PDF - EFFECT OF OUT-DOOR LABORATORY ON STUDENTS' ACHIEVEMENT AND RETENTION IN AGRICULTURAL SCIENCE - researchcub.info***Abstract***

The main purpose of this study is to determine the effect ofout-door laboratory method on students' achievement and retention inAgricultural science. To guide this study, four research questions were posedand four hypotheses was formulated. The control and Experimental groupsanswered a set of fourty questions from Agricultural science Achievement test(ASAT). Intact classes made up of males and females were used .Literaturereview was organized under the following subheadings: conceptual framework,theoretical framework, review of empirical studies and summary of literaturereview. Multistage sampling technique was used for sampling. Mean andstandard deviation was used to answer research question and hypothesesformulated was analyzed using ANCOVA at 0.05 level of significance. The majorfindings of the study are as follows: Out-door laboratory method significantly affectstudents achievement in Agricultural Science contents of senior secondaryschool. Male students achieved better result than their female counterpartswhen exposed to out-door laboratory method. There is no significant interactioneffect of out-door laboratory method and gender on students' achievement andretention in Agricultural science achievement test. Based on therecommendations: Much emphasis should be placed on the use of appropriatemethod of teaching. Workshop and seminars are to be organized for teachers ofAgricultural science on the need to use appropriate instructional resourcematerials and appropriate method of teaching of both males and females.

CHAPTER ONE

INTRODUCTION

Background of the Study

Science and technology are important tools for development andproductivity in any nation. Science is a necessity for every nation that wantsto maintain its independence, sovereignty, self-reliance, ensure growth andhave its head held high among civilized nations. This is because science and technologyprovide the basic tools for industrialization and economic development in theareas of communication, transport, energy, information, pollution and wastecontrol, among others. In Nigeria, the study of science is of great importancethat a lot of emphasis has been laid on the teaching and learning of science ascontained in the National Policy on Education, being to equip the students tolive effectively in this modern age (Federal Ministry of Education, 2004). Thiscan be achieved by the inculcation of the necessary scientific skills andattitudes in learners.

The inculcation of scientific skills and attitudes in studentscan only be achieved through the proper teaching of the various sciencesubjects such as Biology, chemistry, physics, mathematics, health science,agricultural science among others. Agriculture as one of the science subjectshas been endorsed as a core subject by the National policy on Education

(NPE,2004). Agriculture embraces the basic knowledge of farming or husbandry that isthe cultivation of land, rearing of animals which is normally taught at juniorsecondary level. The study of Agriculture is Agricultural science which is theapplication of scientific principles to the growing of crops and rearing ofanimals. This is taught as a school subject in senior secondary school.Agricultural science when properly taught will help students to solve personaland societal problems.

According to Anyanwu (2003), Agricultural science is a practicalsubject and the best way of helping students to learn agriculture is to bringthem face to face with the world which education intends to introduce to them.Emedo (2003) defined agricultural science as the art and science of productionof plants and animals that are useful to man. Agricultural Science as a subjecthelp students to acquire knowledge to live effectively in our modern age ofscience and technology. At the policy level, common goals of agricultureinclude:- conservation, economic stability, environmental stability, foodquality, food safety, food security, poverty reduction among others.

Furthermore, the overall purpose of the Agricultural sciencesenior secondary school curriculum, Nigerian educational research anddevelopment council (NERDC, 2008) is to provide students with sufficientknowledge and skills to both explore their talents and rich agriculturalresources of Nigeria environment.

Specifically, the objectives of senior secondary AgriculturalEducation should be to:

a. Stimulate and sustain students interest in Agriculture

b. Impact functional knowledge and practical skills inAgriculture to students

c. Prepare students for further studies in Agriculture

d. Prepare students for occupation in Agriculture

Agricultural science as a secondary school subject is meant togive the students fundamental knowledge of Agricultural practices. It is afoundation on which the future of food production and Agricultural economy isbuilt.

Agricultural science curriculum at the secondary level is meant to provide highschool graduates armed with the knowledge and competencies for tertiaryeducation in a bid to make career in agriculture. The curriculum provides forsuch practically oriented areas like nursery establishment, crop production andfarm survey, vegetable production, fruit production, livestock production(goat, sheep, cattle, rabbits, pigs and poultry).

Poultry refers to group of domesticated birds reared for food and otherpurposes. Poultry has the capacity to convert vegetable fed into animalprotein. It is estimated that in terms of food conversion, poultry eggs rankwith cow's milk in being the most economically produced animal protein and thatpoultry flesh ranks above that of other domestic animals in this respect.Poultry has so many advantages over the other domesticated animals whoseproduction is very much hindered by lack of money, high temperature, diseaseand lack of food at certain periods of the year. Therefore, it becomes necessaryto pay attention

to the Poultry industry through better management whichinvolves: the use of high producing breeds, good fencing, housing, protectionfrom bad weather conditions and careful marketing.

Poultry includes such birds as: domestic fowl, turkey, goose, guinea fowl andduck. Fowl is a kind of Poultry reared for food and other purposes. The variousspecies of fowls had a common ancestor, the primitive fowl called gallus. Thevarious breeds of fowls can be classified into three main groups:

(a) Egg producers eg white leghorn, brown leghorn (b) The meatproducers (broilers) eg Sussex, Cornish and cochin (c) The dual purpose ones(ie both meat and egg producers) eg Rhode Island Red, Plymouth Rock and NewHampshire.

Fowl as found in the section of the Senior Secondary SchoolAgricultural science curriculum meant for S.S II students covers the followingcontents. Meaning of fowl, Anatomy and physiology of a fowl, fowl reproduction,environmental physiology of a fowl and fowl management. The teacher is a majorhub around which the success of education revolves. In this case, agriculturalscience topics are taught in such a way that it gingers interest in thestudents to the point of practice. As a vocational subject, AgriculturalScience is taught practically to facilitate skill acquisition since what isdone is remembered more than what is just heard. This therefore calls for amaster apprentice relationship interaction between teacher and students in thefield which indirectly involve instruction outside the classroom. Agriculturalscience as a secondary school subject is meant to give the students fundamentalknowledge of agricultural practice. It is a foundation on which the future offood production and agricultural economy is built. Despite the fact thatAgricultural science are important to human progress, students still performpoorly in it. This is an indication of low retention of what is taughtand subsequently poor achievement.

Considering the statistical reports of West African seniorschool certificate exanimation (May/June from 2009-2011) illustrating thestudents low performance in Agricultural science in Nsukka L.G.A for threeconsecutive years. In 2009, the total number of candidates who sat for SSCE wereeight thousand, seven hundred and eighty (8788) candidates and out of thisnumber two thousand, three hundred and fifty nine (2359) candidates got creditand above represented by 26.8 percent. Two thousand, nine hundred and twentynine (2929) candidates got passes represented by 33.3 percent. Three thousand,five hundred (3500) candidates failed entirely represented 39.8 percent.(Source: Post Primary School Management Board, Nsukka).

In 2010, the total number of candidates who sat for theexamination were ten thousand, seven hundred and sixty –six (10766) candidatesand out of this number three thousand, four hundred and sixty-seven (3467)candidates got credit and represented by 32.2 percent. Three thousand, fivehundred and eight (3588) candidates got passes represented by 33.3 percent andthree thousand, seven hundred and eleven (3711) candidates failed

entirelyrepresented by 34.5 percent. (Source: Post Primary School Management Board,Nsukka).

In 2011, the total number of candidates who sat for the examinationwere eleven thousand, eight hundred and thirty-two (11832) candidates and outof this number three thousand, five hundred and eighty eight (3588) candidatesgot credit and represented by 30.2 percent. Three thousand, nine hundred andforty-four (3944) candidates got passes represented by 33.3 percent and fourthousand, three hundred (4300) candidates failed entirely represented by 36.3percent. (Source: Post Primary School Management Board, Nsukka).

This is also evident in the chief Examiners Report of the WestAfrican Examination Council (2011). There are indications that candidates whosat for the WASC Examination in Agricultural science subjects exhibited thefollowing lapses; Inability to interprete questions, failure to write or answertheir questions convincingly, and systematically as expected, shallowunderstanding of most concepts, inability to correctly spell many agriculturalterms.

Evidence from researches showed that there is no consistency onthe variables that may lead to the students retaining more of what they havelearnt. The variables include: the ability levels of the learners, genderissues, teaching learning environment (location), teaching methods, teachersability to use the various methods and materials provided, students backgrounds,level of intelligence of the students, students cognitive styles, among othervariables (Eccels, 2002). The overall achievement of students in their academicpursuits relates to their ability levels and retention of what they learnt.Ability means to perform something successfully.

Students vary in their academic abilities and this tends to bereflected in the extent to which they are affected by a particular teachingmethods. For instance, Diamond and Onwuegbuzie (2001) expressed concern over theinfluence of different teaching methods on students of different abilitygroups, stating that differences in intellectual functioning among learnersnecessitate variations in instructional strategies. Researches conducted byUdeji (2007) indicted that teaching methods have differential effects onstudents of different academic ability levels (low, average, high levels) withone group benefiting more from a particular teaching method than the other. Inview of the foregoing, it might be necessary to find out the students academicability group for which a particular teaching method will be more effective.

Various teaching methods are used by teachers in the teaching ofagricultural science aimed at brining about meaningful learning. These includediscussion method, discovery, field trip, indoor method, out door laboratoryamong many others. The most commonly used is the indoor method. This is mostlyemployed by most Agricultural science teachers because of some of it’sadvantage which include the fact that it can be used to cover a large contentarea at a time and the students are given the same content at the same time.Another major advantage is that it can be used to teach a large class which isa prominent feature in most

Nigerian secondary schools. Indoor method can bevery useful in teaching when used in conjunction with other methods especiallyfor the purpose of introducing the topic. Despite all these advantages, theindoor method employed in the teaching of agricultural science has some flaws,which might be one of the causes of the poor achievement and retention. Theindoor method is mainly teacher–centered, with the students being consistentlypassive and contents are taught as absolute knowledge. This method had failedin the recognition of the uniqueness of the inquiry-based nature ofAgricultural science and the learner's individuality. Furthermore it does notfacilitate the development of reasoning skills and processes in the students.These, among other reasons had not enhanced learning in students and thus hadled to poor achievement and retention of students.

It has been observed that effective teaching may facilitatelearning and make it more meaningful and effective teaching helps the learnerto learn better, while poor teaching would naturally lead to poor learning andconsequently poor retention and achievement. Retention refers to the ability toremember or utilize already acquired knowledge and skills. Retention refers toskills or knowledge or competencies a learner acquired and retained from alearning situation after forgetting has taken place. It is the capacity toremember something, knowledge, skills, habits, attitudes or other responsesinitially acquired.

Retention, according to Chanham (1987), is a direct correlate ofpositive transfer of learning. This means that high retention may lead to highachievement which is a factor of many variables such as interval betweenlearning and retrieval, intervening experiences, specific subject involved,teaching strategies/methods used, and environmental situations, among others.Evidence from researches showed that there is no consistency on the variablesthat may lead to the students retaining more of what they have learnt. Inpractical Agricultural science, the acquisition of skill and retention of suchskills may facilitate the learning of the new task and achievement. Howeverother studies carried out by Udousoro (2002) and Udeji (2007) showed that themethods employed in teaching led student to high retention and achievement.These findings suggest that there is need to carry out more studies to clarifyissues related to achievement and retention as it concerns methods of teachingused in teaching. Since there is no consensus on the effect of methods onstudents' retention and achievement, there is need to investigate on anout-door laboratory method and its effect on achievement and retention.

Out-door laboratory is a students-centered activity–orientedteaching strategy where the teacher acts as a facilitator of learning, guidingthe students through a series of activities and problems which may helplearners to achieve highly. It enriches the students' understanding of thetotal geographical environment of the area they live or operate and encouragesthem to find facts for themselves (Sada 1996).

According to Okwor and Ike (1995), out-door laboratory may bedescribed as an exterior learning areas on or adjacent to a school site whichis suitable for environmental studies. It

may be likened to field-trip orexcursion, where students go outside the classroom to places where knowledgecan be acquired by obtaining information directly about things as they areactually. During instructional situations, the teacher may decide to take thestudents to a place outside the classroom where certain materials needed forillustrating a lesson can be found in their setting. This place outside theclassroom is an out-door laboratory.

In solving the students' problems of poor achievement andretention in agriculture, there is need to shift from the conventional methodsof teaching like indoor to a more innovative method -a method that should seekfor a way of making teaching more precise and concrete/real while at the sametime adjusting both the objective and methods of learning to the needs andcharacteristics of the individual learners.

The noticeable loopholes on a particular method of teaching madeit inappropriate to be used alone in teaching some agricultural content insecondary schools. Thus the need to try out other methods is thereforenecessary. This drives home the need to examine the effect of out-doorlaboratory as a teaching method on students achievement and retention inagricultural science.

One related factor that is confronting the use of out-doorlaboratory method of teaching, is its ability to have the same impact on bothmale and female students equally. This raises the issue of gender in relationto achievement and retention. Influence of gender on students' achievement andretention in science subjects has over the years attracted the attention andinterest of scholars. However, it is worthy of note that opinions and findingsabout the issues have been diverse.

Gender means the culturally determined traits associated withand roles played by males and females. According to Erich (1994) gender is asociological concept referring to the roles each sex is assigned by society toplay within it. This implies that, gender comprises all those social andcultural distinctions that distinguish men from women. The traditional genderrole expectation of a woman is that she is created to nurse babies, look afterthe family food and take care of the house. This belief is carried to educationwhere certain courses are meant for the females and some for males. Forinstance they label Home Economies, Biology and secretarial education as femalesubjects while science technical and vocational subjects such as Agriculturalscience, physics, chemistry, mathematics as male subjects.

Influence of gender on students achievement and retention inAgricultural science has over the years attracted the attention and interest ofscholars.

Specifically, while some scholars such as (Kahle; 1985 andBadmus; 2002) found out that males achieve higher and retain more than females,others such as (Omoniyi 2006) found out otherwise. Yet another group ofscholars are of the view that achievement and retention in Agricultural scienceand other science subjects are not influenced by gender (Iloputaife, 2001 andIbitoye; 1998). However, it is worthy of note that opinions and findings aboutthe issue have been diverse. Therefore, this study investigates studentsachievement and

retention in agricultural science when outdoor laboratorymethod is employed in teaching them.

Statement of Problem

Science learning is expected to produce individuals that arecapable of solving their problems as well as those of the society. Suchindividuals are expected to be autonomous, confident and self-reliant. Scienceand technology constitute the basis of advancement in nearly all fields ofhuman endeavours yet, all is not well with agricultural science instruction inNigerian secondary schools because most teaching lays extreme emphasis oncontent and the use of "chalk and talk" method. This negligence attitude of notadopting activity oriented method of teaching has led to abstraction whichmakes the students less active and more prone to rote memorization. Based on this, a lot has beendone to improve agricultural science teaching in secondary schools in Nigeria.In spite of that, students continue to perform poorly in Agricultural science.The situation has created the need for more effective teaching method. It thenbecomes necessary to explore the efficacy of alternative method of redressingthe situation. Yet, there is no empirical evidence so far, on effect ofout-door laboratory on students' achievement and retention in Agriculturalscience. Therefore, the problem of this study posed as a question is: What isthe effect of out-door laboratory method on students' achievement and retentionin Agricultural science?

Purpose of the Study

The purpose of this study is to determine the effect of out-doorlaboratory method on student's achievement and retention in Agriculturalscience.

Specifically, the study will

1. Find out the effect of out-door laboratory method onstudents' achievement in Agricultural science
2. Ascertain the effect of out-door laboratory method onstudent's retention in Agricultural science
3. Find out the interaction effect of method and gender onstudents' achievement in Agricultural science.
4. Find out the interaction effect of method and gender onstudents' retention in Agricultural science.

Significance of the Study

The result of this study have both practical and theoreticalsignificance.

Practically, the Findings of this study will hopefully be ofimmense benefits to students, curriculum planners, authors, researchers andsociety.

The findings will be of immense benefit to students because thisstudy will among other things specify the type of activities that are learnercentered and of interest to students and which if included in the texts theyuse, will motivate them to add more meaning by combining their experiencesoutside the classroom with the experiences gained from reading textbooks.

Thisstudy will reveal to the students the various interesting activities theyshould involve in while studying Agricultural science and they will acquirebetter and adequate knowledge of how best to study Agricultural science.Through out-door laboratory, rote learning will be minimized or even stoppedand teaching will be seen as a productive practical-oriented venture. What theteacher will impart on the students will be more meaningful and the teacher'swork will also be much more appreciated and more easily understood.

The research findings will help the curriculum planners to planAgricultural science curriculum in such a way that the contents will be filledwith activities which teachers and students will do together. It is expectedthat by involving students in practical activities, they will not only learnAgricultural science concepts but will also acquire skills and developscientific attitudes to problem solving.

The findings of this study will provide a basis for decisionamong teachers on the effective teaching methods to be adopted in Nigerianeducational system to make Agricultural science teaching more meaningful andinteresting to the students. Also it will enable Agricultural science teachersto adjust their teaching patterns and recognize students ownership of ideaswhich will be negotiated in the classroom.

The findings of this study will also hopefully furnish authorsof secondary school agricultural science textbooks with vital information thatwould enable the textbooks appeal to the experience, retention and achievementof students. Also, the findings of this study will among other things specifythe type of activities that are learner centered and of interest to studentsand which if included in the texts they use, will motivate them to add moremeaning by combining their experiences outside the classroom with theexperiences gained from reading textbooks. The findings of this study will alsoserve as a source of information to those interested in doing further researchin this area. The benefits of effective teaching and learning of Agriculturalscience in the school manifest in the society in a number of ways for instance,the application of the knowledge of the subject in solving health, nutritionand even economical problems in the society by the students. This will make thesociety a better place. The findings of this study will also serve as a sourceof information to those interested in doing further research in this area.

This study is also theoretically justified by the fact thatcognitive development takes place from the active interaction of the child withhis environment. This means that the basis of learning is the child's ownability as he interacts with his physical environment. This has a closerelationship with the out door laboratory which is student-centered.

In other words, the out-door laboratory method in conformitywith the theory emphasizes active interaction of the learner with hisenvironment while the teacher guides or facilities the interaction. The resultof this study would therefore help in authenticating the tenet of Piaget'stheory.

Scope of the Study

The study was delimited to the investigation of the effect ofthe out – door laboratory method on secondary schools students' achievement andretention of Agricultural science concepts. The investigation was restrictedonly on the topic-Fowl as found in the section of the senior secondary schoolagricultural science curriculum meant for S.S.II students. Fowl as a topicdeals with meaning of fowl, Anatomy and physiology of a fowl, fowlreproduction, environmental physiology of a fowl and fowl management.

The study was carried out with only S.S.II agricultural sciencestudents in two co-educational secondary schools in Nsukka local governmentarea of Enugu state. The decision was taken to ensure that gender which is amajor variable of interest in the study receive adequate attention. S.S.IIAgric students were used for the study because the topic: Fowl is in theircurriculum and they are also preparing for SSCE/NECO/NABTEB exams.

Research Questions

The following research questions were developed to guide thestudy. What are the

1. Effectof out-door laboratory method on students' achievement in Agriculturalscience?
2. Effectof out-door laboratory method on students' retention in Agricultural science?
3. Interactioneffect of method and gender on students' achievement in Agricultural science?
4. Interactioneffect of method and gender on students' retention in Agricultural science?

Research Hypotheses

The following null hypotheses which were tested at 0.05 level ofsignificance were formulated to guide the study.

1. There will be no significant difference in the meanachievement scores of students taught Poultry production (fowl) through outdoor laboratory method and those thought through classroom interaction (indoormethod)
2. There will be no significant difference in the mean retentionscores of students taught Poultry production (Fowl) through out-door laboratorymethod and those taught through classroom interaction (indoor method)
3. There is no significant interaction effect of methods andgender on students' achievement in Agricultural science.
4. There is no significant interaction effect of methods andgender on students retention in Agricultural science.

EFFECT OF OUT-DOOR LABORATORY ON STUDENTS' ACHIEVEMENT AND RETENTION IN AGRICULTURAL SCIENCE

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