

EFFECTS OF CLASS SIZE ON STUDENTS' ACADEMIC ACHIEVEMENTS IN PUBLIC UNIVERSITIES IN NORTH CENTRAL, NIGERIA

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Abstract

The study investigated the effects of class size on students' academic achievement in public universities in North Central, Nigeria. The descriptive survey research design was employed for the study. Three research questions and three hypotheses guided the study. The population of the study comprised 14,812 students from 13 public universities in North Central, Nigeria, both state and federal. The sample size was 400 students selected through simple random and proportionate random sampling procedure. The instrument used for data collection was a structured questionnaire titled: Effects of Class Size and Students' Academic Achievement Questionnaire (ECSSAAQ). The data collected were analysed using mean score and standard

deviation to answer the research questions and chi-square was used to test the null hypotheses at 0.05 level of significance. The study revealed that class size had significantly effects public universities in North Central, Nigeria. Based on the findings of the study, it was recommended among others that the number of students' in the Class should be controlled to enable class participation. Students should work toward enriching their grades in schools for better academic achievement.

Keywords: Effect, Class Size, Students' Academic Achievement, Public Universities.

Introduction

As the world population continues to increase, leading to increase in student's enrolment in schools also class sizes are also affected. Class size is a serious problem that have affected student's achievement, quality of school budgets and administration as well (Owoeye & Yara 2019). It is considered as one of the most important determinants of academic achievement over which teachers have little or no control. Class size may be defined as the number of students per teacher in a given class or the population of a class (Ajayi, Audu, & Ajayi, 2017). Class size is the number of students in a given course or classroom. Specifically, it is either the number of students being taught by an individual teacher in a course/classroom or the average number of students being taught by teachers in a school or an educational system. Class size may also

be defined as the number of students' participating in a learning experience. Class size refers to an educational tool that can be used to describe the average number of students per class in a school (Adeyemi 2018). There are large and small class sizes in schools; the smaller the class, the greater the likelihood that a teacher will spend more time with individual students'. Large classes present more challenges for classroom management, students' planning, control, marking, and assessment. Teachers are put under more pressure when faced with large classes; in small classes, it can be easier for teachers to spot problems and give feedback, identify specific needs, directing teaching to meet them, and set individual targets for pupils.

Most researchers are of the opinion that the size of a class would prove a significant determinant of the degree of success of students. The concern that calls for immediate clarification is what number of students should constitute a large group and what should be described as a small group?

In describing a small group Bray (2010) observes that they have few teachers with a small pool of talent; offer limited range of subjects and characteristically finding it hard to justify costly investment on libraries... their pupils lack competition and interest with relatively few peers as they get stocked with same teacher for an entire school career.

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The description appears to be an anti-type of what obtains in large group. Large class sizes on the other hand are often impersonal, having broader curricula with teachers being given wider support, while students may suffer discipline problems as teachers cannot get to know their students very easily. Bray finds it easy to stream students according to ability while commitment to work may stand a test of time. Mokobia and Okoye (2019) explain that educators universally have identified class size as important and desirable attribute of effective educational system.

Gibbs (2020) states that the typical class size in many institutions of higher learning in the twentieth century are likely to be 80 to 100, with small group work being defined as involving 16 to 20 students. Gibbs maintains that the danger of increase in students' population is that the system will not be able to adapt fast enough to changes in school plant. This could result in universities responding to modelling themselves on existing systems of mass higher education or by attempting to remain the same with the aim that resources will be stretched beyond acceptable limits. Herbst (2010:69) advances a number of reasons for variations in terms of optimum class sizes in different universities. Herbst asserts that systems around the country differ in many respects. Important sources of variation include the examination system, existence of high-stake incentives for students and educators, provision of remedial instruction for deficient students or of enrichment classes for outstanding achievers, the level of allocation of resources, the quality of educators amongst others. Herbst believes that these are the factors that inform class sizes in many universities. As a result, naively assumed estimations of educational production functions may be selective by omitting variables among these characteristics of good teaching. These include the ability to communicate challenging content involving students in hands-on experiences; providing clear and immediate feedback and supporting family involvement and endogeneity of class size with respect to students' achievement. In this regard, Herbst stated that estimating the "true" class size effect, which is the causal outcome of class size on academic achievement, requires an identification strategy. Herbst maintains that this should restrict the analysis of exogenous variations in class size, being the factors other than those earlier mentioned. Several of these exogenous features involved classroom

management issues such as student discipline and instilling a culture of hard work. Overall, differences were found with regard to student misbehaviour, teacher misbehaviour reprimands, teacher control, noise levels, students' engagement, perceptions of class size and effectiveness, the use of in-depth projects and equipment as well as student assignment choice. After assessing the plethora of factors that Herbst believes and also contribute immensely to students' academic achievement, teacher behaviour, teacher feedback and students' cooperative help were seen as being more prevalent in large classes. Herbst is of the opinion that other variables such as potential grade inflation, students' aptitude, lower academic standards and a lack of remediation for ill-prepared and disadvantaged students, teaching styles and student motivation and effort could confound research results in this area and may also account for inconsistent results.

Herbst (2010:71) believes that even though there is more evidence that smaller class sizes improve student performance, at least in some circumstances, the debate continues on the other hand. In particular, the economists point out the need to weigh the costs of achieving smaller classes versus the cost of improving students' achievement by other means. The investigation concludes that the strategy of class size manipulation should currently be reassessed and a new impetus for educators in universities should be encouraged, to look beyond the usual methods and investigate new trends for creating effective classrooms for a better academic achievement.

Academic achievement is the outcome of education, the extent to which a student, teacher or institution has attained in short or long-term educational goals. It is the completions of an educational benchmark such as primary school, secondary school, diploma or bachelor's degree represents academic achievement (Annie, Howard & Mildred 2019). According to Narad and Abdullah (2016) academic achievement is the knowledge gained which is assessed by a teacher and/or educational goals set by students and teachers to be achieved over a specific period of time. It is the measurement of students' achievement across various academic subjects. Teachers and education officials typically measure achievement using classroom performance, graduation rates and results from standardized tests. Academic achievement is a term used to describe

activities that relate to the work performances in universities. It is measured by the final grade earned in a course. It is defined by students' reporting of past semester Cumulative Grade point Average/Grade point Average (CGPA/GPA) and their expected GPA for the current semester. The GPA is now used by the most of the tertiary institutions as a convenient summary measure of the academic achievement of their students. The GPA is a better measurement because it provides a greater insight into the relative level of performance of individuals and different group of students. Academic achievement is the level of performances in written works and examinations. How students deal with studies and how they cope with or accomplish different tasks given to them by their teachers within a team or semester is measured from the standpoint of academic grades. Naabo (2018) says academic achievement is commonly measured through examinations or continuous assessments but there is no general agreement on how it is best evaluated or which aspects are most important-procedural knowledge such as facts. Furthermore, there are inconclusive results over which individual factors successfully predict academic achievement, elements such as test anxiety, environment, motivation and emotions require consideration when developing models of school achievement. A school/university with more academic achievements would receive more money than that one with fewer achievements.

North Central Nigeria which is the focus of the research consists of seven (7) states situated geographically in the middle belt region of the country, spanning from the west, around the confluence of the River Niger and the River Benue. The region itself is rich in natural land features, and boasts some of Nigeria's most exciting scenery. The region is also home to many historical and colonial relics. The states under the North Central zone are;

1. Abuja (Centre of power)
 2. Benue State (Food Basket of the Nation)
 3. Kogi State (Confluence State)
 4. Kwara State (The State of Harmony)
 5. Nasarawa State (Home of Solid Minerals)
 6. Niger State (Power State)
 7. Plateau State (Home of Peace and Tourism)
- (www.researchgate.net 18/8/2020)

The variables that are used to class size in public universities are explained briefly for clarification. They

are: Class participation, Grade point average, Student reading habit.

Class Participation: The most frequently used form of classroom teaching is classroom participation/activities. Through classroom activities, teachers take the students to review the old knowledge, present the new knowledge and get them organically combined. Teachers also need to judge the extent to which the students have command of the new knowledge and make decision on whether or not and to what degree to introduce the new knowledge. All these require confirmation through various forms of classroom activities and this is the natural response to the principle of "teachers as the leading role and students as the component." When the students are unwilling or reluctant in participating in classroom activities, teaching cannot go on and teachers feel frustrated. Naabo (2010) calls it 'active learning or classroom participation' every teacher wants to know how to motivate students to participate and how to nurture more involved students and fewer apathetic ones. With a little extra planning, that is possible. The silence and withdrawal of the students and their fear of communication will not only hinder their share of the knowledge learned, but also deprive the teachers and peers of their benefit from the communication. Class Participation is an important aspect of student learning when students speak up in class they learn to express their ideas in a way that others can understand. When they ask questions, they learn how to obtain information to enhance their own understanding of the topic.

Grade Point Average: Majority of education institutes consider their productivity by students that will contribute to the society. Since the productivity of university students is based on their academic achievements, most of the researchers have used the grade point average (GPA) of students for their research studies as an ascertaining factor (McKenzie and Schweitzer, 2011; Erdem, Senturk & Arsian, 2017; Mushtaq and Khan, 2012). Since the number of graduates are increasing in the job market, it is very hard to get an appropriate job with only having the knowledge. Employers mostly prefer professionals with a higher cumulative grade point average (Erdem, et al;

2017). Grade point average (GPA) is thought to be key indicator of academic qualification. The dominating factors determining CGPA are among others gender, previous academic achievement, age, living place, family, status, social environment, the type of quality of high schools graduated from, the high school GPA, time spent for studying, learning ability and living place during the university life (Erdem et al; 2017). Grade Point Average is calculated from dividing the total credits that are weighted on grade point values by the total number of credits. The students' academic achievements are determined on their calculated GPA based on end semester examination results.

$$\text{Grade Point Average (GPA)} = \frac{\text{Total credit - weighted Score}}{\text{Total no. of credits}}$$

GPA is calculated by the university system according to the grades obtained and relevant point values as shown in the table below. Table 1:

Grade/point values	Range of marks	Grade Point Value
70 – above	A	4.0
60 – 69	B	3.0
50 – 59	C	2.0
40 – 49	D	1.0
30 – 39	E	0.0

Source: National Universities Commission, 2020

Student's Study Habit: Reading is one of the most important components of our language and it is an essential tool for lifelong learning for all learners. In order to face the 21st century, education has to prepare these learners to adapt to social and technological changes that are taking place at an unprecedented rate. Education under these circumstances depends largely on language competency. In this context, reading especially is a resource for continued education, for the acquisition of new knowledge and skills, for gaining information through media, especially newspapers, books, radio, television, and the computers. Thus the achievement of quality basic education calls for the development of good reading habits of both young and adult learners. Reading is a key to a wealth of experience that links people in a way far beyond distance or time.

Reading provides experience to the individual so that he may expand his horizons, identify, extend and intensify his interest and gain deeper understanding of himself and other human being and of the world. Reading is important for students in general in order to cope with new knowledge in a changing world – that of the technological age. The ability to read is at the heart of self education and lifelong learning. Reading is a very important issue which is not only about enjoyment but a necessity; the basic tool of education (Mokatsi, 2015).

Statement of the Problem

The advent of democracy in Nigeria in 1999 ushered in a new era of what Luckett and Sutherland (2020) and Biggs (2013) refer to as the 'massification' of education and the 'diversification' of the classroom, especially at tertiary level. This means that universities in Nigeria are currently experiencing enormous challenges in institutions of learning due to a plethora of problems. To this end, Gibbs (2020:96) has advocated for what he terms “flexibility, choice and movement around the system”, to be put in sharp focus as instability in these centres creates many societal problems. It is important to try and attend to these problems from all possible angles. Class size is an ongoing issue in education and it is continually expanding in many universities. What was once a normal classroom of 50-100 students' per class is now pushing at the seams with an extremely students of 200-300 students and above per class. Researchers and educators have argued that large classes can have negative effects on students' academic achievements. This consists of a decrease in students' achievement of those in larger classes and an increase in student achievement of those in smaller classes. The impression that students in larger classes have less one-on-one time with the teachers, which therefore leads to less instruction time and in turn lower test scores. Also it implies that in larger classes discipline becomes more of a challenge because there are more students to attend to. On the contrary, in a small class students are given more instructional time and are able to focus more on the curriculum the teacher uses to teach instead of discipline and other challenges that are arising from them. Therefore, it is imperative that class size and its effects on student's academic achievement be investigated.

Research Questions

The following research questions are formulated to guide the study;

1. What effect has class size (class participation) on student's academic achievement in public universities in North Central, Nigeria?
2. What effect has class size (grade point average) on students' academic achievement in Public Universities?
3. To what extent does class size (student's study habit) effects students' academic achievement in Public Universities?

Research Hypothesis

The following null hypotheses were formulated and will be tested at 0.05 level of significance.

1. Class size (class participation) has no significant effect on student's academic achievement in public universities in North Central, Nigeria.
2. Class size (grade point average) has no significant effect on student's academic achievement in public universities.
3. Class size (student's study habit) has no significant effect on student's academic achievement in public universities.

Methodology

The research design adopted is the descriptive survey research design. Descriptive survey research design investigates events in their natural setting without the researcher's manipulation of the dependent and independent variables. In this study, the design seeks to collect data from a representative sample of the population with regards to class size and students' academic achievement/performances in public

universities in North Central, Nigeria. The researcher's choice for the design is because of its suitability to the study. The population of the study is 14,812 students in seven (7) public universities in North Central, Nigeria (Federal Ministry of Education Statistics, 2020). The study employed simple random sampling and proportionate sampling techniques. Three states- Benue, Kogi, Nasarawa, and Federal Capital Territory, Abuja, was selected. The sample size for the study comprises 400 students (respondents) from 3 states chosen in North Central, Nigeria and the Federal Capital Territory, Abuja. The research instrument used for data collection was a self-designed questionnaire titled Effects of Class Size on Students' Academic Achievement Questionnaire (ECSSAAQ). The instrument was divided into two sections "A" and "B" eliciting responses on the variables of the study from the respondents. A 4- point rating scale with the response mode of Strongly Agreed (SA) =4 points, Agreed (A) =3 points, Disagreed (D) = 2 points, Strongly Disagreed (SD) =1 point respectively is used to weigh the responses. The questionnaire was administered to the respondents from the four (4) sampled schools using eight (8) research assistants that were chosen from the sampled schools in North Central, Nigeria. The data generated were analysed using mean score and standard deviation to answer the research questions while chi-square was used to test the null hypotheses at 0.05 level of significance.

Data Presentation

Research Question 1: What effect has class size (class participation) on students' academic achievement in public universities in North Central, Nigeria?

Table 1: Mean and Standard Deviation of Respondents on Effects of Class Size (class participation) on Student's Academic Achievement in Public Universities in North Central, Nigeria

Item No	Item description	N	X	SD	Decision
1.	Students hardly see writings on the board when seated at the back in a large class?	400	2.83	0.99	Agree
2.	Students have the opportunity to cheat during class exercises, test and examinations in large class size?	400	3.15	0.73	Agree
3.	Students can do other things like coping notes in large class when lessons are going on without the teacher noticing?	400	3.44	0.74	Agree
4.	Smaller class sizes allow more time for teachers to help students with practical and develop their skills which can increase student's performances?	400	2.36	1.01	Agree
5.	Students are very active in large class size than in small class size?	400	3.45	0.92	Agree
	Cluster mean & SD		3.05	0.88	Agree

Table 1: Show high ratings on all the items which are above the accepted cut off point of 2.50 which were 2.83, 3.15, 3.44, 2.36 and 3.45 with corresponding standard deviations of 0.99, 0.73, 0.74, 1.01 and 0.92 respectively. Since the mean ratings of all the five items were above the cut-off value of 2.50, it implied that class participation has great effect on students' achievements in schools. Class participation shows that the students understand the topic of discussion; this class participation is most effective in smaller classes than large ones. The teacher enjoys an interactive class more than a passive class and this improves students' achievements in academics. The cluster mean of 3.05 and standard deviation of 0.88 implied that class participation has great effect on students' academic achievements in public universities in North Central, Nigeria.

Research Question 2: What effect has class size (grade point average) on students' academic achievement in public universities in North Central, Nigeria?

Table 2 indicates high mean ratings on all the items which are above the accepted cut-off point of 2.50. The mean ratings of the items were 3.41, 3.20, 2.99, 3.28, and 3.56 with corresponding standard deviations of 0.98, 0.91, 1.07, 0.78 and 0.77 respectively. Since the mean rating of all the five items were above the cut-off value of 2.50, it implied that, the low grades students get in schools affected the students' academic achievements because low grades in the university lead students to carryovers, withdrawals or transfer to other departments they did not apply for. The cluster mean of 3.29 and standard deviation of 0.91 implies that grade point average have effect on students' academic achievements in public universities in North Central, Nigeria.

Table 2: Mean and Standard Deviation of Respondents on Effects of Class Size (grade point average) on Student's Academic Achievement in Public Universities in North Central, Nigeria

Item No	Item Description	N	X	SD	Decision
1.	The neglect in teaching practical skills in large classes affects student's performances and their grades?	400	3.41	0.98	Agree
2.	Student's grades are affected as teachers are likely to give more class exercise to students in smaller class size than in large classes?	400	3.20	0.91	Agree
3.	The use of audio visual aids in large class would make lessons more interesting improving student's performance and grades?	400	2.99	1.07	Agree
4.	The atmosphere in large class size is always teacher centred with passive students' affecting performances and grades?	400	3.28	0.78	Agree
5.	Most students are not conversant to the web/ICT so it affects their performances when presented with general exams?	400	3.56	0.77	Agree
	Cluster mean & SD		3.29	0.91	Agree

Table 3: Mean and Standard Deviation of Respondents on Effect of Class Size (students' study habit) on Students' Academic Achievement in Public Universities in North Central, Nigeria

Item No	Item Description	N	X	SD	Decision
1.	Students like large classes as it prevent them from reading in class?	400	3.41	0.98	Agree
2.	Students find it difficult to concentrate due to the noisy and stressful atmosphere in large class size?	400	3.20	0.91	Agree
3.	Students tend to be anxious and uncomfortable due to the crowd in large class size?	400	2.99	1.07	Agree
4.	Students don't get cautioned when they do not read during school hours in large classes?	400	3.28	0.78	Agree
5.	Students go unnoticed by teachers when they miss lessons in large classes?	400	3.56	0.77	Agree
	Cluster mean & SD		3.29	0.91	Agree

Research Question 3: To what extent does class size (students' study habit) effects on students' academic achievement in public universities in North Central, Nigeria?

Table 3 indicates high mean ratings on all the items which are above the accepted cut-off point of 2.50. The mean ratings of the items were 3.41, 3.20, 2.99, 3.28, and 3.56 with corresponding standard deviations of 0.98, 0.91, 1.07, 0.78 and 0.77 respectively. Since the mean rating of all the five items were above the cut-off value of 2.50, it implied that, most students do not take their studies serious this have a negative effects on their academic achievements, the large number of students in the class prevent them from reading in class because of the noisy nature of the class, some feel uncomfortable with the crowd to read while others don't read because teacher's do not caution them or are not noticed because of the size of the class. The cluster mean of 3.29 and standard deviation of 0.91 implies that students' study habit have negative effects on students' academic achievements in public universities in North Central, Nigeria.

Hypothesis 1: Class size (class participation) has no significant effect on students' academic achievements in public universities in North Central, Nigeria.

Table 4: Chi-square on Impact of Class Size (class participation) on Students' Academic Achievement/ Performances in Public Universities in North Central, Nigeria

Responses mode	Observed frequency	Expected frequency	Df	Sig level	χ^2	PValue	Decision
SA	101	10.0	3	0.05	140.84	.000	Rejected
A	195	10.0					
D	37	10.0					
SD	67	10.0					
Total	400						

Table 4 shows that the $X^2=140.84$, Df=3, P. Value of $0.00<0.05$. The null hypothesis which states that there is significant effect of class participation

on students' academic achievements in public universities in North Central, Nigeria is rejected. This implies that class participation has no significant effect on students' academic achievements in public universities in North Central, Nigeria.

Hypothesis 2: Class size (grade point average) has no significant effect on students' academic achievements in public universities in North Central, Nigeria

Table 5: Chi-square on Effect of Class Size (grade point average) on Students' Academic Achievement/ Performances in Public Universities in North Central, Nigeria

Responses mode	Observed frequency	Expected frequency	Df	Sig level	χ^2	PValue	Decision
SA	274	10.0	3	0.05	405.148	.000	Rejected
A	51	10.0					
D	41	10.0					
SD	34	10.0					
Total	400						

Table 5 shows that the $x^2=405.14$, Df=3, P.value of $0.00<0.05$. The null hypothesis which states that class size (grade point average) has no significant effect on students' academic achievement in public universities in North Central, Nigeria is rejected. This implies that there is significant effect of class size (grade point average) on students' academic achievement in public universities in North Central, Nigeria.

Hypothesis 3: Class size (students' study habit) has no significant effect on students' academic achievements in public universities in North Central, Nigeria

Table 6 shows that the $x^2=405.14$, Df=3, P.value of $0.00<0.05$. The null hypothesis which states that class size (students' study habit) has no significant effect on students' academic achievement in public universities in North Central, Nigeria is rejected. This implies that there is significant effect of class size (students' study habit) on students' academic achievement in public universities in North Central, Nigeria.

Table 6: Chi-square of Class Size (students' study habit) has no significant Effect on Students' Academic Achievement/ Performances in Public Universities in North Central, Nigeria

Responses mode	Observed frequency	Expected frequency	Df	Sig level	χ^2	PValue	Decision
SA	274	10.0	3	0.05	400.148	.000	Rejected
A	50	10.0					
D	40	10.0					
SD	36	10.0					
Total	400						

Discussion of Findings

The study revealed that class participation has significant impact on students' academic achievements in public universities in North Central, Nigeria. The result is in consonance with Ogunode (2020), who observed that teacher- student interaction is mostly neglected in large class size. Naabo (2018) found out that it is difficult for teachers to spot problems during lessons and give corrections, identify specific needs of the students and gear teaching to meet them, set individual targets for students, and be flexible in the use of different approaches in teaching. Sixty nine percent of students agreed that teachers easily identify students who need extra tuition and attention during lessons in small class size than in large class size. Additionally, 65 percent of the students believe that teachers find it difficult to remember students by name in large class size while another 65 percent indicate that teachers are unable to notice students who are not serious with jottings and note coping and this invariably has an adverse effect on the progress of the students' academic achievement/ performances.

The second finding revealed that grade point average has significant impact on student's academic achievements in public universities in North Central, Nigeria. This accepts with the findings of Bosworth (2014) which says there is high possibility of cheating during examination in a large class; this means that the true performance of the students cannot be ascertained since poor student's stand to benefit from the act of cheating. Also, 48 percent of the students indicated that they can hardly see the writings on the board in a large class. It can also be observed that large class makes it difficult to be active in class but smaller classes allow more time for teachers to help students develop appropriate practical skills which can increase student's performance.

The third finding of the study revealed that class size (student's study habit) significant impact on students'

academic achievements in public universities in North Central, Nigeria. In large class sizes most students have difficulty in planning their reading time and giving attention to it, they prefer listening to music and engagement on social media which tends to affect their academic achievements. This study accepts with the finding of Mbahan 2018 who says when students dedicate their quality time to their books it better their academic achievements, they take reading as not a difficult task but part of their lives this intent shows in the quality of test, assignment, examinations and placement in all aspects of their lives, which better their academic achievements.

Conclusion

Based on the results of the study, it has been empirically established that class size has great effects on students' academic achievements in public universities in North Central, Nigeria. The study also concluded that class size using these variables of class participation; grade point average and students' study habits have significant effects on students' academic achievements in public universities in North Central, Nigeria.

Recommendations

Based on the findings of the study, the following recommendations were made

1. The number of students' in a class should not exceed NUC bench mark of 30-50 students' in a class to enable effective class participation.
2. Smaller class sizes are better as they help students' work toward enriching their grades in schools for better academic achievements.
3. Students should prepare a study time table and follow it diligently to help boost their study habits and performances in school.

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