



Classroom Organization as Correlate of Students' Academic Achievement and Interest in Chemistry

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Abstract

This study was carried out to investigate the relationship between classroom organization, students' academic achievement and interest in chemistry using a Correlational research design. Two research questions and two null hypotheses guided the study. The study was conducted in Nsukka Urban of Enugu State. 100 senior secondary two (SS II) Chemistry students made up the sample for the study. Three researcher developed instruments, Chemistry Achievement Test (CAT), Classroom organization Questionnaire (COQ), and Chemistry Students' Interest Inventory (CSII) was employed to collect the data. Research question were answered using Regression analysis while the null hypotheses were tested at 0.05 level of significance using Analysis of Variance (ANOVA). The results of the study showed that there is a positive and high significant relationship with 97% variation between classroom organization and students' academic achievement in chemistry, and there is also a positive, high and significant relationship between Classroom Organisation and interest of senior secondary school students in chemistry. Based on the findings, recommendations were made.

Keywords: Classroom Organization, Chemistry, Achievement and Interest

Introduction

Chemistry is referred to as mother of all sciences and has played a vital role in professional development in the fields of Agriculture, Medicine, Pharmacy, Nursing, Radiography among other scientific disciplines. Students intending to pursue careers in any of these fields must have adequate understanding and knowledge of chemistry contents (Oshinyemi & Seyi, 2018). It is therefore not out of place to say that chemistry is the bedrock of sustainable growth and development in any nation. This is why Chemistry occupies a unique position among various science subjects offered at secondary schools. Apart from having contents that form the foundations for understanding of other science subjects, its learning develops the scientific habit in students which are transferable to other areas of life, such as non-reliance on superstition, critical thinking, understanding of natural phenomena and respect for other people's opinion. This notwithstanding, many students struggle with chemistry concepts and as such fail to develop a genuine interest in the subject consequently poor records of achievement in external examinations. This is observable from the performances of students in

external examinations such as Joint Admission and Matriculation Board (JAMB), West African School Certificate Examination (WASCE), National Examination Council Examinations (NECO), and National Board for Technical Examinations Board (NABTEB) Examinations. (Abdi -rim, 2015; Naiz, 2015; Igwe, 2015, WAEC Chief Examiner, (2017 - 2021) In Nigeria's march toward scientific and technological advancement, nothing short of good achievement is needed in chemistry at all levels of schooling.

The educational quality of a nation can be seen in the academic achievement of the students when they compete with other nations in external examinations, hence, it is beneficial to maintain a high achievement in internal and external examinations. Understanding the factors that influence students' academic achievement in chemistry becomes essential for designing effective instructional strategies that promote learning and achievement. A number of factors has been identified to this effect these includes but not limited to the methods used by the chemistry teachers, availability of teaching and learning materials, well equipped Chemistry



laboratories among others. (Jarvis, 2021). Bello (2021), also noted that some of the complex issues in the field of science education include the availability of appropriate textbooks and classroom resources and cutting-edge science instructions.

Chemistry educators have put in much efforts to resolve these issues especially in the areas of pedagogy and instructional material, with array of teaching methods being advocated in literature in a bid to ensure that students' academic achievement in Chemistry external examination becomes excellent regrettably, it still remained poor in most of the years as noted earlier. It therefore, becomes necessary to look outside the box and consider the relationship between classroom organization and academic achievement alongside interest. A classroom is a room set aside specifically designed and furnished for the purpose of teaching and learning. Generally, it refers to a designated space where learning and teaching activities takes place. Traditionally, classrooms have been a physical space where students gather to learn from a teacher, but with the advent of online learning and other forms of remote education, the concept of the classroom has expanded to include virtual spaces as well. Falsario, Muyong and Neuvaespana (2014) identified two parts of classroom namely, the physical and social environment. Physical classroom environment refers to the arrangement of chairs, tables, fixtures and pieces of furniture, painting, lighting and ventilation, arranging furniture, materials, pictures, chalkboard/whiteboard, teacher's table and student's desk. The physical Classrooms environment can further be categorized into two major types; the departmentalized classroom and self-contained classroom.

Departmentalized classroom is a classroom where one teacher teaches a specific subject to a set of students. In such a classroom setting one teacher teaches a specific content, for instance in Chemistry as a subject with three main branches; Organic Chemistry, Physical Chemistry and Inorganic Chemistry. One teacher in a departmentalized classroom do not teach the three branches, each branch is taught by a separate specialty in that area which is used mainly in higher schools but can be effectively used in secondary schools. In a departmentalized classroom, the classroom setting is changed frequently to reflect the area or the branch of Chemistry that is taught. When it is time to teach Organic Chemistry, charts and models of Organic compounds are used to design the classroom (Day, 2019). This is not team teaching or collaborative teaching. Team teaching is a strategy where multiple

teachers share teaching duties regularly, they plan together and execute together. The teachers may work in the same classroom, the same topic but different unit and the same scenario, nothing is changed in the classroom setting whereas, it is regularly changed in a designated departmentalized classroom. Self-contained classroom is one in which one teacher teaches the students multiple topics. This is usually obtainable in the Primary schools, but due to lack of subject teachers in some areas of specialty like Chemistry, Mathematics and Physics in many Secondary schools, it is employed. An Agriculture teacher can be assigned to teach Chemistry, Physics, Agriculture, Integrated science and even Mathematics (Moore, 2008). While the social environment refers to the leadership role of the teacher and student's participation and interaction.

Classroom organization therefore connotes the systematic arrangement and management of physical and instructional elements within a classroom to create an effective and conducive learning environment hence every classroom plays host to different personality types of learners who come into the classroom differently prepared within the same classroom environment from different culture and background. This becomes a challenge to the teacher on who, lies the huge challenges of arousing their interest and leading them to high and impressive academic achievement. Studies are sparse on the relationship between classroom arrangements and organization patterns, academic achievement and interest in Chemistry, but a number of studies have been carried out on the effect of learning environment on students' academic achievement with none focusing specifically on the relationship between organization and arrangement of the classroom as a central learning environment and students' achievement or interest. (Udoh, 2012; Ezike, 2018; Laura, et al, 2023). This research will expand this understanding to different classroom organization and arrangements. This research therefore, conducted a systematic investigation into the relationship between classroom organization, students' academic achievement and interest in chemistry at the secondary school level.

Interest and achievements go hand -in- hand because it does appear that when one is interested in an activity or an exercise, the individual tend to perform and achieve better in that exercise, if it is a learning process, more learning will occur, hence better achievement. Academic achievement may be referred to as the extent to which an educational goal is achieved. A student who earns good grades or awards

in science has achieved in that academic field of science. Anselmus (2017) asserted that academic achievement is a person's strong performance in a given academic endeavor and that it is a cardinal concept in education, hence the need to improve on it in every field of study especially in Chemistry which is regarded as the mother of all sciences. On the other hand, Interest can be said to be a feeling that go with or causes special attention to an object or class of objects. It is the feeling that makes somebody to act towards or against something in the environment. Interest as defined by Renninger and Hidi, (2016) is a psychological state characterized by heightened attention, positive effect, and a strong inclination to engage with and explore a particular topic or activity. This study therefore, anchors theoretically on social constructivism by Vygotsky's which believed that children learn more efficiently in a social environment and emphasizes the role of social interaction and cultural context in shaping cognitive development and learning. Thus highlighting the importance of creating an environment that facilitates social interaction, interest, collaborative learning, and meaningful engagement.

Research Questions

The following research questions were formulated to guide the study;

1. What is the relationship between classroom organization and students' achievement in chemistry?
2. What is the relationship between classroom organization and students' interest in chemistry?

Research Hypothesis

1. There is no significant relationship between the mean achievement score of students in chemistry and classroom organization.

2. There is no significant relationship between the mean interest score of students in chemistry and classroom organization.

Methods

The study employed a correlational research design due to its appropriateness in the measurement of two or more variables and the relationship between or among those variables. The design involves the measurement of variance on the outcome variable relative to variance on the predictor variable(s) and there was no manipulation of the variables or subjects under study. A population of 1011 Senior Secondary two (SS2) students in nine Secondary schools located in Nsukka Main Urban of Enugu State was taken for the study, 10% of this population which gave a sample size of 100 SS2 Chemistry students used for this study. Three instruments developed by the researcher were used for data collection, these are; Classroom Organization Questionnaire (COQ), Chemistry Students' Interest Inventory (CSII) and Chemistry Achievement Test (CAT). The instruments were validated by three experts from the Department of Science Education, University of Nigeria Nsukka. The reliability was established using Cronbach's Alpha for classroom organization questionnaire and students interest inventory. Then, KR-20 for Chemistry Achievement Test (CAT) and the reliability indices are 0.964, 0.953 and 0.84 respectively. The chemistry achievement test was first administered to the sampled students to ascertain their level of knowledge and achievement in Chemistry. There after the Classroom organization questionnaire was given to them followed by the Chemistry Interest Inventory. Their responses were collated and subjected to further analysis. The research questions were answered using regression analysis, while hypotheses were tested using analysis of variance (ANOVA) at $p < 0.05$ level of significance.

Results

Table 1: Regression analysis on the relationship between classroom organization and students' academic achievement of senior secondary school in chemistry in Nsukka Urban of Enugu State

Model	N	R	R Square	Adjusted Square	R Std. Error of the Estimate
1	100	.985 ^a	.970	.970	5.22419

a. Predictors: (Constant), Classroom Organizational Structures

b. Dependent Variable: Achievement

The result presented in Table 1 shows the regression analysis of the relationship between classroom organization and students' academic

achievement of senior secondary school in chemistry in Nsukka Urban of Enugu State. The result shows that a regression coefficient (R) of 0.985 was obtained. This

means that there is a positive and high correlation between classroom organization and students' academic achievement of senior secondary school in chemistry in the Zone. The coefficient of determination (R Square) of 0.970 obtained implies that 97% of the variation in

students' academic achievement was as a result of classroom organization. This is an indication that 3% of variation in students' achievement is attributed to other factors other than classroom organization.

Table 2: ANOVA result on the relationship between classroom organization and academic achievement among senior secondary school students.

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	87519.961	1	87519.961	3206.784	.000 ^b
	Residual	2674.629	98	27.292		
	Total	90194.590	99			

a. Dependent Variable: Achievement

b. Predictors: (Constant), Classroom Organization

The result in Table 2 is on the relationship between classroom organization and academic achievement of senior secondary school students in chemistry in Nsukka Urban of Enugu State. An F-ratio of 3206.784 was obtained. Since the p-value of 0.000 obtained is less than 0.05 level of significance set for

decision making, the null hypothesis is rejected. Thus, there is a significant relationship between classroom organization and academic achievement among senior secondary school students in chemistry in Nsukka Urban of Enugu State.

Table 3: Regression analysis on the relationship between classroom organization and interest of senior secondary school students in chemistry in Nsukka Urban of Enugu State.

Model	N	R	R Square	Adjusted Square	R	Std. Error of the Estimate
1	100	1.000 ^a	1.000	1.000		.55133

a. Predictors: (Constant), Classroom Organization

b. Dependent Variable: Interest

The result presented in Table 3 shows the regression analysis of the relationship between classroom organization and interest of senior secondary school students in chemistry in Nsukka urban of Enugu State. The result shows that a regression coefficient (R) of 1.000 was obtained. This means that there is a positive and high correlation between students' classroom organization and interest of senior secondary

school students in chemistry in Nsukka urban. The coefficient of determination (R Square) of 1.000 obtained implies that 100% of the variation in students' interest was as a result of classroom organization. This is an indication that 0% of variation in students' interest is attributed to other factors other than classroom organizational structures.

Table 4: ANOVA result on the relationship between classroom organization and interest of senior secondary school students.

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	115111.989	1	115111.989	378698.602	.000 ^b
	Residual	29.789	98	.304		
	Total	115141.778	99			

a. Dependent Variable: Interest



b. Predictors: (Constant), Classroom Organization

The result in Table 4 is on the relationship between the classroom organization and interest of senior secondary school students in chemistry in Nsukka Urban of Enugu State. An F-ratio of 378698.602 was obtained. Since the p-value of 0.000 obtained is less than 0.05 level of significance set for decision making, the null hypothesis is rejected. Thus, there is a significant relationship between classroom organization and interest of senior secondary school students in chemistry in Nsukka Urban schools of Enugu State.

Discussion and Conclusion

The result of the study shows that there is a positive significant relationship between classroom organization and students' academic achievement in chemistry. Most school classrooms do not take the proper shape and organization to reflect a conducive environment for the teaching and learning of such a subject as Chemistry, with a number of concepts termed abstract there should be good classroom environment that can cushion the phobia experienced by many students at onset of a Chemistry lesson. In-line with the finding of this study, Rufus et al, (2021) affirms that learning environment strongly influence students' achievement. This implies that when a classroom is well organized with the appropriate facilities, learners will become attracted to and interested in the activities going on in such a classroom, consequently, promoting active learning and engagement. In other words, interest and achievements go hand -in- hand.

The findings from this study also showed convincingly that there is a correlation between classroom organization and students' interest in chemistry. One key observation from this research was that students who indicated having or being in a more conducive and Chemistry reflected classrooms recorded higher interest in chemistry in the interest scale. Further probing revealed that such environment not only makes them to understand what the teacher is teaching but also reminds them of answers to questions during a test or examination. Little wonder, their scores were higher in the chemistry achievement test. It may then follow that classroom environment when made favorable will increase interest and will predict achievement in all subjects not only in Chemistry. This agrees with the assertion of Okello, (2023) that the extent to which students learn could be enhanced by the school location, structure of their classroom,

availability of instructional facilities and accessories. The implication of this is that if Chemistry educators, curriculum planners and policy makers do not put in place strategies that promote better classroom organization by incorporating elements of effective classroom organization into the chemistry curriculum students' interest and achievement in Chemistry will continue to fluctuate or remain poor despite all other efforts.

Recommendation

The researchers therefore recommend that,

- Teachers should adopt a culture of organizing their classroom in such way that heightens students' interest and understanding of the seemingly abstract Chemistry contents.
- Student survey should be considered to obtain views and preferences on the patterns of classroom organizational that enhances student's enthusiasm and readiness to learn.
- Curriculum planners should incorporate classroom organization and periodic restructuring of classrooms in the production of instructional materials into chemistry curriculum.
- Professional bodies such as Science Teacher Association of Nigeria (STAN) should organize periodically workshops, seminars on classroom organization for in-service and pre-service teachers.

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