

## EFFECTS OF CLASS SIZE ON THE ACADEMIC PERFORMANCE IN MATHEMATICS AMONG PUBLIC PRIMARY SCHOOL PUPILS IN ZARIA KADUNA STATE NIGERIA

ABDULRAHEEM TAWA<sup>1</sup> & MURTALA AKANBI YUSUF<sup>2</sup>

Department of Adult Education and Extension Services,  
Usmanu Danfodiyo University Sokoto, Sokoto State, Nigeria  
Abdulraheemtawa1990@gmail.com

### Abstract

The introduction of the Universal Basic Education (UBE) in 1999 led to expansion in the school enrollment rate in primary schools in Nigeria and Zaria in particular. Also, in recent years, this high expansion in the school enrollment rate in Zaria was compounded by the federal and state government's free feeding programmes. Therefore, this study investigates the Effect of class size on the academic performance of primary school pupils in the core subject of mathematics. The study adopted quasi-experimental research design. The population of the study were thirty-six thousand nine hundred and eighteen (36,918) primary six schools' pupils; out which one hundred and ninety-three (193) primary six pupils, were purposively selected. Self-formulated Mathematics performance test (MPT) was used for data collection. The instrument had a reliability index of 0.89. Mean and standard deviation, were used to analyze the data obtain while t-test was used in testing the hypotheses. The findings indicated that there was significant difference in academic performance between the pupils taught in large and normal class size in Mathematics and the difference was in favor of pupils in normal classes. The study concludes that normal class size has positive impact on pupils' academic performance in Mathematics. The study recommended that the correct ratio of one teacher per 35 pupils should be encouraged as stipulated by the NPE. This arrangement will enable teachers to teach well and ensure good classroom management.

**Keywords:** Class size; Academic Performance; public primary schools; Mathematics; UBE

### Introduction

The introduction of the Universal Basic Education (UBE) in 1999 led to expansion in the school enrollment rate in primary schools in Nigeria and Zaria in particular. Also, in recent years, this high expansion in the school enrollment rate in Zaria was compounded by the federal and state government's free feeding programmes. Due to this, there was high demand for education today which resulted to large class size that could not be control by the teacher Dror (2009). Improving pupils' academic performance has been one of the concerns of stakeholders in education. Class size is one of the school variables that determine how effectively pupils learn. As the school population increases, class sizes also increase, and the performances of pupils become an issue. Class size as earlier stated is a school variable that determine how effectively pupils learn, it could affect how pupils interact with each other (Erenberg, 2001). Class size refers to the average number of pupils taught by a tutor in a class room (Anderson and Omwirhiren, 2016). It is the number of pupils a teacher is responsible for, during a school year (Michaelson 2007) the size of class varies from one educational level to the other. National policy on education (NPE, 2013) recommends a class of 25 pupils in pre-primary: 35 pupils in primary and junior secondary school. Some researchers opined that a normal class size should be around 30-35 pupils, teaching and learning take place when there is moderate number of pupils in a class (Adeyela, 2000).

Mathematics as a subject in primary school require teacher to provides the basic concept of the subject

for better understanding. Mathematic is the foundation for science without which a nation can never be prosperous and economically independent (Uwakmfon, 2019). It is because of this phenomenon that mathematics is made a compulsory subject in every aspect of educational system. Academic performance refers to how pupils deal with their studies and how they cope with or accomplish different tasks given to them by their teachers (Steinmayr et al., 2014). Pupils’ academic performance has been a great concern to stake holder, educationist, government and public in general.

Nigeria is a developing country; it is quite disturbing to see large number of pupils learning in a classroom meant for small pupils. As a result of the huge expansion in school enrolment rate in the country, most classes become overpopulated. Mathematics is a subject which required teacher to explain the basic fundamental concept of the subject for better understanding of the principle at the early age, when not taught in a conducive environment, it will give birth to anxiety, feeling of tension and fear that interfered with mathematics performance (Awofala, 2012). In a situation where classes were overpopulated, lesson become boring, there by affecting the academic performance of pupils. Against this obstacles of overpopulated classes this study investigates the effect of class size on academic performance of primary school pupils in Zaria, Kaduna, State.

**Objective of the Study**

To determine the difference in Mathematics performance between pupils taught in normal classes and those taught in large classes

**Research Question**

What is the difference in Mathematics performance of pupils taught in normal classes and those taught in large classes?

**Research Null Hypothesis**

There is no significant difference in mathematics performance of pupils taught in normal classes and those in large classes.

**Methodology**

The experimental research design is quasi experimental using pretest, posttest method.

Diagrammatic Presentation of the Data

Experiment	O1	X	O2
-----			
Control	O3	—	O4

Key:

Experimental Group

Control Group

O1 and O3 = Pretest given to the experimental and control groups before treatment

X= Treatment

----- = indicated absence of randomization

— = No treatment

O2 and O4= posttest given to the experimental and control groups after treatment

Four groups: two experimental and two control groups were adopted in conducting the research, the experimental and control groups were giving same pretest before the experiment and posttest after the treatment with assistance of the research assistant. The statistical tools used was mean and standard deviation meant to answer the research questions; while t-test analysis was used to test the null hypotheses at 0.05 level of significance.

The population of the study were thirty-six thousand nine hundred and eighteen (36,918) primary six

schools’ pupils in Kaduna state; while a sample of 193 pupils was drawn from four primary schools. Purposive sampling was used to select four intact classes from the selected schools in Zaria Kaduna State. The researchers used two primary schools with two intact class as large class, with 65 and 62 pupils. At the same time two primary school was purposely selected with two intact class as normal class, with 32 and 34 pupils. The pupils in normal class made up the experimental group with 66 pupils while those in large class made up the control group with 127 pupils.

The instruments used for each group is a self-formulated Mathematics Academic Performance Test (MAPT). It consists of a 10-item multiple choice questions with options A-D. The instrument was validated by two experts in Adult education and Extension Services Usmanu Danfodiyo University Sokoto. In order to determine its reliability, a pilot test was carried out with a co-efficient of 0.89, using Cronbach Alpha. Therefore, this indicate the reliability of the test items. The test was administered on the respondent in person. The test lasted for 20 minutes, making it two minutes per question since the multiple choice questions was ten (10).

**Results**

**Research Question one:** What is the mean difference in Mathematics performance of pupils taught in normal classes and those taught in large classes?

**Table 1: Descriptive statistics showing the mean and standard deviation of Mathematics Performance of Pupils taught in normal classes (Experimental Group) and those taught in large classes (Control Group)**

Classes	N	Mean	Standard Deviation	Mean Difference
Experimental (Normal)	66	11.84	2.97	6.25
Control (Large)	127	5.59	2.65	

Table 1 shows the mean difference in Mathematics performance of pupils taught in large class and those taught in normal class. From the result, the mean performances of experimental and control groups were 11.84 and 5.59 respectively. The mean difference was 6.25, while the standard deviations were 2.97 and 2.65 respectively. The experimental group with higher mean performed better than the control group. This shows that pupils in normal classes performed better than those in large classes.

**Test of Hypotheses**

There is no significant difference in mathematics performance of pupils taught in large classes and those in normal classes

**Table 2: t-test of the mean Performance Difference of pupils taught mathematics in normal class (Experimental Group) and large class (Control Group)**

Classes	N	Mean	SD	Df	t-cal.	P-value	Decision
Experimental (Normal)	66	11.84	2.71	191	15.47	0.000	H0- Rejected
Control(Large)	127	5.59	2.65				

shows the t-test analysis of the difference between the mean performance of pupils in normal class and those in the large class. Results on the table revealed that calculated t-value (15.47), at 191 degree of freedom and at 0.05 level of significance. Therefore, the null hypothesis was rejected. This means that a significant difference exists in the mean scores of pupils taught in normal class and those in the large class. Moreover, the Pie chart in figure 1 also shows that the normal class mean value of 11.84 was better than the large class size of 5.59

## Discussion

The finding of the study revealed that pupils in normal class performed better than those in the large class. This finding was presented on Table 1 by answering the research question one, where the experimental group performed better than the control group. The t-test analysis used to test null hypothesis 1, as presented on Table 2, revealed that there is a significance difference in mean scores of pupils taught in normal class and those taught in the large class. This finding was in line with the findings of (Afolabi, 2020; Abizada & Seyidove, 2024) in Kaduna which investigated the effect of class size on the teaching and learning of Mathematics.

The study found that pupils in small class performed better than those in large class. The result was also in line with the study carried out by Ubah (2019) in River State which looks at class size as a determinant factor of school performance in Mathematics. The study found that class size affects class control, pupils' interest, attention, and time expended in dealing with disciplinary issues. However, the finding was not in agreement with that of Rasheed, who conducted a study on the effect of class size on pupils' learning achievement in mathematics. The finding from his research revealed that large class sizes were not the problem of the performance of pupils in Mathematics, but the implementation of the appropriate policy (Rashad, 2021). But, this finding proven to be otherwise as the pupils' population is the main determinant factor for effective learning, understanding, and assimilations.

## Conclusion

From the finding, it was concluded that normal class size has a positive impact on pupils' academic performance in Mathematics. Normal class size was proven to be very effective in imparting knowledge as it will enable the teacher to monitor pupils learning activities effectively. whereas, large class size proven to be ineffective in imparting knowledge in the classroom.

## Recommendations

The Ministry of Education and schools' administrator should enforce the recommendations of the National Policy on Education (NPE, 2013) concerning class size by providing facilities to cater for the primary school population in Zaria Local Government area of Kaduna State.

The school head teachers in Kaduna state should liaise with authorities in charge of practicing of primary education to make all public primary schools to adhere to normal class sizes so that classrooms should be spacious to warrant the creation of a Mathematics activity area as a segment in each classroom to enable teachers of Mathematics to expose pupils to effective learning of mathematics.

Once changes in class size have been implemented, pupils' scores should be monitored frequently to provide evidence that class size reduction can make a difference in Mathematics learning process.

## References

- Azar Abizada & Sevinj Seyidova (2024) Effect of class size on student achievement at public secondary schools in Azerbaijan, *Cogent Education*, 11:1, 2280306, DOI: 10.1080/2331186X.2023.2280306
- \Adeyela, J. (2000). Problems of teaching science in large classes of the Junior, Secondary school Level. Implication for teaching outcomes. Unpublished M.Ed Thesis, University of Ibadan, Ibadan
- Afolabi, B. Y., Wakili, L. B. & Afolabi, A. O. (2020). An investigation of class size on teaching and learning of mathematics in secondary schools in Kaduna State, Nigeria. *British Journal of Education, Society & Behavioural Science*, 31 (10) 40-52
- Anderson, F. E. & Omwirhiren, E. M. (2016). Effect of class size and pupils' attitude on academic performance in chemistry at demonstration secondary school, Ahmadu Bello University
- Awofala, A. O. (2012). An analysis of the new 9-year basic education mathematics curriculum in

Nigeria. *Acta Didactica Napocensia*, 5(1), 17-28

Dror, Y. (1995). School location as a function of uniqueness, autonomy integration and comprehensiveness: A historical model with current implication. *Journal of Education Administration and History*, 27 (1):1-16

Ehrenberg, R.G., Brewer, D.J., Gamorran, A. & Williams, D. J. (2015). Class size and student achievement. *Psychological Science in the Public interest*, 2 (1), 1-30

Federal Republic of Nigeria, (2013). National policy on education. Lagos: NERDC Press

Michaelson, I.K. (2007) *Getting started with team based learning*. Wesport Preager.

Rashad, S, Mustapha, F. & Sehubo, O.S. (2021). Effect of class size on students' learning achievement in mathematics in junior secondary schools Bauchi State: *International Journal of Innovative Research and Advanced Studies*, 8 (1) 45-50

Steinmayr, R., Meibner, A., Weidinger, A.F., & Wirthwein, L. (2014). "Academic achievement," in *Oxford Bibliographies Online: Education*, ed. Meyer L.H. (New York:Oxford University Press)

Uba, A. & Sandra, T.F. (2019). Class size as a determining factor in the academic achievement of secondary school students in mathematics Rivers State.7 (1): 10-17

UBE Forum, (Vol.1 2001) *Ajournal of Basic Education in Nigeria*.

Uwakmfon, M. (2019). *The Problems Associated with Teaching and Learning of Mathematics: A Case Study of Ovia North East Local Government Area of Edo State, Nigeria*