SENIOR SECONDARY SCHOOL CHEMISTRY STUDENTS' RATINGS OF THE CHALLENGES ENCOUNTERED IN LABORATORY CLASSES IN EKITI STATE

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Abstract

This research focused on the challenges facing Chemistry laboratory classes in senior secondary schools in Ado Ekiti. 204 Chemistry students from secondary schools in Ekiti state were randomly selected from 9 secondary schools. Questionnaire was distributed to elicit information on the challenges facing chemistry practical classes. The challenges, after careful examination of the questionnaire were grouped into three; lack of Chemistry laboratory/inadequate laboratory materials, irregular practical classes and poor teaching method. It was concluded that the problems facing senior secondary school Chemistry laboratory classes fall under the above groups. It was recommended that school proprietors and owners should ensure that Chemistry laboratories are adequately stocked, laboratory classes should be consistently carried out in the term, and Chemistry teachers are to be dynamic in the way and approach they teach in the laboratory.

Keywords: challenges, Chemistry students, practical classes

Introduction

Chemistry is a branch of science that deals with chemical concepts as well as their properties and due to this nature, can easily be understood with the feel of practical class. There are lots of benefits that come from engaging students in laboratory activities (Croker, Andersson, Lush, Prince and Gomez 2010). Observations and experience revealed that practical class develops the students' scientific process skills, it provides students the exposure to real experiments and observations and it also provides concrete learning to the learner. It suffices to say that practical classes not only will enhance teaching and learning of Chemistry, it will develop the learners' interest which will positively affect the attitude and values of the learner (George 2017). Omiko (2015) observed the use of laboratory in science teaching; he stated that practical classes make the students/learners to learn about the nature of science and technology. Tatli and Ayas (2013) stated that laboratory work is an indispensable element in understanding chemical concepts. These connotes that adequate practical classes are needed for proper dissemination of chemical concepts in secondary school.

As important as practical classes are to Chemistry teaching and learning, there are many challenges that secondary school Chemistry students encounter in their practical classes. The need for Chemistry laboratory and laboratory facilities to be updated has been stressed in Nigerian secondary schools. However, researchers have found shortage in the number of laboratories in Nigerian secondary school (Adegoke 2017*)*. He also stated that many schools do not have the required laboratory

facilities and science teachers were unable to conduct practical classes as they should.

Tatli and Ayas (2013) stated that most of the practical hours involve only the teachers demonstrating the experiments. This implies that students do not really have time to carry out practical classes themselves, which will eventually leave the learners to struggle with understanding the concept taught. Emendu and Okoye (2015) highlighted that the secondary schools have inadequate classroom, they lack laboratory, no enough equipment, the environment is not conducive, poor power supply and no water, few qualified Chemistry teachers in schools, no laboratory assistants and attendants, all these makes the staff and students not to be happy. Practical class increases inquisitiveness on the part of the learner while the teacher will enjoy his/her teaching. When there are little or no practical activities, the chemical concept will become difficult, to understand by the learners and, to instruct by the teacher.

George (2017) revealed that the level of laboratory facilities is still far too poor to adequately cater for Chemistry teaching. It is in the light of all these assertions that the researcher sought to look into the challenges as rated by senior secondary school students in Ado Ekiti.

Statement of the Problem

From observations, it was discovered that most secondary schools in Nigeria do not have same number of laboratories. Some schools have three laboratories, some two and some have just one laboratory. It implies that some schools are not exposed to adequate laboratory/practical activities in the core science subjects. Some schools also might not have enough guides as regards the number of laboratories that a secondary school must have. Also it was discovered that practical classes are not consistent while Chemistry students are not accustomed with practical activities in school.

Science students, specifically Chemistry students in secondary schools are not satisfied with the way practical classes are carried out. Chemistry being a course that involves the use of chemicals, which are thrown away at the end of the experiment and are not recyclable, encounter the difficulties related to practical class the most when compared to other science subjects. This condition dispossesses the Chemistry students of the benefits of carrying out experiments, leading to struggling to understand the concept, with consequences of chemistry students losing interest in the subject. This has prompted the researcher to look at the challenges that secondary school Chemistry students feel are prominent, so that solutions can be proffered through researches.

Purpose of this study

The main purpose of this study is to examine the challenges encountered by Chemistry students in their practical classes. This study tends to determine the prominent challenges encountered by senior secondary school Chemistry students in their practical classes. Also to find out how prominent the challenges are so as to place these challenges in order of priorities.

Research Questions

The following questions are raised to guide this study;

1. What are the imminent challenges that are encountered by Chemistry students in their practical classes?
2. What are the ratings of these challenges encountered by Chemistry students in their practical classes?

Methodology

The research adopted a descriptive survey research design. The population of the study consists of all chemistry students from public secondary schools in Ado Ekiti. A sample of 204 participants was used for the study. This study adopted a multi stage sampling techniques in selecting the participants. There are three senatorial districts in Ekiti state; Ekiti south, Ekiti north and Ekiti central. Firstly, one local government was randomly selected from each of the senatorial district. Secondly, three (3) secondary schools were randomly selected from the selected Local Governments and thirdly, twenty four (24) students were randomly selected from each school. These students were SS1 and SS2 students having an age range of 12 to 19years with a mean of 14.5. Out of 216 copies of the questionnaire given out to the respondents for data collection, only 204 were returned making a success of 94.4% of the study while the attrition rate is just 5.6%.

Questionnaire adapted by the researcher was used for the data collection. Data obtained were analysed using frequency count and mean. The numeric values assigned to the different scaling items are as follows; SA =1, A = 2, D = 3 and SD = 4. Therefore, the mean for these values was determined by $X = 1+2+3+4 = 2.5$

The cut-off point for mean is 2.5. This implies that any of the response that has a mean score below 2.5 is accepted, while the response with mean score of 2.5 and above is rejected. Also the response was ranked using the mean score. The lower the mean score, the higher the ranking as regards challenges.

Results

Table 1: Descriptive Statistics of mean and grand mean of responses on lack of chemistry laboratory/ inadequ-ate laboratory materials.

N	Minimum	Maximum	Mean ($\overline{X}$)	Std. Deviation	Grand Mean (X)
204	1.00	4.00	1.5441	.79594	
204	1.00	4.00	1.8382	.70067	
204	1.00	4.00	1.7353	.96670	1.7206
204	1.00	4.00	1.8088	.88095	
204	1.00	4.00	1.6765	.90059	

The results on table 1 above, indicated that the chemistry students in the senior secondary schools agree that lack of chemistry laboratory/inadequate laboratory materials is a major challenge facing the practical classes in Ado Ekiti, with a grand mean score of 1.7206 which is below the cut-off mark of 2.5, hence it was accepted that lack of chemistry laboratory/inadequate laboratory materials is one of the major challenges encountered by chemistry students.

Table 2: Descriptive Statistics of mean and grand mean of responses on irregular practical classes

N	Minimum	Maximum	Mean ($\overline{X}$)	Std. Deviation	Grand Mean (X)
204	1.00	4.00	2.0735	.99233	
204	1.00	4.00	2.1176	.96535	
204	1.00	4.00	2.0147	1.08040	1.9500

204	1.00	4.00	1.5735	.84776
204	1.00	4.00	1.9706	.76829

Table 2 revealed that chemistry students in the senior secondary schools agree that irregular practical classes is a major challenge facing the practical classes in Ado Ekiti, with a grand mean score of 1.9500 which is also below the cut-off mark of 2.5, hence it was accepted that irregular classes is also one of the major challenges encountered by chemistry students.

Table 3: Descriptive Statistics of mean and grand mean of responses on poor teaching method

N	Minimum	Maximum	Mean ($\overline{X}$)	Std. Deviation	Grand Mean ($\overline{X}$)
204	1.00	4.00	1.9559	1.00884	
204	1.00	4.00	2.0882	1.13696	
204	1.00	4.00	1.7647	1.06143	
204	1.00	4.00	2.0735	.86502	1.9265
204	1.00	4.00	1.6765	.77729	
204	1.00	4.00	2.0294	1.07324	
204	1.00	4.00	1.8971	1.00452	

Table 3 showed chemistry students in the senior secondary schools agree that poor teaching method is a major challenge facing the practical classes in Ado Ekiti, with a grand mean score of 1.9265 which is below the cut-off mark of 2.5, hence it was accepted that one of the major problem encountering by chemistry students in Ekiti state is poor teaching method.

Table 4: The ranking of challenges faced by chemistry students in their practical classes.

S/N	Challenges facing chemistry students in their practical classes	Grand Mean	Ranking
1.	Lack of chemistry laboratory/inadequate laboratory materials	1.7206	1st
2.	Poor teaching method	1.9265	2nd
3.	Irregular practical classes	1.9500	3rd

Table 4 above revealed the ranking of the challenges facing the practical classes with respect to their grand means. Lack of chemistry laboratory/inadequate laboratory materials was ranked highest in the order of challenges facing chemistry practical classes because it has the lowest grand mean of 1.7206. Poor teaching method was rated second because it has a grand mean of 1.9265 which is lower than the grand mean of Irregular practical classes with a grand mean of 1.9500.

Discussion

The findings revealed that the highest and greatest challenge chemistry students encounter is the lack of chemistry laboratory/inadequate laboratory resources and materials. This study corroborates the findings of Tatli and Ayas (2013) who stated

that many schools lack chemistry laboratory and chemistry laboratory materials. This study also aligns with George (2017) who establish that that many secondary school owned by the government do not have laboratory materials. Most secondary schools in Ekiti state do not have chemistry laboratory, they make use of general science laboratory for chemistry, physics, biology, agriculture and basic science. The Findings of the study also reveals that challenges relating to poor teaching method is a major one that needs to be attended to. This study support Kristen, Malinda, Monica and Kendra (2017) who also found out that the creativity of chemistry teachers in teaching in the laboratory goes a long way in making practical class interesting for students. It was also revealed in the course of the study that many schools do not carry out regular practical classes needed for chemistry. George (2017) stated most of secondary schools perform less than ten practical classes while very few performed more than 10 practical classes.

Conclusion and Recommendations

It can be concluded that challenges encountered by secondary school chemistry students can be grouped into (i) lack of physical laboratory/inadequate laboratory facilities, (ii) poor teachers' quality and teaching method and (iii) irregular practical classes. Results from the findings revealed that many secondary schools do not have chemistry laboratory in Ekiti state, while those that have chemistry laboratory do not have the facilities. It was also revealed that most secondary school chemistry teachers are stereotyped in their approach to teaching practical class.

The findings of the study also revealed that many secondary in Ekiti state do not have a chemistry laboratory, most schools have a central laboratory for the science subjects.

Therefore, it was recommended that every secondary schools in Ekiti state and Nigeria should focus on equipping their laboratories. The quality of their laboratory will determine the quality of their preparation for external examinations. Also it was recommended that secondary school teachers, specifically, chemistry teachers should update themselves regularly with the digital resources available for effective teaching. The use of online and virtual laboratory should be introduced into chemistry teaching, so as to help in schools where laboratories aren't adequate or available. Every secondary schools in Ekiti state and Nigeria should make available a laboratory for every science subject. The idea of a central laboratory for all courses should be put aside and focus on providing and equipping each laboratory for each subject.

References

Adegoke, B.A. (2017) Survey of laboratory activities in senior secondary school physics in Nigeria. *British Journal of Education, Society & Behavioural Science 19 (3):1-10*

Ajunwo, F.O. (2018). Self-Concept and Academic Achievement of Undergra-duate Business Education Students in Rivers State

Croker K Andersson H, Lush, D, Prince, R and Gomez S. (2010). Enhancing the students experience of laboratory practicals through digital video guides. *Bioscience Education, 16:1, 1-13.* https://doi.org/10.3108/beej.16.2

Emendu, N. B and Okoye, C. M. (2015). Identifying Problems Associated with Studying of Chemistry in Anambra State,

Nigeria. *International Journal of Scientific and Research Publications*, 5 (6), 1-7.

George, M. J. (2017). Assessing the Level of Laboratory Resources for Teaching and Learning of Chemistry at Advanced Level in Lesotho Secondary Schools. *South African Journal of Chemistry 70, 154 - 162.*

Hennah, N. and Seery M. K. (2017). Using Digital Bandages for Developing High School Chemistry Laboratory Skills. *Journal of Chemical Education 94, 844 - 848.* United Kingdom.

Kristen K. B., Malinda W. G., Monica D. and Kendra M. (2017). Pedagogical Methods and Technology Used in Chemistry Secondary Education. *Modern Chemistry and Applications. 5:3, 223.* doi:10.4172/2329-6798, 1000223. U.S.A.

Omiko, A. (2015). Laboratory Teaching: Implication on Students' Achievement in Chemistry In Secondary Schools In Ebonyi State of Nigeria. *Journal of Education and Practice 6:30, 206-213.*

Taber S. K. and Akpan B. (2017). *New Directions in Mathematics and Science Education.* Vol. 31, Sense Publishers, Rotterdam, Netherlands.

Talti, Z and Ayas, A. (2013) Effect of Virtual Chemistry Laboratory on Students' Achievement. *Educational Technology & Society, 16 (1), 159-170.*