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Laboratory Teaching: Implication on Students' Achievement In Chemistry In Secondary Schools In Ebonyi State of Nigeria

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Abstract
This study aimed at investigation of the roles of the laboratory in students' academic achievement in chemistry in secondary schools in Ebonyi State of Nigeria. Four research questions and two hypotheses guided the study. A sample of 240 students selected through simple random sampling technique from ten secondary schools in the 3 Education Zones in Ebonyi State was used for the study. A questionnaire instrument developed by the researcher was used for data collection. The instrument was validated by three experts one from measurement and evaluation and the other 2 from chemistry education. The data collected were analyzed using mean and standard deviation statistics. t-test was used in testing the hypotheses. The results showed that the use of the laboratory helps to: develop scientific attitudes in the students towards the learning of chemistry especially practicals, develop scientific skills for problem solving in students among others. Based on the findings, the following recommendations were made: chemistry should be taught in the laboratory, government should build and equip the science laboratories, employ more qualified chemistry teachers in the secondary system.
Key words: Laboratory, chemistry, teaching, achievement, students.

Introduction

The laboratory in the school has been defined by several authors in different ways. Maduabum (1992) sees a laboratory as a place where scientific exercises are conducted by the science teachers for the benefit of the students (learners). The laboratory exercises include; experiments, and other activities which help the students in acquiring scientific skills. Ezeliora (2001) defined science laboratory as a workshop where science is done or where scientific activities are carried out under conducive environment. She also sees the laboratory as a place where science equipment, materials or instruments are housed for security and safety. Igwe (2003) observed that a laboratory can be indoor such as the sufficiently designed and equipped room found in most schools or outdoor involving such places as riverside, workshop, field and even market for carrying out scientific studies. He further stated that what ever the type of laboratory employed in science teaching, the same laboratory experience should be attained, that is a participation n the series of experimental, observational and demonstrating activities which provide opportunity for students to develop understanding of practical and theoretical concepts through solutions of problems.

According to Omiko (2007) "A laboratory is a room, or building or a special period of time equipped and set apart for practical or experimental studies to take place". He sees the laboratory as the heart of a good scientific programme which allows students in the school to have experience which are consistent with the goals of scientific literacy. This implies that science teaching and learning cannot be completely done in a secondary school where there is no equipped laboratory. Ufondu (2009) observed that the laboratory is an indispensable organ of the school if effective teaching and learning of the science subjects are to be achieved.

Oxford Advanced Learners Dictionary Special Price Edition (1998) defined laboratory as a room or building used for scientific research, experiments, demonstration, testing and analyzing of data etc. However, whatever is done in the science laboratory is to obtain or acquire skills that would help to advance scientific knowledge which subsequently would lead to the development of the human society. Dienye and Gbamanja (1990) observed that laboratory method of teaching is an activity involving a two-way approach carried out by one or more persons through the exercise and experimental approaches both of which are useful in science teaching. The experimental approach provides an opportunity for students to seek information using experimental procedures. These procedures call for careful observations and interpretation of data. It has the qualities of questioning, investigating and confronting the unknown.

Udonfu (2009) and Omiko (2015) observed that the use of the laboratory in science teaching has the following benefits:

(1) Laboratory teaching makes the students/learners to learn about the nature of science and technology in order to foster the knowledge of human enterprise of science and thus enhance the aesthetic and intellectual understanding of the child. Dienye and Gbamanja (1990) opined that science is known to be a way of doing certain things by the observation of natural phenomena, quantifying the observed thing, integration of such quantities and interpretation of the results in order to make useful meaning out of the exercise. The students can identify cause and effect relationships and in this process develop important skills.

(2) Learning scientific inquiry skills that can be transferred to other spheres of problem solving (that is acquisition of problem solving skills). One of the basic goals of science education is to help students learn skills that can be applied to other life situations in future. It thus follows that the exercise of transfer of such learning condition must have something in common with the situation to which it will be applied.

(3) Students learning to appreciate and infact, emulate the role of the scientist through acquisition of manipulative skills. The students should be allowed to investigate by:
   (a) Indirect observation of objects and materials for the acquisition of mental as well as manipulative skills, example measuring substances, using weighing balances pictures, cylinder, etc.
   (b) Through multiple trials, students can in the process of fiddling with materials and activities without stated theories arrive at useful conclusions.
   (c) Given a known theory, students can be guided to observe some phenomena selected by the teacher and from such observation make predictions that are likely to occur.

(4) Developing interests, attitudes and values by considering what science entails, it is clear that a field experience has the best potential for stimulating a life time interest in science in the students when accorded the chance for personal experience by handling the real things. Students interest in science increases as they yearn to investigate and explore more about their environment. According to Hancy in Omiko (2007), eight (8) aspects of scientific attitudes exist all of which can be nurtured in the science laboratory in the school. They are; (i) curiosity (ii) open mindedness (iii) objectivity (iv) intellectual honesty (v) rationality (vi) willingness to suspend judgment (vii) humility (viii) reverence for life.

Queensu (2008), an internet website on good practice (laboratory-based learning) states that science educators believe that the laboratory is an important means of instruction in science since late 19th century. According to them laboratory instruction is considered essential because it provides training in observation, supplies detailed information, and aroused pupil's interest. It also goes further to say that "developing and teaching in an effective laboratory requires as much skill, creativity, and hard work as proposing and executing a first-rate research project. They also listed the following number of possible goals that can be achieved through a developed laboratory programme: (i) develop intuition and deepen understanding of concepts (ii) apply concept learned in class to new situations (iii) experience basic phenomena (iv) develop experimental and data analysis skills (v) learn to use scientific apparatus (vi) learn to estimate statistical error and recognize systematic errors (vii) develop reporting skills (written and oral).

Omiko (2015) and Ufondu (2009) were of the same opinion where they observed that laboratory teaching is sometimes used in conjunction with large lecture courses so that students may acquire technical skills and apply concepts and theories presented in the lecture. Omiko (2015) stated that "hands-on experience encourages students to develop a spirit of inquiry and allows them to acquire scientific skills and the right attitude to handle scientific tools and materials. Science laboratory provides students with the richest experiences which they will transfer to the society and their various places of work. It helps in providing the students the opportunities to practice science as the scientist do. In order for the laboratory to be effective, students need to understand not only how to do the experiment, but why the experiment is worth doing, and what purpose it serves for better understanding of a concept, relation, or process.

Shulman and Tamir in Omiko (2007), listed five groups of educational objectives that may be achieved through the use of the laboratory in science teaching.

1. Skills: manipulative skills, inquiry skills, investigative skills, organizational skills and communicative skills.
2. Concept of mastery: For example, hypothesis, theoretical model, taxonomic category.
3. development of cognitive abilities: Critical thinking, problem solving, application, analysis, synthesis
4. Understanding the nature of science – scientific enterprises, scientists and how they work, existence of a multiplicity of scientific methods, inter-relationships between science and technology and among the various disciplines of science.
5. Development of scientific attitudes: For example, curiosity, interest, risk taking, objectivity, precision, confidence, perseverance, satisfaction, responsibility, consensus, collaboration, and liking science.

Based on the roles of the science laboratory in science teaching and learning, it implies that schools without laboratories, where students can carry out biology, chemistry and physics practicals would end up producing or graduating students who will have no knowledge of science practicals required by the West African Examination Council (WAEC) and the National Examination Council (NECO) to pass the senior school certificate examination. Consequently, these students will lack the requisite requirement qualification for courses like medicine, engineering, agricultural science and any of the science related careers.

The chief examiners reports of WAEC and NECO, 2013, 2014 and 2015 indicate poor performance of students in the sciences particularly chemistry. This calls for urgent attention if we are to meet up with the challenging and rapidly growing wealth of scientific knowledge.

Statement of the Problem

The laboratory has been identified as the heart of a good scientific programme which allows students in the school to have experience which are consistent with the goals of scientific literacy. Practical chemistry constitutes a major part in chemistry education, if it is not taught properly the education of the students in the other science courses will be affected negatively. Therefore secondary schools require properly equipped and functional laboratories.

When the students are taught chemistry theoretically, without the practical aspects done in the laboratory, the students will not learn properly. The implication of this means that the role of the laboratory on the academic achievement of the students in chemistry is being ignored. Consequently, the students will;

(i) Lack scientific attitude
(ii) Lack problem solving skills
(iii) Lack scientific inquiry skills
(iv) Lack acquisition of scientific skills
(v) Lack scientific research environment
(vi) Learn chemistry poorly
(vii) Perform poorly in practical chemistry in internal and external examinations.

The solution to the above mentioned effects constitute the problem of this study

Purpose of the Study

This study aimed at investigating the roles of the laboratory on the academic achievement of students in chemistry in Ebonyi State of Nigeria. Specifically, the study tends to;

(i) Determine if the use of the chemistry laboratory in teaching the subject, develops scientific attitudes in students towards the learning of chemistry.
(ii) Ascertain if the use of the chemistry laboratory in teaching the subject develops scientific skills for problem solving in students
(iii) Find out if the use of the chemistry laboratory in teaching the subject, helps the students to learn scientific methods.
(iv) Find out whether the use of the chemistry laboratory helps the students to match their abilities through the laboratory experiences they are exposed to.

Research Questions

The following research questions guided the study;

(1) Does the use of the chemistry laboratory in teaching the subject develop scientific attitudes in students towards the learning of chemistry?
(2) Does the use of the chemistry laboratory develop scientific skills in the students for problem solving?
(3) Does the use of the chemistry laboratory in teaching the subject help the students to learn scientific methods for science learning?
(4) Does the use of the chemistry laboratory in teaching the subject help the students match their abilities through the laboratory experiences they are exposed to?

Hypotheses

The following hypotheses were formulated the by researcher to guide the study.

$H0_1$: There is no significant difference between the mean response of students on development of scientific attitudes and scientific skills as roles of the use of chemistry laboratory in teaching the subject.

$H0_2$: There is no significant difference between the mean response of students on the learning of scientific methods and matching of their abilities through the laboratory experiences they are exposed to;

Methodology

Design of the Study

The research design that was adopted in this study was the descriptive survey research design. In this design, population of the study was studied through collecting and analyzing data from only representative sample of the entire group. The finding from the sample of the population was generalized to the entire population.

Area of the Study

This study was carried out in the three Education Zones in Ebonyi State of Nigeria. The Education Zones include; Abakaliki, Afikpo and Onueke. Ebonyi State is made up of 13 Local Government Areas (Abakaliki, Afikpo, North, Afikpo South, Ebonyi, Ivo, Ikwo, Izzi, Ohaozara, Ohaukwu, Onicha, Ezza-South, Ezza North and Isi-elu). Ebonyi state is bounded in the East by cross state, in the North by Benue state, in the West by Enugu state and in the South by Abia State.

Population of the Study

The population of the study consisted all the chemistry students in the secondary schools in the thirteen (13) Local Government Areas of the state. There are about 212 Government owned secondary schools in Ebonyi State.

Sample and Sampling Techniques

Simple random sampling technique was used to select ten (10) secondary schools from across the three Education Zones in the state. Three schools each from two Education Zones (Afikpo and Onueke) and 4 schools from Abakaliki Education Zone making a total of ten (10) schools. From the ten (10) schools selected for the study, simple random sampling was used also to select twenty-four (24) chemistry students from each of the 10 schools selected and made up a total sample of 240 chemistry students.

Instrument for Data Collection

Questionnaire instrument developed by the researcher was used for the data collection. Questionnaire items were constructed to afford answers to the research questions formulated to guide the study. The questionnaire consisted of two sections. Section (1) sought information on personal data while the second section contains twenty (20) items structured to provide answers to the major research questions. Four (4) likert rating scales of strongly Agreed (SA), Agreed (A), Disagree (D) and Strongly disagree (SD) were used and nominal value of 4, 3, 2 , and 1 were attached.

Validation of the Instrument

The instrument was validated by three experts, one from measurement and evaluation and two from chemistry Education. They made necessary corrections on the items, and their inputs were incorporated in the final draft of the instrument. The final copy of the instrument after the validation was used for data collection.

Reliability of the Instrument

The reliability of an instrument is the consistency of the instrument in measuring whatever it is designed to measure. The final instrument made up of 20 items were subjected to a test of reliability using Cronbach Alpha-statistics. A reliability co-efficient of 0.80 was obtained. This high value shows that the instrument was reliable and suitable for the study.

Method of Data Collection

The researcher and other trained research assistants administered 240 questionnaires in the ten (10) selected secondary schools. The researcher and the trained research assistant administered the questionnaire personally to the respondents and on the spot collection was made. The on the spot collection enabled the researcher to obtain 100% return of the filled questionnaire, it also helped the researcher to offer assistance to the respondents when need arose.

Method of Data Analysis

The data obtained were analyzed and interpreted using arithmetic mean and standard deviation. The numeric values assigned to the different scaling items used are as follows; SA = 4, A = 3, D = 2 and SD = 1. Therefore, the mean for these values was determined by

$$\bar{x} = \frac{4+3+2+1}{4} = 2.5$$, the cut-off-point is 2.5

Decision Rule

The cut-off-point mean is 2.50. Any response that has a mean score of 2.5 and above is accepted while any response with a mean score below 2.5 is rejected.

Results

The results of this study are presented in tables and according to the research questions and hypotheses they addressed.

Research Question 1

Does the use of the chemistry laboratory in teaching the subject develop scientific attitudes in students towards the learning of chemistry?

Table 1: Mean Scores of Responses on the Scientific Attitudes towards Learning of Chemistry

S/N	Items	N	$\bar{x}$	SD	Decision
1.	I am always honest by using the laboratory in learning chemistry	240	3.88	0.72	Accepted
2.	I exhibit curiosity by using the laboratory in learning chemistry	240	2.21	0.85	Rejected
3.	I have come to learn to be patient by using the laboratory for learning chemistry	240	3.31	0.70	Accepted
4.	The use of the Laboratory has made me skeptical of things I do not see	240	3.70	0.81	Accepted
5.	I am not always open-minded due to the use of laboratory in learning chemistry	240	2.43	0.85	Rejected
	Grand Mean		**3.1**		**Accepted**

The results on table 1 above, indicate that the chemistry students in the senior secondary schools agree that the use of the chemistry laboratory develops scientific attitudes in the students towards the learning of chemistry in Ebonyi State of Nigeria, with a grand mean score of 3.1 which is above the cut-off mark of 2.5, hence it is accepted.

Research Question2

Does the use of the chemistry laboratory develop scientific skills in the students for problem solving?

Table 2: Mean scores of respondents on scientific skills development of students

S/N	Items	N	$\bar{x}$	SD	Decision
6.	By using the laboratory in learning chemistry, I learn how to observe	240	3.30	0.85	Accepted
7.	I do not learn how to measure because I use the laboratory in learning chemistry.	240	2.10	0.85	Rejected
8.	By using the laboratory in learning chemistry, I learn how to classify things.	240	3.13	0.78	Accepted
9.	I learn how to predict by using the laboratory in learning chemistry	240	3.28	0.67	Accepted
10.	By using the laboratory in learning chemistry, I learn how to experiment	240	2.52	0.79	Accepted
	Grand Mean		**3.0**		**Accepted**

The results on table 2 above, indicate that the respondents agreed that the use of chemistry laboratory develops scientific skills in the students in Ebonyi State secondary schools, with the grand mean score of 3.0, which is above cut off point of 2.5, hence it is accepted.

Research Questions 3

Does the use of the chemistry laboratory in teaching the subject help the students to learn scientific methods for science learning?

Table 3: Mean scores of responses on the Scientific Method for Learning Science.

S/N	Items	N	$\bar{x}$	SD	Decision
11.	I Lean to think critically by using the laboratory in learning chemistry	240	3.52	0.67	Accepted
12.	I do not exhibit creative thinking while using the laboratory in learning chemistry	240	1.15	0.86	Rejected
13.	I show reflective thinking due to the use of the laboratory in learning chemistry.	240	3.25	0.81	Accepted
14.	I do not imagine things in learning chemistry	240	3.23	0.79	Accepted
15.	I can express some hypotheses by using the laboratory in learning chemistry	240	3.18	0.76	Accepted
	Grand Mean		**3.06**		**Accepted**

The results on table 3 above show that the chemistry students agreed that the use of the laboratory helps them to learn scientific method necessary for effective learning of science in the secondary schools; The grand mean score of the items in table 3 is 3.06 which is above the cut off-point of 2.5, it is accepted because it shows agreement.

Research Question 4

Does the use of the chemistry laboratory in teaching the subject help the students match their abilities through the laboratory experiences they are exposed to?

Table 4: Mean scores of responses on the Matching of Scientific Abilities with Laboratory Experiences

S/N	Items	N	$\bar{x}$	SD	Decision
16.	The use of laboratory helps me to organize information or materials during laboratory experiences	240	3.16	0.86	Accepted
17.	I can identify the materials or reagents to use for any chemistry practical.	240	3.25	0.78	Accepted
18.	I can successfully execute a project or any investigation to be carried out in the laboratory	240	3.40	0.70	Accepted
19.	I find it difficult to retain facts more permanently for any Laboratory experience	240	2.11	0.83	Rejected
20.	The use of the laboratory helps me to draw conclusions based on my findings in the laboratory work.	240	3.0	0.86	Accepted
	Grand Mean		**2.98**		**Accepted**

Table 4 above illustrates the results of the analysis of the items. The results show that all the respondents agreed that the use of the laboratory helps the students to match their abilities through the laboratory experiences they are exposed to. With the grand mean score of 2.98, which is above the cut-off-point of 2.50, is accepted.

Hypothesis: HO_1

There is no significant difference between the mean response of students on development of scientific attitudes and scientific skills as roles of the use of chemistry laboratory in teaching the subject.

Table 5: t-test Analysis between Scientific Attitudes and Scientific Skills

S/N	Variables	No of Pairs	$\bar{x}$	SD	df	t-cal	t-crit	Decision
1.	Scientific Attitude	240	3.88	0.72	119	0.26	1.96	Accepted HO_1
6	Scientific Skills		3.30	0.85				
2.	Scientific Attitude	240	2.21	0.85	119	1.23	1.96	Accepted HO_1
7.	Scientific Skills		2.10	0.85				
3.	Scientific Attitude	240	3.31	0.70	119	1.18	1.96	Accepted HO_1
8.	Scientific Skills		3.13	0.78				
4.	Scientific Attitude	240	3.70	0.81	119	1.80	1.96	Accepted HO_1
9.	Scientific Skills		3.28	0.67				
5.	Scientific Attitude	240	2.43	0.85	119	1.28	1.96	Accepted HO_1
10.	Scientific Skills		2.52	0.79				
	T-test Value				**1.37**		**1.96**	**Accepted HO_1**

From the t-test results on table 5, HO_1 which states that there is no significant difference between the mean response of students on development of scientific attitudes and scientific skills as roles of the use of chemistry laboratory in teaching the subject is accepted. It is accepted because the grand t-test value for t-cal which is 1.37, is less than the t-crit. Value which is 1.96. Hence, HO_1 is accepted. This implies that the chemistry laboratory experience does not affect both scientific attitudes and scientific skills adversely.

Hypothesis: HO_2

There is no significant difference between the mean response of students on the learning of scientific methods and matching of their abilities through the laboratory experiences they are exposed to.

Table 6: T-test Analysis between Scientific Methods and Matching Scientific Abilities

S/N	Variables	No of Pairs	$\bar{x}$	SD	df	t-cal	t-crit	Decision
11.	Scientific Attitude	240	3.52	0.67	119	3.19	1.96	Rejected HO_2
16.	Scientific Skills		3.16	0.86				
12.	Scientific Attitude	240	2.05	0.86	119	1.28	1.96	Accepted HO_2
17.	Scientific Skills		3.10	0.78				
13.	Scientific Attitude	240	3.25	0.81	119	2.13	1.96	Rejected HO_2
18.	Scientific Skills		3.40	0.70				
14.	Scientific Attitude	240	3.23	0.79	119	1.50	1.96	Accepted HO_1
19.	Scientific Skills		3.15	0.83				
15.	Scientific Attitude	240	2.18	0.76	119	1.0	1.96	Rejected HO_2
20.	Scientific Skills		2.20	0.86				
	T-test Value					**1.82**	**1.96**	**Accepted HO_2**

From the results of the t-test analysis on table 6, HO_2 is accepted. HO_2: states that there is no significant difference between the mean response of students on the learning of scientific methods and matching of their abilities through the laboratory experiences they are exposed to. The result is accepted because the grand t-test value for t-cal, which is 1.82, is less than the t-critical value which is 1.96. Therefore HO_2 is accepted. This implies that the chemistry laboratory experience does not affect both scientific methods and matching of scientific abilities adversely.

Discussion of the Findings

The findings of this study showed that many secondary schools surveyed in the three Education Zones in Ebonyi State of Nigeria (Abakaliki, Onueke, And Afikpo) agreed that the use of the chemistry laboratory develops scientific attitudes, such as (honesty, Patience, skepticism, among others) in students towards the learning of chemistry with the grand mean of 3.10 which is above the cut-off point of 2.5 This finding is in agreement with the finding of Igwe (2003), who observed that one of the ways of developing scientific attitudes which include, curiosity, open-mindedness, appraisal of results, humility, patience, honesty, skepticism and accuracy in children is through engaging in practical work. Usually, practical work in secondary schools serves as extension of the students' knowledge, which sometimes confirms or disabuses their current ideas. Omiko (2007) in stating the functions of the laboratory in science teaching observed that the use of the laboratory develops interest, good attitudes and values in students.

The findings in research question two showed that most of the respondents agreed that the use of chemistry laboratory in teaching and learning develops scientific skills in the students for problem solving with the grand mean score of 3.0 which is above the cut-off point of 2.5. This finding agrees with Eze (2006) that says that "students are near blank, in terms of possession of basic scientific knowledge and process skills, as they (the school teachers) do not expose the students to practical sessions in the laboratory, but simply announce abstract science facts to them. This implies that the use of the laboratory is meant to help the students develop scientific skills. Omiko (2007) observed that the use of the laboratory in Science Education helps the students in acquiring problem solving skills.

From research question 3, the findings indicate that most of the respondents agreed that the use of the chemistry laboratory helps the students to learn scientific methods for science learning with grand mean score of 3.06 which is above the cut-off point of 2.5. This finding agrees with Omiko (2015), Igwe (2003) and Eze (2006) they stated that "we get involved in science teaching for three important aspects of human development. These are creative thinking, reflective thinking and critical thinking. Science teaching helps individual learners to develop both in critical thinking, creative thinking and reflective thinking and this enables the students to change their impression about the environment and the world at large.

The findings on research question 4 indicate that most of the respondents agreed that the use of the laboratory helps the students to learn scientific method for science learning with grand mean score of 2.98 which is above the cut-off points of 2.5. This result shows that the use of the chemistry laboratory helps the students to match their abilities through the laboratory experiences they are exposed to with grand mean score of 2.98 which is in line with Bruner, in Igwe (2003) where he stated that the use of the laboratory is the most widely acclaimed strategy for laboratory inquiry instruction. It helps to develop students' ability to organize and classify information, give self-satisfaction and reward to students especially on successful execution of a project or investigation, retain facts more permanently, especially when such facts and information are collected by the students themselves through investigation.

Hypothesis 1 (HO_1), which states that there is no significant difference between the mean response of students on development of scientific attitudes and scientific skills as roles of the use of the chemistry laboratory

in learning chemistry, was accepted; because the grand t-test value for t-cal is less than the t-critical value. This implies that the laboratory experience does not affect both scientific attitude and scientific skills adversely (differently).

Hypothesis 2 (HO_2) which states that there is no significant difference between the mean response of students on the learning of scientific methods and matching of their abilities through the laboratory experiences they are exposed to was accepted, because the grand t-test value for t-cal is less than the t-critical value. This implies that the laboratory experience does not affect both the learning of scientific methods and the matching of their ability through the laboratory experience they are exposed to adversely.

Recommendations

Based on the findings of this study, the researcher made the following recommendations.

- ❖ All the topics in chemistry which are practically oriented should be taught in the laboratory, using all the necessary equipment and reagents. By using the chemicals/reagents, the students would acquire the skills involved in handling dangerous substances.
- ❖ All the science laboratories in the school should be equipped with modern equipment and other necessary teaching aids or instructional materials. The provision of these materials/equipment will help both the teachers and the students in their teaching and learning process.
- ❖ The science (chemistry) teachers should be encouraged to attend conferences, seminars and workshops. This will help them to learn new things, methods and acquire new skills in teaching difficult chemistry concepts
- ❖ The science teachers should be motivated through payment of specially allowance; or they may be placed one step ahead of their counterparts on the same salary grade level.
- ❖ There should be more periods on the time-table for practical chemistry lessons. The teachers and their students should use the correct chemistry textbooks recommended by the federal, and states ministry of Education in teaching the students.
- ❖ There should be an increased and enough finance for the purchase of essential laboratory equipment. As a matter of urgency, adequate provision should be made with regards to practical guide or work book for students and teachers if any meaningful achievement is expected from them.

Conclusion

Based on the discussion of the results on the use of the chemistry laboratory in teaching the subject especially the practical aspects, the researcher observed that: Most of the secondary schools surveyed in the three Education zones of Ebonyi State did not have well equipped chemistry laboratories. Those schools that have laboratories lacked qualified chemistry teachers and untrained laboratory Assistants. For the teachers to perform very well in their teaching career, the school authorities and the Government should build and equip the chemistry laboratories.

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