught at both junior and senior secondary schools in Nigeria. Farombi (2008) defines it as a process of training learners in the process of Agricultural productivity as well as the techniques for teaching of agriculture. Wikipedia (2018) describes Agricultural science education as a broad multidisciplinary field that deals with the selection, breeding and management of crops and domestic animals for economic production. It is a subject taught in secondary schools as a means of transmitting agricultural education to young learners for self-reliance and preparation for further studies. According to Ransford, Opoku, and Darko (2016), the rationale for the introduction of Agricultural Science education, particularly in the various secondary schools was to dispel students' apparent negative attitude towards farming, and to further expose students to the knowledge and skills that they would require in agricultural production should they become farmers in future. Among the aims of the Agricultural Science programme in the Senior High School are to help learners develop self-reliance in agriculture, demonstrate that farming is a dignified and profitable occupation, and to enhance skills needed in carrying out agricultural practices (Vandenbosch, 2006). This is to develop occupational outlook in agriculture and to enable schools to take an active role in national development through agricultural activities.

Agricultural science is therefore designed for the inculcation of the necessary skills for the practice of agriculture for effective citizenship and contribution to food security for national sustainability. That is why the Federal Republic of Nigeria-FRN, (2004) outlines seven major objectives of teaching and learning of agricultural science to reflect the; Ability to stimulate students' interest in agriculture; To enable students acquire basic knowledge of agriculture; Ability to develop basic agricultural skills in students; Ability to enable students integrate knowledge with skills in agriculture; Ability to expose students to opportunities in the field of agriculture; Ability to prepare students for further studies in agriculture; and Ability to prepare students for occupations in Agriculture. The attainment of these objectives depends on the availability and adequate utilization of teaching and learning resources, Abah (2012).

Agricultural science is a very important science oriented vocational subject and a requirement for further learning of a number of science-related Agro-based professional courses like Agricultural Extension, Agriculture, Agricultural Engineering, Agricultural Economics etc. In contemporary Nigeria, greater emphasis is placed on science and technological development. As a result, students are being encouraged to take up science-related subjects. Today, Agricultural science products pervade literally every field of human endeavours, and play a fundamental role in national advancement. Thus, the teaching of Agricultural Science in Nigerian secondary schools needs to be properly handled. Agriculture contributes to the nation's economic development besides its potential for job creation. In the area of employment generation for example, The International Standard Classification of Occupations (1988 version), lists over 100 occupations that exist in the agro-food sector available for school leavers. These are categorized into: Elementary occupations, such as farm-hands and laborers; Service workers and shop and market sales workers, such as shop, stall and market salespersons and demonstrators (in the food retail sector); Skilled agricultural and fishery workers, such as gardeners, horticultural and nursery growers, and dairy and livestock producers; Craft and related trades workers, such as agricultural- or industrial machinery mechanics and fitters and bakers, pastry-cooks and confectionery makers; Plant and machine operators and assemblers, such as wood-processing-plant operators and dairy-products machine operators; technicians and associate professionals, such as safety, health and quality inspectors, life science technicians, agronomy and forestry technicians and farming and forestry advisers, buyers, and appraisers, valuers and auctioneers; Professionals, such as biologists, botanists, zoologists, and agronomists; Legislators, senior officials and managers, such as production and operations managers in agriculture, hunting, forestry and fishing, production and operations managers in manufacturing, supply and distribution managers.

In view of the foregoing, it is expedient that Agricultural science be taught thoroughly if it is to meet the educational and economic expectations. More so, Agricultural science being a vocational subject cannot be taught effectively without the use of appropriate instructional materials. Prominent among them, according to Akinkugbe (2014), are the school farm, science laboratory and Library.

The school farm is described by Olaitan and Mama (2001), as an area specially earmarked for agricultural activities by a school. This area usually possesses the potentials required for agricultural productivity. It may be in the school or at a fairly walking distance. School farms allow students to study Land Management, Agriculture, Animal Care and Husbandry and have hands on experience of life on the school farm. Olaitan and Mama (2001) further enumerated the relevance of

the school farm as; source of money, a store of value, source of transfer of knowledge, developing skills in studies, stimulating students' interest in farming, as a laboratory for research, for improving background knowledge of students, for recreation and so on.

Science Laboratory is a room with specific equipment specially built for teaching by demonstration of theoretical phenomenon into practical terms. Farombi (2008) agreed with the saying that "seeing is believing" as the effect of using laboratories in teaching and learning of science and other science related disciplines as students tend to understand and recall what they see than what they hear or were told. Other studies reported that laboratory adequacy which is a school environmental factor affect the performance of students in Agricultural science (Raimi, 2005). In terms of academic achievement, Soyibo and Nyong (2004) have shown that schools with well-equipped laboratories have better results in the School Certificate Science Examinations than those that are ill-equipped. Writing on the situation of our secondary schools, Okoli (2005) reported that laboratories have become shelves of empty bottles of chemicals. In another study, Yahaya (2007) noted that no course in science and mathematics can be considered as complete without including some practical work. The practical work ought to be carried out by individuals either in science laboratories, in the field or in classes. It is an established truth that an object handled impresses itself more firmly on the mind than the object merely seen from a distance or in an illustration. Thus practical work forms an important feature in any science and mathematics course (UNESCO, 2008).

Library as a resource, occupies a central and primary place in any school system. It supports all functions of school-teaching and provides service and guidance to its readers. According to Fowowe (2013), a library must be up-to-date and at the same time allow access to older materials. Keith (2004) in a study found that the size of a library media programme as indicated by the size of its staff and collection is the best school predictor of academic achievement of students. He added that the instructional role of the library media specialist shapes the collection and in turn, students' academic achievement. Additionally, the degree of collaboration between library media specialist and classroom teacher is affected by the ratio of teachers to students. In a related study, Waldman (2003) found that students visit library for different purposes. This purpose, therefore, has a strong influence on their performance. In other studies, Lance (2004) confirmed a significant correlation between the presence and the use of library materials by students and teachers with better student performance. And a correlation was found between the school inputs and better student achievement (Tale, 2005).

It is thus obvious that availability of teaching/learning resources is a function of the effectiveness of schools. They are the basic things that can enhance academic performance in the students. Wootoyitidde (2010) is in agreement when he posits that Agriculture as a practical subject requires facilities like land, equipment and well-equipped laboratory. Sadly, in the last decade, the performance of students in all secondary schools located within Otukpo local government area of Benue State has taken a downward trend in the National examination, West African Senior Secondary Certificate Examination. The 2010 Chief Examiner's Report on Agriculture Science indicated that the fundamentals of agriculture and knowledge of practical agriculture were ignored by students (West Africa Examination Council [WAEC], 2010). The report further stated that most students failed to perform simple experiments. A similar observation was indicated in the 2011 report, which added that it appeared most students never stepped into a laboratory during the course of study. Akinkugbe, (2014) observed that this downward trend is particularly seen in the study area and can be attributed to many interacting factors ranging from availability of laboratory, classrooms, school farm, farm structures, textbooks and library; these being among the most implicated. In this study, these factors are referred to as teaching and learning resources.

The purpose of this study is to find out the perception of students on the extent to which teaching-learning resources - school farm, science laboratory and Library affect students' academic performance in agricultural science subject. It has been observed that most of the previously conducted researches in this area do not cover secondary schools located within Otukpo local government area of Benue state. The obviously low level of availability and utilization of the teaching-learning resources under investigation in schools within the study area leaves much to be desired. Hence the researcher wondered if students are aware of the situation. It is against this background that this research was undertaken. It is hoped that this will close the existing gap created by the stated missing link.

Research Questions

The following research questions guided the study:

1. To what extent does the availability of Science laboratory affect students' academic performance in agricultural science?
2. To what extent does the availability of school farm affect students' academic performance in agricultural science?
3. To what extent does library affect students' academic performance in agricultural science?

Research Hypotheses

In pursuance of the purpose of this study, the following null hypotheses were formulated.

HO_1: There is no significant difference, based on gender, in the mean ratings of respondents' perception of the effects of the availability of laboratory on students' academic performance in agricultural science.
HO_2: There is no significant difference, based on gender, in the mean ratings of respondents' perception of the effects of the availability of school farm on students' academic performance in agricultural science.
HO_3: There is no significant difference, based on gender, in the mean ratings of respondents' perception of the effects of the availability of Library on students' academic performance in agricultural science.

Methodology

The descriptive survey design was adopted for the study. Questionnaire was the instrument used for data collection and it was titled T-LRQ (Teaching-Learning Resources Questionnaire). One set of questionnaire was used to collect research data. The questionnaire was designed to address research questions; outcome of the responses was analyzed using descriptive statistics (mean). The same set of research questionnaire was designed to address research hypotheses. Outcome of the responses was placed on inferential statistical tool, t-test, for decision on the stated research hypotheses one to three. Data was converted into numerical indices using the modified 4-point Likert scale as well as the t-test statistical analytical tool for a reliable generalization.

Validity of Questionnaire

Drafted questionnaire was given to two experts in the field of Agricultural science education and an expert in Agronomy, in National Open University of Nigeria, to carry out face and content validity. Their comments, observations and advice were utilized accordingly.

Reliability of Questionnaire

The Questionnaire was trial tested to see how long it takes to complete each, to check that all question items and instructions were cleared, and to enable the researcher to remove any question items which do not yield usable data. The Piloting exercise was carried out on a group similar to the target population of this study. This enabled researcher to obtain a final questionnaire from which respondents did not experience any difficulty completing. To ensure the reliability of the research instrument, it was subjected to internal consistency reliability test using the Cronbach's Alpha method. This indicates that the questionnaire designed for this research study has internal consistency, thus it is usable.
The researcher personally visited all the 10 randomly sampled schools to administer the instrument. The second visitation was used to carry-out reliability assessment of the prepared research questionnaire. A day was scheduled for each

of these procedures. The instruments were administered and retrieved within the day.

The questionnaire had two sections namely; Section A: Respondent personal information unit, and Section B: Items unit comprising fifteen (15) questions, purposely designed to elicit responses meant for this research. The questionnaire is scored on the 4-point Likert scale: Highly Adequate (4), Adequate (3), Inadequate (2), Highly inadequate (1); and they denoted as **H A, A, I,** and **H I** respectively.

This study was carried out in senior secondary schools located in Otukpo local government area of Benue State which constitutes the study area. From a population of 875 SS-3 Agricultural science students in 10 public and private senior secondary schools located in Otukpo local government area of Benue state, 400 students were selected using the random sampling technique; two hundred (200) male and two hundred (200) female respondents at the rate of 40 students from each of the 10 schools. The 10 schools were randomly selected from 18 secondary schools in Otukpo metropolis that meet the requirements for this study. There are only 2 public schools in the study area. The rest are private but grant-aided by the state government. The schools selected for the study include; Govt. Model secondary school, Govt. Day Secondary school, Wesley High School, St. Francis/ St. Anne's Secondary school, Methodist high school, St. Paul's secondary school, Ewulo College, Otukpo Community secondary school, Idoma Community Secondary school, and Jesus College Otukpo.

Presentation of results

Hypotheses Testing

Hypothesis I: There is no significant difference, based on gender, in the mean ratings of respondents' perception of the effects of the availability of laboratory on students' academic performance in agricultural science.

Table 1:

The mean rating of male and female students' perceptions of the effects availability of laboratory.

Gender	No	Mean	Sd	Df	t crit. value	t. cal. Value.	sig	Decision
Male	200	2.00	0.95	398	1.96	1.12	0.05	Accepted
Female	200	1.90	0.83					

Table 1 reveals the t-test analysis of the perception based on gender, of the effect of the availability of laboratory on students' academic performance in agricultural science. At t critical value of 1.96, and df of 398 and a significant level of 0.05, the hypothesis was accepted since t calculated value of 1.12 is less than the t.

critical value of 1.96. The implication therefore is that, there is no significant difference, based on gender, in the mean ratings of respondents' perception of the effect of the availability of laboratory on students' academic performance in agricultural science.

Hypothesis 2: There is no significant difference, based on gender, in the mean ratings of respondents' perception of the effects of the availability of school farm on students' academic performance in agricultural science.

Table 2:
The mean rating of male and female students' perceptions of the effect of the availability of school Farm on academic performance.

Gender	No	Mean	Sd	Df	t crit. value	t. cal. Value.	sig	Decision
Male	200	1.88	0.90	398	1.96	1.13	0.05	Accepted
Female	200	1.99	1.04					

Table 2 shows degree of freedom of 398, and a critical t-value of 1.96 obtained at the 0.05 level of significance. From the table, it can be seen that the t-calculated value is less than the t-table value. Hence, the null hypothesis was accepted. This indicates that there is no significant difference, based on gender, in the mean ratings of respondents' perception of the effect of school farm on students' academic performance in agricultural science.

Hypothesis 3: There is no significant difference, based on gender, in the mean ratings of respondents' perception of the effect of the availability of Library on students' academic performance in agricultural science.

Table 3:
The mean rating of male and female students' perceptions of the effect of the availability of Library on performance.

Gender	No	Mean	Sd	Df	t crit. value	t. cal. Value.	sig	Decision
Male	200	1.93	1.01	398	1.96	0.67	0.05	Accepted
Female	200	2.03	1.08					

The t-calculated value of 0.67 was obtained. The degree of freedom was 398, while the critical t-value of 1.96 was obtained at the 0.05 level of significance. From the table, it can be seen that the t-calculated value is less than the t-table value. Hence, the null hypothesis, which states that there is no significant difference, based on gender, in the mean ratings of respondents' perception of the effects of the availability of Library on students' academic performance in agricultural science, was accepted.

Discussion

The analysis obtained from table 1, table 2, and table 3 shows that each of the questionnaire items 1 to 15 reflects average respondents' perception on the basis of the 4-point Likert scale. Thus, table 1 shows that all respondents confirmed that availability of laboratory affects students' academic performance in agricultural science; this justified the position of Raimi, (2005) that laboratory adequacy which is a school environmental factor affect the performance of students in Agricultural science. Also Soyibo and Nyong (2004) have already shown that schools with well-equipped laboratories have better results in the School Certificate Science Examinations than those that are ill-equipped. Table 2 shows that most respondents confirmed that the availability of school farm affects students' academic performance in agricultural science. Olaitan and Mama (2001) had earlier enumerated the relevance of school farm as a source of transfer of knowledge. They also agreed that school farm will improve background knowledge of students, which in turn influences their performance. Table 3 indicates that most respondents believe that the availability of library facilitates students' academic performance just as Waldman (2003) found in his study on the influence of library on students' performance. Lance, (2004) confirmed a significant correlation between the presence and the use of library materials by students and teachers with better student performance. The null hypotheses were all accepted. The implication of the finding is that the aims and objectives of the agricultural science curriculum will hardly be attained where the indicated learning facilities are not adequately provided and utilized appropriately, the awareness of which the students themselves have expressed.

Conclusion

It has been observed that teaching and learning resources such as school farm, science laboratory and library are very necessary factors in the overall performance of students. Most respondents believe that the availability of these resources enhances students' performance in agricultural science. Their homogenous perception is adequately supported and duly justified by previous research.

Recommendations

1) There is need for the enforcement of the provision of school farms in all secondary schools. The school farm is where practical knowledge of agriculture is demonstrated and theories are put to practice for skill acquisition.
2) Agricultural Science students should join such Agricultural clubs as Young Farmers' club where members receive training in practical agriculture via demonstrations on school farm.

3) The Parents Teachers Association (PTA), Philanthropists, Alumni and other charitable organizations are also implored to compliment the effort of the government to boost and sustain the performance of students in Agricultural Science at the SSCE by donating laboratories, libraries, and farm tools and machineries; Agriculture science classrooms and farm land.
4) The Ministry of Education should allocate more funds to equip the laboratories, agriculture science rooms, school farms and Libraries that are ICT compliant.

References.

Abah, J. J. (2012). Production of cheap Instructional Materials for 6 -3 -3-4 system of Education with emphasis on primary school level 'InI. Imogie (Ed). Trends in Educational Technology: Ibadan; Y - books.

Akinkugbe, B. O. (2014). Resource Concentration, Utilization and Manage-ment as Correlates of Students' Learning outcomes: A study in School Quality in Oyo State. Unpublished Ph.D. Thesis, University of Ibadan.

Farombi (2008). *Nigerian Education; Trends and Issues.* Ile Ife, University of Ife Press Limited.

Federal Republic of Nigeria FRN (2004). Blueprint on Family Support Programme.Lagos: NERDC.

Fowowe, S. (Thursday 25th November, 2013). Mass Failure will continue until… *Nigeria Tribune,* 8 10

Keith, G. Y. (2004). *Contextual Effects on Learner characteristics: Determinant of Students Achievement.* Cape Publishers Int'l Ltd, Ibadan, NG

Lance, J. B. (2004). Resource Concentration, Utilization and Management as Correlates of Students' Learning outcomes: A study in School Quality in Oyo State. Unpublished Ph.D. Thesis, university of Ibadan.

Maduekwe, W. L. (2006). *Investing in the Future: Setting Educational Priorities in the Developing World.* Paris 1; TEP and Pergonion Press.

Okoli, M. K. (2005). *An Introduction to Educational Administration.* Ibadan Odusote.

Olaitan S. O. & Mama, R. O. (2001). *Principles of School Farm Management*. Cape Publishers Int'l Ltd, Ibadan, NG

Raimi, K. G. (2005). Progress and Problems in Nigerian Secondary School Education 2003 – 2008. *Journal of Research in Curriculum* (Special) 1, 51 – 61.

Ransford, Opoku, and Darko (2016) Constraints encountered in teaching practical Agriculture in selected senior high schools in the sekondi-takoradi metropolis *International Journal of Information Research and Review 03(07) 2604-2611*

Soyibo, E. O., & Nyong, S. P. (2004). *Resource Material Utilization in the Teaching of Integrated Science"* Paper presented at the Year 2004AD STAN National Workshop on Integrated Science, held at Ilorin.

Tale, Y. G. (2005). *Making the Classroom Conducive to the Teaching and Learning of Primary Science.* A paper presented at STAN National Primary Science Workshop held at Federal Government College, Sokoto, Sokoto State, 8-13th May, 2005.

The International Standard Classification of Occupations, 2008 (ISCO-08) (http://www.ilo.org/public/english/bureau/stat/isco/docs/resol08.pdf; Retrieved 28/8/16.

UNESCO. (2008). *Challenges of implementing free day secondary education in Kenya. Experiences from district.* Nairobi: UNESCO.

Vandenbosch, T. 2006. Post Primary Education &Training in sub-Saharan Africa*; PrincipalResearch work commissioned by the World Bank on Agricultural Education and Training in Sub- Saharan Africa. Nairobi: World Agro forestry Centre (ICRAF).*

Waldman, R. D. (2003) Manpower Development for Effective Utilization in Urban and Rural Economics. *Education and National Development* 1(1), 45-71.

West African Examinations Council [WAEC] 2010. *Senior Secondary Certificate Examinations: Integrated Science Chief Examiners' Report*. Accra: Author

Wikipedia (2018) https://en.wikipedia.org/wiki/Agricultural_education

Wootoyitidde, J.H. (2010). The effect of funding on practical teaching of Agriculture in Secondary schools in Rakai District, Uganda. Unpublished M.Ed. Science Education Dissertation. Makerere University, Uganda

Yahaya, D. M. (2007). *Major Concepts and Issues in Education Administration*. Onitsha: Cape Publishers.