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Analysis of Poor Performance of Senior Secondary Students in Chemistry in Nigeria (Pp. 324-334)

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Abstract

This study investigated the poor performance of students in Chemistry. The widespread poor performance and the negative attitudes towards chemistry of secondary school students have been largely ascribed to teaching problems. A random sample of 109 students from St Pius X College Bodo City was used. The research instrument was a reliable and validated 20 items likert type questionnaire which was administered on 109 secondary school students to obtain responses on the factors that are responsible for poor performance of students in Chemistry. The responses were analyzed using t-test statistics. At 0.05 significant level and 38 degree of freedom, the calculated t-value was 0.469 and the t-critical was 2.021. Since t critical was significant the null hypothesis was retained. Thus, there was no significant difference among the respondents concerning the factors that are responsible for poor performance of students in Chemistry in Nigerian secondary schools. One of the recommendations made was the need for efficient and effective teachers who are professionally and academically qualified to promote Chemistry learning in schools.

Key words: *Performance, students, chemistry, secondary school.*

Introduction

The role of chemistry in the development of the scientific base of a country cannot be overemphasized and Nigeria is not an exception. Yet with the increasing importance of chemistry to the unfolding world, the performance of Nigerian students in the subject at the secondary school remains a dismal failure. However it is disappointing to note that the students' performance in chemistry at internal and external examination has remained considerably poor despite the relative importance of chemistry (Saage 2009). Several factors have been advanced to affect students' poor performance. Korau (2006) reported that such include the student factor, teacher factor, societal factor, the governmental infrastructural problem, language problem examination body related variables, curriculum related variables, test related variables, textbook related variables and home related variables. Saage (2009) identified specific variables such as poor primary school background in science, lack of incentives for test, lack of interest on the part of students, students not interested in hard work, incompetent teachers in the primary school, large classes, fear of the subject psychologically etc.

In Nigeria the pupil's home upbringing tends to affect their attitudes to authority. It is one of co-operation and passive submission. Children seen to have a natural tendency to explore, find out and collect objects. Too much restriction can have a lasting effect on the learner to the extent that he becomes afraid to experiment and explore in chemistry and later in life when encouraged to find out for him or make individual contribution he may be too inhibited to do so (Lawis, and Eddy 1967). Kahl (1961) has shown that parental attitudes were more important in predicting aspiration of pupils towards continuing their schooling and successes in school than status. Parents should not expect too little or too much from their children. Too much pressure can lead to failure and dislike of chemistry. Critical remarks can encourage lukewarm attitude towards chemistry. They should therefore discuss the progress of their children with the teachers so as to assist the learners in their areas of difficulty.

Parents that are too push-up can cause academic maladjustment for learners. Boocock (1972) found that parental dominance tend to discourage the children in school learning. However some parents over-pamper their children too much to the points of spoiling them completely Korau, 2006).

Since such parents shun their responsibility to train their children at home such children will develop nonchalant attitude to chemistry and other courses.

Korau (2006) observed that the schools population counts in thousands today against the hundreds of the previous years. Schools today are overcrowded in classrooms which make it impossible to talk of an ideal size of a classroom for effective teaching of chemistry. No effective teaching can take place under a chaotic situation where he cannot handle the large number of students effectively. Consciously quantity and quality cannot work together and this can affect the students' learning of chemistry and thus perform poorly.

Literature revealed that there are factors responsible for poor performance of students in school chemistry. This study is an attempt to contribute to these findings as it affects St Pius X College Bodo City students in particular and Nigeria in general. The purpose of this research study was to find out if there is any significant difference between male and female respondents concerning the factors that are responsible for poor performance in school chemistry. The following tentative answers were raised for the work.

HO₁: There is no significant difference in the responses of students concerning the poor performance of students in school Chemistry.

HO₂: There is no significant difference of male and female respondents concerning the factors that contribute to poor performance of students in school chemistry.

Methodology

A random sample of 109 students out of the total population of 245 students from St Pius X College Bodo City comprising of 51 females responded to the questionnaire to determine their response towards the factors that are responsible for poor performance of students in school chemistry. This comprised of 30 students from Senior Secondary One, 50 students Senior Secondary Two and 29 students from Senior Secondary Three. This represents 44.4% of the College population. The simple random method used involved common 'draw' method whereby numbers 1 to 30 were written on slips of paper and other papers contain nothing for Senior Secondary One Students. These slips were put inside a container. After thorough shuffling,

they were drawn one by one until the number of students required in the class was obtained. The same technique was repeated for Senior Secondary Two and Senior Secondary Three students to select the number of students required for the study.

Respondent's questionnaire containing 20 items was designed to collect data. Each respondent responded to the same 20 questions by ticking the choices given. The choices were very true, true, fairly true and not true. Respondents were tick whether their poor performance in school chemistry are due to lack of qualified teachers, lack of incentive for teachers which prevent them from teaching effectively, some absent and incompetent teachers, lack of interest in chemistry on the part of students, overpopulation, poor background in chemistry, chemistry difficulty, the abstract nature of chemistry, lack of and outdated instructional materials, expensive chemistry text books, lack of encouragement from parents, other engagements in the home and uneducated parents who do not help students when they have difficulty to solve problems in chemistry are some of the factors that are responsible for their poor performance in school chemistry.

Content validity was established by relating the content of each question to the literature while reliability coefficient of 0.8 was found to be internally consistent. "Experts in chemistry were given the test items to validate in order to meet the disposition of the population targeted in this study and give their recommendations. The choices of words and sentence structures of the questionnaire were corrected by the experts. These were fully affected in the final correction before administering. The text was administered to the respondents by the researcher. It involves ticking the correct letter among the choices given.

Results and discussion

From Table 1, the males' mean score was 0.97. They scored above the means in incompetent teachers, lack of understanding, many topics that cannot be understood, lack of teaching facilities/Laboratory, obsolete materials, library not well equipped, and expensive text books. They scored below the mean in lack of qualified teachers, lack of incentive for teachers, teachers' absenteeism, lack of interest, poor background, lack of concentration, chemistry difficulty, abstractness of chemistry, chemistry language, financial problems to buy textbooks, lack of encouragement from parents, lack of help from parents and lack of time for practices.

The females' mean score was 0.87. They scored above the mean in lack of incentive for teachers, incompetent teachers, lack of understanding, many topics that cannot be understood, abstractness of chemistry, chemistry language, and financial problems to buy textbooks, lack of encouragement from parents, lack of help from parents and lack of time for practices. It is also observed that both male and female respondents were similar opinion that there was lack of help from parent and lack of time practices.

On Table 2, chi-square test statistic was used to analyze the data test null hypothesis which stated that there was no significant difference among the respondents concerning the students' poor performance in school chemistry. The relevant data collected were analyzed. Table 1 give the summary of the computation at 0.05 significance level with the degree of freedom = 19, the calculated chi-square value was 2.01 and t critical values was 10.12. Since the critical value was significant the hypothesis was retained. Therefore there was no significant difference in the responses of the respondents regarding the poor performance of students in school chemistry.

In Table 3, t-test statistic was used to analyze the data to test null hypothesis which stated that there was no significant difference among the male and female respondents concerning the factors that are responsible for poor performance of students in school chemistry. The relevant data collected were analyzed. Table 3 gives the summary of the computation at 0.05 significance level and with the degree of freedom = 107, the t-value was 0.469 and t critical was 1.980. Since t-critical was significant difference the hypothesis was retained. Therefore, there was no significant difference in the responses of the male and female respondents regarding the factors that are responsible for poor performance of students in school chemistry.

In Table 2, chi-square test statistic was used for the analysis of the null hypothesis which stated that there was no significant difference among the male and female respondents concerning the factors that are responsible for poor performance of students in school chemistry. There were 20 curriculum items that were used to administer to the 109 respondents. At 0.5 significance level and with the degree of freedom = 19, the critical value of 10.12 was significant, therefore the hypothesis was retained. Therefore there was no significant difference in the responses of the respondents regarding the poor performance of students in school chemistry. However, Saage (2009) identified poor primary school background in chemistry, lack of interest on the part of the students, lack of incentive for the teachers, incompetent

teachers in primary schools, students not interested in hard work and psychological fear of the subject can be factors that are responsible for poor students performance in school chemistry therefore efforts should be made to remedy all these negative factors.

On Table 3, t-test statistic was used to analyze the data to test null hypothesis which stated that there was no significant difference among the male and female respondents concerning the factors that are responsible for poor performance of students in school chemistry. There were 20 items that were used to administer to the 109 respondents. The means of the responses per item of 51 males and 58 female respondents were calculated and used to calculate the t-value. At 0.5 significance level and with the degree of freedom = 107, the t-value of 1.980 was significant, therefore the hypothesis was retained. Therefore, there was no significant difference in the responses of the male and female respondents concerning the factors that are responsible for poor performance of students in school chemistry.

The most critical factor in the chemistry education is the teacher which according to (Adesoko 2000) is the spark and key man in the drive to progress in our educational system. Korau (2006) also observed that the schools population counts in thousands today against the hundreds of the previous years. Schools today are overcrowded in classrooms which make it impossible to talk of an ideal size of a classroom for effective teaching of chemistry. No effective teaching can take place under a chaotic situation where a teacher cannot handle the large number of students effectively. Consciously or unconsciously quantity and quality cannot work together and this can affect the students' learning of chemistry and thus perform poorly.

Table 1: Summary of the Mean Score of data for testing the respondents of male and female students concerning factors responsible for the poor performance of students in school chemistry

Variable	Male	Female
Lack of qualified teachers	0.61	0.62
Lack of incentive for teachers	0.96	0.10
Incompetent teacher	1.0	1.10
Teachers' absenteeism	0.63	0.48
Lack of interest	0.39	0.33
Lack of understanding	1.18	1.0
Poor background	0.88	0.95
Lack of consideration	0.71	0.52

Chemistry difficulty	0.69	0.71
Many topics that isn't understood	1.16	1.36
Abstractness of chemistry	0.73	1.07
Chemistry language	0.57	0.38
Lack of teaching facilities/ Lab	1.90	1.98
Obsolete materials	1.41	1.19
Library not well equipped	1.84	0.59
Expensive textbooks	1.75	1.36
Financial problem to buy textbooks	0.94	0.59
Lack of parental encouragement	0.57	0.55
Lack of help from parents	0.79	0.76
Lack of time of practice	0.67	0.67
Mean	0.97	0.87

Source: Survey, 2012

Table 2: Summary of the data for testing the responses of students concerning the factors that are responsible for poor performance of students in school chemistry

Factor	True	Not True	Total
1	58	10	68
2	103	20	123
3	97	17	114
4	48	12	60
5	26	10	36
6	101	18	119
7	92	14	106
8	53	14	67
9	58	18	76
10	111	29	140
11	86	18	104
12	38	11	49
13	198	11	209
14	120	17	137
15	87	14	101
16	140	24	164
17	61	20	81
18	37	7	44
19	22	15	37
20	55	13	68
Cal.	2.01		
d.f	19		
Critical	10.12		

Table 3: Summary of the data for testing responses of male and female respondents concerning the factors that are responsible for poor performance in school chemistry

Variable	Number	X	SD	df	t.cal	t-critical
Male	51	0.965	0.445	107	0.469	1.980
Female	58	0.866	0.410			

Conclusion

Despite the relative importance of chemistry, it is very disappointing to note that the performance in the subject at both internal and external examinations has remained constantly poor (Keleosho et al 1998) and the trend of students' performance has been on the decline (Salau 1995). Some of the variables that may be responsible for these may be curriculum related variables and instructional materials related variables.

Teachers are catalysts of the expected changes in society. These demands that they should be well trained, have recourse to retraining and updating of their chemistry knowledge through in-service training, workshops, seminars and conferences (Tahir, 2006). Efficient and effective teachers who are professionally and academically qualified must be produced to promote chemistry learning in schools. Teachers must be highly motivated with adequate incentives and the issues of teachers' salaries and other fringe benefits should be addressed by the government. The low morale and status of Nigerian teachers have affected the quality of the intake and those already on the job. This has been attributed to poor incentives to improve performance, very poor equipped working environments and non-availability of working materials, inadequate social recognition powerlessness and lack of control over working condition.

Recommendations

1. The authorities should provide and retain qualified teachers and provide adequate teaching and learning facilities and equipments to schools. Teachers preparation programme should be student centered. They should show equal concern and treatment to students' and have knowledge of classroom interaction that serve to undermine students' self esteem, academic achievement and ultimately professional

preparation so that they are adequately prepared to face the future with hope. Teachers should create an environment where students do not feel scared to ask questions.

2. Affective and cognitive teaching strategies should be interwoven during chemistry teaching and learning since both have impact on chemistry reasoning. Chemistry laboratories should be established in all the school system. Practical solutions to problems both simple and complex concepts should be assured. Both teacher and students should be involved in the design of teaching and learning materials. The Universal Basic Education (UBE) should incorporate laboratory of pre-primary to Junior Secondary levels so that they can have good foundation in science before proceeding to tertiary institutions. These laboratories should be well developed in Teacher Education Institution, Faculties of Education and Institutes of Education. Practical should also carry some credits in grading of students. The language in which chemistry tests are written must be simple and in all cases within the level of the ability of students in English language.
3. The use of questions in teaching and learning of chemistry is very vital and their importance cannot be emphasized. The value of asking and attempting to answers questions has been established by finding from research studies. An instructional environment that encourages asking of questions is known to have positive effect on comprehension (Costa et al 2009). A link was also reported to exist between question asking and improved problem-solving skills. (Dori and Herscovitz 2010) and that question asking aids in developing independent learning skills (Marbach-Ad and Sokolove 2008). Questions are usually asked by teachers, students and also generated in textual materials.

Transfer of whatever is learnt in the classroom enables students to appreciate the relevance of chemistry in different spheres of human life. More opportunities for students to actively participate in the analysis of problems will improve confidence in solving chemistry problems.

4. Since not all students can afford to buy expensive textbooks, every school should have an adequate and functionally library, manned by at least one professional librarian. The contents of such a library should be supportive of the curriculum and reflective of our indigenous culture and home experiences and should accommodate future development

and desirable world-view. A high powered commitment should be set up at various conferences and workshops concerning chemistry to look into salient points raised during workshops and conferences and come up with a blue-print for implementation. The various teaching methods that have been tested to be very effective should be made popular in the school system. Chemistry teachers need to be exposed to such methods which could be in form of conferences or workshops to update their knowledge of subject matter and teaching techniques.

5. These should be effective school psychological services which would lead to good teacher-pupils' relationship, effective classroom management and motivated teachers and pupils. This will eventually provide a conducive school climate for effective and learning process of chemistry.

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