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# EDITORIAL

Journal of Science Education and Research (JSER) is a peer-reviewed published Bimonthly. It aimed at advancing knowledge and professionalism in all aspects of educational research, including but not limited to innovations in science education, educational technology, guidance and counselling psychology, childhood studies and early years, curriculum studies, evaluation, vocational training, planning, policy, pedagogy, human kinetics, health education and so on. JSER publish different types of research outputs including monographs, field articles, brief notes, comments on published articles and book reviews.

We are grateful to the contributors and hope that our readers will enjoy reading these contributions.

**Prof. Patrick C. Igbojinwaekwu**
**Editor-in-Chief**

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# INFLUENCE OF SCHOOL ENVIRONMENT ON ACADEMIC ACHIEVEMENT OF CHEMISTRY STUDENTS IN JALINGO LOCAL GOVERNMENT AREA, TARABA STATE, NIGERIA

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## Abstract

*This study investigated the influence of school environment on the academic achievement of chemistry students in Jalingo Local Government Area, Taraba State. The study employed survey research design. The population of the study comprised of 3985 chemistry students in Jalingo Local Government Area. Based on KrejCie and Morgan (1970) table for determining sample size, a sample of 355 respondents was selected to ensure representativeness. The simple random sampling technique was used in selecting the sample from six schools in the study area. A structured questionnaire titled: Influence of School Environment on Chemistry Students' Academic Achievement Questionnaire (ISECSAAQ) was used for data collection. A reliability test was carried out using Cronbach Alpha and reliability coefficient of 0.83 was obtained. The questionnaire ISECSAAQ was administered to the selected schools to determine the respond of the respondents. Mean and standard deviation were used to answer the research question while Chi square was used in testing the hypotheses. Findings of the study revealed that class size influences chemistry students' academic achievement, there is no significance influence of instructional facilities on chemistry students' academic achievement. Based on the findings of the study, it is evident therefore to conclude that class size influences chemistry students' academic achievement; there is no significance influence of instructional facilities on chemistry students' academic achievement. Chemistry students should not be over-populated in chemistry class as that will enhanced students' academic achievement. The study recommend that Chemistry teachers should use teaching/ learning materials that are culturally relevant, current or aligned with the curriculum as that will lead to maximum impact of learning outcomes among learners.*
**Keywords:** School Environment, Academic Achievement

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## Introduction

In Nigeria secondary schools, science is studied as chemistry, physics and biology. The field of chemistry has made significant contributions in different fields of science endeavor. According to Helmenstine (2019), chemistry is the scientific study of matter, its properties and interactions with other matter and with energy. To Kofoed and Miller (2020), chemistry is the study of matter and the changes its undergoes. Chemistry therefore is the branch of science that studies matter, its properties and the changes its undergoes. Ojokuku in Gongden (2021) stressed that chemistry occupies a central position among the sciences due to its remarkable contribution in medicine, pharmacy, textile industry, engineering and agriculture. For instance, chemical knowledge has helped in the preparation and use of materials for surgery. The sutures used in surgeries today do not have to be removed because they dissolve in the body after a period of time.

The field of chemistry therefore, is playing an undeniable, significant and indispensable role in the development of the vaccine and drugs for the prevention and treatment of the virus. According to Eze and Dinneya (2022), the development of a new drug for any disease involves a complicated chemical analytical process. The chemistry of the disease as well as the chemistry of the human body must be studied to determine how the drug would affect the patients. The role of chemistry in scientific and technological development informs why it is a pre-requisite for acquisition of appropriate skills in the study of the subject chemistry and other science-based courses in secondary schools and Nigeria Universities. This acquisition of appropriate skills, abilities and competence cannot be achieved without the utilization of resources in the teaching and learning (Nnoli, 2016). The school environment remains an important area that should be studied and well managed to enhance students' academic achievement in all areas of educational studies in order to make teaching and learning effective (Jegede & Okeya, 2022).

Kingsley (2014) examine the classroom learning environment and students' academic performance in River State. A sample of 500 students were randomly selected from population of 56438 students in public secondary schools for the study. The design adopted for the study was a causal comparative design. The major instrument used in the study was student and teacher questionnaires and revealed that class size has effects on students' academic performance. Ezekiel (2015) conducted a study on influence of classroom size on student academic achievement in Chemistry in Abak Education Zone

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of Akwa lbom State. In order to achieve this, three hypotheses were formulated and tested at 0.05 alpha level. The design adopted for the study was the ex-post facto. The sample for the study consisted of 200 students randomly selected in Abak Education Zone of Akwa lbom State. The results obtained amongst others, revealed that there is a significant influence of class size on students' academic achievement in Biology in Abak Education Zone of Akwa lbom State.

Etim (2016) examine the effect class size on students' academic performance in Chemistry in Akamkpa Local Government Area of Cross River State. The study was carried out in 5 randomly selected public secondary schools in Akamkpa Local Government Area. A sample 200 students were randomly selected from 2832 students in public secondary schools for the study. The results obtained amongst others, revealed that there is a significant influence of class size on students' academic performance. Jegede and Okeya (2022) investigated a study on the influence of environment on students' academic performance in chemistry in secondary schools rural areas of Ekiti State, Nigeria. Descriptive design was used for the study. Sample size for the study was 100 respondents and instrument used for the study was self - developed questionnaire comprised of 20 items. Finding of the study revealed that there was significant relationship between school environment and students' academic performance. Conducive or friendly environment encourage teaching and learning and promote students understanding of the language used.

In another similar study by Li and Xue (2022) on class size and academic outcomes in Chinese middle schools. Hierarchical linear was employed for the study. 10,000 students were sampled. Findings revealed that larger classes led to lower academic achievement. Peter et al (2022) conducted a study on effect of instructional materials on chemistry academic achievement and retention of challenging chemistry concepts. Results indicated that use of instructional materials significantly enhanced both achievement and retention rate among students. A similar study by Obikezie, Eke and Abumchukwu (2022) on comparative effects of teaching with improvised and standard instructional materials on secondary school students' academic retention in chemistry with a sample of 192 SS1 students. Finding revealed that improvised materials lead to higher retention than standard materials. Igunu, Gital & Suleiman (2024) in a study titled impact of improvised materials on performance. Findings revealed a positive impact of improvised materials on students' academic performance. This implies that instructional materials plays a vital role in enhancing students' academic achievement.

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Afolabi and Aluko (2024) in a study class size and learning in Nigerian Universities found that smaller tutorial groups significantly improved academic performance of students. Obikezie et al. (2023) found that urban male students using the generative learning model achieved higher gains than rural students in Anambra State, Nigeria. Rural students often struggle with inadequate laboratory facilities, poor instructional materials, and longer travel distances to schools.

**Statement of the Problem**
Academic achievement in secondary school chemistry remains a concern among educators, policymakers, parents, and students in Nigeria. In Jalingo, the capital of Taraba State, reports from examinations such as the West African Senior School Certificate Examination (WASSCE) and National Examination Council (NECO) have shown that a significant proportion of students continue to underperform in core science subjects, particularly chemistry. Emerging evidence suggests that the school environment plays a pivotal but often underexplored role in shaping students' academic outcomes. The school environment encompasses all the physical, psychological, social, and academic factors within a school that influence teaching and learning. It includes infrastructure such as classrooms, laboratories, libraries, and sanitation facilities; availability of teaching and learning materials; school safety; class size; and the overall organizational climate. In the context of chemistry, which is both conceptually challenging and practically intensive, the need for a conducive learning environment is even more critical. A well-equipped laboratory, access to updated chemistry textbooks, functional power supply, safe chemical storage, and adequate ventilation are essential elements that directly affect how chemistry is taught and understood. In many secondary schools in Jalingo Local Government Area, however, these facilities are either lacking, insufficient, or in poor condition. Furthermore, teacher-student interactions, peer collaboration, and administrative support constitute other important components of the school environment that may influence chemistry students' engagement and motivation. For instance, overcrowded classrooms and under qualified or poorly motivated teachers can lead to ineffective instruction, reduced individual attention, and ultimately lower academic achievement. Despite government efforts through various educational reforms and programs such as the Universal Basic Education (UBE) and the Teachers' Professional Development initiatives, there remains a wide disparity in school environments across urban and rural areas in Jalingo. Research conducted in other parts of Nigeria and internationally has consistently demonstrated the significant correlation between school environment and student

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achievement. However, limited empirical studies have specifically focused on the Taraba State context, particularly within the science discipline. Without localized evidence, it becomes challenging for school administrators, curriculum planners, and educational policymakers to make data-driven decisions aimed at improving student outcomes. This study therefore seeks to bridge this gap by investigating the influence of the school environment on the academic achievement of chemistry students in Jalingo Local Government Area. By identifying the specific aspects of the school environment that significantly impact academic achievement; this research can inform targeted interventions to enhance science education delivery in the region. Ultimately, understanding the relationship between school environment and academic achievement in chemistry will provide a basis for improving the quality of science education and fostering better learning outcomes among students in Jalingo and similar educational contexts.

## Purpose of the Study

This study aims to explore the influence of school environment on academic achievement of chemistry students in Jalingo local government area, Taraba State. Specifically, the study seeks to determine;

1. examined the influence of class size on chemistry students' academic achievement in Jalingo Local Government Area of Taraba State
2. examined the influence of instructional facilities on chemistry students' academic achievement in Jalingo Local Government Area of Taraba State
3. examined the influence of school location on chemistry students' academic achievement in Jalingo Local Government Area of Taraba State

## Research Questions

The following research questions guided the study;

1. What is the influence of class size on chemistry students' academic achievement in Jalingo Local Government Area of Taraba State?
2. What is the influence of instructional facilities on chemistry students' academic achievement in Jalingo Local Government Area of Taraba State?
3. What is the influence of school location on chemistry students' academic achievement in Jalingo Local Government Area of Taraba State

**Hypotheses**

The following hypotheses were tested at 0.05 level of significance.

$H0_1$: There is no significance influence of class size on chemistry students' academic achievement in Jalingo Local Government Area of Taraba State

$H0_2$: There is no significance influence of instructional facilities on chemistry students' academic achievement in Jalingo Local Government Area of Taraba State

$H0_3$: There is no significance influence of school location on chemistry students' academic achievement in Jalingo Local Government Area of Taraba State

**Methodology**

The study employed survey research design. The population of the study comprised of 3985 chemistry students in Jalingo Local Government Area. Based on KrejCie and Morgan (1970) table for determining sample size, a sample of 355 was selected to ensure representativeness. The simple random sampling technique was used in selecting the sample from six schools in the study area. A structured questionnaire titled: Influence of School Environment on Chemistry Students Academic Achievement Questionnaire (ISECSAAQ) was used for data collection in the study. The instrument comprised of 15 items statement which were drawn in the format of 4-point likert scale i.e strongly agree (SA= 4), agree (A=3), disagree (DA-2) and strongly disagree (SD=1). The cut – off point for decision making was adopted as 4+3+2+1 /4= 2.5..A reliability test was carried out using Cronbach Alpha and reliability coefficient of 0.83 was obtained. The questionnaire was administered to 355 students. Mean and standard deviation were used to answer the research question while Chi square was used in testing the hypotheses.

**Results**

**Research Question 1:** What is the influence of class size on chemistry students' academic achievement in Jalingo Local Government Area of Taraba State

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**Table 1: Descriptive statistics of influence of class size on chemistry students' academic achievement in Jalingo Local Government Area of Taraba State**

| S/N Statement | SA | A | D | SD | N | Mean | Std. Dev. | Decision |
|---|---|---|---|---|---|---|---|---|
| Proper arrangement of seats for free movement in my Chemistry class facilitates easy understanding of lessons. | 71 | 253 | 31 | 0 | 355 | 3.11 | 0.52 | Agreed |
| Hearing the teacher from the back is not difficult in Chemistry class | 34 | 40 | 223 | 58 | 355 | 2.14 | 0.80 | Disagreed |
| The size of Chemistry class enables utilization of the available teaching aids for effective learning | 0 | 44 | 202 | 109 | 355 | 1.82 | 0.63 | Disagreed |
| There is adequate furniture (tables and stools) and space to accommodate students in Chemistry class | 60 | 262 | 33 | 0 | 355 | 3.08 | 0.51 | Agreed |
| Class size influences students attention and understanding in Chemistry class | 48 | 263 | 44 | 0 | 355 | 3.01 | 0.51 | Agreed |
| **Cluster Mean/Standard Deviation** | | | | | **355** | **2.63** | **0.60** | **Agreed** |

Table 1 presents mean and standard deviation ratings of responses on the influence of class size on students' academic achievement. The result shows that item 2 and 3 have means of less than 2.50 while item 1, 4 and 5 have mean within the range of 2.50 to 4.00. The cluster has a mean of 2.63 and a standard deviation of 0.60; the cluster mean implies that class size influences chemistry students' academic achievement. While, the cluster standard deviation signifies that the respondents are similar on their opinion.

**Research Question 2:** What is the Influence of Instructional Facilities on Chemistry Students' Academic achievement in Jalingo Local Government Area of Taraba State

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**Table 2: Descriptive statistics of influence of Instructional Facilities on chemistry Students' Academic achievement in Jalingo Local Government Area of Taraba State**

| S/N Statement | SA | A | D | SD | N | Mean | Std. Dev. | Decision |
|---|---|---|---|---|---|---|---|---|
| Our Chemistry teacher uses real object to teach us which help us understand Chemistry lessons. | 0 | 0 | 244 | 111 | 355 | 1.69 | 0.46 | Disagreed |
| He/she uses audio-visual for lessons which help us understand Chemistry lessons | 11 | 0 | 274 | 70 | 355 | 1.89 | 0.55 | Disagreed |
| We have good white board in the class which help us understand Chemistry lessons | 0 | 0 | 220 | 135 | 355 | 1.62 | 0.49 | Disagreed |
| There are enough textbooks for my teacher to use in the class which help us understand Chemistry lessons. | 0 | 0 | 205 | 150 | 355 | 1.58 | 0.49 | Disagreed |
| There are enough models/ mocks for teacher to use in the class which help us understand Chemistry lessons | 0 | 0 | 197 | 158 | 355 | 1.55 | 0.50 | Disagreed |
| **Cluster Mean/Standard Deviation** | | | | | **355** | **1.66** | **0.49** | **Disagreed** |

Data in Table 2 shows mean and standard deviation ratings of responses on the influence of instructional facilities on students' academic achievement. The result shows that all items have means of less than 2.50; this shows that respondents disagreed that instructional facilities have influence on students' academic performance. The cluster has a mean of 1.66 and a standard deviation of 0.49; the cluster mean implies that instructional facilities do not influence students' academic achievement. While, the cluster standard deviation signifies that the respondents are similar on their opinion.

**Research Question 3:** What is the Influence of School Location on Chemistry Students' Academic achievement in Jalingo Local Government Area of Taraba State

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**Table 3: Descriptive statistics of Influence of School Location on Chemistry Students' Academic achievement in Jalingo Local Government Area of Taraba State**

| S/N Statement | SA | A | D | SD | N | Mean | Std. Dev. | Decision |
|---|---|---|---|---|---|---|---|---|
| Students from urban schools perform better academically than students in rural schools | 0 | 0 | 262 | 93 | 355 | 1.74 | 0.44 | Disagreed |
| School location influences students' retention and progression | 93 | 225 | 19 | 18 | 355 | 3.11 | 0.71 | Agreed |
| Students in urban school have more to educational facilities than students in rural schools | 0 | 11 | 247 | 97 | 355 | 1.76 | 0.50 | Disagreed |
| There are more trained teachers in urban schools that in rural schools which affects content coverage by teachers in rural schools. | 122 | 233 | 0 | 0 | 355 | 3.34 | 0.48 | Agreed |
| Students' attendance in urban schools is higher than students in rural area. | 78 | 277 | 0 | 0 | 355 | 3.22 | 0.41 | Agreed |
| **Cluster Mean/Standard Deviation** | | | | | **355** | **2.63** | **0.51** | **Agreed** |

Table 3 presents mean and standard deviation ratings of responses on the influence of school location on students' academic achievement. The result shows that item 1 and 3 have means of less than 2.50 while item 2, 4 and 5 have mean within the range of 2.50 to 4.00. The cluster has a mean of 2.63 and a standard deviation of 0.51; the cluster mean implies that school location influences students' academic achievement. While, the cluster standard deviation signifies that the respondents are similar on their opinion.

**H0$_1$:** There is no significance influence of Class Size on Chemistry Students' Academic achievement

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**Table 4: Chi-Square Tests of the influence of Class Size on Chemistry Students' Academic achievement**

|  | Value | Df | Asymp. Sig. (2-sided) |
|---|---|---|---|
| Pearson Chi-Square | 271.044 | 354 | .000 |
| Likelihood Ratio | 297.411 | 354 | .000 |
| Linear-by-Linear Association | 15.695 | 1 | .000 |
| N of Valid Cases | 355 |  |  |

Table 4 revealed Chi-square test was used to test for significance of the influence of class size on students' academic achievement in Taraba State ($\chi^2$ = 271.044, df = 354, $p$ < .001). The result in Table 4 shows that there is a significance influence of Class Size on Students' Academic achievement. Therefore, the null hypothesis which states that there is no significance influence of Class Size on Students' Academic achievement is rejected.

**H0₂:** There is no Significance Influence of Instructional Facilities on chemistry Students' Academic achievement in Jalingo Local Government Area of Taraba State

**Table 5: Chi-Square Tests of Significance Influence of Instructional Facilities on chemistry Students' Academic achievement in Jalingo Local Government Area of Taraba State**

|  | Value | Df | Asymp. Sig. (2-sided) |
|---|---|---|---|
| Pearson Chi-Square | 11.930 | 354 | .063 |
| Likelihood Ratio | 18.254 | 354 | .055 |
| Linear-by-Linear Association | 1.884 | 1 | .170 |
| N of Valid Cases | 355 |  |  |

Data in Table 5 points at Chi-square test was used to test for significance of the influence of instructional facilities on students' academic achievement in Jalingo Local Government Area of Taraba State ($\chi^2$ = 11.930, df = 354, $p$ = .063). The result in Table 5 shows that there is no significance influence of instructional facilities on students' academic achievement. Therefore, the null hypothesis which states that there is no significance influence of instructional facilities on students' academic achievement is retained.

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**H0₃:** There is no significance influence of School Location on Chemistry Students' Academic achievement in Jalingo Local Government Area of Taraba State

**Table 6: Chi-Square Tests of** significance influence of School Location on Chemistry Students' Academic achievement in Jalingo Local Government Area of Taraba State

|  | Value | Df | Asymp. Sig. (2-sided) |
|---|---|---|---|
| Pearson Chi-Square | 131.482 | 354 | .000 |
| Likelihood Ratio | 149.812 | 354 | .000 |
| Linear-by-Linear Association | 2.719 | 1 | .099 |
| N of Valid Cases | 355 |  |  |

Table 6 x-rayed Chi-square test was used to test for significance of the influence of school location on chemistry students' academic achievement in Jalingo Local Government Area of Taraba State ($\chi^2 = 131.482$, df = 354, $p < .001$). The result in Table 6 shows that there is a significance influence of school location on Students' Academic achievement. Therefore, the null hypothesis which states that there is no significance influence of school location on Students' Academic achievement is rejected.

**Discussion**

Finding reveals that class size influences chemistry students' academic achievement in Jalingo Local Government Area of Taraba State. This finding is in agreement with Ezekiel (2015) and Etim (2016) who found that class size significantly influence on students' academic performance. The implication that class size significantly affects chemistry students' academic achievement underscores the importance of smaller, manageable class sizes for effective science education. Smaller class sizes allow teachers to give more individualized attention which is critical in subject like chemistry that requires understanding of complex concepts and hands-on laboratory work.

Another finding revealed that there is no significance influence of instructional facilities on chemistry students' academic achievement. The implication of this finding is that, the materials used by chemistry teachers may be culturally irrelevant, outdated or misaligned with the curriculum leading to minimal impact of learning outcomes. It could also mean that education stakeholders need to reassess how resources are allocated and more emphasis might be placed on teacher training, classroom management or students support services. The implication may also be that curriculum

designers might need to focus more on interactive, students-centred learning experiences rather than content delivery through materials. This study disagree with the finding of Obikezie, Eke & Abumchukwu (2022), Igunu, Gital & Suleiman (2024) who all found a positive impact of improvised materials on students' academic performance.

Furthermore, the finding revealed that there is a significant influence of school location on chemistry students' academic achievement. The finding suggest that students in urban schools may have better academic outcomes in chemistry due to greater access to qualified teachers, laboratories and learning materials while those in rural areas may face resource shortage. This study agrees with the findings of Obikezie et al. (2023) who found that rural students often struggle with inadequate laboratory facilities, poor instructional materials, and longer travel distances to schools.

## Conclusion

Based on the findings of the study, it is evident therefore to conclude that class size influences chemistry students' academic achievement; there is no significance influence of instructional facilities on chemistry students' academic achievement. This could be that the materials used by chemistry teachers may be culturally irrelevant, outdated or misaligned with the curriculum leading to minimal learning outcomes, and there is a significant influence of school location on chemistry students' academic achievement.

## Recommendations

The following recommendations were made based on the findings of the study;

1. Chemistry students should not be over-populated in a chemistry as that will enhanced students' academic achievement
2. Chemistry teachers should use teaching/ learning materials that are culturally relevant, current or aligned with the curriculum as that will lead to maximum impact of learning outcomes among learners.
3. Educational stakeholders should provide adequate laboratory facilities and instructional materials to schools in rural areas

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