School Facilities, Preferential Treatment And Class Size As Predictor Of Achievement In Senior Secondary Chemistry In Rivers State, Nigeria

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ABSTRACT
Chemistry is one of the Core Science Subject offered by all science students but the performance of students in the subject has not been encouraging. This study investigated the relationship of school facilities, preferential treatment and class size with academic achievement in Senior Secondary School Chemistry. The study adopted a survey research design with a sample of 350 Senior Secondary School Student been selected from two Local Government Area of Rivers State. Three valid and reliable instruments were used for data collection and they are; School Facilities Inventory Questionnaire (SFIQ), Student Preferential Treatment Scale (SPTS) and Chemistry Achievement Test (CAT). Four Research Questions were raised and answered in the study. Data collected were analyzed using both descriptive and inferential statistics. The results showed that all the independent variables were positively correlated to the Chemistry achievement test in Chemistry. The finding also showed that the three independent variables jointly correlate positively with student achievement in Chemistry. It is therefore recommended that managers of school should provide learning facilities and reduce large class size.
Keywords: School Facilities. Preferential Treatment. Class size Predictor. Achievement. Chemistry.

INTRODUCTION
Education is often seen worldwide as a vehicular instrument for social economic, political, scientific and technologic development. Science which chemistry is core has been seen as the main driving force for rapid technological and industrial advancement of any nation. Shaibu (1992) define science as a complex human activity that lead to the production of a body of universe statements called laws and theories which serve to explain the observable behaviour of the universe or some aspect of it.

Chemistry which is central to science provides the fundamental basis upon which the technology for the production, processing and preservation of food is established. Chemistry provides the solution through which mineral fertilizer industry thrives. The essentials of chemistry input in agriculture, textile, manufacturing, extraction, paint, oil and gas, housing etc. cannot be undermined.

It has been established that chemistry is the second highest enrolled subject at the senior Secondary School Certificate Examination since 1960 and the second with poorest result in the sciences (WAEC 1999). The learning of chemistry helps in the understanding of chemical process and daily scientific occurrences. Several research works have been carried to unraveled the reasons for student poor performance in chemistry.

Shaibu (2002) examines student's learning environment and their chemistry problem skill, Ahiakwo (2006) invested cognitive strategic on concept attainment and attitudes towards chemistry. Nevertheless, students' performance in chemistry has not improved. It's still low, discouraging and disturbing at the Senior Secondary School Certificate Examination. This study therefore looks at the cause of poor academic achievement in Chemistry from the angle of school facilities, teacher's use of preferential treatment and class size due to moderate enrollment in Chemistry. The first variable in this study is school facilities.

School facilities are those things that enable the teacher to do his/her work very well and helping the learners to learn effectively. The chalkboard for example, facilitates the imparting of information on the learner. School facilities also include school building e.g classrooms, assembly halls, laboratories, workshops, libraries etc. they also include teaching aids, chairs, tables, devices such as modern educational hardware and software in the form of magnetic tapes, films and transparent stripes. School facilities are all the things that are needed for effective teaching – learning process to take place. they are designed to enhance the process of teaching. The absence of school facilities implies the non-existence of any set up that may be referred to as school. Peretemode (2001) concludes that "educational facilities are those things of education which enables a skillful teacher to achieve a level of instructional effectiveness that far exceeds what is possible when they are not provided". The successful implementation of any educational programme depends mostly on the quality of available school facilities that are to be provided for such programme. This is supported by the view of Ihuoma (2008) who posits that "the type of atmosphere required for effective learning is that consisting of better school buildings, more and better teaching facilities". Also, Ihuoma (2008) posits that "the quality of education that our children get bears direct relevance to the availability or the lack of physical facilities and overall atmosphere where the learning takes place also in the words of Yoloye (2004) are these wise saying " Excellent school facilities and dedicated teachers are basic ingredients of good educational programme". The desire for education attainment is on the high side, the consumers of education therefore expect the attainment of standard and quality education that will give them a sense of belonging, fulfillment and satisfaction.

Preferential treatment is sometimes viewed as reverse of discrimination, occurs whenever a person receives a benefits because he or she is of the correct race, gender, economic status, religious affiliation or other categorization (Oriafor 1997). Preferential treatment can be very difficult to prove or overcome. It does not often rise to the level of discrimination as in favouring one person or another. It is illegal in many cases to promote certain students based on a perceived school activity. It could be construed as preferential treatment but not legal discrimination based on participation. However, there is a difference between discrimination and preferential treatment. Discrimination is seen to be illegal and bad, preferential treatment is not illegal but preferential treatment is frowned upon in many schooling and work environment. Discrimination tends to have a lot of backlash which may result to socio-social and inter class conflict.

In psychology, preferences had been defined in various ways. It could be conceived of as an individual's attitude towards a set of objects, typically reflected in an explicit decision-making process (Lichtenstein and Slovic 2006). However, it does not mean that a preference is necessarily stable overtime. Preference can be notably modified by decision making processes.

It has been established that there is moderate enrolment of students in Chemistry in our secondary schools, which leads to the classes been faced by the teachers. Some academics and policy makers have however emphasized the importance of small class size (Rivken, Hanushek and Kain 2000). Concerning the advantages of small class sizes, views, has been consistently divided between those who claim that small classes lead to a better quality of teaching and learning, and those who argue that the effects are likely to be modest at best and that there are more cost-effective initiatives (Blatchford, Basset, Goldstein and Martin 2003). The first view is consistent with the view of many teachers and was given support by the Tennessee Star research study, which employed a powerful design involving random allocation of pupils and teachers to three classes within school. It was found that children in small classes performed better in literacy and mathematics and that there were particular benefits for children from ethnic minorities (Finn and Archilles, 1999; Nye, Hedges and Konstantopoulus, 2000).

Some academics have argued in support of smaller classes as a cornerstone of educational policy (Achilles, 1999; Wang and Finn, 2000). This view has led to costly class size reduction initiatives in a number of states in the USA, notably California s well in other countries around the world, Nigeria notably Rivers State. It is also reflected in the UK government's commitment to maximum of 30 students in a class. The second view has found expression in the opinion of politicians and policy makers worried by the enormous costs involved in hiring extra teachers. In the UK, the government agency, the office for Standards in Education (OFSTED, 1995), on the basis of inspectors' report, concluded that class size made little difference and this was used by government, ministers of the day to support no change in investment in smaller classes.

Statement of the Problem

The incidence of poor academic achievement of students in Chemistry has been of much concern to stakeholder. Many studies had been conducted on the likely causes, still no reasonable achievement has been made in final SSCE (Senior Secondary Certificate Examination). However, it has been observed that school facilities, teachers given preferential treatment to students probably because of moderate enrolment faced by the teacher and because of the varying levels of intelligence of the students could be some of the causes;

This study therefore investigated the relationship between school facilities, preferential treatment, class and size on students' academic achievement in Chemistry.

Research Questions

The study provided answers to the following research questions:

1. What is the relationship between school facilities and students' academic achievement in Chemistry?
2. What is the relationship between preferential treatment and students' achievement in Chemistry?
3. What is the relationship between class, size and students' achievement in Chemistry?
4. What is the composite effect of school facility, preferential treatment and class size on students' achievement in Chemistry.

METHODOLOGY

The Research Design

The design study adopted a Survey Research Design

The Variables

The Independent variables are school facilities, preferential treatment and class size. The dependent variable is the academic achievement in Chemistry.

Population, Sampling Procedures And Sample

The population of the study consists of all Senior Secondary Chemistry Students in Rivers State. All the Senior Secondary School Two (SSS II) students in the two local government areas of Rivers State constitute the target population. Two local government areas were randomly selected out of the twenty three local government areas in the Rivers State. Ten Senior Secondary Schools out of all the public Senior Secondary School from the selected local government areas were taken. Thirty five (35) students were sampled in each of the schools, to make up a total of 350 participants.

Instrumentations

The following instruments were used in the study;

1. School facilities Inventory Questionnaire (SFIQ). The (SFIQ) was developed by the researcher. It consisted of two section A and B. Section A was purely on Demographic Information of the respondent. Section B consisted of 20 items designed questions to elicit information on school facilities available in the school by the student. The (SFIQ) was validated and the reliability index was 0.93 Cronbach Alpha

2. Student Preferential Treatment Scale (SPTS). The (SPTS) was developed by the researcher. It is a 25 item scale, consisting of two sections A and B. section A consists of the student bio-data while section B is a likert scale consisting of 25 items designed to elicit information on preferential treatment given to the students by their teachers. The 'SPTS' was validated and the reliability index was 0.87 Cronbach Alpha.

3. Chemistry Achievement Test (CAT). This was a 30 item objective test adopted from a pool of WAEC (WASSCE) 2015-2017 objective. The instrument was revalidated by the researcher, using Kinder-Richardson and the reliability coefficient was 0.98.

Method Of Data Analysis

Analysis of data was done using descriptive statistics, Pearson Moment Correlation and multiple regression. Pearson moment correlation was used to analyze research questions 1 and 2 while multiple regression was used to analyze research question 2.

RESULTS
Research Question 1
What is the relationship between school facilities and students' achievement in Chemistry ?
Table 1: Correlation between Student Facilities and achievement in Chemistry

	N	Mean	Std. Deviation	R	Significant level
Numerical Ability	350	22.27	3.119		
Chemistry Achievement	350	20.44	9.081	-.244	.000*
$r^2 = 0.060$					

*Significant at P<0.05

Table 1 shows that there is significant statistical relationship between the students' school facilities and achievement in Chemistry, significant at P<0.05.

The coefficient r = 0.244 between students' school facilities and achievement in Chemistry shows a positive relationship. This implies that when there is positive improvement in the students' school facilities, there will be positive increase in their achievement in Chemistry. The coefficient $r^2 = 0.060$ implies that 6.0% of the variation in achievement in Chemistry can be attributed to the students' school facilities.

Research Question 2
What is the relationship between preferential treatments and students' achievement in Chemistry?
Table 2: Correlation between Preferential Treatment and Students' Achievements' in Chemistry

	N	Mean	Std. Deviation	r	Significant level
Preferential Treatment	350	29.34	11.867		
Chemistry Achievement	350	21.16	12.973	.62:2	.000*
$r^2 = 0.387$					

*Significant at P<0.05

Table 2: shows that there is statistically significant relationship between preferential treatment and students' achievement in Chemistry, significant at P<0.05. The coefficient 1r = 0.622 implies that the higher the preferential treatment given to a student, the higher the achievement in Chemistry. The $r^2 = 0.387$ implies that 38.7% of the variation in achievement in Chemistry can be attributed to the preferential treatment.

Research Question 3
What is the relationship between class size and students' achievement in Chemistry?
Table 3: Correlation between class size and students achievement in Chemistry

	N	Mean	Std. Deviation	r	Significant level
Class Size	350	3.33	.844		
Chemistry Achievement	350	25.24	12.083	-.285	.000*
$R^2 = 0.142$					

*Significant at P<0.05

Table 3 shows that there is statistical significant relationship between class size and students' achievement in Chemistry, significant at P<0.05.

The negative correlation (r = -0. 285) between class size and students' achievement in Chemistry implies that large class size leads to decrease in students' achievement in Chemistry and vice versa.

Research Question 4

What is the composite effect of school facilities and preferential treatment, class size on students' achievement in school facilities?

Table 4: Regression of school facilities, preferential treatment and class size on Students Achievement in Chemistry.

Model		Sum of squares	Df	Mean square	F	Sig.
	Regression	16385.830	3	3427.943	38.369	.000
	Residual	27550.890	376	89.341		
	Total	36278.720	387			
R=.429 R square = .280 adjusted R. square = .373						

Table 4 shows that there is significant statistical effect between school facilities, preferential treatment and class size on students' achievement in Chemistry. The adjusted R Square = 0.373 implies that 37.3% of the variance in the students' achievement in Chemistry can be attributed to the combined effect of the three independent variables. These findings indicate that there is a positive composite effect of school facilities, preferential treatment, and class size on student's achievement in Chemistry.

DISCUSSION

The findings of this study revealed that school facilities have a significant positive correlation with students' academic achievement in Chemistry, this is corroborated with Agabi (2004) which stated that students' achievement depends upon the physical school facility, its age, the design, and that the condition of the school facilities played a significant role in directing the task of teaching and that of shaping students learning process in and out of school.

The findings from this study also reveal that there is a significant positive relationship between preferential treatment and achievement of students in Chemistry. This is corroborated by Akorede and Salami (2012). Who found out that preferential treatment increased the academic benefit of effort from the students. They both stated that when preferential treatment if mild, it reduces the expected academic achievement of the disadvantaged (low and moderate students). However, the findings of Espenshade et al (2004) asserted that preferential treatment does not alter the marginal benefit of effort from the students.

The results of this study also revealed that there is a significant positive relationship between class size and students' achievement relationship between class size and students' achievement in Chemistry. This means that students from a small class size performed better than students highly populated classes. Hence, the higher the class size, the lower the students' achievement and vice versa. This finding is supported by the research evidence from Tennessee's project star, which shows that the students in smaller classes perform better than those in large class (Finn and Achilled, 1990; Kruegger and Whitmore, 2001; Finn et al, 2005). This study however contradicts the studies of (Ogbonna, 2007; and Slate & Jones 2005), that stated that students in larger class did better in academic achievement than student from smaller classes.

Therefore, class size which could affect students' achievement positively or negatively has to be balanced with the teacher's ability to manage a class professionally. Findings from this study further contradicted the findings of Abusayeed (2015) who found no significant relationship between class size, school environment and academic achievement. Conducive classroom environment enhances the process of teaching and learning, motivates and encourage students toward learning and make learning process exciting and interesting which in turn leads to improved academic performance.

Finally, the findings of this study revealed that the combination of the independent variables, that is: school facilities preferential treatment, and class size jointly has a strong prediction on achievement of students in chemistry. This means that the variations of achievement in chemistry can be attributed to the influence of these variables.

IMPLICATION AND CONCLUSION
- School management should provide adequate school facilities to aid learning.
- Chemistry teachers should have high expectation of their students and frequently communicate the same to the students irrespective of their personal characteristics and abilities.
- Chemistry teachers should treat students equally, irrespective of their gender, race, religion and level of intelligence.
- Parents should make provision for the materials needed by their children in order for them to be actively involved in the class activities, for good outcome.
- Government should build more classes and increase the number of classrooms, and to reduce large class size.

In conclusion, the findings of this study showed that students that are provided with adequate school facilities treated better by their teachers, study in smaller classes, performed better than the other students. Hence, students of chemistry are bound to perform well if they are treated equally by their teachers and are taught in smaller classes or less populated classes.

RECOMMENDATIONS
1. Teachers should be made to treat all students equally, so that adequate attention should be given to all
2. Government should try to build more classrooms in our public schools, so that class size would be reduced
3. Students should take their study seriously so as to justify the facilities provided by the government
4. Parents should provide conducive environment at home, so that their children would be able to study.

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