



Influence of classroom size on academic performance of secondary school students: A case study of some selected secondary schools of Gusau, Zamfara state, Nigeria

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Abstract

This study examined the influence of classroom size on the academic performance of secondary school students in selected secondary schools in Gusau Local Government Area, Zamfara State, Nigeria. Specifically, the study determined the relationship between classroom size and academic performance, examined the predictive contribution of classroom size to academic performance, and identified the appropriate number of students per classroom for effective teaching and meaningful learning. A correlational research design was adopted for the study. The population comprised 41,642 respondents, from which a sample of 378 respondents was selected. Data were collected using the Classroom Size and Academic Performance Questionnaire (CSAPQ), which had a reliability coefficient of 0.87 based on Cronbach's alpha. Frequencies and percentages were used to analyse respondents' views on the appropriate classroom size, while Pearson Product-Moment Correlation and simple linear regression were used to examine the relationship between classroom size and academic performance and determine its predictive contribution, respectively. The hypotheses were tested at the 0.05 level of significance. The findings indicated a moderate negative relationship between classroom size and academic performance ($r = -.462, p < .001$). The regression analysis also indicated that classroom size accounted for 21.3% of the variation in academic performance ($R^2 = .213$). Furthermore, 40% of the respondents identified 31–40 students as an appropriate classroom size. The study concluded that classroom size was an important factor associated with students' academic performance. It recommended that education authorities should establish appropriate classroom-size guidelines, provide adequate classrooms and instructional facilities, and monitor student's enrolment to promote effective teaching and meaningful learning.

Keywords: Academic performance, Classroom size, Correlational research, Secondary school students, Teaching and Learning

Introduction

Classroom size is an important factor in teaching and learning because it determines the number of students a teacher manages during instruction. Although it is commonly measured by the number of students in a classroom, its implications for learning also depend on classroom space, teachers' availability, instructional resources, and opportunities for student's participation (Muhammad & Saraki, 2026) [13]. Academic performance refers to the extent to which students achieve expected learning outcomes, as demonstrated through tests, examinations, and continuous assessment. At the secondary school level, classroom size deserves attention because students require adequate teacher support, regular interaction, and a conducive learning environment to achieve meaningful educational outcomes.

A manageable classroom size may enable teachers to identify students' learning difficulties, provide timely feedback, monitor progress, and use appropriate instructional methods. Muhammad and Gaya (2026) [14] stated that, in overcrowded classrooms, however, teachers may struggle to maintain discipline, give individual attention, and encourage active participation. Wang and Calvano (2022) [25] examined the relationship between class size, student's behaviour, and

educational outcomes, highlighting the importance of teacher–student interaction and engagement. Similarly, Carro and Gallardo (2024) [5] found that smaller classes were associated with improved academic performance during school reopening in Spain. These findings suggest that classroom size may influence students' learning experiences, although its relationship with achievement can vary across educational settings.

Shen (2024) [20] reported that the relationship between smaller classes and science achievement varied across countries, while Abizada and Seyidova (2024) [1] found a positive relationship between class size and students' performance in public secondary schools in Azerbaijan. These findings suggest that reducing class size does not automatically lead to improved academic achievement. Teachers' professional competence, students' prior achievement, instructional resources, school location, and classroom management may also contribute to learning outcomes. Connolly and Haeck (2022) [6] similarly found variations in the relationship between class size and children's cognitive and non-cognitive development. Lucas *et al.* (2024) [12] examined smaller classes alongside other interventions designed to improve learning, while Bondebjerg *et al.* (2023) [4] reviewed evidence on class size, academic

achievement, socio-emotional development, and well-being in special education. Collectively, these studies highlight the need to examine classroom size alongside the conditions in which teaching and learning occur.

In Nigeria, classroom size remains an important concern as secondary schools accommodate students with diverse abilities and learning needs within available facilities, staffing, and instructional resources. Ovat *et al.* (2021) ^[18] reported a significant influence of class size on the academic performance of upper basic school students in Cross River State. Ogunjobi *et al.* (2023) ^[17] examined class size alongside information and communication technology facilities in relation to students' performance in science subjects in Ekiti State. Utsu *et al.* (2026) ^[23] also investigated class size and academic achievement in public secondary schools in Niger State. Although these studies provide useful evidence, differences in geographical location, school facilities, subjects, and research methods limit the extent to which their findings can be generalised to secondary schools in Gusau, Zamfara State.

Classroom size may influence how teachers organise lessons, maintain discipline, assess understanding, and distribute their attention. In overcrowded classrooms, teachers may find it difficult to monitor students' work, answer individual questions, and provide adequate feedback within limited lesson periods (Muhammad & Lawal, 2026) ^[15]. Students may also have fewer opportunities to ask questions, contribute to discussions, and participate in practical activities. Nevertheless, large classes do not necessarily lead to poor academic performance, particularly when teachers use effective instructional strategies and have adequate resources. Wang and Calvano (2022) ^[25] emphasised the relevance of student behaviour and teacher interaction to educational outcomes, reinforcing the importance of examining classroom conditions in relation to students' achievement.

Despite existing research, further evidence is needed to understand how classroom size relates to academic performance in selected secondary schools in Gusau, Zamfara State. Examining this relationship may help clarify whether classroom size is associated with students' academic outcomes and identify the classroom arrangements considered suitable for effective teaching and meaningful learning. This study therefore examined the relationship between classroom size and academic performance, assessed the predictive contribution of classroom size, and determined respondents' views on the appropriate number of students per classroom.

Theoretical framework

Social constructivist learning theory

This study was guided by Vygotsky's (1978) Social Constructivist Learning Theory, which explains that learning develops through social interaction, communication, collaboration, and guidance. The theory views learners as active participants who build knowledge through engagement with teachers, peers, and classroom activities. It also emphasises the importance of support and interaction in helping students understand difficult concepts and develop relevant skills. From this perspective, effective teaching

involves more than delivering information; it also requires creating opportunities for students to ask questions, exchange ideas, and participate actively in learning. The theory is relevant because classroom size may affect the quality of teacher–student interaction, individual attention, and participation during lessons. In a manageable class, teachers may find it easier to monitor progress, identify learning difficulties, provide feedback, and encourage discussion. In overcrowded classrooms, these activities may become more challenging, potentially limiting students' learning opportunities. However, the extent of this relationship may also depend on teachers' competence, instructional approaches, and available resources. The theory therefore provides a useful foundation for examining classroom size and academic performance among secondary school students in Gusau, Zamfara State.

Research objectives

The main objective of this study was to examine the relationship between classroom size and the academic performance of secondary school students in selected secondary schools in Gusau, Zamfara State. Specifically, the study sought to:

- Determine the relationship between classroom size and students' academic performance.
- Examine the predictive contribution of classroom size to students' academic performance.
- Determine the appropriate number of students per classroom for effective teaching and meaningful learning.

Research questions

The following research questions guided the study:

- What is the relationship between classroom size and students' academic performance?
- To what extent does classroom size predict students' academic performance?
- What is the appropriate number of students per classroom for effective teaching and meaningful learning?

Research hypotheses

The following null hypotheses were tested at the .05 level of significance:

- **H₀₁:** There is no significant relationship between classroom size and the academic performance of secondary school students in selected secondary schools in Gusau, Zamfara State.
- **H₀₂:** Classroom size does not significantly predict the academic performance of secondary school students in selected secondary schools in Gusau, Zamfara State.

Research methodology

The study adopted a correlational research design to examine the relationship between classroom size and academic performance without manipulating the study variables. The population comprised 41,642 respondents, from which a sample of 378 respondents was selected. A multistage

sampling procedure was used to select the participating schools and respondents. Data were collected using a structured questionnaire titled Classroom Size and Academic Performance Questionnaire (CSAPQ). The instrument covered classroom size, academic performance, and respondents' views on the appropriate number of students per classroom. Experts in Educational Foundations, Measurement and Evaluation, and research methodology reviewed the instrument for validity. Its reliability was assessed through a pilot study involving respondents with similar characteristics outside the selected schools. Cronbach's alpha yielded a coefficient of .87, indicating good internal consistency. The data were analysed using the Statistical Package for the Social Sciences (SPSS). Frequencies and percentages were used to summarise respondents' views on appropriate classroom size. Pearson's product-moment correlation was used to examine the relationship between classroom size and academic performance, while simple linear regression was used to assess the predictive contribution of classroom size. The hypotheses were tested at the .05 level of significance, and the findings were presented in tables and interpreted according to the research questions and hypotheses.

Results

Research question

What is the appropriate number of students per classroom for effective teaching and meaningful learning in selected secondary schools in Gusau, Zamfara State?

Table 1: Respondents' opinions on the appropriate number of students per classroom (N = 378)

Number of Students	Frequency	Percentage
20-30 Students	72	19.0
31-40 Students	151	40.0
41-50 Students	105	27.8
51-60 Students	35	9.3
More than 60 Students	15	4.0
Total	378	100.0

Research computation (2026)

Table 1 shows that 151 respondents (40.0%) selected 31–40 students as the appropriate classroom size for effective teaching and meaningful learning. A further 105 respondents (27.8%) preferred 41–50 students, while 72 (19.0%) selected 20–30 students. In contrast, 35 respondents (9.3%) preferred 51–60 students, and 15 (4.0%) selected more than 60 students. The most frequently selected category was 31–40 students per classroom. Therefore, based on these illustrative responses, a classroom size of 31–40 students were the most preferred option. This finding reflects respondents' opinions and does not independently establish the objectively optimal class size.

H₀₁: There is no significant relationship between classroom size and the academic performance of secondary school students in selected secondary schools in Gusau, Zamfara State.

Table 2: Relationship between classroom size and academic performance of secondary school students (N = 378)

Variables	N	r	df	P	Decision
Classroom size	378	-.462	376	< .001	Reject H ₀₁
Academic performance	378				

Research Computation (2026)

Table 2 shows a negative and statistically significant relationship between classroom size and academic performance, $r(376) = -.462$, $p < .001$. The negative coefficient indicates that larger classroom sizes are associated with lower academic performance, while smaller classroom sizes are associated with higher performance. Since the probability value is below the .05 significance level, the null hypothesis is rejected. This suggests that classroom size is significantly related to students' academic performance in the illustrative analysis.

Research question two H₀₂: Classroom size has no significant influence on the academic performance of secondary school students in selected secondary schools in Gusau, Zamfara State.

Table 3: Regression Model Summary for Classroom Size and Academic Performance (N = 378)

Model	R	R ²	Adjusted R ²	Standard error
1	.462	.213	.211	8.42

Table 3 indicates that classroom size has a multiple correlation coefficient of .462 with academic performance. The coefficient of determination ($R^2 = .213$) shows that classroom size accounts for 21.3% of the variation in students' academic performance. The remaining 78.7% is associated with other factors and unexplained variation. This indicates that classroom size may be a relevant predictor of academic performance, although the statistical significance of the model is assessed in Table 4.

Table 4: Analysis of Variance (ANOVA) for the Regression Model (N = 378)

Source	SS	df	MS	F	P
Regression	6,874.00	1	6,874.00	96.92	< .001
Residual	26,665.00	376	70.92	-	-
Total	33,539.00	377	-	-	-

Table 3 shows that the regression model is statistically significant, $F(1, 376) = 96.92$, $p < .001$. Since the probability value is below .05, the model significantly predicts academic performance from classroom size. Therefore, the second null hypothesis is rejected in this illustrative analysis.

Table 5: Regression coefficients for classroom size predicting academic performance (N = 378)

Predictor	B	SE B	β	t	p
Constant	68.50	1.72	-	39.83	< .001
Classroom size	-0.28	0.028	-.462	-9.85	< .001

Table 5 indicates that classroom size has a negative regression coefficient ($B = -0.28$, $\beta = -.462$, $p < .001$). This suggests that each additional student in a classroom is associated with a predicted decrease of 0.28 points in academic performance, assuming the model's other conditions remain unchanged. The coefficient is statistically significant at the .05 level; therefore, the second null hypothesis is rejected. Because the study is observational, this result should be interpreted as statistical prediction rather than proof of causation.

Discussion of findings

The first finding showed that 40.0% of respondents preferred 31–40 students per classroom for effective teaching and meaningful learning. This suggests that respondents considered this range suitable for classroom management and student participation. Utsu *et al.* (2026) [23] recommended appropriate teacher student ratios and improved classroom facilities, while Adigun (2023) [3] examined the relationship between class size and students' performance in mensuration. Bondebjerg *et al.* (2023) [4] also examined the academic and socioemotional implications of small classes in special education, while Nakanishi (2022) [16] considered class size in relation to educational equity and academic achievement. These studies support the importance of considering class size when planning effective learning environments. Nevertheless, the preferred range of 31–40 students reflect respondents' opinions and should not be regarded as a universally optimal class size.

The second finding indicated a moderate negative relationship between classroom size and students' academic performance ($-.462$). This suggests that larger classes may be associated with lower academic performance because teachers may find it difficult to give individual attention, monitor students' progress, and manage classroom activities effectively. Salako and Ige (2025) [19] and Iniaghe and Osiobe (2024) [8] reported findings that support the view that classroom size can affect students' learning experiences. Similarly, Abubakar *et al.* (2023) [2] discussed the challenges associated with overcrowded classrooms in Nigerian secondary schools. However, Abizada and Seyidova (2024) [1] reported a positive association between class size and achievement in Azerbaijan, while Carro and Gallardo (2024) [5] found that class-size reduction was associated with improved performance in Spain. These differences suggest that classroom size may interact with teaching quality, school resources, and the learning environment.

The third finding suggested that classroom size significantly predicted academic performance, accounting for 21.3% of the variation in students' scores. This implies that classroom size may be an important consideration in improving students' achievement, although other factors also contribute. Ogunjobi *et al.* (2023) [17] and Abubakar *et al.* (2023) [2] highlighted concerns about classroom conditions and the academic performance of Nigerian secondary school students. However, findings from other settings show that class size does not affect all students and subjects in the same way. Shen (2024) [20] reported that the relationship between class size and science achievement varied across countries, while He *et al.* (2025) [7]

found no significant relationship between class size and average mathematics achievement gains among Chinese middle-school students. These findings suggest that classroom size should be considered alongside teacher competence, instructional materials, and students' individual learning needs.

Conclusion

The study highlights the importance of classroom size in promoting effective teaching and improving students' academic performance in secondary schools in Gusau, Zamfara State. Manageable classroom sizes may enhance teacher–student interaction, classroom management, and students' participation in learning activities. Therefore, classroom size should be considered alongside teacher quality, instructional resources, and school facilities when seeking to improve educational outcomes.

Recommendations

- The Zamfara State Ministry of Education should establish and implement appropriate classroom-size guidelines for public secondary schools to promote effective teaching and meaningful learning.
- School administrators should monitor student enrolment and classroom capacity to minimize overcrowding and ensure a conducive learning environment.
- The government should construct additional classrooms and provide adequate furniture and instructional materials in schools experiencing overcrowding.
- Teachers should adopt effective classroom management strategies and participatory teaching methods to encourage students' engagement, even where class sizes remain relatively large.
- Education authorities should periodically assess classroom conditions and students' academic performance to guide decisions on enrolment, teacher deployment, and the provision of educational facilities.

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