
INFLUENCE OF CHEMISTRY PRACTICAL ON STUDENTS' INTEREST AND ACADEMIC ACHIEVEMENT IN SENIOR SECONDARY SCHOOLS CHEMISTRY

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Abstract

The study determined the influence of Chemistry practical on students' interest and academic achievement in senior secondary school chemistry. The general purpose of the study was how to find out how practical chemistry exercises triggered interest and hence promoted more academic achievement in senior secondary schools chemistry. In order to give this study a sense of direction, two research questions were raised and answered while two hypotheses were formulated and tested at 0.05 level of significance. Literature related to the study was reviewed under conceptual and empirical frameworks. The design of the study is survey. The area of the study is Awgu Education zone. The population of the study was three thousand and five hundred (3,500) SS2 students. The sample and sampling technique were one hundred and fifty (150) SS2 students and stratified random sampling technique. The instruments used are chemistry practical achievement test (CPAT) and chemistry interest inventory (CII). Two instruments were used to collect data. The Data collected were analyzed using Mean and SD. T-test analysis was also used to obtain t-calculated and hence t-critical. Results show that the mean and SD obtained are mean = 112.34 and SD = 13.34. The t-calculated value = 25.56 at DF of 49 and t-critical (P) value = 1.68. The t-calculated for the two hypotheses is greater than the t-critical. Therefore the null hypotheses were rejected. That is to say they are significant at DF of 49 at 0.05 level of significance.

5 Keywords: Chemistry, Practical, Students, Achievement and Interest.

INTRODUCTION

Research in chemistry education has continued to seek better approaches for teaching practical chemistry in order to bring about meaningful learning and to identify factors responsible for persistent problems of low interest and understanding among students. Oleyede (2010); Okeke (2005) and Akpan (2005) conducted researches in practical chemistry involving students' achievement and interest. Akpan (2005) compared students' achievement in the three categories of questions in Qualitative chemical analysis and quantitative chemical analysis and theory of practical in senior secondary school certificate (S.S.C.E) practical chemistry examination. Okeke (2011) found out that students scored the highest mark in theory of practical aspect of the examination. Akpan (2005) inferred that students' low performance was due to lack of in-depth conceptual understanding of chemical concepts behind practical chemistry. Akpan (2005) then recommended the development of theoretical background knowledge of concepts upon which the practical activities would be based. Okeke (2015) and Oloyede (2010) conducted similar researches and found out that students performed poorly in the theoretical aspects of practical chemistry. This postulation seems to suggest that acquisition of concepts behind practical chemistry could serve as prior knowledge to provide meaningful links for learners to participate and maximally acquire knowledge and skills in practicals. Many studies have been conducted on the students' gender and interest in chemistry (Ezeh. 1992) (Okeke, 2011). Anaekwe (1997) conducted a research on the effect of students' interaction patterns (SIP) on students in chemistry including other dependent variables. He reported that there is a significant effect of (SIP) on students' interest in chemistry. Ifeakor (1999) studied the effect of assessment techniques on students' interest in chemistry and reported significant effect on students' interest towards chemistry. In a related study Ezeh (1992) noted that teaching strategies have been known to influence students' interest in chemistry. Joseph (1996) concluded that there are gender differences in senior secondary school chemistry performance. Therefore, there is no consensus view on the contributive factors that affects Nigerian students' disposition in chemistry and chemistry related careers. Truly, interest is very important to understand the individual learner and to guide students' future activities (Ifeakor, 2003).

Teaching and learning of science have significant roles towards technological development in developing countries. Since chemistry is embedded in our life and society, economically, ecologically and societal influences (Okeke, 2011). The performance of students in science based subjects like chemistry is closely

related to their theoretical and practical knowledge (Akpan, 2010). Some are taught in isolation from the process of discovery or the conceptual applications. This however, depends solely on the subject at various classes and also on particular factors within and without the teaching and learning environment (Johnson and Johnson, 1987). The practical experience also contributes an integral part of chemistry science, the subject consist of many topics that can be verified experimentally with an objective to create an enabling environment to stimulate students learning about chemistry that is commonly presumed as abstract, quantitative, and boring (Okeke,2015).

The availability of laboratory equipment's, chemicals and materials, laboratory personnel, working conditions in the laboratory and safety measures, substantial recommended textbooks and accurate periods allocated for the teaching of the subjects. Ezeudu (1995) studied and carefully controlled concept map for effective teaching of chemistry could be achieved, which in turn created a scholastically rich, rewarding environment (atmosphere) for the students to learn the basic tools of Chemistry. Furthermore, in some of the developing countries such as Nigeria, proprietors, proprietresses and school principals as the building leaders are influential personality to make change happen, take responsibility for technology (Adesoji, 2008) or any kind of innovations and enhance curriculum implementation in the schools due to their positions in policy making (Ezeliora, 1999). This also lead to the increase in the number of students (Adeyegbe, 1993) thereby, causing a lot of problems in the teaching and learning processes, especially, in the science and areas of practical's, inadequacy as a result of population explosion. Overcrowded classrooms and gross inadequate facilities are on the increase in the developing nation's school system (Okafor, 1990). In addition, inadequate funding has contributed to inadequate facilities and resources required for the successful implementation of school curriculum (FME, 2004). In the light of this, the aim of the present study is to explore strategies that promotes effective teaching of chemistry in secondary schools which in turn increase or enhance the performance of students in chemistry both in theory and practical (Okeke,2011)

A greater deal of work has been done in an effort to identify problems that are inherent in the teaching of chemistry in secondary schools. These factors influence the effective teaching of chemistry which in turn plays a vital role in the lives of the students as it affects their performance. These include: physical classroom and laboratory: instructional arrangement and school management (Johnson etal 1987). The physical classroom and laboratory represents the presence of good ventilation, availability of good chalkboard, preparatory room, enough chairs and tables, charts and clean environment (Okeke,2011) The other factors include the presence of instructional materials in the laboratory such as apparatus and chemicals (Jegade and Brown 1998). To achieve the desired objective of effective teaching of chemistry in secondary schools, operational chemistry laboratory equipments has to be provided but it is dish-eating to note that most of our schools do not have functional laboratories (Akpan, 2010). Akpan (2010) noted that infrastructure is often stressed as a result of the insufficient or incomplete laboratory equipments in most of the public secondary schools both in the urban and the rural areas. With inadequate laboratory infrastructures, the students will be taken into the existing dilapidated existing one if any. Effective science teaching is the gateway to attainment of scientific and technological greatness and this can be achieved via integrating theory with practical work (Okeke, 2007). Laboratory program is an integral part of chemistry teaching as it is used in (Okeke, 2011) It is needed as a means of obtaining and learning scientific information, stimulates learners' interests as they are made to personally engage in useful scientific activities and experimentations in (Okeke,2011). It is also needed as means of verifying scientific principles, laws or theories that are already known to the students (Ezeudu, 1995). Students can easily be engaged with text books and other learning materials (Okeke, 2005). Knowledge obtained through laboratory work promotes long term memory (Okeke, 2011). Abdulahi (1982) stated that even though laboratory activities breed interest in student's attitude to science education, it does not warranty realization. Interest could be defined as an activity one enjoys and devotes his/her time in doing or studying (Okeke, 2011). Interest could also be seen as a feeling one has in the cause of wanting to know or learn more about something or somebody. Interest differs from ones personal attitude which refers to the manner of behaving towards somebody or something.

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The availability of laboratory equipment's, chemicals and materials, laboratory personnel, working conditions in the laboratory and safety measures, substantial recommended textbooks and accurate periods allocated for the teaching of the subjects will eventually perform the magic. (Ezeudu, 1995) studied and carefully controlled concept map for effective teaching of chemistry could be achieved, which in turn created a scholastically rich, rewarding environment (atmosphere) for the students to learn the basic tools of Chemistry. Furthermore, in some of the developing countries such as Nigeria, proprietors, proprietresses and school principals as the building leaders are influential personality to make change happen, take responsibility for technology (Adesoji, 2008) or any kind of innovations and enhance curriculum implementation in the schools due to their positions in policy making (Ezeliora, 1999). This also lead to the increase in the number of students (Adeyegbe 1993) thereby, causing a lot of problems in the teaching and learning processes, especially, in the science and areas of practical's, inadequacy as a result of population explosion. Overcrowded classrooms and gross inadequate facilities are on the increase in the developing nation's school system (Okafor, 1990). In addition, inadequate funding has contributed to inadequate facilities and resources required for the successful implementation of school curriculum (FME, 2004). In the light of this, the aim of the present study is to explore strategies that promotes effective teaching of chemistry in secondary schools which in turn increase or enhance the performance of students in chemistry both in theory and practical (Okeke,2011)

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Purpose of the study

The general purpose of the study was to determine the influence of chemistry practical on student's interest and academic achievement. Specifically, the study determines (i) the mean academic achievement of the student's (boys and girls) (ii) the mean interest of the student's (boys and girls)

Method of the Study

The study involves the use of intact class to ensure that regular class periods were not altered in their various schools and locations. The study adopted survey as the design of the study. The area of the study is Awgu Education zone. The population of the study comprises all the senior secondary schools SS2 Chemistry Students in Awgu Education zone. Awgu Education zone comprised of the three local governments. They are Aninri local government area, Awgu local government and Oji River local government areas. In each of the local government areas one state school was randomly selected by balloting. The Schools selected are Girls High School Nenwe from Aninri local Govt Area, Rosary High school Awgu from Awgu local Govt Area. Other are Boys secondary school Awgu from Awgu local Govt area and Girls' Secondary school Achi from Oji River local government and Awgu High school Nenwe from Aninri local Govt area. In all, five secondary schools were randomly selected, Three girls schools and two boys schools. In each of the five secondary schools a definite number of students were selected by the same random sampling technique. One hundred (100) girls were randomly selected from the three girls' schools. GHŞN 30, RHSA 30 and GSSA 40 while twenty five (25) boys were selected from the two boys sec schools AHSN and ABSA respectively.

The researcher had earlier visited the sampled schools and made known to the principals and chemistry teachers his intention to carry this research in their schools. He urged them to step up the teaching of chemistry practical in their schools as it may turn out to be good omen for the students and teachers in the struggle to be great Science, Technology and Mathematics (STM) in Education. After one month the Chemistry Practical Achievement Test (CPAT) and Chemistry Interest Inventory (CII) were administered. The scores were collated and collected with the help of the teachers.

Result

Research Question One

1. What is the mean achievement score of the girls and boys?

Research Question Two

2. What is the difference in the mean achievement score of the boys and girls?

Table One:

Mean and SD of Students Responses on the Use of Chemistry Laboratory

Groups	Number	Mean	SD	Std Error Mean
Girls	100	112.34	34.09	4.80749
Boys	50	5.46	3.26	0.46131

Research Hypothesis One

1. There is no significant difference in the mean achievement scores of the girls and boys.

Research Hypothesis Two

2. There is no relationship between the mean interest inventory of the boys and that of the girls.

Table Two

T-test Analysis of Students Interest Responses on the use of Chemistry Laboratory

Groups	N	Mean	SD	DF	t-value	p-value	Decision
Girls	100	112.34	34.09	49	51.06	1.68	S
Boys	50	5.46	3.26	24	16.27	1.75	S

Discussion of the results

From the results, the mean achievement scores for the boys and girls are 5.46 and 112.34. Also the t-calculated for the girls is 51.06 and that of the boys is 16.27 respectively. The p-value for the girls and boys are 1.75 and 1.68 respectively. Since the t-cal is greater than t-critical of the hypotheses or P-values. They are rejected and hence they are significant.

RECOMMENDATIONS

1. The boys and girls chemistry laboratory are not of the same standard.
2. The girls have more chemistry teachers than the boys. Conclusively, the government should equip secondary school laboratory and send chemistry teacher to teach the students adequately.

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