

# Class Size And Students' Achievement In General Science In Junior High Schools Of Cape Coast

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*Abstract: The paper investigated the implications of class size on students' achievement in general science within selected Junior High Schools in Cape Coast. Three areas of possible effects were explored: effect of class size directly on students' performance; psychological effect of class size on students' performance and social effect of class size on students' academic performance. Descriptive survey and self-administered questionnaire were used in this study. A sample of One hundred and fifty (150) students in three selected Junior High schools was used. Form two (2) and three (3) students were used for the study. A five-point Likert scale was employed. The analysis was done using descriptive statistics and frequencies. It was found that large class size has negative effect on students' academic effect. It also emerged that class size has psychological and social effect on students' academic performance. Where the class size cannot be reduced in the short term due to challenges beyond authorities control, it is recommended that teachers and management of these schools could encourage rotational students group formation and study. These groups could identify common challenges and present to teachers to support. As a long term measure, Government should increase budget allocation to improve schools infrastructural facilities.*

*Keywords: Class size, Students' achievement and General Science*

## I. INTRODUCTION

Science plays a crucial role in the progression of technology. In this era of technological progression, the significance of science is highly evident in its applicability in almost all school subjects like economics, accounting and even in the arts (scientific methods). General science is one of the obligatory subjects in the Ghanaian education system from primary to the secondary school. General science as a subject affects all aspect of human life at different levels and is seen by society as the foundation of scientific technological knowledge that is vital in socio - economic development of a nation (Cervetti, Barber, Dorph, Pearson & Goldschmidt, 2012; Schultz, Duffield, Rasmussen & Wageman, 2014). The general aim of the general science education in the basic schools is to help students develop the spirit of creativity, curiosity and critical thinking ability to develop an inquiry attitude to life, and also acquire basic mathematical skills and concepts and solve scientific problems as well (Stephens, Hamedani & Destin, 2014; Rubin, 2012). Nevertheless, like

all the taught subjects in schools, students' performance in general science is also affected by all the antecedents of performance including class size.

As the world population continuous to increase the class sizes is also affected. Class size is often mentioned by experts in the educational literature as having effect on student's feelings and achievement, quality and school budgets and on administration (Awoeye & Yara, 2011). It is considered as one of the important determinants of academic performance over which teachers in schools 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). Mokobia and Okoye (2011) explained that educators universally have identified class size as important and desirable attribute of effective educational system. Consequently, debate has continued in the educational literature stakeholders such as academics, policy makers and parents over the educational consequences of class size. Some researchers have maintained that class size is a tool which can be adopted in measuring performance of educational system

(Kedney, 2013). According to Imoke (2006) optimum class size implies rational coordination of educational infrastructures, subject to available number of students in order to attain high level of productivity.

In Ghana however, the class size is becoming increasingly unmanageable, putting teachers in an impossible position of giving individual students attention to the learner's needs. In most of the basic schools in Ghana, the teachers' eye contact with the students in class has become so dissipated that some of the poorly motivated students can form number of committees at the back of the class whiles teaching is going on to engage in non-school discussion. Regular assignments and home works are dreaded by teachers considering the staggering number of books to mark and to record. This is totally at variance with the shift in modern education. According to Doyle (2014), in modern day education, the focus is on the needs, interest and comfort of the students. Thus, managing class size allows students to learn effectively without disturbing one another (Garret, 2008). This is contrary to what is found in the Ghanaian basic schools.

Unfortunately the spotlight in terms of class size is not on the basic school due to the current development. The current government educational policy has introduced 'Free Senior High School' system which gives all students equal and free access to secondary education. This is galloping the school enrolments in the senior high school. Realising the threat of class size on quality of education, Ghana government has proposed 'Double Track System' where the school will be ran on semester basis. This seems to suggest that contrary to the quick response to class size challenges in senior high schools, policy makers do not consider class size as a threat to quality of basic school education. This might have been arisen from the inconclusiveness of whether or not class size really matters.

While a number of studies have found support for the importance of class size on student achievement, others strongly disprove this claim concluding that class size has little to no impact on objective student outcomes. Copious studies have investigated the influence of class size on student attitudes, behaviors, and outcomes. The devastating issue is that limited number of these studies has focused on elementary school effects of class size on student achievement (Altinok & Kingdon, 2012). The orthodox wisdom among parents, teachers, school administrators, and policy makers is that, smaller class size translates to improvements in student learning and outcomes. This orthodox wisdom, however, has not been universally supported by realistic evidence (Aturupane, Glewwe & Wisniewski, 2013). It has been argued that increasing the intake of basic school students in a large class has numerous benefits for the schools and the country as a whole. It helps to reduce the cost of building additional classrooms of which few schools as well as the country have the resources to fund additional classrooms and teachers. Also there is usually high energy, fun and exciting in large class size in basic schools. In addition, students learn to work well in groups since group work is a necessity in large class size (Azigwe, Kyriakides, Panayiotou & Creemers, 2016; Owolabi, Gyimah & Amponsah, 2012).

In spite of all these benefits, large class size may generate a lot of controversy due to the difficulty for teachers to work with large class size. These controversies may serve as thorns that crumble the performance of students in general science at the junior high school level. Some of these problems may be; teachers may find it difficult to use varied teaching methodology in teaching, students may find it difficult to concentrate in the class, teachers may find it difficult in controlling the students in class, and there may be insufficient teaching and learning resources. Hence the quality of teaching, assessment of students and quality of class may be affected. As explained earlier one of the subjects in the basic schools in Ghana which requires demonstrations and much student attention is general science. Therefore, the present study seeks to use general science as baseline to revisit the issue of class size implications on quality of teaching and learning. Findings from this study would not only contribute to the educational literature but also educational planning and policy towards school infrastructure. The study focuses on three effects of class size: instructional effects of class size on students' performance; psychological effects of class size on students' performance and social effect of class size on students' performance in general science at the junior high school.

## II. THEORETICAL LITERATURE

The law of diminishing marginal utility is borrowed to underscore this study. The law of diminishing marginal utility is an economics theory of consumption. The tenets and assumptions of the theory have been borrowed to other disciplines. Therefore, the current paper borrows the theory in explaining class size and students' performance. The theory states that all other things being equal, when a person takes successive units of a commodity, the marginal utility diminishes constantly (Rios, McConnell & Brue, 2013). The marginal utility of a commodity diminishes at the consumer gets larger quantities of it. Marginal utility is the change in the total utility resulting from one unit change in the consumption of a commodity per unit of time. The general implication of the theory is that when high quantity of a product is utilized, the satisfaction of derived from it keeps dwindling.

Borrowing the theory and its implication to class size and students' performance, it could be argued that as the size of a class get larger, the attention of students to assimilate what is being taught in class diminishes. Moreover, the ability of teachers to fully control students in class and pay keen attention to their needs becomes a problem. The teacher may not be able to give class assignment and mark to monitor the progress of each student in class. Additionally, some students may take advantage of teacher's inability to control the class to indulge in all forms of activities detrimental to their academic progress (Owolabi et al, 2012). Some of these are, talking while lessons are in progress, absenteeism without teachers noticing and many more. This indicates that if the number of students in class is large the possibility of students performing poorly would be high.

The implication of the law has social dimensions as well. Different students from different background are merged in into one class. These students may have diverse influence on

the one another. In a larger class, the influence is expected to be high as monitoring and control is likely to be minimal. Thus when such influence is in the negative direction, the academic performance of student is likely to suffer abysmally. Starting with instructional perspective, Altinok and Kingdon (2012) synopsized the theory of the effects of class size on learning; the authors concentrated on how instructors and students behave differently in large and small classes. It is noted that discussion time becomes scrappy among students in large classes and instructors may rely on passive lecturing, assign less written homework or fewer problem sets, and may not require written papers. In addition, instructors may find it complex to know each student personally and style his pedagogy to meet individual student needs in a large class. Altinok and Kingdon (2012) however, recommended that learning is not affected much by class size mostly because instructors do not amend their teaching methods to class size.

### III. EMPIRICAL LITERATURE

The empirical review has been grouped according to instructional, psychological and social effect of class size on the performance of junior high school students on general science. Rubin (2012) specified that while strong conventional wisdom indicates that class size affects students' learning, most of the earlier studies were not conducted in higher education and report little more than surveyed impressions, thus offering little empirical evidence. In a study involving 121 different tutors and 178 classes at 49 different colleges and universities by, Rubin (2012) the author found no evidence that teaching approaches employed by tutors depended on class size. Students' responses to the survey also propose that the efficiency of various pedagogies may not differ much between large and small classes.

A research by Bosworth (2014) revealed that, the correlation between class size and student achievement is complex with many disagreeing results. The study concluded that class-size has tiny impact on student achievement. The findings are consistent with the results of Rubin (2012) in that the latter indicated that as the class size increases, student achievement declines. In other words, the impact of class size upon student achievement is not significant.

Contributing to exiting studies, conclusion from a study by Allen, Gregory, Mikami, Lun, Hamre and Pianta, (2013) was that 62 students per teacher was a threshold number and once class size went beyond 62, learning effectively stopped. Thus, as the number of students in a class were more than 62, teachers find it difficult to teach effectively and efficiently leading to students not able to also learn effectively since low participation of class activities were possible. Despite this finding, Allen, et al (2013) indicated that large class sizes do have moderate adverse effect on teaching and learning. The findings however contradict the earlier studies and conclusions by Bosworth (2014) and Rubin (2012).

In a related study, Evans and Popova, (2015) established that there is a negative non-linear relationship between class size and student evaluations stronger than the relationship to student achievement, and with less concavity. This supports findings including an analysis of studies which revealed a

similar negative relationship between class size and student evaluation, particularly in regards to instructor interactions with students as demonstrated by Altinok and Kingdon (2012). Besides, the literature has argued that pedagogies specifically designed for teaching smaller classes sometimes overlap with pedagogies employed when teaching larger classes but have distinct characteristics that differentiate them from those employed when teaching larger class (Aturupane et al, 2013; Azigwe et al 2016). Small class pedagogies can include project work where students are individually monitored and provided with continuous feedback on investigative tasks designed to develop higher order thinking skills (Altinok & Kingdon, 2012; Bosworth, 2014). Additionally, these studies suggested that advantage should be taken of having fewer students in a class to provide learning experiences that facilitate increased collaboration and communication among students, provide helpful learning opportunities and foster student metacognitive skills through the development of information discovering and help-seeking behaviours

According to Amadahe (2016), one of the most essential parts of the teaching and learning process is assessment and evaluation of student. Large classes call for large volumes of marking to be done and feedback given to students. This is a major challenge, especially in Ghanaian schools. In the face of large classes, instructors are upset with the workload and resort to traditional teaching and assessment methods. Teachers are unable to finish marking assignments, exercises and examinations on time, and this delays the feedback given to students.

From the social perspective, studies on large class size exist in developing countries but the results are often questionable. Aturupane, Glewwe, and Wisniewski, (2013) reviewed 96 studies that tried to link various educational inputs to student performance in developing countries and found out that nearly a third (31) of the reviewed studies specifically considered the effect of pupil-teacher ratio. Out of the investigation, only eight found reduction in class size to significantly explain improved academic achievement. This study is inconsistent with Stephens et al (2014) study on learning competencies in five francophone sub-Saharan African countries (Burkina Faso, Cameroon, Cote d'Ivoire and Senegal) which demonstrated an inverse relationship existed between class sizes and learning outcomes. That is, student learning decreased as class sizes increased. This means that the higher the total number of students in a class, the lower the level of concentration which leads to poor performance of the students.

Azigwe, Kyriakides, Panayiotou, and Creemers (2016) revealed that students' engagement, behaviour, and retention are affected in so many ways by the size of the class. This conclusion was drawn when reviewing studies on the link between student engagement and class size conceptualized student engagement in two forms, namely, social engagement (how a student interacts socially with other students and teachers in either pro-social or anti-social ways) and academic engagement (students' attitude towards schooling and the learning process). The study indicated that when students are placed in smaller classes, they become more engaged, both academically and socially, and argue that with strong social academic engagement, academic achievement improves.

#### IV. METHODOLOGY

The paper used a descriptive survey design. It is used for investigating a variety of educational problems including assessment of attitudes, opinions, demographic information, conditions and procedures, among others. The descriptive survey was used because it aims at primarily describing, observing and documenting a situation as they occur rather than explaining them. The design has the advantage of producing a good amount of responses from a wide range of people. It involves extracting information from a large number of individual using the same set of questions through personal contact, electronic mails and the phones.

The target population is junior high school students in Cape Coast. The sample consisted of One hundred and fifty (150) students in three selected Junior High school. Form two (2) and three (3) students were used for the study since they have had a year or two years respectively of learning experience in junior high school studying general science. They will therefore be in the position to answer the questions accordingly. The schools were purposely selected based on the students population and secondly the accessibility. The students were however selected randomly.

The instrument used in this study was questionnaire. The instrument was developed according to the research questions and issued raised in reviewing literature about the topic. The questionnaire was structured into four sections with closed-ended questions. Section A collects data on the background information of the respondents. Section B contains questions on the effects of class size on instructional strategies, section C captures questions on the psychological effect of class size on students' performance and section D involves questions about the social effect of class size on students' performance. The questions from section B to D requires the students to strongly agree (SA), Agree (A), undecided (U), disagree (D), and strongly disagree (SD) respectively. The questionnaires were administered personally. Subsequent to the data collection, the data were edited, coded and analysed. Analysis of the Data involves organizing, summering and applying an appropriate statistical procedure in answering the research questions. Statistical Package and Service Selection (SPSS) was used to analyse the data.

#### V. RESULTS AND DISCUSSIONS

The paper reports the results from the study and discusses the findings in line with the focus of the study. The discussions have been organised according to the specific objectives.

##### A. EFFECT OF CLASS SIZE ON INSTRUCTIONAL STRATEGY AND ACADEMIC ACHIEVEMENT OF STUDENTS

The analysis is in two folds, "a" and "b". The "a" part tackles the effect of class size on students' performance while the "b" part deals with the effect of class size on instructional materials. The responds are based on a five-point Likert scale where 1 is the highest and 5 the lowest. It follows in this

direction: SA =strongly agree, A = agree, U = undecided, DA = disagree and SD = strongly disagree

Responds	SD	D	U	A	SA
I can study other subjects/topics in large class when general science lesson is going on without the teacher seeing me.	40 (29.0%)	42(30.0%)	5(4.0%)	20(14.0%)	33(23.0%)
There is the opportunity to cheat during class exercises, test and examination in large class size	20 (14.0%)	32(23.0%)	2(2.0%)	29(21.0%)	57(40.0%)
I hardly see writings on the board when seated at the back in a large class.	32 (23.0%)	33(24.0%)	8(5.0%)	38(27.0%)	29(21.0%)
Students are very active in large class size than in small class.	52(37.0%)	36(26.0%)	15(11.0%)	28(20.0%)	9 (6.0%)
Smaller class sizes allow more time for teachers to help students with practical in general science and develop their skills which can increase students achievement.	17(12.0%)	10 (7.0%)	5 (4.0%)	58(41.0%)	50(36.0%)

Source: Fieldwork, 2018

Table 1: Effect of Class Size on Students' Academic Achievement

Table 1 presents detailed results on how class size affects the academic performance of the students in general science. It could be observed that majority of the students agree that there is a high possibility to cheat during examination in a large class. This is confirmed by 86 of the students which represent 61% of the total population. This means that the true performance of the students could not be seen since poor student stand to benefit from the act of cheating. Moreover 65 of the respondents representing 47% of the students indicate that they can hardly see the writings on the board in a large class. However, this number is contrasted by 67 of them who indicate that they can clearly see writings on the board in a large class. Granted that the 65 students are having sight problems, the difference is too small both in nominal terms (2) and percentage wise (1.0%).

Additionally, it can be observed that large class makes it difficult to be active in class. This is revealed from 88 (63%) of the students. Furthermore, 108 students representing 77% of the total respondents agree that smaller class sizes allow more time for teachers to help students develop appropriate practical skills which can increase student's achievement. This means that in large classes it would be difficult for teachers to help students to develop skills to increase their achievement. In sum, the findings have largely demonstrated that large class size has negative effect on students' achievements. These findings disaffirm the results in the study of Evans and Popova, (2015) who established that there is a negative non-linear relationship between class size and student evaluations



stronger than the relationship to student achievement, and with less concavity. Surprisingly, 82 of the students representing 59% of the respondents disagreed to the fact that they can study other subjects/topics in large class when mathematics lesson is going on without the teacher seeing them. This may be attributed to the fear of being punished when caught and the desire to pay attention in science class due to its perceived difficulty.

Overall, there is a strong reason to conclude that large class size could negatively affect students' achievement. Students are likely to lose concentration, focus and even attention from teachers. This confirms the assertion that some small class pedagogies which could include project work where students are individually monitored and provided with continuous feedback on investigative tasks designed to develop higher order thinking skills (Altinok & Kingdon 2012; Bosworth 2014). Consistent with some earlier studies, it has been established in this study that small class size provides learning experiences that facilitate increased collaboration and communication among students, provide helpful learning opportunities and foster student metacognitive skills through the development of information discovering and help-seeking behaviors (Altinok & Kingdon 2012; Bosworth 2014) through practical orientation and class participation. The results further confirms the study by Azigwe et al (2016) which indicated that teachers find it difficult teach effectively and efficiently leading to students not able to also learn effectively since low participation of class activities were possible.

Table 2 also depicts the results on the effect of class size on instructional strategy. It is believed that class size has implications not only on students' academic achievement but also the strategy that teachers adopt. The evidence from this analysis is reported in Table 2.

Responds	SD	D	U	A	SA
The teaching of practical general skills is neglected in large class size.	28(20.0%)	47(34.0%)	10(7.0%)	34(24.0%)	21(15.0%)
In a large class the use of audio-visual aids would make lessons interesting	60(43.0%)	19(13.0%)	5 (4.0%)	37(26.0%)	11(13.0%)
A teacher is likely to give more class exercise to students in smaller class size than larger class size.	22(16.0%)	14(10.0%)	4 (2.0%)	40(29.0%)	60(43.0%)
The atmosphere in large class size is teacher-centered with passive students.	11 (8.0%)	25(20.0%)	21(15.0%)	36(25.0%)	47(34.0%)

Source: Fieldwork, 2018

Table 2: Effect of Class Size on Instructional Strategies

From Table 2, it could be observed that class size has some relationship with instructional strategy be it positively related or negatively related. The results have shown that teachers do not neglect the practicals because of large class size. 75 of the students disagreed that the teaching of practical skills is neglected in large class size. This number represents

54% of the total population. This is consistent with the findings by Aturupane et al, (2013). They revealed that teachers able to use teaching strategies that fit the large class size such as group work and working on projects rather than employing pedagogies like collaborative learning and the systems and structures needed for working effectively within the context of collaborative learning are embedded in the careful sequencing of activities that follow a specific design to promote learning. This means that in terms of instructional practicability and ways of teaching, class size has no significant relationship with respect to instructional strategy.

The students revealed further that the use of audio-visual aids in large class size would not be appropriate and could not make lessons interesting. The number of students who holds this view is 79 representing 56% of total respondents. The findings further showed that teachers are more likely to teach with very little or no classes exercise in a large class size. Whooping 100 (72%) of the respondents provided evidences to such effect. Regular exercise is an important instructional strategy which helps increase academic performance of students (Hattie, 2009). Therefore, the likelihood it would be absent in large class size suggests that class size affects instructional strategies and spillover effect on students' achievement. Furthermore, 83 of the students which represent 59% of the total respondents accepted that in large classes, the atmosphere is teacher-centered with passive students. This is evidence that class size has implications on instructional strategy and students' academic achievement.

The findings contradict some existing empirical evidences (Allen et al 2014; Schultz et al 2014 ). These authors concluded that class-size has just a tiny impact on student achievement. Similarly, Stephens et al (2014) stated that there is no guarantee that smaller classes will automatically lead to more productive works. However, the findings affirm the results of Amedahe (2016). Similar to the evidences found in this study, Amedahe (2016) noted that discussion time becomes scrappy among students in large classes and instructors may rely on passive lecturing, assign less written homework or fewer problem sets, and may not require written papers.

## B. EFFECT OF CLASS SIZE ON STUDENTS' PSYCHOLOGICAL READINESS FOR ACADEMIC ACHIEVEMENT

Psychological stance of students is an integral part of means to ensure positive students' achievement. The study therefore assesses how class size could affect the psychological readiness in general science class. The results are captured in Table 3

Responds	SD	D	U	A	SA
I feel shy to speak in large class size.	27(19.0%)	27(19.0%)	6(4.0%)	55(39.0%)	25(19.0%)
The opportunity to express myself in large class size is rare.	13 (9.0%)	32(23.0%)	19(13.0%)	46(33.0%)	30(21.0%)
I feel relaxed in large class size since my course mates do not know my name.	16(12.0%)	31(22.0%)	19(13.0%)	51(37.0%)	23 (16.0)
I like sitting at the back to avoid	32(23.0%)	47(34.0%)	2 (1.0%)	43(30.0%)	16(12.0%)

the attention of the teacher in large class size. I feel anxious and uncomfortable due to overcrowding in large class size.	13 (9.0%)	20(14.0%)	16(12.0%)	70(50.0%)	21(15.0%)
There is some freedom in large class size more than in small class size.	30(21.0%)	6 (4.0%)	13 (9.0%)	46(33.0%)	45(32.0%)
The atmosphere is noisy and stressful in large class size more than in small class size.	30(21.0%)	16(12.0%)	9 (6.0%)	44 (32.0)	41 (29.0)
I have the desire to study hard and prove myself in large class size.	26(17.0%)	29(19.0%)	16(12.0%)	42(30.0%)	30(20.0%)
The atmosphere in large class size encourages me to learn.	41(29.0%)	25(17.0%)	6 (4.0%)	41(29.0%)	27(20.0%)
The teacher does not care about me if I sleep during lessons in large class size.	59(42.0%)	38(27.0%)	3 (2.0%)	24(17.0%)	16(12.0%)
I can miss lessons without the notice of the teacher in large class size.	27(19.0%)	28(20.0%)	8 (5.0%)	43 (31.0)	34 (24.0)

Source: Fieldwork, 2018

Table 3: Class Size and Psychological Readiness in General Science Class

The results reported in Table 3 provide evidence to show that there are psychological effects of class size on the performance of the students. 80 students which represent 58% of the total respondents indicate that they feel shy talking in the classroom. This seems to affirm the conclusion reached by Rubin (2012). Rubin (2012) revealed that most of students in large class may not understand the concept of what is taught as the size deters them from voicing to ask questions. This could negatively affect their achievement or performance in the class. The same explanation is applied to the number of students who indicate that the opportunity to express myself in large class size is rare. The number of students who make up this category is 76 representing 54% of the entire respondents. Moreover 74 of the students representing 53% agree that they feel relaxed in large class size since their course mates do not know their names. On the contrary, 79 of them which constitute 57% of the respondents disagree that they like sitting at the back to avoid the attention of the teacher in large class size. Similarly 50% of the respondents indicate that have the desire to study hard and prove myself even in large class size.

These evidences seem to support the findings of Hattie (2009). According to Hattie, it is not the size of the class that enhances student academic performance but the quality of the teaching that takes place. Hattie (2009) also noted that when teachers continue to use large class teaching strategies, even when teaching small classes, there is little approval that learning is enhanced. To further buttress the point of Hattie (2009) 69 of the students which represent almost half of the

total respondents (49%) say that the atmosphere in large class size encourages them to learn.

However, one important psychological effect of class size that is found in this study is that as many as 77 students who constitute 55% of the total respondents agreed that they can miss lessons without the notice of the teacher in large class size. Under this circumstance students could perform poorly since teachers are not able to monitor their presence in class. This support the finding of Bosworth (2014) and Evans and Popova, (2015) which revealed that there is an impact of class size upon student achievement since its (achievement) decreases as the class size increases. In another development to buttress the point above, 61% of the students indicate that the atmosphere is noisy and stressful in large class size more than in small class size and hence adversely affect their academic progress. Lastly 97 students which represent 71% of respondents disagree that teachers does not care about them if they sleep during mathematics lessons in large class size. This means that notwithstanding the size of class students cannot just sleep without incurring punishment from the teacher.

The findings about the effect of class size on students' psychological readiness have been mixed. Some test items showed no significant effect while others have revealed negative effect. However, it is evidential that the overall effect of all the test items revealed that large class size has significant negative effect on students' psychological readiness. Even where the evidence seems to favour large size, the differential effect is inconsequential. Thus, it is reasonable to conclude that large class size has significant negative effect on students' psychological readiness to achievement academic excellent.

### C. SOCIAL EFFECTS OF CLASS SIZE ON STUDENTS' ACADEMIC ACHIEVEMENT IN GENERAL SCIENCE

The study further investigates the social effects of class size on students' academic achievement. Eight (8) items were used to assess this effect. The results are reported in Table 4

Responds	SD	D	U	A	SA
Student-Student interaction is mostly neglected in large class size.	55(39.0%)	26(19.0%)	17(12.0%)	24(17.0%)	18(13.0%)
Teacher-Student interaction is mostly neglected in large class size.	14 (10.0)	24(17.0%)	15(11.0%)	45(32.0%)	42(30.0%)
Effective communication is mostly neglected in large class size.	17(12.0%)	9 (6.0%)	4 (2.0%)	66(47.0%)	44(31.0%)
The teacher is able to identify students who need extra tuition during lesson period easier in small class size than in large class size.	11 (7.0%)	15(11.0%)	15(11.0%)	53(37.0%)	46(32.0%)
There is a lot of fun and humor in large class size.	16(11.0%)	15(10.0%)	8 (5.0%)	68(48.0%)	33(26.0%)
The teacher hardly	8 (5.0%)	25(18.0%)	15(11.0%)	67(47.0%)	25(18.0%)

remembers names of all students in large class size.	53(37.0%)	45(32.0%)	2 (1.0%)	14(10.0%)	26(19.0%)
I'm mostly able to evaluate my progress in class by comparing answers obtained with class other colleagues in large class than in a small class.					
In a large class, I can take my class mates' notes to write if I fail to write at the time of dictating it without the teachers notice	8 (5.0%)	25(18.0%)	15(11.0%)	67(47.0%)	25(18.0%)

Source: Fieldwork, 2018

Table 4: Social Effects of Class Size on Students' Academic Achievement

58% of the respondents which is equal to 81 students in nominal terms indicate that student-student interaction is very high in large class size. This means that students – interaction which create good social bond is achieved in a large sized class. This contradicts the findings by Finn, Pannozzo and Achilles (2003). Finn et al (2003) found that when students are placed in smaller classes, they become more engaged, both academically and socially, and argue that with strong social academic engagement, academic achievement improves. The differences in the results may be attributed to differences in social settings of where Finn et al conducted their study and the current study setting. Ghanaian culture embraces large social settings and people feel good with others. This might have been translated into classroom.

Moreover, majority of the students (87) representing 62% reported that teacher-student interaction is mostly neglected in large class size. This supports the earlier study by Altinok and Kingdon (2012). Altinok and Kingdon (2012) also found that it is difficult for teachers to spot problems during lessons and gives criticism, 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.

Furthermore, 110 which represent 78% of the students disclosed that effective communication is mostly neglected in large class size. Again 99 students agree that the teacher is able to identify students who need extra tuition during lesson period easier in small class size than in large class size. Additionally, 65% of the students believe that the teacher hardly remembers names of all students in large class size while 92 representing 65% indicate that in a large class, they can take their class mates' notes to write if they fail to write at the time of dictating it without the teachers notice. This invariably have adverse effect on the performance of the students' academic performance.

## VI. CONCLUSIONS AND RECOMMENDATIONS

This paper investigated the effect of class size on students' academic achievement in Cape Coast. Three areas of possible effects were explored: effect of class size directly on students' performance; psychological effect of class size on

students' performance and social effect of class size on students' academic performance. Regarding the first objective, the conclusion is that there is the opportunity to cheat during class exercises, test and examination in large class size. This indicates that the actual performance of the students could not be seen or is not reflected in their class score which could affect them adversely in any external examination since poor student stand to benefit from the act of cheating. Other adverse effect of large class size were difficulty in following and seeing what has been written on the class room board; difficult for teachers to have time to help students develop appropriate practical skills which can impede students' achievement. Thus, large sized classes have negative effect on the academic performance of students. It is also concluded that class size has significant effect on the appropriateness of teachers' instructional strategies.

With respect to the psychological effects of class size on students' performance, it was revealed that students' feel shy to speak in large class size and also find it really hard to express themselves in a large class; the atmosphere becomes noisy and stressful and breed the opportunity to miss lessons without the notice of the teacher in large class size. There is therefore enough reason to assume that large class size has psychological effect on academic performance. The last objective sought to examine the social effect of class size on students' performance. It was revealed that though student-student interaction is enhanced in large class, teacher to students' interaction is mostly neglected in large class size. Furthermore, it was found that teachers are not able to identify students who need extra tuition during lesson period in large class size and also effective communication is mostly neglected in large class size.

The study has demonstrated that large class size could have adverse effect on students' academic achievement. Therefore, where the class size cannot be reduced in the short term due to challenges beyond authorities control, it is recommended that teachers and management of these schools could encourage rotational students group formation and study. These groups could identify common challenges and present to teachers to support. Furthermore, as seen from the findings that some students find it difficult seeing what the teacher write on the board, the use of technologies such as projectors are encouraged to suppress this effect.

As a long term measure, Government should increase budget allocation to improve schools infrastructural facilities. The Ministry of Education, other policy makers, parent teachers association, old school association and other non-governmental organisations and corporate bodies should contribute respectively to renovate dilapidated classrooms, build more classrooms to contain the growing enrolments in the schools.

## REFERENCES

- [1] Ajayi, O. V., Audu, C. T., & Ajayi, E. E (2017), Influence of class size on students' classroom discipline, engagement and communication: a case study of senior secondary schools in Ekiti state, Nigeria. Sky Journal of Educational Research 5(5), 060 – 067,

- [2] Amedahe, F. K. (2016). Large classes in Ghanaian universities: Challenges and innovations. Paper presented at the First International Symposium on Strategies for Effective Teaching in Tertiary Education, Cape Coast, Ghana, May 11-12, 2016
- [3] Azigwe, J. B., Kyriakides, L., Panayiotou, A., & Creemers, B. P. (2016). The impact of effective teaching characteristics in promoting student achievement in Ghana. *International Journal of Educational Development*, 51, 51-61.
- [4] Allen, J., Gregory, A., Mikami, A., Lun, J., Hamre, B., & Pianta, R. (2013). Observations of effective teacher-student interactions in secondary school classrooms: Predicting student achievement with the classroom assessment scoring system—secondary. *School Psychology Review*, 42(1), 76.
- [5] Altinok, N., & Kingdon, G. (2012). New evidence on class size effects: A pupil fixed effects approach. *Oxford Bulletin of Economics and Statistics*, 74(2), 203-234.
- [6] Aturupane, H., Glewwe, P., & Wisniewski, S. (2013). The impact of school quality, socioeconomic factors, and child health on students' academic performance: evidence from Sri Lankan primary schools. *Education Economics*, 21(1), 2-37.
- [7] Bosworth, R. (2014). Class size, class composition, and the distribution of student achievement. *Education Economics*, 22(2), 141-165.
- [8] Doyle W (2014). Classroom organization and management. In M. C. Wittrock (Ed.). *Handbook of research on teaching* (3rd ed.). New York: Macmillan
- [9] Evans, D. K., & Popova, A. (2015). What really works to improve learning in developing countries? An analysis of divergent findings in systematic reviews. *The World Bank*.
- [10] Garret DJ (2008). *Classroom management Essentials*. London: Cambridge University Press.
- [11] Imoke F (2006). *Class size and academic success among adolescent Nigerians*. Ile-Ife: Obafemi Awolowo University Press Ltd
- [12] Kedney R. J (2013). *Performance measurement in non-advanced further education: The use of statistics*. Unpublished PhD. Thesis, University of Lancaster, United Kingdom
- [13] Mokobia M. O., & Okoye, N. S (2011). Effect of class size on the teaching and learning of in secondary schools in Delta state, Nigeria. *J. of Edu. and Policy*, 3(1): 1 - 7
- [14] Owolabi, H. O., Gyimah, E. K., & Amponsah, M. O. (2012). Assessment of junior high school students' awareness of climate change and sustainable development in central region, Ghana. *Educational Research Journal*, 2(9), 308-317.
- [15] Rubin, M. (2012). Social class differences in social integration among students in higher education: A meta-analysis and recommendations for future research. *Journal of Diversity in Higher Education*, 5(1), 22.
- [16] Rios, M. C., McConnell, C. R., & Brue, S. L. (2013). *Economics: Principles, problems, and policies*. McGraw-Hill.
- [17] Schultz, D., Duffield, S., Rasmussen, S. C., & Wageman, J. (2014). Effects of the flipped classroom model on student performance for advanced placement high school chemistry students. *Journal of chemical education*, 91(9), 1334-1339.
- [18] Stephens, N. M., Hamedani, M. G., & Destin, M. (2014). Closing the social-class achievement gap: A difference-education intervention improves first-generation students' academic performance and all students' college transition. *Psychological science*, 25(4), 943-953.