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Impact of Practical Activities in Chemistry Laboratory Exercise in Senior Secondary School in Nigeria.

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ABSTRACT

Practical activity is the engine for chemistry laboratory exercise. The impact of practical activities in chemistry laboratory exercises in schools was investigated in Nigeria. The study covered all the secondary schools in five eastern states of Nigeria. A survey research design was employed. Four hundred chemistry teachers were used as sample from all the chemistry teachers in the five states. Structured questionnaire was used for data collection. Three research questions were answered. Means and standard deviations were used to answer the research questions. Results show that the practical activities have an impact on the chemistry laboratory exercises by familiarizing with students, helping to induce the scientific attitude to the student as well as helping the students to maintain interest in chemistry. Some recommendations were made such as allotting more time for practical, encourage students to do more practical and so on. Conclusion was drawn from the study.

Keywords: Impact, practical, chemistry, laboratory and exercise.

INTRODUCTION

The need to have all the required equipment in chemistry laboratory cannot be over emphasized. Chemistry laboratory exercises require a practical exercises. Practical involves the use of this equipment. [1], sees nature of science as a process and product. Learning process skills is a preparation to becoming a scientist. When the process skills are applied in science, they are called science process skills. [2], gave a brief explanation of these processes skills. Science and especially chemistry is very important in the development of any nation. The product of science is the development. One of the ways of appreciating chemistry teaching and learning is through effective laboratory instruction. The laboratory activities avail students the opportunity to think logically, ask reasonable questions, seek appropriate answers and solve problems. The availability and maintenance of equipment in chemistry teaching makes chemistry lessons concrete and stimulating and helps to enhance the achievement of the students. No one can do activity in the chemistry laboratory without equipment. [3] defines activity as a thing that you do for interest or pleasure.

Chemistry, described by [4], as the oracle of modern science, it is practical oriented and has a linked to many modern industries. [5], clarified that chemistry teaching advocates students' participation through experimentation and discussion in the laboratory. Chemistry is a scientific study of structure of matter as well as the changes in the structure and composition which matter undergoes [2].

Laboratory is a place equipped for experimental study in science [6]. The laboratory consists of various tools and equipment used by scientists /science students either for the finding of new knowledge or to ascertain previous findings. Science Laboratory is a specially equipped room in a building where science lessons or activities hold on a regular basis or a corner of the regular classroom with table, benches, apparatus, materials, chemicals, equipment or a room containing a collection of teaching aids for students manipulation. Chemistry Laboratory can also be viewed as a room where things can be counted, ordered, recorded, packed, grouped, arranged , measured, joined, partitioned, constructed, experimented, verified among other activities. It is a place where students can learn and explore various science concepts and verify different scientific facts, principles and theories using verities of activities and materials. It is also seen as a resource centre for learning science (chemistry). The use of Chemistry laboratory is based on the principles of learning by doing, observation and proceeding from concrete to abstract in order to limit the spectrum of students' thinking .Based on the above, laboratory is described as a place where functional knowledge, scientific concepts and principles are acquired and unknown identified [7]. [8], reported that there are five categories for classifying laboratory outcomes. These are (a) skills (b) concepts (c) cognitive abilities (d) understanding the nature of science (e) attitudes.

Chemistry is the bedrock of science and technology because many of the analysis on which the scientific and technological advancement depends are the products of chemistry. Chemistry is therefore a core subject in science and technology since it studies the essence of matter. The principles of chemistry have been widely used for various economic purposes.

There are a number of reasons why practical activities is of great importance in the Chemistry laboratory. At first, practical activity helps to familiarize students with such mental processes as counting, measuring, observing, classifying, and inferring hypothesizing, interpreting as so on. Secondly, Practical activities stimulates and maintains the interest of students in science specially chemistry where many have lost interest due to its abstract nature. Thirdly, it induces the scientific attitudes like curiosity, perseverance, honesty, objectivity and endurance.

It is very true that laboratory is a resource- centre for scientific study; it can be the most dangerous place for activity. It could be one of the reasons why most teachers are afraid to do practical work. Many chemistry teachers do not bother how they conduct practical chemistry in the laboratory [6]. That resulted to very poor science skill acquisition in senior secondary school. This poor science skill acquisition by students is not in keeping with the aims and objectives of education in Nigeria which states that, "education should aim at helping the child acquire appropriate skills, abilities and competencies, for the development of his society [5]. A number of factors have been identified as contributing to non acquisition of skills by secondary school students. One of such factors is lack of practical activity in the laboratory. This study is aim at looking at the impact of practical activity in the chemistry laboratory exercises in senior secondary school.

IMPORTANCE OF PRACTICAL CHEMISTRY

For centuries, chemistry educators believe that practical chemistry is indispensable in chemistry teaching and learning processes. Specifically, the importance of chemistry practicals are as follows:

1. It help students develop science process skills such as observing, classifying, predicting, measuring, drawing, recording data, hypothesizing, etc.
2. It promotes the development of scientific attitudes such as objectivity, honesty, curiosity, patience, open-mindedness, etc.
3. It helps students to understand and appreciate the spirit and methods of science such as problem solving, analytic minds and methods of science.
4. It is used to reinforce what is learnt in the theory class and hence encourages the spirit of experimentation.
5. It arouses and maintains interest and curiosity in chemistry.
6. It helps students to develop manipulative skills and proficiency in writing reports.
7. It enhances students' better understanding of concepts and principles and by so doing, significantly contributes to students achievements in chemistry.
8. It encourages students to be active in the class, in other hand, discourages abstraction, rote memorization and inattentiveness in the class.
9. It leads to fundamental and applied research in chemistry at all levels of education.
10. It helps to verify laws and theories that the students have already learnt.

STATEMENT OF THE PROBLEM

Over the years, there was a complaint by the parents, government, teachers and students about the performance of students in chemistry [9]. For the fact that the laboratory

practical's are neglected by the students and teachers, the end result is the poor performance in practical chemistry. Some questions need to be asked in order to have a critical activity on the impact of practical activity on chemistry laboratory. Such questions include, does the practical activity has any value in chemistry laboratory exercise, and will the practical work help to induce the scientific attitude to the student? And will it help to maintain student interest in chemistry?

PURPOSE OF THE STUDY

The purpose of the study is to find out

1. If the practical activity has any help in chemistry laboratory exercises.
2. If the practical activity helps to induce the scientific attitude to the students.
3. If the practical activity helps to maintain students' interest in chemistry.

SIGNIFICANCE OF THE STUDY

The study is very important as it will help the student to learn more the value of practical work in chemistry. The study will encourage the teachers more to do the practical work in school. The future of our society will be brighter as these students will later enter the labour market to practice what they learnt. The practical work will make students do better in school than when they depend on teachers note.

RESEACH QUESTIONS

1. To what extent do practical activities help to familiarize the students in chemistry?
2. To what extent do practical activities help to induce the scientific attitude to the student?
3. To what extent do practical activities help the student to maintain interest in chemistry?

SCOPE OF THE STUDY

The research work is the impact of practical activities in chemistry laboratory in senior secondary schools. The work is limited to eastern part of Nigeria.

METHODOLOGY

The study was carried out in Eastern part of Nigeria using survey design. Precisely the study covered Anambra, Enugu, Ebonyi, Abia and Imo States. A sample of affected states were four hundred (400) chemistry teachers. Structured questionnaire containing 50 items, developed by the researchers was used for data collection. Section A of the instrument (questionnaire) was used to elicit information on the respondents bio data, while section B made up of three parts to sought information on the following: the extent practical activity

helps in teaching chemistry in school, the extent practical activity helps to induce the scientific attitude to the students and the extent practical activity helps the student to maintain interest in chemistry. The instrument was structured on a four point scale of very great extent (4 point), great extent (3 point), low extent (2 point) and very low extent (1 point). The instrument was validated by experts in the field and reliability analyzed using cronbach alpha co- efficient technique and was found to be 0.84 Responses from 2.50 and above indicates positive response while below 2.49 indicates negative response.

RESULTS

Research Question 1: To what extent do practical activities help to familiarize the students in chemistry ?

Table one: Extent practical activity helps to familiarize the students in chemistry?

S/N	ITEM	MEAN	SD	REMARK
	The practical work helps to familiarize the students with mental process as			
1	Counting	2.72	1.21	Large Extent
2	Measuring	2.63	1.01	Large Extent
3	Observing	3.64	1.21	Large Extent
4	Classifying	2.82	1.24	Large Extent
5	Inferring	3.14	.98	Large Extent
6	Hypothesizing	3.22	.92	Large Extent
7	Analyzing	3.01	1.02	Large Extent
8	Interpreting	2.87	1.12	Large Extent
9	Questioning	3.11	0.98	Large Extent

From table one above it shows that the practical work helps to familiarize the students with mental process such as counting, measuring, observing, classifying, inferring, hypothesizing, analyzing, interpreting and questioning to a large extent.

Research Question 2: To what extent do practical activities help to induce the scientific attitude to the students.

Table 2: Extent the practical activity induces scientific attitude to students

S/N	ITEM	MEAN	SD	REMARK
	Extent the practical work induces scientific attitude of students.			
1	Curiosity	3.00	1.55	Large Extent
2	Perseverance	2.72	.82	Large Extent
3	Honesty	3.12	.92	Large Extent
4	Objectivity	3.11	.1.21	Large Extent
5	Endurance	3.14	1.32	Large Extent

6	Trustworthy	2.72	1.42	Large Extent
7	concentration	3.00	1.11	Large Extent

Table two shows that practical activity induces some scientific attitude in students such as curiosity, perseverance, honesty, objectivity, endurance, trustworthy and concentration to a large extent.

Research Question 3: To what extent do practical activities help the student to maintain interest in chemistry?

Table 3: Extent practical activity helps the students to maintain interest in chemistry.

S/N	ITEM	MEAN	SD	REMARK
	Extent the practical work help the students to maintain interest in chemistry.			
1	Core participating to the chemistry	3.00	1.11	Large Extent
2	Put more interest in the chemistry	2.72	1.12	Large Extent
3	Devote more time in the chemistry	2.70	.98	Large Extent
4	Concentrate more during chemistry	2.69	.99	Large Extent
5	Obey the teachers' instruction	2.88	.92	Large Extent
6	Carry out work on his / her own	2.92	.1.02	Large Extent
7	Pay more attention during practical work	2.85	1.11	Large Extent

Table 3 it shows that the practical activity helps the students to maintain interest in chemistry. The results show that they participate, pay attention, devote time, concentrate, obey the teachers during the chemistry class as well as carrying out work to a large extent

DISCUSSION

Practical activity is very necessary in secondary school but; almost all teachers are not doing the practical due to hazard in the practical. Hence, [9], maintained that cases of fatal accidents occurred in schools as a result lack of proper knowledge of the nature and behaviour of certain substances. Also Ali and [10], reported that science materials and equipment were poorly maintained in schools. Most of the chemistry laboratories do not have safety equipment or gadgets. [11], reported that teachers do not possess the required skills for the practice activity. All these show that practical activity is neglected in chemistry laboratory in secondary schools as a result it has great impact in chemistry exercise.

The result of this study it shows that practical activity has a great impart in chemistry laboratory exercises. From research question one, it was discovered that the practical activity makes students to familiarize with the chemistry practical. They will master the following skills of counting, measuring, observing, classifying, inferring, hypothesizing, analyzing, interpreting and questioning. Once the students are familiar with these skills, practical activity will be very simple for them. These are in line with the Nigerian Educational Research and Development Council which in 1999 listed fifteen (15) science process skills which include: observing, measuring, classifying, communicating, predicting, inferring, using member, using space/time relationship, questioning, controlling variables, defining operationally, formulating models, hypothesizing, designing experiment and interpreting data [12] ; [13].

Practical activity also induces the scientific attitude in the student. At least they will be recorded high in the attitude of curiosity, perseverance, honesty, objectivity, evidence, trustworthy and concentration. With these attitudes the spirit of discovery will be with the students. There will be a continuity in the work of chemistry. Also the students will have regard and respect in the work of the teachers. Hence, [14] indicated that practical activities can be regarded as a strategy that could be adopted to make the task of a teacher more real to the students as opposed to abstract or theoretical presentation of facts, principles and concepts of subject matters.

The practical activity will make the students to maintain interest in chemistry. The work will make the students to participate in the exercise. The students will be made to put more interest in the exercise, they will devote more time to chemistry, as well as concentrating more on the chemistry practical. They will obey the teacher as well as carry out work by themselves.

EDUCATIONAL IMPLICATIONS OF THE FINDINGS

The findings of the study have some educational implications for the students, teachers and curriculum planners.

Familiarization of the practical activities aids relation and makes the lesson more meaningful. This is because as the students will master the skills in the practical, it will make the activity very simply to perform. The students can easily manipulate equipment / materials, they will be forced to apply the five senses and other skills to their lesson.

The findings will make the teachers to adopt practical activity method of teaching which is the student centred method. Students learn better when they are involved in the activity.

Activity-based methods enhances understanding of chemistry concepts and increase the abilities to acquire science process skills by the learner.

The findings will help the curriculum planners to consider the students activity in planning.

RECOMMENDATION

The following recommendations were made.

- School should give more time for the practical work in chemistry laboratory.
- Teachers should be motivated to improvise the equipment for the work in chemistry.
- Government should organize more workshops/seminars for the practical work in chemistry.

CONCLUSION

From the study carried out, it has been established that practical activity has a great impact in the chemistry laboratory exercises. It helps the students to familiarize with the chemistry laboratory exercises. In the process of familiarizing with the chemistry laboratory exercise, the students will master the skills as well as inducing the scientific attitude to the students and make the students to maintain interest in chemistry laboratory exercises. With the help of the practical activities the chemistry students will be having excellent results in chemistry.

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