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## SURVEY OF CHALLENGES FACED BY SECONDARY SCHOOL STUDENTS IN CHEMISTRY PRACTICAL CLASS AS PERCEIVED BY TEACHERS IN MINNA METROPOLIS

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### ABSTRACT

This research work is aimed at Surveying of Challenges Faced by Secondary School Students in Chemistry Practical Class as Perceived by Teachers in Minna Metropolis. The design of the study is descriptive survey. The population of this study consisted of the Twenty-Five (25) Public Secondary schools in Minna Metropolis with the target population of all the Chemistry teachers in Minna Metropolis with a total number of 78 teachers consisting of 52 Males and 26 Female Teachers. A purposive sampling technique was used to all the 78 teachers Chemistry teachers in Minna Metropolis. Two research questions were used for the study. Descriptive statistics mainly mean and standard deviation were used in answering the research questions. The result teacher perceived that laboratories are not adequately available and spacious, equipment and chemicals, fire extinguishers and antidotes, electric and water facilities, furniture, are all inadequate in the available ones. It was therefore recommended that there should be need for education stake holders to find out why student performance is not compatible to their attitude.

**Keywords:** - Challenges and Chemistry Practical

### Introduction

The development of any nation depends on its scientific and technological advancement, Nigeria is not an exception. Science itself, is a field of knowledge which involve the study of nature conducted or learned using a particular logical method referred to as Scientific Method (Bajon, 2015). According to the Bajon, the field of knowledge can only be acquired through a special type of education for example Science Education which comprises of Science subjects like Biology, Physics and Chemistry among which Chemistry as a science subject is introduced to the learners for the first time at Senior Secondary School level of Education in Nigeria. The knowledge of Chemistry is necessary in the understanding of the composition, properties, and behaviour changes of matter that form the environment and the entire globe thereby making Chemistry a practical subject where scientific concepts, principles and skills are developed through experimental investigations from the topics and content in chemistry that are carefully and logically arranged to facilitate step by step realizations of the expected behaviour changes taught the students in abstract and practically in a Laboratory as stated by the National Education Research and Development Council (NERDC, 2008).

According to Omiko (2015), a laboratory is a room, or building in which at a special period of time, is being equipped and set apart for practical or experimental studies to take place for students. The author sees the laboratory as the heart of a good scientific programmed which allows students in the school to have experience that 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 well-equipped laboratory. Mbalenhle (2016) observed that the laboratory is an indispensable organ of the school if effective teaching and learning of the science subjects are to be achieved.

The chemistry laboratory in the Senior Secondary School has been defined by several authors in different ways. Maduabum (2016) sees a Chemistry laboratory as a place where scientific exercises in chemistry 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. Aminu and Isah (2015) observed that laboratory method of teaching is an activity involving a two-way

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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. Mbalenhle (2016) observed that the use of the laboratory in science teaching has the following benefits: (a) 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 visual and intellectual understanding of the child. The students can identify cause and effect relationships and in this process, develop important skills. (b) 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.

Senior Secondary two (SSII) seem to be the most challenging class for science students at secondary level of education to prepare a solid foundation for Sciences and Technology based courses that will determine their success in their future career, since this stage exposes them to hands-on laboratory apparatus, activities and laboratory safety rules to be taken (Tolessa & Muhammed, 2016). The authors further stated that, there should be enough apparatus in the laboratory to be used to conduct practical and clearly visualize science concepts. Hunde and Tegegne (2010) reported that, even though with the use of laboratories to clearly explain a concept attracts many benefits like making learning concrete to lying basis for science education among others; students were deprived of such prospects. "Many countries have given attention to the effective implementation and practice of science education at their secondary schools" (Tolessa & Muhammed, 2016).

Chemistry practical seemed to be essential for every science student, John (2016) revealed a significant difference between male and female students' response to chemistry practical. Even if learners benefit in chemistry practical through interactions, hands-on activities and application in science, he also observed that that sex may determine students' attitude towards science. John (2016) discovered that there exist different attitudes to the same teaching styles between male and female students of the same age. Contrarily, Kibirige and Tsamago (2013) opined that "the attitudes of boys and girls towards science are not different when using similar methods".

## Statement of the Problem

Chemistry is a science subject that has the most direct and dramatic impact on the lives of so many, and Chemistry is the science that shapes the world. The uniqueness of chemistry and the central role that it stands to play in the development of any nation when considered, are however, not evident in the performance of students mostly in the practical aspect that has been poor and unimpressive (Anaso, 2010). In the same vain Omiko, (2015) found out that students' level of academic achievement in Chemistry has been poor over the years evidently, the performance of secondary school students in science subjects WAEC examinations, especially in chemistry has not been appreciable according to WAEC Chief Examiners report (2015 to date), Despite the fact that practical knowledge is very paramount to the overall achievement in science subjects, it was also reported that poor performance among students was observed in practical chemistry according to the report. Among the reasons attributed the failure in the practical chemistry is insufficient equipment, poor attitudes among student among others. But there has been inconsistency in the reasons attributed to that failure according to several places. Hence, the study sees the need to conduct a survey on the challenges faced by secondary school students in Chemistry practical class as perceived by teachers in Minna Metropolis.

## Aim and Objectives of the Study

The aim of this study is to conduct a survey on the challenges faced by secondary school students in Chemistry practical class as perceived by teachers in Minna Metropolis. Specifically, the study had the following set of objectives;

1. Investigate the challenges faced by secondary school students in Chemistry practical class as perceived by teachers in Minna Metropolis.



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2. To find out the influence of Gender on challenges face by students in Chemistry practical.

## Research Questions

The following research questions set to guide the study:

1. What are the challenges faced by secondary school students in Chemistry practical class as perceived by teachers in Minna Metropolis?
2. What is the influence of Gender on challenges face by students in Chemistry practical?

## Research Methodology

The design adopted for this study was a descriptive survey design. This choice of design was to enabled the researcher to investigate challenges in chemistry practical as perceived by teachers in Secondary Schools in Minna Metropolis using a questionnaire as the instrument for data collection. The population of this study consisted of the Twenty-Five (25) Public Secondary schools in Minna Metropolis with the target population of all the Chemistry teachers in Minna Metropolis with a total number of 78 teachers consisting of 52 Males and 26 Female Teachers. A purposive sampling technique was used to all the 78 teachers Chemistry teachers in Minna Metropolis. The instrument used for the study was Chemistry Practical Challenges Questionnaire (CPCQ). It consists of 10 items in all covering issues on Availability of laboratories and equipment, causes of failure in chemistry practical and students attitudes towards chemistry practical. The instrument was developed on a Five-point Likert scale of "SA", "A", "U", "D" or "SD" and it consists of Two Sections A and B. Section A consists biodata of the students, while Section B consists the items. The instrument was validated by four experts in Science Education Department Federal University of Technology Minna, who ascertained whether the items were relevant, clear and unambiguous and also if the items were sufficiently inclusive. CPCQ was pilot tested using 20 teachers from different secondary schools which are within the population of the study but not part of the sample of the study. Cronbach Alpha was used in getting the internal consistency of the scale and an index of 0.83 coefficient was obtained which signified that the instrument was reliable. The Questionnaires were distributed by the researcher in the various schools to the teachers (respondents). The exercise lasted for a week, and the questionnaires were retrieved as expected. The Questionnaires were collated and set for data analysis. Descriptive statistics mainly Mean and Standard deviation were used in the answering the research questions using Statistical package for social sciences (SPSS) version 23.

## Results

**RQ1:** What are the challenges faced by secondary school students in Chemistry practical class as perceived by teachers in Minna Metropolis?

**Table 1:** Mean and Standard Deviation of challenges faced by secondary school students in Chemistry practical class as perceived by teachers

S/N	ITEM	MEAN	SD	RMK
1	There is chemistry laboratory in my school	2.16	0.769	Disagreed
2	The chemistry laboratory in my school is well ventilated and spacious.	1.89	0.988	Disagreed
3	There are electric facilities in my school laboratory.	2.68	0.616	Agreed
4	There is water facilities in my school laboratory.	1.67	0.764	Disagreed
5	There are adequate chairs and tables in my school laboratory.	1.86	0.746	Disagreed
6	There are available Fire extinguishers and antidotes .in the laboratories	2.11	1.181	Disagreed
7	All equipment and chemicals are in are adequate and in good form	1.84	0.985	Disagreed



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8	Poor practical knowledge and skills causes failure in chemistry practical	3.60	0.802	Agreed
9	Presence of unqualified teachers contribute to the failure in chemistry practical	3.94	1.085	Agreed
10	Limited space for all students to carry out the practical	2.03	0.86	Disagreed
<b>Grand Mean</b>		2.38		Disagreed

Table 1 reports: Mean and Standard Deviation of challenges faced by secondary school students in Chemistry practical class as perceived by teachers. From the grand mean 2.38, it shows that teacher perceived that laboratories are not adequately available and spacious, equipment and chemicals, fire extinguishers and antidotes, electric and water facilities, furniture, are all inadequate in the available ones.

**RQ2:** What is the influence of Gender on challenges face by students in Chemistry practical

**Table 2 Mean and standard deviation of influence of Gender on challenges face by students in Chemistry practical**

S/N	ITEM	MEAN			
		Male	RMK	Female	RMK
1	There is chemistry laboratory in my school	2.61	Agreed	2.60	Disagreed
2	The chemistry laboratory in my school is well ventilated and spacious.	2.62	Agreed	2.42	Disagreed
3	There are electric facilities in my school laboratory.	2.68	Agreed	2.16	Agreed
4	There is water facilities in my school laboratory.	1.67	Disagreed	2.42	Disagreed
5	There are adequate chairs and tables in my school laboratory.	1.86	Disagreed	2.46	Disagreed
6	There are available Fire extinguishers and antidotes in the laboratories	2.11	Disagreed	2.10	Disagreed
7	All equipment and chemicals are in are adequate and in good form	1.84	Disagreed	2.34	Disagreed
8	Poor practical knowledge and skills causes failure in chemistry practical	3.60	Agreed	2.68	Agreed
9	Presence of unqualified teachers contribute to the failure in chemistry practical	3.94	Agreed	2.66	Agreed
10	Limited space for all students to carry out the practical	2.36	Disagreed	2.56	Agreed
<b>Grand Mean</b>		2.53	Agreed	2.44	Disagreed

Table 2 reports: Mean and Standard Deviation of influence of Gender on challenges face by students in Chemistry practical. From the grand mean of 2.53, it shows that male teacher perceived that laboratories are not adequately available and spacious, equipment and chemicals, fire extinguishers and antidotes,



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electric and water facilities, furniture, are all inadequate in the available ones. From the grand mean of 2.44, it shows that female teacher perceived that laboratories are adequately available and spacious, equipment and chemicals, fire extinguishers and antidotes, electric and water facilities, furniture, are all adequate in the available ones.

## Discussion of the Findings

Table 1 reports: Mean and Standard Deviation of challenges faced by secondary school students in Chemistry practical class as perceived by teachers. From the grand mean 2.38, it shows that teacher perceived that laboratories are not adequately available and spacious, equipment and chemicals, fire extinguishers and antidotes, electric and water facilities, furniture, are all inadequate in the available ones. This result agreed with the findings of Abudu & Gbadamosi, (2014) who posit that negative attitudes towards chemistry leads to poor performance. Other researchers (Ngema, 2016) discovered that positive attitude leads to interest, and interest leads to commitment, and commitment, in turn, leads to a yearning for academic achievement. Also, Bukola (2016) found out that there is a positive association between the nature of the laboratory performance and students' attitude.

Table 2 reports: Mean and Standard Deviation of influence of Gender on challenges face by students in Chemistry practical. From the grand mean of 2.53, it shows that male teacher perceived that laboratories are not adequately available and spacious, equipment and chemicals, fire extinguishers and antidotes, electric and water facilities, furniture, are all inadequate in the available ones. From the grand mean of 2.44, it shows that female teacher perceived that laboratories are adequately available and spacious, equipment and chemicals, fire extinguishers and antidotes, electric and water facilities, furniture, are all adequate in the available ones. The result of this study indicates that Gender is not a factor used to determine the influence of chemistry practical class among students as perceived by female teachers. The result of the study is in agreement with the finding of Kibirige and Tsamago (2013).

## Conclusions

Based on the findings of this study, the study concludes; The poor performance in chemistry practical examinations can be attributed to the poor nature of the practical laboratories and students' negative attitudes towards practical activities. The situation may not be controlled unless the problems are eliminated being that practical knowledge and skill are pre-requisite for learning sciences which enhances general academic achievement

## Recommendations

Based on the findings of the study, the following recommendations are made:

1. The schools should strive to provide adequate resources. Where schools are limited in ways of finances, improvisation should be encouraged where possible. There is need for immediate intervention to improve on performance.
2. From the study the Chemistry teacher are qualified but there was need for them to enrol for higher studies (masters and doctoral programmes) to have enough experience to teach the students, attend workshops and in-service training. This may enhance staff development of the Chemistry teachers. Lastly, chemistry teachers should organize symposium to sensitize students on the practical applications/career related to chemistry. This would enhance understanding of chemistry subjects amongst students and enable them to compete adequately in choosing careers which are chemistry oriented.

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