International Letters of Social and Humanistic Sciences *Online: 2015-10-05*
ISSN: 2300-2697, Vol. 61, pp 70-81
doi:10.18052/www.scipress.com/ILSHS.61.70

EFFECTS OF TWO METHODS ON STUDENT'S ACHIEVEMENT IN JUNIOR SECONDARY SCHOOLS IN YAKURR, CROSS RIVER STATE

[1]J. GBENGA ADEWALE (Ph.D), [2]EFFIONG, OJI EKPO

[1]International centre for Educational Evaluation, Institute of Education,
University of Ibadan, Ibadan – Nigeria.
[2]Department of Integrated Science, Cross River State College of Education
Akamkpa – Nigeria
Corresponding Author: gbengaadewale@yahoo.co.uk

Keywords: Guided inquiry, Expository lecture, junior school, Basic science, student's achievement, Yakurr

ABSTRACT. In Nigeria, student's performances in basic science in the public examinations have not been encouraging over the years. The conventional method of teaching employed by the teachers has been one of the salient factors contributing to the discouraging performance. Previous studies have examined different instructional methods in different subjects without paying much attention to the use of guided inquiry and expository lecture methods on student's achievement in Basic science in Yakurr. This study therefore investigates the effects of guided inquiry and expository lecture methods on students' achievement in junior secondary school Basic science in Yakurr, Cross River State.

The study adopted a pretest-posttest non-randomized control groups design using one experimental group and one control group with a 2x2x2 factorial matrix. Four schools were randomly selected from Yakurr LGA. Junior secondary school students in year II(Jss2) in intact classes in each school were used. Two validated research instruments: Basic science Achievement test (BSAT)(r=0.97) and study habit inventory(SHL)(a=0.81) were used. Four hypotheses were tested at 0.05 significant level. Data were analyzed using analysis of covariance (ANCOVA).

There is a significant effect of treatment on student`s achievement in basic science. Students in the guided inquiry method had a higher mean score than those exposed to expository lecture method. Gender and study habit did not have significant main effect on student's achievement in basic science. The three-way interaction effects of treatment, gender and study habit did not have significant effect on student's achievement in Basic science.

Guided inquiry method is superior to expository lecture method. Classroom teachers, educational psychologists, school administrators, educational planners and counselors should therefore embrace the use of guided inquiry method of teaching in the classroom.

1. INTRODUCTION

There is an increase in social concern over the performance of students in school examination. People tend to agree that student's performance has been a threat to the students and the entire society. This is exemplified by the poor cognitive performance of students particularly in Basic science has been very poor (Igbokwe, 1995).

Science is the foundation upon which the bulk of the present day technological breakthrough is built. Nations all over the world including Nigeria are striving hard to develop scientifically and technologically.Owolabi(2004) define science as an integral part of human society whose impact is felt in every sphere of human life, so much that it is intricately linked with a nation's development. Science is the theory upon which the technology is built, without science; there cannot be intuition for technology (Odeleye, Olusola and Awodun 2010). In the past, science is taught as integrated science at junior secondary school level.

Integrated science being the foundation for the sciences deals basically with the fundamental unity of science. It includes subjects like mathematics, physics, Chemistry, Biology, Geography, Physical and Health Education. It also cuts -across many other fields of human study. Today, based on recent development in science and technology, integrated science is taught as Basic science in

junior secondary schools. This is why this work emphasizes on Basic science.Basic science is an enquiry-oriented discipline that helps in sharpening the learner's intellectual developments and also building his attitudes. As a subject, basic science offers students the opportunity to look at science in a new way, not following the traditional divisions of biology, chemistry and physics.

The study of Basic science gives students and teachers a chance to look at the ways in which science is important to our societies and to their development. Basic science can be more relevant to development issues, and should be topical and useful, rather than dry and academic.

Basic science has enabled human societies to build huge industries through industrial science which have helped to improve standards of living and have also brought wealth and prosperity. Techniques on food supply as well as health sector have also evolved. All these are traceable to the importance of Basic science. Basic science inculcates into the students the ability to manipulate things in nature.

Basic science helps students to understand scientific problems as well as finding possible solutions to the problems. Basic science lays a foundation for specialized science study as well as increased understanding of the environment. Basic science introduces the students to logical thinking and scientific method. It arouses the student's curiosity thereby developing scientific attitudes in the students.

However, all Basicscience programs have some common elements such as the programmer's adherence or indifference to compartmentalization of science into discrete subject disciplines, of the traditional type, and an acceptance of Basic science as a unified course presented to students to provide a foundation for scientificliteracy, future scientific career and personal growth.

Notwithstanding the tremendous growth, development and role of Basic science in inculcating desirable values and skills, the discipline has been faced with many problems. Such problems among others are traceable to some factors; such as;

(i) the shortage of scientific equipment, lack of laboratory facilities, cognitive functioning of students, home conditions, peer group behavior, school conditions, teacher's methodology/pedagogy, and emotional predisposition of students.
(ii) Inadequate pedagogical training of teachers resulting in poor teaching and learning (Oyedeji 2000)
(iii) Economic and socio-cultural background of students (Ayedun and Ebeh, 2000)
(iv) inadequate Basic science textbooks and teaching aids (Ale 1981, Georgewill 1990)
(v) Inadequate number of qualified and dedicated teachers (Georgewill 1990)
(vi) Negative attitudes of students towards Basic science(Ogunniyi, 1996)
(vii) Poor instructional strategies (Georgewill 1990, Jacques, 1994)

The above problems have however resulted to poor performance of students in Basic science learning.

In the past, research efforts had been focused on identifying factors that militate against student's learning outcomes in Basic science. For instance, there are indications that self-concept, gender stereotyping, motivation, interest in the subject as well as the abstract nature of the subject could influence learning outcomes in Basic science (Afemikhe, 1985, Fennema, et al 1987, Pisgahi, 1970). Additionally, the manner in which the subject is presented to students can significantly influence their interest and knowledge. While the manner of presentation is supposed to be activity-based, most Nigerian secondary school teachers rely on expository lecture method. Studies like those of Ajeyalemi(1983), Kay(1986), Umeoduagu(1994), Okobia(2000), Akpochafo(2001) and Arisi(2002) have pointed out that despite the thirty(30) years existence of learning style theories(detailing how people learn), most teachers still dispense information using traditional lecture methods without regard to student's learning abilities. These methods are theoretical, extremely didactic and teacher-directed, instead of being experimental or activity-based.

According to Abegunde (1981), the procedure teacher employsinvolves new dimensions in learning in which inputs are made to satisfy the native and need of the learners, the demands of the subject matter and the needs of the learner's society.

Through the ages, the phenomena that different teaching styles affect achievement differently has been globally tested and trusted. Olawoye (1996) said that the knowledge of the various forms of teaching methods exposes the teacher to adopting good and well researched methods in order to stimulate and motivate students to greater learning. Each new period with technological changes brings new knowledge and new ways of gaining it. There is a large number of information hard to remember and new information technology is giving total new situation towards learning (Zadar, 2000).

Teaching methods are primarily description of learning objectives oriented activities and flow of information between teachers and students. The methods of teaching for the effective teaching of Basic science are the innovative ways of imparting knowledge to learners. They usually involve interactions between the teachers, the instructional facilities, the learners and the classroom environment. There are different methods and techniques of teaching Basic science and like the other school subjects, there are no best method of teaching. A method that is appropriate for a particular subject matter in a particular level may be inappropriate elsewhere. This is because varieties of factors combine to determine how effective or otherwise a method is.

The effective teaching of Basic science could be measured by examining the methods of teaching applied by teacher vis-à-vis the performance of students in school examination (Adeyemi,1981). It is observed nowadays that learners perform badly in the school subjects and many research works such as Adegbile (1990 and 1999) and Adeagbo (2005) have found that one of the major causes of this problem is poor methods of teaching.

A subject teacher should not just have a sound mastery of the subject matter, he should also be versatile in the methods of teaching. This is a way of having various methods of teaching at one's disposal and being able to make use of them appropriately. Teaching methods could be regarded as the vehicle through which a message is delivered. The existing method of instruction in the normal classroom setting is the conventional methods of instruction. Among such conventional methods of instructions are project method, Socratic method, Montessori method, field trip, lecture methods etc Salami (1999).

Adima (1987) discovered that the problem of students not learning the subject properly is caused by the subject methodology. The general poor performance of students in Basic science in junior secondary schools is evident in the JSSCE results which always indicate consistent poor performance of students. The teacher therefore has to be adequately and efficiently grounded in pedagogy. With good professional background, the teacher will be able to determine each child's background, the peculiarities of each subject that is related to Basic science and arrange learning experiences based on individual differences in the subject. This will help students not only to understand Basic science but how it influences their future career. In view of this, Chalmer and Keown (2002) argue that teachers are most effective in teaching when they are developed professionally, personally and socially.

Effective instructional strategy leads to improve students' performance whereas poor teaching strategy leads to poor performance and frustration on the part of the students. Odogun (1995) report vividly that poor performances of students are a direct result of techniques employed by teachers. Therefore, effective instructional strategy not only improves students' performance, but motivates the learners. It is in view of the importance of instructional strategy in improving students' performance that researchers continue to seek for appropriate strategies that will ensure effective teaching and learning (Brown 1999).

In this study, the Guided inquiry based learning and the Expository lecture method of teaching/learning shall be considered. This is because the strategies will help to develop students' thinking and decision making abilities which are vital in equipping learners to live, interact effectively and meaningfully with their environment, and bringing about the much desired educational improvement.

Guided inquiry based method is always known to be an effective teaching method due to its interactive nature. Questions are asked by the teacher with an intention to know what the students have learnt from earlier discussion and help in deciding what should be taught further. In guided

inquiry, students practice problem solving,critical thinking skills to arrive at a conclusion.(Instructional methods information, 2010). This teaching method is extremely student-centred and student-directed and can be modified for students at any level reaching them where they are. The method gives students the opportunity to investigate a problem and find answers to questions. This is achieved through the gathering and processing of information in order to find solutions and to draw conclusions from them.

The teacher should encourage this in a positive way so that the student's critical thinking is developed. The guided inquiry based method of learning encourages the learner to find out, investigate and evaluate facts, ideas,knowledge and information in Basic science. The method tends to develop in learners the skill of finding out on their own. It motivates students to learn and also promotes the skills of essential thinking in learning.

The Expository lecture method is the second method examined in this study.. Expository as a conventional strategy has not actually helped to achieve the much desired improved performance needed by the learners. In view of this, Awolu and Esugbohungbe (2002) pointed out that learners are just passive recipients of information, and there is very little interaction between learners and the teacher, hence this strategy of teaching may not achieve desired objective of Basic science. This is because the strategy operates under the assumption that the learner is an empty vessel which the teacher must fill with knowledge. It is imperative to note that, no matter how easy the expository lecture method of teaching/learning may appear to an observer, the real key to success is the same as any other teaching effects, organization and planning (Dada, 2000), Ochonogor and Ajaja (2005).

Another variable which must not be left out in considering student's learning outcomes in Basic science is gender differences. Gender as a variable is believed would influence students' learning, guides the teacher on the method or strategy to use so as to improve effective performance in Basic science.

Study habit is also another variable of interest in this study which is believed would influence students' learning and improves performance in Basic science. Study habits are learning tendencies that enable students work privately. Study habit can be good or poor. A good study habit is a systematic and coordinated way a student uses to gain greater access to learning materials and develop confidence in his/her academic work (Agbaje 2010). A poor study habit on the other hand, is where a student is not conscious about learning materials thereby performing poorly in academic work and developing lack of confidence in him or herself (Sainji 2003). A good study habit creates awareness in the students, which in turn provides them with career awareness skill.

The use of effective instructional strategy such as the guided inquiry strategy will promote good study habit and as well address the issue of gender disparity or bias in students' achievement in Basic science. But the introduction of a poor teaching strategy such as the expository lecture method will create an educational imbalance. This leads to students' poor study habit and discrepancies in gender thus affecting students' achievement in Basic science.

Statement of the Problem

This study seeks to determine the effects of the Teacher Guided Inquiry and the Expository Lecture methods on students in Basic science among junior secondary schools. It will also specifically find out how gender and study habits affect students in Basic science and how these two variables interact with the guided inquiry and expository lecture methods in raising student's achievement in Basic science.

1.3 Research Hypotheses

The following hypotheses were tested at 0.05 significantlevel.

1. There will be no significant main effect of treatment on students'achievement in Basic science
2. There will be no significant main effect of gender on students'achievement in Basic science.

3. There will be no significant main effect of study habits (high or low) on students'achievement in Basic science.
4. There will be no interaction effect of treatment, gender and study habits on students'achievement in Basic science.

Methodology

The study uses a quasi-experimental design with a non-randomized pretest and post-test control group design. It adopted a 2x2x2 factorial matrix. The outcome of the design is shown below;

Experimental Group $O_1X_1\ O_2$
Control Group $O_1X_2\ O_2$

Where:

O_1 represents observations in the pre-test,
O_2 represents observation in the post-test.
X_1 and X_2represent experimental and control group respectively.
The outline of the design is shown in the Table 1 below

Table 1. 2x2x2 Factorial Matrix

Treatment	Study Habits	Gender	
		Male	Female
Guided Inquiry	High		
	Low		
Expository Lecture	High		
	Low		

Population and sample

The subject

This consists of all Junior Secondary School students (JSS 2) in Yakurr Local Government Area. The schools involved were public and co-educational, and had been registering students for junior school certificate examination for at least five (5) years. This is to ensure comparability of the schools.

Sampling and Sampling Procedure

A random sampling procedure was used to select four (4) comparable public Junior Secondary Schools in Yakurr Local Government Area in Cross River State. One arm of JSS 2 was randomly selected and intact class was used as samples in each of the four schools selected. Two schools were randomly assigned to experimental study by using guided inquiry strategy as treatment while the other two schools were randomly assigned expository lecture strategy as control.

Table 2 below shows the number of students in the experimental (Guided inquiry treatment) and control (Expository lecture strategy) group.

Table 2. Number of students in the experimental and control groups

S/N	Name Of School	Group	Male	Female	Total
1	School 1	Experimental	27	23	50
2	School 2	Control	24	26	50
3	School 3	Experimental	30	20	50
4	School 4	Control	21	29	50
	Total		102	98	200

Instrumentation

The instruments for this study are the stimulus and response instruments.

(i) The stimulus instruments are the treatment packages which include:
(a) Guided inquiry teaching strategy
(b) Expository lecture strategy

(ii) The response instruments are:
(a) Basic Science Achievement Test (BSAT)
(b) Study Habit Inventory (SHI)

Basic Science Achievement Test (BSAT):

The Basic science achievement test was designed by the researcher to measure acquisition of knowledge, comprehension and application. The test has two sections, section Aconsists of students' personal profile such as name of school, sex, age of students. Section B is a 30-item multiple choice test chosen out of initial draft containing 50 items with four options lettered A-D.The test items were constructed with reference to the lesson objectives specified for the content.The content of the test covered all the topics taught during the experiment. The number of items picked for each topic was proportional to the number of sub concepts and ideas covered within the topic.

Table 3 Below shows specification and distribution of the questions as used for the selection of items.

Content	Knowledge	Comprehension	Application	Total
Element, compound and mixtures	1	4	3	8
Digestive system	2	8	-	10
Excretory system	7	-	5	12
Total	10	12	8	30

The above table was developed by identifying the cognitive level of testees and the proportion of time spent on each topic.The initial items were typed and given to two Basic science teachers in secondary schools who are also experienced teachers in Junior Secondary school for proper scrutiny and vetting. They were requested to ascertain the suitability of the items with reference to the target population and in terms of clarification and language. The 30 difficulty index was 0.73 and the discrimination index was 0.46. The reliability index of Basic science achievement test was 0.97. This was established using Kuder Richardson 20 formula 20(K20).

The criteria used for validity were;
(i) Difficulty indices were determined
(ii) Discrimination indices were also determined
(iii). Results of foil analysis were also used for the modification of items and options noticed to be ambiguous.

Study Habit Inventory (SHI)

The study habit inventory designed by Bakare (1977) was adopted. It consists of two sections; the first section shows background information of the subjects. The second section is made up of 45 Likert type items in eight (8) sub-components. The sub-components measure the study habits of students. It includes work and assignment, time allocation, reading and note taking, study period procedure, concentration, written work, examination and teacher consultation. The participants responded to a 5-point Likert scale response options of;

Always never,
Less than half of the time,
About half of the time,
More than half of the time,
Almost always.

It was recently validated by Ola andMakinyo (2010), Ighallo (2014) and test re-test reliability estimates of 0.83 and 0.64 were obtained respectively. In addition, Cronbach alpha was used to establish0.81reliability co-efficient of the instrument.

Research Instructional Packages

The package consists of well-prepared lessons on the selected course content. The Basic science textbooks prescribed for use in all the junior secondary schools in Cross River State were consulted for the various content objectives treated under the subtopics prepared for students by the publishers. The textbooks are;

(a) UBE Basic science textbook by F.O.C Ndu and E.O Somoye. Longman publication
(b) Basic science and Technology BK 2 by IdodoUmeh.
(c) Nigerian Integrated science textbook 2 by STAN
(d) SimplifiedBasic science for JSS byEseyinOlushola O.

The package was prepared on weekly basis. The package has in its outline the period, topics, subtopics, duration, instructional aids, behavioural or specific objectives, presentation (teacher and student activities), evaluation, summary, assignment as well as referencing.

Procedure for Administration of Instrument

In other to collect the data, three phases were used by the researcher. These are; the pretest, treatment and the post test. During the first week of the experiment, the Basic science achievement test was administered in all the four schools used for the study. This was collected immediately with the help of the Basic science teachers in the school on the sameday. This was followed by the administration of the Basic science attitude scale both as pretest. After the pretest, teaching commenced by the participating teachers. The investigator during the period paid unscheduled visits to these schools so as to ensure that the participating teachers do not derail from the instructional guides. One topic was taught per week out of the three topics and the experiment lasted for four weeks. The post tests of Basic science achievement test and study habit inventory were admitted on the last two days of the experiment in that order. These tests were conducted in all the four schools used for the study at the same time. The scripts were also collected immediately after the test.

Data Analysis

The data gathered from the study were analyzed using the Analysis of Co-variance (ANCOVA). This is evident on the **2x2x2** factorial representation of the study design. ANCOVA was used to determine the group differences, using the pretest as covariate. Where the main effects were significant, marginal means was employed to detect the magnitude and the direction of the effect.

RESULTS AND DISCUSSION

The four research hypotheses were tested as follows;

Research Hypotheses 1

There will be no significant main effect of treatment on students' achievement in Basic science.

Table 4 shows the main effect of treatment on student's achievement in Basic Science.

Table 4. Summary of a 2x2x2 Analysis of covariance (ANCOVA) in Basic science treatment, gender and study habit.

Sources of variations	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Pretest	1880.526	1	1880.526	239.459	.000	.556
Treatment	3972.604	1	3972.604	505.857	.000	.726
Gender	160.443	1	160.443	20.430	.000	.097
Study habit	4.288	1	4.288	.546	.461	.003
Treatment * gender * study habit	.337	1	.337	.043	.836	.000
Error	1499.964	191	7.853			
Total	56419.000	200				
Corrected total	8089.595	199				
a. R Squared = .815 (Adjusted R Squared = .807)						

The table shows that there is a main significant effect of treatment on students' achievement in Basic science. The obtained F ration is 505.857, P > 0.05. The null hypothesis one is rejected. The partial eta squared of 0.726 implies that treatment (guided inquiry and expository lecture) account for 72.6% of the observed variance in achievement in Basic science.

Table 5 Estimated Marginal Means for Treatment

Treatment	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Experiment	20.044	.285	19.481	20.607
Control	10.929	.286	10.365	11.493

Table 5 presents the estimated marginal means for the treatment. The table shows that the group in the experimental setting had a mean score of 20.04 while those in the control had a mean score of 10.93. This implies that the students exposed to the guided inquiry are better than those exposed to the expository lecture method.

Research Hypotheses 2

There will be no significant main effect of gender on students' achievement in Basic science.

Table 4 shows that the main effect of gender on students' achievement in Basic science is significant. F (20.430), P > 0.05. Therefore the null hypothesis Ho_2 was rejected. The partial eta squared of 0.97 implies that gender (male or female) account for 9.7% of the observed variance in achievement in Basic science.

Table 6 Estimated Marginal Means for Gender

Gender	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Male	16.393	.285	15.831	16.955
Female	14.580	.286	14.015	15.145

Although, gender did not have a significant effect on students' achievement in Basic science, male students performed better with a mean score of 16.39 than the female students with a mean score of 14.58.

Research Hypotheses 3

There will be no significant main effect of study habits on students' achievement in Basic science.

Table 4 shows that the main effect of study habit is not significant in Basic science. F = 0.546, P > 0.05. Therefore we do not reject the null hypothesis. The partial eta squared of 0.003 implies that study habits account for 0.3% of the observed variance in achievement in Basic science.

Table 7 Estimated Marginal Means for Study Habit

Study Habit	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Low	15.299	.286	14.735	15.862
High	15.674	.285	15.112	16.237

Although, study habit did not have a significant effect on students' achievement in Basic science, students with high study habit performed better with a mean score of 16.67 than the students with low study habit with a mean score of 15.30.

Research Hypotheses 4

There will be no interaction effects of treatment, gender and study habit on students' achievement in Basic science.

Table 4 shows that interaction effect of treatment, gender and study habit is not significant on students' achievement in Basic science. F ratio = 0.043, P > 0.05. Therefore the null hypothesis Ho_7 is rejected. The partial eta squared of 0.000 implies that interaction effect of treatment, gender and study habit account for only 0% of the observed variance in students' achievement in Basic science.

Table 8. Set of means showing interaction effect of treatment, gender and study habits on students' achievement in Basic science.

Treatment	Gender		Study Habits	
	Male	Female	low	High
Guided inquiry	21.38	19.24	19.98	20.55
Expository lecture	11.25	10.27	10.60	11.08

Table 8 shows that the mean ($\bar{x}$ = 21.38) for male students in guided inquiry was the overall best while the expository lecture strategy recorded the overall least mean ($\bar{x}$ = 10.27) for female students. The table also reveals that the guided inquiry strategy has the highest mean ($\bar{x}$ = 20.55) for study habit of students as against the expository lecture strategy which has a mean ($\bar{x}$) of 11.08.

Main Effect of Treatment on Student's Achievement in Basic Science

The result showed that there is a main significant effect of treatment on students' performances in Basic science. The main effect of guided inquiry strategy was the best while the expository lecture strategy has the least main effect of treatment. This indicates that guided inquiry method is capable of improving students' achievement in Basic science than the expository lecture method that is the control. This is probably because it is a strategy that motivates and encourages both the students and teachers during classroom interaction. In this method, the teacher provides the students with opportunity to discover new truths, rules and methods to tackle problems as well as new values for themselves. In the study, the teacher provides the student materials to manipulate explore and experiment in order to find out facts and gain knowledge by themselves. All these are seen as capable of improving the teachers' effectiveness and as well enhancing students' performance in Basic science.

The findings of this study support the view of Gauvanin (2001) and Vygotsky (1987) when they saw the guided inquiry method as a way of helping the students to discover the truth and improve in knowledge. The findings also corroborates with that of Heather Banchi and Randy Bell (2008) when they assert that progress and outcomes are generally assessed by how well people develop experimental and analytic skills, and often how well they work in groups. Harry (2002) work also supports this finding when he maintained that guided inquiry strategy helps the students to be more focused and sharpened or reinforced their processes of observing, making inferences and predicting. This assertion was affirmed by Metz, 2004; Wallace et al 2004; Colburn 2000 and Blonder et al 2008.

The expository lecture method was on the other hand found to be less effective than the guided inquiry method in improving students' performance in Basic science. This is because it is a direct instructional method of teaching and learning (Fax 2006:12). The findings support the work of Cheung 2007 when he listed the obstacles emerged during the implementation of this method in a study with chemistry teachers include scarcity of effective research materials, pedagogical problems, crowded classes, fear of encouraging students to misunderstanding, students' complains, fear of assessments, scarcity of teaching materials, teachers being among others. The reason for this is the lack of methodological knowledge as well as scientific contents (shedletzky and Zion 2005). Expository lecture method as a conventional strategy in this study has not actually helped to achieve the much desired improved performance needed by the learners (Onuka 1985).

Effects of Gender on Student's Achievements in Basic Science

The result showed that there is a significant effect of gender on student's achievements in Basic science. The mean scores presented in table 5 in guided inquiry strategy, the male has a mean of 21.38 and the female students have a mean of 19.24. Also in the expository lecture which is the control group, the male students have a mean of 11.25 while the female students have a mean of 10.27. The mean of the male students both in the experimental and control groups is higher than that of the females. This shows that gender of students is significant in the academic achievement in Basic science. The findings of Adeigwe (1992), Kanler (1994), Bajah and Bozima (1978) which say that boys generally do better than girls in school work support this result. Similarly, Balogun and

Olarewaju (1980) also found that female students proved to be better in problem solving than their male counterparts. However, Adepoju (1998) did not find any differences in achievement between boys and girls.

Main Effect of Study Habit on Students' Achievement in Basic Science

The result of this study showed that study habit was not significant in students' achievement in Basic science. The content, nature and level of understanding of the JSS II students in Basic science could be attributable for this. This is evident on the fact that students need to be guided adequately and tutored on the relevance of good study habit. Hassan (1983) and Sanda (2004) as quoted by Agbaje (2010) explained that the activities a learner must carry out to have good study habit to improve in his/her performance include regular class attendance, good note taking, and good study environment among others. This study defiles the work of Abbey (1993) in an ex-post facto design involving 624 Junior Secondary School class three (3) students in Oyo state, where he found that study habit influenced achievement in social studies. He also found out during the study that most of the variables that had indirect effect on the students' achievement in social studies did so via study habits. Owolabi (1990) investigated the study of 274 Nigerian Secondary School Students, and the result showed no relationship between study habit and academic achievement which is in line with this study.

Interaction Effect of Treatment, Gender and Study habit on Students' Achievement in Basic science

The findings show that there is no significant interaction effect of treatment, gender and study habit on students' achievement in Basic science. This implies that treatment, gender and study habit did not combine to influence students' achievement in Basic Science.

Although there is the general belief that treatment, gender and study habit can influence students' achievement in any school subject, the result from this study is contrary to that belief. However, it is imperative and significant to note that the various studies that have been carried out on students' achievement in school subjects indicates that the way the students study a subject at school is dependent on their choice of subject and activities (Yarmey,1999, Botvinick, Wang, Cowan, Roy, Bastianen, Mayo and Houk 2009). Most importantly, it should be noted that the finding revealed that the students, irrespective of their gender and study habit differences, placed high premium on the treatment used in this study.

2. CONCLUSION AND RECOMMENDATION

The findings of the study revealed that students that were exposed to guided inquiry strategy performed better than those exposed to the expository lecture strategy (control group). In guided inquiry, the teacher actually plays the important role in providing the structure and opportunities for learners to develop their skills in both the learning and teaching in the strategy. Based on this, it is therefore important that teachers begin to think in how they can provide the opportunity and structure to do inquiry in everyday lesson.

The results and findings of this study should be a way of ensuring better response to life changes in the real world, outside the classroom environment rather than being additional data to the understanding of the theories in the teaching and learning. From the findings, it is also imperative to note that if the guided inquiry strategy is employed in schools, and students encouraged and motivated in Basic science class, there is the possibility of inculcating into the students life-long skills that will enhance effective teaching/learning of Basic science in Junior Secondary Schools.

In order to improve the poor performance of students in Basic science at both internal and external examinations, it is recommended that teachers of Basic science should provide the structure and opportunities for learners to be engaged in inquiry learning strategy and the old stereotyped expository lecture (conventional) method of teaching Basic science should be discouraged.

References

[1] Abe, C. V (1995).A casual model of some socio-psychological variables as determinants of achievement in school social studies.Unpublished PhD thesis, University of Ibadan.

[2] Adegoke, B. A (2012).Statistical methods for behavioural and social sciences research.2nd edition.Everlasting printing ventures.

[3] Adesoji, F. A. and OginniAderonke M. (2012).Students Aptitude indices as predictors of learning outcomes in chemistry.British journal of Arts and social sciences vol 8 No2.

[4] Adesoji, F. A and Olatunbosun, S. M. (2008).Student, teachers and school environment factors as determinants of achievement in SSS chemistry in OYO state, Nigeria.Journal of International social research vol1/2.

[5] Agbaje, A. A. (2010). The impact of study habits counseling and parental combinations towards a better academic performance of students in Uyo metropolis. Journal of qualitative education vol 3 pp 130-138

[6] Aladagao, M. M. (1998). Teaching factors in teaching process in integrated science. Unpublished B.eD.Faculty of Education ABU, Zaria.

[7] Aremu, O. I. and Itiola, O. A. (2002).Formulation effect on the mechanical properties of choroquinediphosphate tablets.Nigerian journal of Pharmaceutical Research 1 (1) 47-50.

[8] Bajah, S. T. and Bello, O. O.(1996). History of the Science Teachers Association of Nigeria. Ibadan. STAN.

[9] Bakare, C. G .M. (1976). Academic need achievement scale manual, department of guidance and counseling, University of Ibadan.

[10] Bakare, C. G. M. (1977). Study habit inventory in Azikiwe (1988). Study habits of university students WCCI region II forum.

[11] Bell, T; Urhahne, D, Schanze, S and Ploetzner R. (2010). Collaborative inquiry learning: Models, tools and challenges. International journal of science education 3(1), 349-377.

[12] Callahan, J. F and Clark, L. H. (1977).Innovation and issues in education planning foe competency.New York Macmillan publishing company. Inc. pp 57-59.

[13] Carew, P. F.C. (1994). Study habits, patterns and academic performance of university students, Maiduguri; Saline Psycho-education services.

[14] Chalmers, L. and Keown, P. (2002).retrieved on http://geog.farmic.edu/sarah/chalmers 4.pdf

[15] Drake, D.D. (2001). Parents and families as partners in the education process: collaboration for the success of students in public schools ERS spectrum.

[16] Effiong, O. E. (2014). Gender parity in repositioning social sciences for national development.Niger Delta journal of education (NIDJOE)vol 1, No 2 pp 248-254.COEASU south-south publication.

[17] Falaye, F. V. (2006).Numerical ability, course of study and gender differences in students' achievement in practical Geography. Retrieved onhttp://journals.mup.man.ac.uk/cg/-bin/pdfdisp//muppdf/RED/7610/760033.pdf

[18] Federal Republic of Nigeria (2004). The National policy on Education, Lagos: Federal Government printer.

[19] Hassan (1983).Psychology of studying and passing mathematics examination.Psychology for everyday living.

[20] Heather Banchi and Randy Bell (2008).The many levels of inquiry.Journal of science and children vol46 No2 pp26-29.

[21] Ighallo, G. O. (2014). Effects of guided discovery, simulation and expository strategies on SSS immediate and delayed recall in Geography. Unpublished PhD thesis, University of Ibadan.

[22] Joe, L. (2009). Guide and strategies. Retrieved on http://edtech.Tennessee edu/-babann on/in-strategies.html

[23] Kelly, A. (1981). Science achievement as an aspect of sex roles. In Kelly, A(ed). The missing half: Girls and science education. Manchester university press pp73-84.

[24] Killen, R. (2007). Effective teaching strategies.Lessons from research and practice.4th edition. South Melbourne, vic. Thomson social science press, 2007.

[25] Kirschner, Sweller and Clark (2006).www.cogtech.usc.edu/.-/hmelo_ep07.pdf

[26] Martin, M. (1983). Retrieved on http://www.sasked.gov.sk.ca/docs/policy/approach/index.html

[27] Mertz (2004).Educational leadership and policy studies.Journal of women in educational leadership 1(4) 303-322.

[28] Ochonogor and Ajaja (2005).effects of discovery and inquiry approaches in teaching/learning. Files.eric.ed.gov/…/Ed527671.pdf

[29] Odogwu, H. N. (1995). The effect of laboratory approach on the performance and the retention of different ability groups in '2' and '3' dimensional geometry. Journal of study in curriculum 59(1,2).

[30] Ogirima, L. A. and James, S. (2009). Strategies for enhancing effective teaching and learning of health education: " A case study of Federal college of Education, Okene". Journal of academic 4(1) ANA.97-101.

[31] Okwilagwe, E. A. (2002). Modern trends in secondary school geography teaching. In S. O. Ayodele, (eds). Teaching strategies for Nigerian secondary schools.Secondary pedagogical support, No 1 pp 121-139.A power house publication.

[32] Onuka, U (1985). Curriculum development for Africa.Africana Feb publishers Ltd. Onitsha, Nigeria.

[33] Sainji, A. (2003). Examination failure and examination phobia among Lakh students in India.Retrieved on http://www.language in india.com/feb2005/verbalabilitynigeria2.

[34] Santrock, J. W. (2001).Educational psychology. New York, McGraw-Hill

[35] Semethrust, W. (1995).Teaching young children to read at home. New York. McGraw-Hill.

[36] Shuell, S. (1992).Planning for instruction. Retrieved on http://edtech.tennesse.edu./-babannon/in-strategies.html

[37] STAN (2005). Nigerian integrated science project pupil's textbook 2. Revised edition.Heinemann educational books, Nigeria plc, Ibadan.

[38] Stevens and Roseline B. (1981). Advance research on teaching exceptional quarterly 2(1) 1-9

[39] Stones, E. (1996).Introduction to educational psychology. University paperback original U.P 172

[40] World Book Encyclopedia (2002).Vol 3 pp214-236.World Book Incor.Chigaro.

[41] Yoloye, E. A. (1995). In Ayodele, S.O; Araromi, M.A; C.A and Isiugu-Abanihe, I.M (eds). Method of classroom teaching. Ibadan: Educational research and study group. Institute of Education.