



## Perception of the Problems of Learning Mathematics in a Large Class among Secondary School Students in Gusau, Zamfara State

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### Abstract

This study aims at investigating the Perception of the Problems of Learning Mathematics in a Large Class among Secondary School Students in Gusau, Zamfara State. The target population consists of all secondary schools in Gusau local government area of Zamfara state with total enrolment of 22,541 students and 2000 students were randomly selected from six secondary schools to represent the target population. The questionnaire on management of large classrooms was designed by the researchers to collect data for the study and The reliability of 0.56 and 0.82 was obtained using split half method through Pearson Product Moment Coefficient (PPMC). Descriptive survey approach with a sample size of two thousand (2000) students drawn from the six senior secondary schools. Three research questions and one hypothesis were answered by the descriptive statistic and t-test statistic was used to answer the research hypotheses. The results of the analysis showed that there are no classrooms for student 1:40 per class in the area of the research meaning that the classes are large, found that it also shows that large classroom is not conducive for learning due to disruptive behavior, more noises from students during lesson which lead to less student's attention and teachers found it difficult to control the classes. The also found that, there is significant difference in the view of male and female students' views on class size on the ways mathematics is being taught at secondary school level.

**Keywords:** Problems and Prospects, Large-Class, Secondary, Mathematics, Learning, Implication.



## Introduction

Teachers play a significant role in making students ability to be numerate, literate and self-reliance but encountered some challenges due to some variable that affect the teaching and learning, and the quality of teachers is the primary determinant that influences student academic achievement. Some teachers master their subject very well but lack some basic skills to deliver the lesson successfully for the achievement of their stated learning objectives.

Mathematics as a subject has a vital role to play in all other subjects' areas, especially science and technical subjects and therefore, mathematics is considered as a compulsory subject in Nigerian school education system. Mathematics touches every aspect of our life. According to live science Elaine (2013) opined that "Mathematics is the science that deals with the logic of shape, quantity and arrangement". He further asserted that Mathematics is all around us, in everything we do. It is the building block for everything in our daily lives, including mobile devices, architecture (ancient and modern), art, money, engineering, and even sports. Since the beginning of recorded history, mathematic discovery has been at the forefront of every civilized society, and in use in even the most primitive of cultures. The needs of math arose based on the wants of society. The more complex a society, the more complex the mathematical needs. Primitive tribes needed little more than the ability to count, but also relied on maths to calculate the position of the sun and the physics of hunting (Elaine, 2013). Odili in Tali et.al. (2012) define mathematics as a body of knowledge, a collection of technics and methods, and the product of human activity for solving problems. The two definition trying to show that mathematics is necessary for the development of any immediate society and the nation at large. Meaning that mathematics is a problem solver. There are many problems that hinder the achievement of mathematics. Despite the effort of the government on the development of mathematics teaching and the provision of opportunities for the Improvement of teaching, there are still problems of mathematics teaching and learning. Odili in Tali et.al. (2012) outline some of these problems as follows:

1. Lack of curriculum integration.
2. Shortage of mathematics teachers.
3. Lack of instructional materials.
4. Poor government policy.
5. Poor classroom organization by the teachers.
6. Lack of equipped mathematics laboratory for practical.
7. Over population of students which may cause impedes effective demonstration during practical.
8. Teachers impatient and un-preparedness.
9. Poor remuneration of teachers (Odili in Tali et.al. (2012).

Classroom management refers to the process of getting things done by a teacher through the assistance of other people. For example, provision of a conducive environment for teaching and learning and skillful handling of teaching materials devoid of obeying rules and regulations. Classroom management is also defined by Waterhouse (2009) as a process consisting of key tasks that teacher must attend to in order to develop an environment conducive to learning. These tasks include;

1. Organizing the physical environment
2. Establishing rules routine



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3. Developing caring relationship
4. Implementing engaging instruction and
5. Preventing and responding to discipline problems

For successful classroom teaching and learning it may be necessary sometimes for the teacher to adjust the sitting arrangement in his class to suit a particular lesson depending on what he want teach. The teacher may adopt any of the following seating arrangement when necessary.

1. **Traditional** - The traditional lecture setup typically consists of rows of fixed seating. Students face the instructor with their backs to one another. This classroom seating arrangement is historically common in colleges and universities, minimizing student-student communication and largely supporting a “sage on the stage” learning environment. The highest communication interactions between professors and students typically occurs with students in the first row or along the middle of the classroom. Students in back rows are more likely to be less engaged (Rands and Gansemer-Topf, 2017).
2. **Roundtable** - Many seminar-course room arrangements may consist of instructor and students sitting around a single large table. This seating arrangement can also be formed using individual desks. Students and instructors all face one another in this setup, which can support whole-class as well as pair-wise dialogue (Rands and Gansemer-Topf, 2017).
3. **Horseshoe or Semicircle** - The horseshoe or semi-circle offers a modified roundtable setup, where all participants face each other while the instructor can move about the room. The horseshoe encourages discussion between students and with the instructor, although this setup tends to encourage more engagement between the instructor and students directly opposite, with slightly lesser amounts for students immediately adjacent to the instructor. A horseshoe setup can be particularly effective when the instructor wishes to project and discuss course-related material in the front of the class (Rands and Gansemer-Topf, 2017).
4. **Double Horseshoe** - This seating arrangement involves an inner and outer horseshoe, and similar to the conventional horseshoe, invites greater discussion than the traditional format. It is more limited by the backs of students within the inner circle facing students in the outer circle. However, students may also more easily interact with those nearest to them or turn around and face students behind them for group work (Rands and Gansemer-Topf, 2017).
5. **Pods (Groups, Pairs)** - The pod or pair arrangement can be designed with rectangular, circular or trapezoidal tables, or individual desks. With regards to stations, instructors can place several tables together to form student groups (e.g. 3 - 4 students), or pairs. This arrangement can be especially advantageous when students will work in groups or pairs with their classmates for a large portion of class time. More generally, this arrangement communicates a learning community where students are expected to work with one another (Rands and Gansemer-Topf, 2017).

Head teacher should get involved for them to supervise class room activities of both students and their teachers. This is to monitor the quality of work done in the class by the two parties, i.e. the teacher and his students. The head teacher can easily come to the aid of the class should there be some problems in area of insufficient working material for the class. There can never be an effective classrooms management if needed learning materials are not made available. (Abdulmalik, 2017)



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The teacher should master various teaching method. This is to make his teaching interesting. Method such as drama, field trip, group method when effectively used will engage the students in learning activities and they will be well motivated. For example, when group method of teaching is used it will allow the weak students to receive help from the good students in the group students at times learn better from the classmates as they are not afraid of asking questions from their mates.

Class size is said to have lasting influence in education. According to NPE (2013) “Government shall regulate the establishment of schools, supervision and inspect schools regularly and ensure that all schools follow approved curricula and conform to the National Policy on Education. The teacher pupil ratio at the post basic level shall be 1:40”. This means that for effective teaching and learning, the stated pupil/teachers ratio should be maintain as stated in the NPE for quality education otherwise the classroom will become large if it exceeds 1:40. Teachers have been suffered more when facing with the large class problems in which the overpopulation of the school causes and or lack of infrastructure.

According to Asodike and Onyeike (2015) stated that the classroom can be described as that place within the school where the teacher and students can be located regularly, where everyone supposedly knows one another and one in which everyone works together. Class size refers to the actual number of students/pupils in any natural classroom. It is the number of students/pupils for whom a teacher is primarily assigned during a school year. Groups become large when they reach about 40, because it is at this point that the number of students begins to inhibit a teacher’s ability to make individual connections, and students begin to feel anonymous (Davis & McLeod, 1996). The phenomenon of large classes in developing countries, which is due to the present social demand for formal education, is a reality. The demand for this type of education, led to increase in school enrolment and invariably increase in class size. This resulted to high pupils-teacher ratio in most African countries.

One of the biggest problems facing large classes in developing countries is the quality and quantity of learning resources available to each student, such as desk, textbooks, and other teaching and learning support supplies (Hanushak, 1995). Adding to this fact are Nwagwu (1997), World bank (1995) and Abdulkareem (1997) expression that library facilities and books are grossly inadequate and so is the provision of classrooms, furniture, laboratories and workshops and other facilities such as biros, pencils, cardboards, wall charts, maps, globes and so. The classroom overcrowding may bring about some consequences such as lack of ventilation, disruptive behavior from students, indiscipline, and lack of interest to attend the lesson.

The description of ‘large’ is often associated with situations/objects that deviate from normal size. “Large is in the eye of the beholder and may be related to thresholds above which it seems impossible to things such as have a discussion, learn all students’ names or possible to do other things such as in-class experiment” (Bernstein, in Psychology Teaching, 2009, p. 2). This is not far from the picture of large classes being portrayed in this chapter. The characteristics of large classes therefore include among others

1. Limited space – space is often a luxury in school with large classes
2. The classes are often hot as a result of the number of students
3. Large classes are also small classrooms over-flowing with many students
4. In large classes, students have a feeling of crowdedness, confusion, and sometimes frustration.



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Wilson (2006) stresses that large classes are noisier and that pushing, crowding, and hitting occur more often in larger classes than smaller ones. The situation makes it difficult for teachers to use individualized learning methods as practiced in smaller classes. While teachers have difficulties managing marking; dealing with students' deliberate naughtiness and incivilities and finding ways to get students pay attention, students in large classes also highlight difficulties in asking questions, getting to know others, approaching teachers, and getting enough feedback on work. Ive (2006, p.2) notes that students in large classes also experience significant challenges to their learning, especially if they are new to the college experience. These experiences include:

1. Not knowing what is relevant or important information
2. Hesitation in asking questions or in other ways indicating lack of knowledge
3. Hesitation in appearing "smart" to their peers
2. Lack of experience with time management, studying, or other skills necessary for success in college
3. Perceived anonymity, which allows them to challenge authority and push boundaries (Ive, 2006).

These are indeed challenges that teachers need to overcome and still keep the class under control in order to perform the duties for which they are paid. However, teaching in large classes gives teachers the opportunities to improve their teaching and presentational skills, organizational and managerial skills, interpersonal skills, and above all evaluation skills. With so many students, there are many opportunities to get people to work together, compare, discuss, and benefit from the variety of voices. Students in large classes also have the opportunity to share ideas and interesting experiences. During project work, students learn to share responsibilities, listen to each other, and express themselves thereby developing valuable skills that would be of help to them in future (Asodike and Onyeike, 2015).

Along the same vein Ejakpovi & Ukpebor (2018), indicated that the core effects of overcrowded mathematics classroom is that, it does not allow individual students to get attention from mathematics teachers during discourse, frustrations and decline of interest on the subjects by students, poor mathematics performance and promoting mathematics teachers' incompetency etc. He said the root index of these effect include, lack of educational budget implementation in our system, low level of mathematics teachers' recruitment into the educational sector and government policy in some states in Nigeria without considering available school infrastructures. Therefore, the study will examine the problems of large class, role of classroom management as well as handling individual differences on student academic performance in teaching and learning of mathematics, the problems of large class, the role of the classroom management in teaching and learning mathematics at secondary school level.

As gender views is the major concern of this research, some researchers found a decline in gender differences in science achievement (Afuwape and Oludipe, (2008); Martin, Mullis, Gonzales, Gregory, Smith and Chrostowski, (2004); O'Connor, (2000); Yuwen, (2008) in Kayode 2016). Others found significant main effect of gender on subjects' learning outcomes in science. (Aguele and Agwugah (2007); Becker (2006); Kolawole (2007); Olaniyi (2009); Ugwungwu (2002); Ugwungwu (2006) in Kayode 2016) found in their studies that male students achieved significantly better than female students in science subjects while in the studies carried out by (Raimi (2002); Soltani and Nasrl (2010) in Kayode 2016) girls performed better than boys in





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science subjects. Research reports from different dimension, (Ajila (2003), Aremu and Sangodoyin (2010), Oduwaiye (2009), Raimi and Adeoye (2002) in Kayode 2016) found no significant gender difference in students' achievement in science. Since the argument is strongly based on students' views as gender is the contributing factor, it further attracts the interest of the researchers to investigate the problem.

**Objectives of the Study**

1. To examine students' perception of the effect of class size on learning of mathematics.
2. To assess teachers' competency in caring for individual differences when teaching mathematics.
3. To determine gender difference in students' perception of the effect of class size on learning of mathematics

**Research Questions**

These are the research questions to guide the study

1. Does the large class size affect the students' learning of mathematics?
2. Does the teacher take care for individual differences during mathematics lesson?
3. Is there difference in gender view on effect of class size on their learning of mathematics?

**Research Hypothesis**

1. There is no significant difference in gender view on effect of class size on their learning of mathematics.

**Methodology**

Descriptive survey research design was employed in the study. The research covered all senior secondary school students in Gusau Local Government, Zamfara state with a total enrolment of 22,541 students. A total number of two thousand (2000) students out of the total enrolment were sampled from (6) six secondary schools from Gusau Local Government. Questionnaires were developed and validated by experts in the field of Mathematics Education, Department of Science Education, Faculty of Education, Federal University Gusau to ensure that the appropriateness or otherwise of the questions in the instrument take care of the research purpose that were designed to seek the opinion of the student based on implication of class size on student academic performance, implication of managing large class based on individual differences at senior secondary school level. The reliability of 0.56 and 0.82 were obtained using split half method through Pearson Product Moment Coefficient (PPMC). On the need to improve teachers' knowledge on managing large class in and learning of mathematics, four points Likert scale of strongly agree (SA), agree (A), disagree (D), strongly disagree (SD) was used. A total of 100 questionnaires were administered to six (6) secondary school that were selected randomly from Gusau metropolis for the study. The mean responses were used to analyze the data generated from the questionnaire in order to determine degree of agreement or disagreement in each rating scaling statements in the questionnaire, nominal value of 4 to 1 were assigned to the different scaling statement 4 was for SA; 3 for A; 2 for D; and 1 for SD. Consequently, any response with a mean of 2.5 or more was regarded as agree and any response that was below 2.5 regarded as disagree. Mean scores of participants' responses to the questionnaire was used to answer research questions one to three while t-test was employed to test the null hypothesis at 0.05 significance.



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## Results

### Research Question 1:

Does the large class size affect the students' learning of mathematics?

**Table 1: Responses on the implication of large class size on the students' learning**

S/N	ITEMS	SA	A	D	SD	Mean	Remarks
1	There are classroom for students 1:40 per class in my school	60	320	580	1040	1.7	Disagree
2	There are enough chair in my school	580	780	420	220	2.86	Agree
3	There is more noise and less students attention during lesson	440	700	500	360	2.61	Agree
4	There is proper ventilation in my class	660	740	300	300	2.8 8	Agree
5	My mathematics teacher can't control the class during lesson	580	480	660	280	2.68	Agree
6	There is unnecessary discussion and disruptive behavior during lesson	380	760	540	320	2.6	Agree
7	My classroom is overpopulated and not conducive for leaning	440	600	600	360	2.56	Agree
8	I can hear my teacher from any point I sit in my class	1100	620	160	120	3.35	Agree
9	I can hear see the board from any point I sit in my class	1040	640	220	100	3.31	Agree
10	My mathematics teacher comes with adequate teaching aids for every lesson	380	660	560	400	2.51	Agree
<b>mean = 2.71</b>							

From table 1, the students' response on the first item with mean score of 1.7 disagrees with the statement as to which it was concluded that all schools in the state hardly have a class of 1:40 as recommended by the NPE, 2013. Also, their responses on items 8 and 9 with the mean score of 3.35 and 3.31 respectively indicated that the teacher makes sure that he carry the students along every time in his lesson(s). Average mean of 2.71 shows that class size does not affect students learning of mathematics to some extent.

### Research Question 2:

Does the teacher take care of individual differences during mathematics lesson?

**Table 2: Responses on the implication of managing large class based on individual differences of the students.**

S/N	ITEMS	SA	A	D	SD	Mean	Remarks
1	My mathematics teacher motivate me during/after lesson	860	520	360	260	2.99	Agree
2	My mathematics teacher concentrate on some specific students during /after lesson	500	640	420	440	2.60	Agree



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3	My mathematics teacher check my note, and marks assignment regularly	800	580	380	240	2.97	Agree
4	My mathematics teacher arrange our sitting based on social, physical and emotional maturity before every lesson	440	480	500	580	2.39	Disagree
5	My mathematics teacher use only one teaching method to teach in every lesson	440	560	540	460	2.49	Disagree
6	My mathematics teacher organize extra lesson/debates/competition; on weekly/monthly or end of the term	220	260	620	900	1.90	Disagree
7	My mathematics teacher pays attention to individuals during lesson.	860	660	260	220	3.08	Agree
8	My mathematics teacher moves round the classroom during class activities.	900	600	360	140	3.13	Agree
9	My mathematics teacher supports us in our class activities as he moves round the classroom.	860	580	400	160	3.07	Agree
10	My mathematics teacher gives correction after our class activities.	840	380	260	520	2.77	Agree
<b>mean = 2.74</b>							

Table 2 shows responses from items 4 and 6 with mean scores of 2.39 and 1.90 respectively disagreed as to which the teacher do not organize coaching lessons and as well do not look the social, physical and emotional status of his students in his lesson. While, responses from items 7 and 8 with mean scores of 3.08 and 3.13 agreed with the teacher implications on managing his large classroom as to which he takes his students along in every lesson and also tries to identify the slow-learners among them. With the average mean of 2.74, it shows that mathematics teachers do consider students' individual differences during mathematics lessons.

**Research Question 3:**

Is there difference in gender view on effect of class size on their learning of mathematics?

**Table 3: Mean and Standard Deviation Responses of Students views on Class size on their Teaching Mathematics**

GENDER	N	X	SD	MD
MALE	1000	190.85	32.12	111.5
FEMALE	1000	69.30	14.43	

From Table3, it is clearly observed that Male students had mean score of 190.85 while the female students had a mean score of 69.30 with Standard Deviation of 32.12 and 14.43 respectively, while the mean difference of male and female students is 111.5 This shows that male students views teaching of mathematics higher than the female students.





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## **Research Hypothesis 1:**

There is no significant difference in gender view on effect of class size on their learning of mathematics.

**Table 4: T-test Analysis on the gender view on effect of class size on their learning of mathematics.**

GENDER	N	Df	T-cal	T-critical	REMARK
MALE	1000	19	0.95	1.96	Rejected
FEMALE	1000				

$$t(1998) = 0.95, P < 0.05$$

Table 4 shows that the t-cal is 0.95 which is lower than t-critical 1.96. consequently, the null hypothesis is rejected. There is significant difference in the view of male and female students' views on effect of class size and the ways mathematics is being taught at secondary school level.

## **Discussion of Finding**

From tables 1 and 2, it was found that there are no classrooms for student 1:40 per class in the area of the research meaning that the classes are large which is in line with the findings of Hanushak, (1995) and Wilson, (2006), that large classroom is not conducive for learning due to disruptive behavior, more noises from students during lesson and inadequate quality and quantity instructional resources to go round in the class which lead to less student's attention and teachers found it difficult to control the classes. If most of the mathematics teachers have their grounds in their fields (i.e., a solid mastery of the subject) as such, most of the students will be happy with the approach their teachers are using to teach mathematics and also the motivation that they show towards their learning activities. Further address the problem, null hypotheses was formulated and tested at 1.96 level of significant. Therefore, the result in table 3 shows that, with respect to the mathematics teaching at secondary school level an t-cal 0.95 was obtained, with an associated probability value of 1.96. since the t-cal was less than 1.96 level of significance probability, the null hypothesis was rejected. Thus, there was a significant difference between the male and female students views on class size on the teaching and learning mathematics

Based on the individual differences, it was found that the mathematics teachers often neglect to carry all the students along being the student a slow learner or fast learner and also guide them when student's activities are ongoing which is in line with the findings of Ejakpovi and Ukpebor, (2018) the overcrowded mathematics classrooms does not allow individual students get attention from their mathematics teachers as such, frustration and decline of interest on the subject kicks in which will later result to poor performance in the subject.

## **Conclusion**

From the findings, it is concluded that teachers are considering the individual differences of the students when mathematics lesson is ongoing (i.e. the teachers do consider the students in terms of slow-learners, brilliants and others); No matter how the size of the class is, it does not hinder learning of mathematics amongst students; Male students pay more attention than their female counterpart when mathematics lesson is ongoing.



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**Recommendations**

1. Mathematics teachers should cater for individual differences among students in the classroom.
2. There should be proper implementation of Groups (Pods, Pairs) for teaching large class
3. School authorities should constantly organize workshops for mathematics teachers on classroom management.

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