**INFLUENCE OF LARGE CLASS SIZE ON CLASSROOM MANAGEMENT AND STUDENTS’ ACADEMIC ACTIVITIES IN PUBLIC SECONDARY SCHOOLS IN ABUJA MUNICIPAL AREA COUNCIL**

ABSTRACT

The purpose of this two-phase, sequential mixed methods (QUAN-qual) approach was to analyze the relationship between large class size and academic achievement in secondary schools and how teachers perceive class size as affecting their instructional and classroom management methods. Data collection and analysis for the study involved 3,812 students in 20 classrooms collected from nine public secondary school in Abuja. Additionally, a researcher-developed questionnaire was used to collect data from teachers teaching in the same nine school.

Initial correlation analyses indicated a positive relationship between class size and academic achievement. Regression results indicated that the percentage of gifted students, the percentage of economically disadvantaged students, and the class size were significant predictors of reading achievement levels. For mathematics achievement levels, regression results showed that the percentage of gifted students, the percentage of Introverted students, and the class size were significant predictors. Further analyses involved filtering the data to only include class sizes of at least 15 students per teacher. For both reading and mathematics achievement, large class size was not associated with achievement. Regression results indicated that the percentage of gifted students and the percentage of economically disadvantaged students were significant predictors of reading achievement. For mathematics achievement, regression results showed that the percentage of gifted students and the percentage of Introverted students were significant predictors of achievement.

Questionnaire data revealed teachers felt smaller classes would affect their instructional practices by facilitating the increased use of small group instructional arrangements, hands-on activities, one-on-one instruction, and differentiation of instruction. Respondents either stated that class size did not affect their classroom management plans, or smaller classes would allow their classroom management plans to be less strict, have more student freedom, and have more positive reinforcement. All 51 respondents believed that smaller class sizes had a positive impact on student achievement due to the teachers being able to provide more individualized instruction and having less classroom management issues. Class sizes of 20 or less students per teacher were identified as being ideal due to such class sizes being easier to provide individualized instruction, easier to use group activities, and easier to manage behavior.

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CHAPTER I

# INTRODUCTION

Understanding if there is a relationship between the number of students in a classroom and the academic achievement of the students is vital to educators. Providing the best possible learning environment for all students while making informed decisions about how to best utilize limited funding is at the center of the class size debate (Gilman & Kiger, 2003). Stakeholders at all levels of education need empirical data regarding the significance of the relationship between class size and academic achievement. This is especially true in public areas where funding is even more limited than in more affluent areas. Unfortunately, making the decision of whether or not to decrease the number of students within the classroom to increase academic achievement is one that is only confounded by the abundance of contradictory studies into the topic (Addonizio & Phelps, 2000; Biddle & Berliner, 2002; Milesi & Gamoran, 2006; Slavin, 1989). To provide a baseline understanding of the research that has been conducted regarding class size and academic achievement, historical data as well as a review of the major educational studies will follow.

# Historical Information on Class Size

The need to determine whether a relationship exists between class size and student academic achievement is one that can be traced back to the foundation of the

educational system in America (Biddle & Berliner, 2002). According to Callahan (1962), the need for educational administrators to become more efficient and effective in the expenditure of educational funds was one of the reasons for the initial studies regarding class size. Superintendents at the beginning of the twentieth century sought to apply Frederick Taylor’s scientific management principles within the world of education; thus, per-pupil costs were analyzed and class sizes adjusted to maximize cost ratios (Callahan, 1962). William McAndrew of Chicago was one such superintendent who not only analyzed the cost effectiveness of staffing smaller class sizes but also conducted his own scientific studies in order to provide empirical data in support of his larger classes, leading to the evolution of a formula method for determining the appropriate instructional workload for teachers that would establish the class size norms found in many today (Callahan, 1962).

With the need of educational leaders to justify the increasing of class sizes, descriptive analysis studies summarizing the results of class size studies were abundant well into the mid-twentieth century with the majority of the results indicating a positive relationship between smaller class sizes and student academic achievement within the secondary grades (Robinson, 1990). However, it was not until the research of Glass and Smith (1979) that it was determined a class size of fifteen or less students was optimum for increasing academic achievement, especially for secondary students who were at risk of not achieving at or above the norm. The Glass and Smith meta-analysis included 77 class size studies spanning 70 years of research in a dozen countries with approximately 900,000 students whose average age was 12.3 years. Following the use of quantitative academic achievement data to evaluate the relationship between class size and academic

achievement, educational researchers implemented survey research to provide evidence to what extent class size is related to academic achievement (Biddle & Berliner, 2002). Survey research provided qualitative and anecdotal data regarding stakeholders’ perceptions about class size, but the data was inconclusive in its results, and variables like socio-economic status and peer groups were often cited as more important in determining student academic achievement than class size (Flemming, Toutant, & Raptis, 2002).

Economist Eric Hanushek (1986) would subsequently dissect the findings of previous class size researchers and determine that any positive results for smaller class sizes would be the result of flawed research. Hanushek argued that smaller class sizes had no or little to no effect on academic achievement for students using his own studies into the practice. Hanushek’s use of a student-to-teacher ratio for determining class size instead of the actual number of students assigned to each teacher was later criticized by other researchers (Biddle & Berliner, 2002; Gilman & Antes, 1985).

# Class Size and Classroom Management

Historical information about class size in this country helps educational leaders understand why the need to justify per pupil expenditures became an issue. Previous research regarding class size focused on the relationship between class size and the instructional technique utilized by teachers within differing class sizes and provided data regarding how class size affects the instructional practices of teachers. To really understand how class size affects the instructional environment, educational leaders must also analyze the amount of time teachers have to spend on classroom management as this directly affects the amount of time teachers are able to devote to instruction.

From teacher survey and interview data, Blatchford, et al. (2007) and Cakmak (2009) found that larger classes are often cited as being harder for the teachers to maintain student discipline, resulting in the focus of the classroom environment being more on student behavior than on student academic achievement. Blatchford, Edmonds, and Martin (2003) observed that students in smaller classes (average of 19 students per class) exhibited more time being utilized for instructional purposes and less time being utilized for non-instructional purposes, such as talking to one’s peers about non-academic topics, than students in larger classes (average of 32 students per class). Halbach, Ehrle, Zahorik, and Molnar (2001) found that larger classes prevented teachers from being able to provide in-depth content coverage due to the loss of instructional time occurring since the teachers were spending more time handling student behavior issues. Not only do teachers cite smaller classes as having less discipline problems than larger classes, but they also stated that the more intimate environment of smaller classes enabled them to prevent behavior management issues from developing through the personal relationships they were able to develop with their students (Egelson, Harman, & Achilles, 1996; Halback et al., 2001).

# Class Size and Classroom Instruction

Class size directly affects classroom instruction due to larger class sizes requiring teachers to utilize class time for management tasks rather than for instruction. Class size also directly affects classroom instruction through the interactions of the teachers with the students. Higher levels of interaction between students and teachers, as well as increased levels of student engagement within smaller classes, have been cited in numerous studies (Blatchford, Bassett, Goldstein, & Martin, 2003; Blatchford, Bassett, & Brown, 2005;

Blatchford et al., 2007; Cakmak, 2009; Finn et al., 2003; Smith et al., 2003). From teacher survey and interview data, Pedder (2006) and Blatchford et al. (2003a) cited that teachers felt they were able to be more effective in smaller classes due to the increased opportunities for individual student feedback and more individualized student attention. Additionally, teacher surveys and interviews have revealed that teachers felt they were better able to differentiate instructional lessons to accommodate the diverse needs of students within smaller classes (Blatchford et al., 2007; Cakmak, 2009). Being able to have greater flexibility in the variety of instructional activities, including the use of more small group work and less whole group lectures, was another advantage of smaller classes cited by teachers within the research of Egelson, Harmon, and Achilles (1996) and Graue, Hatch, Rao, and Oen (2007). In smaller classes, teachers felt they were able to provide extensive coverage of the curriculum due to being able to utilize a variety of activities for instruction (Englehart, 2007).

# Statement of the Problem

Class size is a topic that is not new to educators. The idea that the number of students within a class can affect the student’s academic achievement, the teacher’s classroom management, and the teacher’s instructional methods has been discussed for decades. At the heart of this debate is an economic issue of whether or not the funding of additional teachers to reduce class sizes does result in increased levels of academic achievement for the students. Previous research has focused on trying to determine the

optimal student to teacher ratio for academic achievement. Numerous studies focusing on class size and academic achievement have resulted in a plethora of findings that are just as varied in their conclusions and recommendations as the studies themselves.

The contradictory nature of previous class size reduction studies offers no definitive answer as to whether or not a district’s limited funding should be used for reducing class sizes nor does it clearly refute or support the funding of additional teachers to lower class sizes and increase student achievement, resulting in an empirical gap.

Substantial research in the area of how class size affects achievement in small, public secondary schools is another gap in the literature regarding class size. Due to the present economic recession, there is increased financial pressure being placed upon school to show that their local, state, and federal funds are being used effectively and efficiently. Unfortunately, there is a lack of recent data for educational leaders to use in determining whether reducing class sizes is worth the economic burden it places upon school . Educational leaders need research based on the instructional standards and assessments being used in 2011, not ten years ago.

There is a need to understand how class size affects the instructional and classroom management practices of teachers. Therefore, the purpose of this study was to analyze the relationship between large class size and academic achievement in public secondary schools and how teachers’ perceived class size affecting their classroom management and instructional practices.

# Research Questions

The study intended to answer the following overarching research questions: (1) What is the relationship between class size and academic achievement as measured by the classroom grading system (CGS) for secondary school students in public schools? (2) What are teachers’ perceptions of class size as it relates to academic achievement?

The sub-questions that guided the study were the following:

1. What is the degree of the relationship between class size and reading achievement on the CGS for secondary school students?
2. What is the degree of the relationship between class size and mathematics achievement on the CGS for secondary school students?
3. What are the perceptions of secondary school teachers regarding class size and instructional methods?
4. What are the perceptions of secondary school teachers regarding class size and classroom management?

# Significance of the Study

Class size reduction is one strategy that school could implement to increase academic achievement, and there is a multitude of research regarding the practice. However, since the topic of class size reduction is one that is cyclical in educational research with the majority of research having been conducted prior to the new millennium, more contemporary research is needed for federal, state, and local educational leaders to determine whether or not funding additional teachers to reduce class sizes is positively impacting student achievement and worth the expenditure. This study will provide educational leaders, especially those in Abuja, with the evidence needed to determine whether class size reduction is an effective intervention.

In analyzing the relationship between class size and academic achievement, it is also important to understand how class size affects teachers’ instructional and classroom management techniques. A large student population could result in teachers being unable to facilitate learning through the inclusion of multiple instructional activities and content differentiation. Having smaller classes could enable the teachers to promote student engagement and provide students with the individualized attention needed to meet their diverse needs and increase achievement. Educational leaders need to understand the relationship between class size and the learning environment, which is also an important factor in student academic achievement.

# Limitations, Delimitations, and Assumptions

**Limitations**

1. The use of an online survey limited the ability of the researcher to clarify any questions the participants may have had and meant that the participants had to respond to the best of their abilities.
2. Another limitation was the lack of longitudinal academic achievement data for the students.

# Delimitations

1. The purposeful sample of only rural secondary schools in having a 60% or higher economically disadvantaged student population located in Georgia limited the degree by which other researchers will be able to generalize the findings to other populations.
2. The questionnaire assessing teachers’ perceptions regarding the relationship between class size and their instructional practice utilization lacked psychometric properties data. Since the questionnaire was developed and field-tested by the researcher, it only had content validity.
3. Only student scores on the reading and mathematics sections of the CGS for students in secondary school in Abuja were used to determine academic achievement.
4. Only teachers teaching secondary school in participating public secondary schools during the 2011-2012 school year were surveyed.

# Assumptions

1. A questionnaire developed and tested for content validity by the researcher was used to acquire data regarding teachers’ perceptions about class size and how this affects their instructional practices. It was the assumption of the researcher that the questionnaire was valid and accurately measured teachers’ perceptions.
2. Another assumption was that the respondents were honest in their responses.

# Definitions of Key Terms

The following terms are defined to clarify terminology to be used within the study:

*Class Size.* Class size is the number of students who are assigned to a teacher for the entire class section at the administration of the spring 2010 and 2011 CGS administrations.

*Classroom Grading system (CGS)* are used to diagnose individual student academic strengths and weaknesses as well as to gauge the overall effectiveness of the state’s educational program. The tests are designed to measure how well the students acquire the knowledge and skills required by the Georgia Performance Standards (GPS). The content areas of reading, English/Language Arts, mathematics, science, and social studies are tested by the CGS. In Abuja, all students in grade three must pass the reading section of the CGS to be promoted to the next class.

*Economically Disadvantaged.* Economically disadvantaged refers to the percentage of students within a school district qualifying to receive free or reduced lunch based upon the National School Lunch Program (2011) eligibility

guidelines for each school year. For the 2009-2010 and 2010-2011 school years, students who were members of a family of at least four members with an income at or below $28,665 qualified for free meals, and students who were members of a family of at least four members with an income between $28,666 and $40,793 qualified for reduced price meals.

**CHAPTER II**

**LITERATURE REVIEW**

# Introduction

Finding the most effective number of students per classroom in order to optimize the level of academic achievement is an important topic in education. Stakeholders want to see academic achievement increase, yet there is much debate as to how to balance the instructional needs of the students with the district’s financial resources. In addition to a desire to increase academic achievement, there is an Nigerian ideal of increasing academic achievement for all students, regardless of innate ability or family resources.

Even before the economic decline of the twenty-first century, the debate of class size was an issue within the educational systems all over the globe and possibly since the times of the Ancient Romans (Fleming, Toutant, & Raptis, 2002).

The class size issue is one that focuses on whether decreasing the number of students in the classroom will increase academic achievement. Complicating the issue is the fact that reducing the number of students in a class requires the hiring of additional teachers, which means increasing expenditures. Funding for class size reduction projects can come from local, state, or federal sources. The hiring of additional teachers to provide equitable instruction for all students may seem like an easy argument to make; however, the mixed results regarding the most effective class size only complicate the decisions school must make in trying to decide the optimum number of students within a classroom (Addonizio & Phelps, 2000; Biddle & Berliner, 2002; Milesi & Gamoran, 2006; Slavin, 1989). The controversial topic has been researched for years, yet the plethora of studies devoted to analyzing the effects of class size on student

achievement has only added to the conflict further as results are often found to be statistically insignificant and/or in opposition of previous studies.

The purpose of this review is to describe the evolution of class size within the Nigerian educational system and to synthesize research regarding the impact of class size on classroom management, classroom instruction, and student academic achievement as has been documented by empirical research conducted across the nation. The relationship of class size and student academic achievement during the secondary school years in public communities is highlighted. Additionally, the sustainability of class size reduction efforts is assessed. As schools try to narrow the achievement gap between ethnic minority students and ethnic majority students, boys and girls, and economically disadvantaged students and non-economically disadvantaged students, educational leaders need to know if a class size reduction intervention can not only narrow these achievement gaps but also provide long-term benefits, resulting in a higher percentage of high school graduates.

# Class Size and Classroom Management

The move to have school systems use the principles of the scientific management method resulted in superintendents increasing class sizes to reduce costs (Callahan, 1962). Subsequent research would analyze how increasing class sizes affected student academic achievement with meta analysis studies showing class sizes of fifteen students or less resulting in the most academic gains (Glass & Smith, 1979). Hanushek (1986) would later refute these findings and state that smaller class sizes did not result in increased academic achievement. However, critics of Hanushek’s work would cite that his use of class size ratios skewed his finding in support of larger class sizes and did not provide educational leaders with the data needed to accurately increase class sizes (Biddle & Berliner, 2002; Gilman & Antes, 1985). In search of more definitive data regarding how class size affects achievement, additional studies would be conducted.

Often these studies focused on how the number of students in the class affected the routines and practices of the teacher.

# Student Misbehavior

How the number of students in the class affects the classroom management practices is one area researchers investigated. The literature regarding how class size affects classroom management, including student discipline, is fairly consistent in its results, showing that as class sizes increase, time spent handling non-instructional tasks also increases (Deutsch, 2003; Finn, 2002; Finn et al., 2003). Researchers (Blatchford et al., 2007) analyzed approximately 800 teacher surveys regarding how teachers’ perceive class size affecting their instructional and management practices. Teacher survey data suggested that as the number of students increased in the classroom, instances of student misbehavior also increased. Larger classes (31 or more students) were harder for teachers to manage than smaller classes (25 or less students). Teachers cited that more student misbehavior occurred in the larger classes, resulting in more time being spent on controlling the students rather than teaching (Blatchford et al., 2007).

Having to utilize class time for the handling of student misbehavior could affect student achievement and be a reason against increasing class sizes (Blatchford et al., 2007). Cakmak (2009) cited survey data similar to Blatchord et al. (2007) in his research involving approximately 40 student teachers and their class size perceptions. Survey data indicated larger classes have more discipline instances and result in the teacher utilizing more time for the management of students than smaller classes. Student teachers also cited that smaller classes allow them the opportunity to prevent student misbehavior more than larger classes. Survey data indicated student teachers felt there was a relationship between larger classes having more instances of student misbehavior and less academic achievement gains due to instructional time being used for classroom management (Cakmak, 2009).

Through observations of approximately 330 classrooms in Tennessee, Finn and Achilles (1999) identified an improvement in student behavior in smaller classes (13-17 students per teacher) than in larger classes (22-25 students per teacher). Students in smaller classes had less discipline referrals than students in larger classes. More on-task behaviors and less disruptive student behaviors were also observed in the smaller classes. Overall, less discipline issues were observed in the smaller classes, where researchers also noted that student instructional engagement was also higher (Finn & Achilles, 1999).

Survey and observation data indicated that student misbehavior occurred more in larger classes than in smaller classes (Blatchord et al., 2007; Cakmak, 2009; Finn & Achilles, 1999). The more time that teachers had to devote to managing student behavior, the less time teachers had to devote to teaching. This research suggested less time for instruction could result in less academic achievement. In determining whether or not to increase class sizes, the loss of instructional time due to classroom management issues should be considered. Another issue associated with larger class sizes is the lack of physical space and how this affects the classroom environment.

# Physical Space

Increasing the number of students in the classroom increases the instances of student misbehavior and decreases the amount of instructional time (Blatchord et al., 2007; Cakmak, 2009; Finn & Achilles, 1999). Another classroom management issue that must be addressed in larger classes is limited classroom space. The lack of physical space is a factor affecting instruction, and according to Blatchford et al. (2007), having students closer to each other in physical proximity leads to classroom management issues due to the teacher’s inability to effectively separate disruptive students from the general population in larger classes. More arguing among the students was also observed in larger classes and contributed by teachers as the students being too close to each other (Blatchford et al., 2007). Blatchford, Edmonds, and Martin (2003) found that for students aged 4-11, students in large classes (average of 32 students per class) had more instances of off-task behavior in the form of socializing with peers about non-academic topics and were less likely to pay attention to teacher comments and instructions than students in small classes (average of 19 students per class).

A lack of physical space within larger classes (31 or more students) compared to smaller classes (25 or less students) was cited in teacher surveys as creating an inflexible learning environment (Blatchford et al., 2007). Survey data indicated that larger classroom arrangement usually involved the use of traditional groupings of tables or desks in rows, and teachers were less likely to re-arrange the furniture during instruction or to have the students sit on the floor in small group arrangements. Teachers cited that with large numbers of students, it was impossible to arrange the tables or desks in non- traditional groupings (Blatchford et al., 2007). Being unable to change the arrangement of the classroom could hinder the teachers’ ability to provide students with different types of instructional activities and affect the academic achievement of the students.

Lack of physical space can hinder the ability of teachers to vary their instructional practices. For high school classes, especially those involving tools and/or machinery (vocational courses) or chemicals (science courses), large classes can also increase the level of danger. A large classroom population hinders the teacher’s ability to monitor student behavior closely, which can be dangerous in high school science labs (Deutsch, 2003). To maintain an orderly and safe learning environment, teachers of large classes are less likely to use inquiry-based laboratories. This lack of hands-on instruction could result in less academic achievement (Deutsch, 2003). Egelson, Harmon, and Achilles (1996) and Graue et al. (2007) found that smaller classes enabled teachers to provide increased focus to activities through the designing of specialized learning environments throughout the room, allowing students to separate from the whole group learning experience physically and academically. A large number of students in a small classroom means that teachers are unable to effectively manage student behavior, resulting in instructional issues and safety issues.

A lack of physical space prevents teachers from being able to use a variety of instructional strategies and to modify the learning environment to better meet the needs of the students (Blatchford et al., 2007; Deutsch, 2003). In order to provide the best possible learning environment for all students, teachers need to be able to vary their activities. Without the physical space to do this, academic achievement could decrease. Increasing the students in the class affects the amount of space available and implementation of instructional activities.

# Classroom Interactions

Limited physical space due to large classes results in an increase in student misbehavior, increase in safety issues, and decrease in instructional activity variety (Blatchford et al., 2007; Deutsch, 2003). Adding to the research regarding class size and classroom management are studies analyzing how the interactions between teachers and students are affected by larger numbers. Results from approximately 140 teacher surveys from Burke County, North Carolina suggested that smaller classes (15 or less students) helped teachers prevent discipline problems through the personal relationships they were able to establish with their students. Teachers stated that in smaller classes, they were able to interact more with their students and prevent discipline problems from occurring (Egelson et al., 1996; Halback et al., 2001). These findings were replicated in teacher surveys from teachers in New York class size reduction programs, who also stated that being able to get to know their students personally allowed them to have less discipline problems (Finn et al., 2003).

Student-to-teacher interactions are affected by class size, which affects the instruction of students and the classroom management of students. In large classes, teachers are not able to build the relationships that they are able to build in smaller classes (Egelson et al., 1996; Finn et al., 2003; Halback et al., 2001). Being able to interact with their students helps teachers decrease the amount of time they have to devote to classroom management issues and increase the amount of time they can devote to instruction. By simply reducing the number of students, educational leaders could enhance the learning process because teachers will be able to devote more time to instruction.

Student-to-student interactions were also found to be affected by class size (Blatchford et al., 2003a). Using data from 235 systematic observations of children aged 5-7 years, students in larger classes (average of 33 students per teacher) were more likely to be engaged in social discussions unrelated to the instruction than students in smaller classes (average of 19 students per teacher). Peer conversations in the larger classes were observed to be about social matters and were more likely to be distracted by the actions of their peers during instruction (Blatchford et al., 2003a). For social relations, larger classes were ranked by teachers on a Pupil Behavior Rating (PBR) instrument as having more positive peer relationships for students than smaller classes. Smaller classes were cited on the PBR as having more aggressive student behavior towards peers (Blatchford, et al., 2003a). Larger classes provide social benefits for students, but smaller classes provide instructional benefit.

# Non-instructional Tasks

Increasing the number of students in the classroom affects the teacher-to-student interactions and the student-to-student interactions (Blatchford et al., 2003a; Blatchford et al., 2007; Deutsch, 2003). Increasing the student population also affects the amount of non-instructional duties for the teacher. Data from 788 teacher questionnaires showed teachers of smaller classes find the decrease in grading and recordkeeping responsibilities conducive to increasing achievement. Less time spent grading allowed more time and energy for planning and teaching. Eliminating activities to decrease the grading workload in larger classes was cited by teachers as being a common practice even though they knew that this could negatively affect the achievement of the students (Blatchford et al., 2007).

Effectively meeting the needs of all students within the classroom through instruction and outside the classroom through assessment was cited as being important by all teachers in the study. However, teachers within larger classes (average of 33 students per teacher) noted less job satisfaction than teachers in smaller classes (average of 19 students per teacher). One reason for this decrease in teacher morale was identified as being unable to effectively handle all of the non-instructional tasks required (Blatchford et al., 2007). Larger classes require teachers to devote more time outside of class for the completion of non-instructional tasks. Smaller classes enable teachers to focus more on the planning of instruction and to have greater job satisfaction.

Students in large classes are more likely to display off-task behavior, such as talking with peers on topics unrelated to the instruction and to be in need of teacher re- direction; thus, larger classes often result in the wasting of instructional time and less academic achievement (Blatchford et al., 2003a; Blatchford et al., 2003b; Blatchford et al., 2007; Cakmak, 2009; Finn & Achilles, 1999). This increase in time being utilized for classroom management results in less time being utilized for instructional purposes, which means teachers are unable to enhance their lessons through engaging activities and/or instruction (Halbach et al., 2001). Hindering the use of more activities is also the lack of physical space presented by large classes, and the lack of teacher-to-student interactions (Blatchford et al., 2007; Deutsch, 2003; Egelson et al., 1996; Halback et al., 2001). For each classroom management issue, time is taken away from the instruction of the students, affecting their academic achievement. Teachers also report larger classes increase grading workloads and decrease their job satisfaction (Blatchford et al., 2007). Increasing class sizes increases the amount of classroom management. Time used by a teacher to discipline students or to record attendance is time taken away from instruction and learning.

# Class Size and Classroom Instruction

Initial class size research focused on whether reducing class sizes was effective and cost-efficient. Researchers then focused on how class size affected the practices and routines of the classroom. Research on how class size affected the management practices of teachers found larger class sizes resulted in more student misbehavior (Blatchford et al., 2007; Cakmak, 2009; Finn & Achilles, 1999). A lack of physical space to separate disruptive students and to use different types of instructional activities has also been cited in class size research as a disadvantage of larger classes (Blatchford et al., 2007; Deutsch, 2003). Larger student populations prevented teachers from being able to interact with their students as much as they would in smaller populations. This factor also contributed to an increase in classroom management issues (Egelson et al., 1996; Finn et al., 2003; Halback et al., 2001). Teachers reported less job satisfaction due to increased non- instructional workload in larger classes (Blatchford et al., 2007). More discipline issues, less instructional activities, less teacher and student interactions, and more non- instructional tasks contribute to less effective instructional time.

# Teacher and Student Interactions

Classroom management issues due to large class sizes affect the instructional environment by taking time away from instruction. However, class size also affects the instructional environment in other ways. Teacher and student interactions are vital to an effective instructional environment (Blatchford et al., 2002). Students in small classes interacted more with their teachers and were more engaged in their learning than students in large classes, who were often observed as passively listening to the teacher interact with other students (Blatchford et al., 2003a; Blatchford, Bassett, & Brown, 2005; Blatchford et al., 2007; Cakmak, 2009; Finn et al., 2003; Smith, Molnar, & Zahorik, 2003). Data from 235 observations of children aged 5-7 years showed that students in smaller classes received more interaction from their teachers and had more active roles in the classroom than students in larger classes. The quality of teacher and student interactions was higher in smaller classes as well. Students in smaller classes initiated more interactions with their teachers through content-related questions and student- initiated responses (Blatchford et al., 2003a; Blatchford, et al., 2002).

Quality teacher and student interactions increase student engagement, and having students more actively engaged in the classroom is a positive of smaller classes (Blatchford et al., 2002). A critical component of quality teacher and student interactions is instructional feedback. According to Pedder (2006), teachers stated that small classes allowed them to provide students with more individual feedback and more one-to-one interactions, and both were identified by teachers as facilitating learning. From 24 case studies conducted in classes of children aged 5-7 years, Blatchford et al. (2003a) cited more instances of immediate feedback in smaller classes (average of 19 students per teacher) than in larger classes (average of 33 students per teacher). Teachers cited providing students with quick and frequent feedback as an important advantage of smaller classes. This factor also increased their level of job satisfaction (Blatchford et al., 2003a). Being able to provide feedback to the students is one way that teacher and student interactions improve in smaller classes.

Increased individual feedback is one way that smaller classes contribute to a successful learning environment. Smaller classes also facilitate learning through the interactions of the teachers that are also social in context, resulting in the teacher building a deeper relationship with the student (Blatchford et al., 2003a). Questionnaire data from 642 teachers of students aged 5-7 years suggested that teachers felt they were unable to get to know their students in larger classes. Not being able to interact with each child daily in larger classes was cited as a reason for this. This lack of interaction led to teachers being less competent in the knowing the needs of their students academically and emotionally (Blatchford et al., 2003a). For teachers to be able to assess the instructional needs of their students, they must be able to interact with each child daily.

Unfortunately, this is not a possibility in large classes where teachers cite being overwhelmed by the number of students needing their constant attention (Blatchford et al., 2003a). Smaller classes facilitate more frequent and higher quality interactions between teachers and students, and this interaction is vital to the implementation of effective instructional practices.

# Instructional Activities

Smaller classes increase teacher and student interactions (Blatchford et al., 2003a; Blatchford, et al., 2002). Teachers in smaller classes are able to provide students with more instructional feedback (Blatchford et al., 2003a; Pedder, 2006). Daily interactions with students enabled teachers to assess the instructional and emotional needs of their students (Blatchford et al., 2003a). Being able to have quality interactions with their students is an important aspect of smaller class sizes as this facilitates the teacher being able to plan and implement effective instructional activities (Blatchford et al., 2003a). The use of direct instruction of individual students is one result of increased teacher and student interactions that positively affects the instructional activities of the classroom. Researchers (Blatchford et al., 2003a; Blatchford et al., 2005; Cakmak, 2009) observed that teachers devoted more time in the direct instruction of individual students in smaller classes. Having smaller classes also allows the teacher to create smaller groups for group instruction, resulting in more opportunities for teachers to interact with individual students and to provide more meaningful instruction to all students in the class (Blatchford et al., 2003b; Blatchford et al., 2005; Finn et al., 2003; Smith et al., 2003).

Smaller classes allow teachers to interact more with their students through such methods as direct instruction.

Another result of smaller class sizes is the opportunity for more flexible teaching activities, including the use of more non-traditional activities. Observation data of classes of children aged 5-7 years showed that teachers of smaller classes (average of 19 students per teacher) were more likely than teachers of larger classes (average of 33 students per teacher) to use activities other than whole group lecture. These teachers were observed as using more small group activities, more inquiry-based activities, and more open-ended activities (Blatchford et al., 2002). Teacher questionnaire data suggested that smaller classes facilitated the use of non-traditional activities because the teachers felt more comfortable with having the students move around the room. The teachers also stated that they felt they knew the abilities of their students better because of their frequent interactions with the students (Blatchford et al., 2002). Teacher survey data indicated that teachers are more likely to use innovative teaching strategies when the class is small because the teacher feels like he or she can maintain the attention of the students better (Blatchford et al., 2007). Because small class numbers encourage more interactions with the students, teachers are more comfortable with using non-traditional activities to better meet the needs of all students.

# Differentiated Instruction

The ability to interact more with students is one way that class size affects the teacher’s instructional practices. Smaller classes allow teachers to provide students with more individualized attention, providing the opportunity for the needs of all students to be met and for teachers to feel more comfortable with implementing non-traditional instructional activities (Blatchford et al., 2007; Blatchford et al., 2002). Individualized attention and quality teacher and student interactions can result in the differentiation of instruction. The differentiation of instruction allows the teacher the opportunity to assess the individual achievement levels of the students and to create lessons designed to increase these levels (Blatchford et al., 2007; Cakmak, 2009). Nye and Hedges (2002) and Graue, Hatch, Rao, and Oen (2007) found that within smaller classes, the differentiation of instruction for students was increased, and the identification of struggling students happened earlier due to the high level of teacher-student interaction. While the curriculum being taught in small and large classes remained the same, teacher questionnaires indicated that teachers’ instructional practices were focused toward meeting the needs of the average-achieving students in larger classes, resulting in the unintentional neglect of the academic needs of lower and higher achieving students (Blatchford et al., 2007; Cakmak, 2009). With larger classes, the teachers are less likely to be able to differentiate the lessons to satisfy the needs of all students.

The differentiation of instruction ensures that all students are receiving the support that they need to achieve. For teachers in large classes (31 or more students), questionnaire responses indicated that students who scored above or below the average achievement of the class were neglected during instruction. Teachers planned activities aimed at meeting the needs of the majority of the students and did not have time to plan or implement differentiated lessons. Teachers of smaller class size (25 or less students) questionnaire responses indicated that they were able to address the needs of all students and felt that no students were overlooked (Blatchford et al., 2007). Smaller classes facilitate the differentiation of instruction and increased achievement for all students.

The number of students in a classroom affects the teacher’s instructional practices. Smaller classes allow for more frequent and effective interactions between the teacher and the students, resulting in an in-depth understanding of the student’s needs and the confidence to use a variety of activities to address these needs (Blatchford et al., 2003a; Blatchford, et al., 2002). Being able to provide students with innovative teaching strategies to address their unique learning needs is another way that smaller class sizes affect the instructional practices of the teacher (Blatchford et al., 2003a; Blatchford et al., 2005; Cakmak, 2009). Understanding the needs of the students leads to the development and implementation of more effective instructional activities such as direct instruction, inquiry-based instruction, and differentiated instruction (Blatchford et al., 2003b; Blatchford et al., 2005; Cakmak, 2009; Finn et al., 2003; Smith et al., 2003). Smaller class sizes facilitate the identification of the needs of all students, not just the majority (Blatchford et al., 2007).

# Class Size and Academic Achievement

Previously cited literature identified various class size effects on classroom management and classroom instruction. Larger class sizes result in less time being utilized for instruction due to more instances of student misbehavior and off-task behavior (Blatchford et al., 2003b; Blatchford et al., 2007; Cakmak, 2009; Finn & Achilles, 1999). A lack of adequate physical space with which to control student behavior and to implement non-traditional instructional strategies is also a problem in large classes (Blatchford et al., 2007). Teacher and student interactions are more in-depth and focused on student academic and emotional needs in smaller classes, facilitating instructional differentiation (Blatchford et al., 2003a; Blatchford et al., 2002; Pedder, 2006). The size of the class impacts the amount of time the teacher has for the management of the class and for the instruction of the students. With decreased instructional time, academic achievement is not likely to increase.

Subsequent literature analysis will connect class size effects on classroom management and classroom instruction with academic achievement in secondary schools. The issue of class size is one that can be traced back to the early nineteen hundreds (Callahan, 1962), yet is still very relevant to the organizational structures of secondary, middle, and high schools of today (Biddle & Berliner, 2002; Glass & Smith, 1979). With such a long history, one would think that the class size debate would be settled by now with conclusive evidence to support or disclaim the assertion that student achievement is affected by class size. However, this is not the case, resulting in a plethora of findings as varied as the studies themselves. Most previous studies on class size reduction focused on secondary schools, which is where the practice is often used in an attempt to narrow the achievement gap present in minorities and economically disadvantaged students upon entering school.

# Summary

Class size reduction is an issue in education of significance as it is a strategy that is currently being used within many school at the secondary school level in an

attempt to increase achievement for students. Increased accountability is being placed upon schools to make AYP and on school to use their limited funding efficiently and effectively. It is vital that have contemporary research to use in the hiring of additional teachers to create smaller learning environments. While there are numerous studies on smaller class sizes and their affect on achievement, the results of the studies are inconsistent in their findings, leaving educational leaders with no definitive answer regarding the relationship between class size and student academic achievement.

Confounding the data is the varied methodology of the studies, making the generalizability of results arduous. This in-depth study analyzed the relationship between class size and academic achievement within public secondary school classrooms as indicated through CGS scores in the areas of reading and mathematics. The findings of this study provide educational leaders with data regarding class size and academic achievement, resulting in the continuation of class size reduction or the eradication of it.

**CHAPTER III METHOD**

**Research Design**

The purpose of this two-phase, sequential mixed methods (QUAN-qual) approach was to analyze the relationship between class size and academic achievement in public secondary school classrooms and how teachers perceive class size as affecting their instructional and classroom management methods. According to Creswell (2009), utilizing a mixed methods design for research incorporates both quantitative and qualitative data collection and creates a study that is stronger than one that is only qualitative or only quantitative. Quantitative research questions addressed the relationship between class size and student academic achievement as measured using secondary school CGS scores in reading and mathematics in public secondary schools within the the FCT.

Class sizes and rosters were already formed prior to this investigation and altering the class rosters for the purpose of this study was not an option; therefore, the ex post-facto research design was used. Ex post-facto research design refers to the presumed relationship between variables or lack of relationship between variables that will be established utilizing data from events that have already occurred (Gall, Gall, & Borg, 2007).

In addition to the analysis of quantitative standardized test data to analyze the relationship between class size and academic achievement in public secondary school classrooms, qualitative survey data was collected from the teachers within these schools to gain information regarding teachers’ perceptions of class size as it relates to instructional methods and classroom management. In the second phase, the researcher was able to probe into teachers’ perceptions regarding the effect class size has on their instructional methods and classroom management techniques. The reason for following up with qualitative research in the second phase was to gain a deeper understanding of the quantitative data regarding the relationship between class size and academic achievement. By including the qualitative data regarding teachers’ perceptions about how class size affects their instructional practices and classroom management techniques, possible explanations for the relationship were identified. These reasons could then provide educators with valuable information regarding how changing class size affects classroom practices and academic achievement.

# Population

For the quantitative data collection for student academic achievement, the population of the study was secondary school students in public schools within Abuja who completed the CGS. For the qualitative data collection regarding teachers’ perceptions of the relationship between class size and their instructional and management techniques, the population for the study was secondary school teachers in public schools within Abuja. In order to fill the present gap in empirical literature that exists regarding the relationship between class size and academic achievement, it was necessary that the population for the study include only participants from public school systems.

# Sample and Sampling

In order to fully answer the research questions for this study, purposive sampling of secondary school student achievement data and teacher perception data from public school systems was used. Gall, Gall, and Borg (2007) cite that purposive sampling is the ideal sampling method when it is necessary to choose a sample that is apt to provide more in-depth knowledge about the topic. Data regarding the relationship between class size and academic achievement within secondary schools in Abuja.

To obtain the necessary class size, student achievement data, and demographic data for the study, data was collected directly from the public located in Abuja who committed to participate in the study. The first step in the data collection was to request permission to access each school’s class size data from the superintendent of the district. A sample size of 204 classes was obtained, resulting in the use of student achievement and demographic data from 9 school .

# Instrument

secondary school CGS scores for reading and mathematics were used to measure academic achievement. The CGS is used to measure how well students in secondary schools master the skills and knowledge Ministry of Education (MoE). For the purpose of this study, CGS scores in the areas of reading and mathematics were used to measure academic achievement. In addition, a questionnaire, containing constructed response items, was created by the researcher to gain information regarding teachers’ perceptions about class size as it pertains to their instructional practices and classroom management. Previous literature regarding how teachers’ perceive class size as affecting their instructional practices and classroom management techniques was used as the basis for the questions. To test the content validity of the questionnaire, the researcher field tested the items with a group of six educators from who were not participating in the study.

# Data Collection

Data regarding academic achievement as measured by the student scores on the reading and mathematics sections of the CGS was collected by obtaining permission from district-level administrators to access class summary data for each school in the study. Data collection included class size, academic achievement on the reading and mathematics sections of the CGS, percentages of students with disabilities in each class, percentages of students as being identified for the gifted and talented program in each class, ethnic background percentages, English learner percentages, sex percentages, and the percentage of economically disadvantaged students within each class. Additionally, data was collected on the teachers of each class to include years of teaching experience and advanced degree status. Data regarding teachers’ perceptions about class size as it pertains to their instructional practices and classroom management was collected through an electronic questionnaire. Permission to survey teachers was sought from district administrators via electronic correspondence. From district-level administrators, a list of secondary school teacher emails was obtained and used in the electronic survey collection phase of the data collection. Electronic questionnaires were sent to each secondary school teacher at all participating secondary schools, resulting in teachers. Questionnaire data collection was done using a computer-based survey collection program and was done anonymously.

**Data Analysis**

Descriptive statistics were used to summarize the academic achievement data, and inferential statistics were used to generalize the findings of the study to the entire population (Gall et al., 2007). Multiple regression analysis was used to examine the relationship of the dependent variable of academic achievement and the independent variable of class size. The use of multiple regression also allowed the researcher to control for the additional variables of the percentage of students with disabilities, percentages of students as being identified for the gifted and talented program, percentage of students qualifying for free or reduced lunch status, percentage of English learners (EL), and percentages of ethnic background for each class, thus, making the conclusions of the study more generalizable (Gall et al., 2007). Quantitative data was analyzed using the Statistical Package for Social Sciences (SPSS).

Qualitative data, in the form of teacher responses on a questionnaire, was also collected and analyzed. Analysis of teacher responses from the items involved the researcher breaking down the data into segments of information and then assigning the segments identifying labels to develop categories (Merriam, 2009). Once the responses had been analyzed and labeled based on the researchers’ categories, the researcher reported the findings in summarized statements.

Table 2

|  |
| --- |
|  *Demographic Profile of Respondents*  |
| Characteristics | N | % |
| Number of Teachers Surveyed | 103 | 100% |
| Number of Teachers Responding | 51 | 49.5% |
| Sex |  |  |
| Female | 49 | 96.1% |
| Male | 2 | 3.9% |
| RaceExtroverted | 46 | 90.2% |
|  Introverted or African Nigerian | 4 | 7.8% |
| Disabled | 1 | 2.0% |
| Teaching Experience Level |  |  |
| Low (less than 3 years) | 3 | 5.9% |
| Medium (3-20 years) | 37 | 72.6% |
| High (more than 20 years) | 11 | 21.6% |
| Smallest Class Size Range Taught 5 or less students | 2 | 4.5% |
| 6-10 students | 8 | 15.7% |
| 11-15 students | 16 | 31.4% |
| 16-20 students | 24 | 47.1% |
| 21-25 students | 1 | 1.0% |
| 26-30 students | 0 | 0.0% |
| More than 30 students | 0 | 0.0% |
| Largest Class Size Range Taught 5 or less students | 0 | 0.0% |
| 6-10 students | 1 | 2.0% |
| 11-15 students | 0 | 0.0% |
| 16-20 students | 0 | 0.0% |
| 21-25 students | 31 | 60.8% |
| 26-30 students | 11 | 31.6% |
| More than 30 students | 8 | 15.7% |

**CHAPTER IV**

**REPORT OF DATA AND DATA ANALYSIS**

# Introduction

The purpose of this study was to determine the magnitude and direction of the relationship between class size and academic achievement as measured by the reading and mathematics sections of the CGS for secondary school students. Additionally, secondary school teachers’ perceptions regarding how class size affects their classroom practices and routines were collected and analyzed.

A sequential mixed methods (QUAN-qual) design for research was used to analyze the relationship between class size and academic achievement in public secondary school classrooms. The first part of the research was the collection and analysis of quantitative standardized achievement test data in the areas of reading and mathematics. In addition to the use of descriptive and inferential statistics, a multiple regression analysis was used to control for several covariates. For each class set of data, the mean academic achievement scores on the reading and mathematics sections of the CGS were calculated. The dependent variables for the study were classroom mean reading scores on the CGS reading section and classroom mean mathematics scores on the CGS mathematics section. The independent variables were the following:

* the percentage of males in each class.
* the percentage of Extroverted students in each class.
* the percentage of Introveted students in each class.
* the percentage of Disabled students in each class.
* the percentage of English Learner students in each class.
* the percentage of economically disadvantaged students in each class as established by each student’s free or reduced lunch status.
* the percentage of students who qualify for the gifted and talented program in each class.
* the percentage of students with disabilities in each class.
* the number of students per teacher in each class.

The second part of the research was the collection and analysis of qualitative data regarding teachers’ perceptions as to the relationship between class size and their instructional strategies and classroom management techniques through the use of a researcher-developed questionnaire. To collect demographic information for each respondent, the questionnaire contained five questions asking for the respondent’s sex, race, years of teaching, largest class size ever taught, and smallest class size ever taught. Following the demographic questions, respondents were then asked to complete four constructed response questions that were developed using the common themes identified by previous research regarding how teachers’ perceive class size as affecting their classroom instructional and management practices.

# Findings and Data Analysis

The following overarching research questions guided the study: (1) What is the relationship between class size and academic achievement as measured by the CGS for secondary school students in public secondary schools? (2) What are teachers’ perceptions of class size as it relates to academic achievement?

The following sub-questions also guided the study:

1. What is the degree of the relationship between class size and reading achievement on the CGS for secondary school students?
2. What is the degree of the relationship between class size and mathematics achievement on the CGS for secondary school students?
3. What are the perceptions of secondary school teachers regarding class size and instructional methods?
4. What are the perceptions of secondary school teachers regarding class size and classroom management?

Results of the descriptive statistics and correlation analysis are presented in Table 3.

Table 3

*Descriptive Statistics and Correlations Among Class Size, Reading Scores, and Mathematics Scores*

|  |  |  |  |
| --- | --- | --- | --- |
| Variable | Class Size | Reading Score | Math Score |
| Class SizeReading Score Math Score | ---.328\*.308\* | --- | --- |
| Mean | 19.33 | 834.75 | 832.30 |
| SD | 2.89 | 13.54 | 20.41 |
| Note. n=129 |  |  |  |
| \*p< .01 |  |  |  |

Reading achievement and mathematics achievement both had positive correlations with class size. This indicated that as class sizes increased, reading and mathematics scores also increased. The relationship between class size and reading achievement is shown by Figure 1. The relationship between class size and mathematics achievement is shown by Figure 2.



*Figure 1. Correlation Between Class Size and Reading Scores.*

*Figure 2. Correlation Between Class Size and Math Scores.*

Scatterplot analysis indicated that for both reading and mathematics achievement, the relationship with class size was positive. Scatterplot analysis also indicated that class sizes of less than fifteen students per teacher were the ones that were creating the positive association between class size and academic achievement. However, in classes of fifteen or more students per teacher, the relationship between class size and academic achievement did not appear to be positively correlated. Glass and Smith (1979) found that class sizes of fifteen students per teacher were the ideal due to increased levels of academic achievement at this class size. This previous research was not supported by initial analysis of data from this study. Subsequent analyses focused on understanding why initial correlation data for class size and academic achievement indicated a positive relationship instead of a negative one.

To analyze whether filtering the data to only include class sizes of a set minimum would affect the magnitude and direction of the relationship between class size and reading achievement, all class sizes that contained fourteen or fewer students were eliminated from the data set. A bivariate correlation analysis was conducted to examine whether there was a relationship between the dependent variable of reading achievement and the independent variable of class size. In class sizes of at least fifteen students per teacher, class size was not associated with mean reading scores. Descriptive statistics and correlation results are presented in Table 4.

Table 4

*Descriptive Statistics and Correlations Between Class Sizes of at Least 15 Students and Reading Scores*

|  |  |  |
| --- | --- | --- |
| Variable | Class Size | Reading Score |
| Class SizeReading Score | ---.15 | --- |
| Mean | 19.74 | 835.82 |
| SD | 2.36 | 19.74 |
| Note. n=122 |  |  |
| \*p< .01 |  |  |

Analysis of the relationship between mean classroom reading scores and class size resulted in mixed findings depending upon which class sizes were considered. A positive relationship was found for classroom mean reading scores and class size when all class sizes were included (r =.328, N = 129, p < .01). For classes of fifteen students or more per teacher, no relationship was found between classroom mean reading scores and class size (r = .15, N = 122, p > .01). Subsequent analysis focused on understanding the relationship further.

A multiple regression analysis was conducted to examine the relationship between the covariates and the dependent variable of reading achievement in all class sizes. The covariates for the analysis were the following: class size, percentage of students as being identified for the gifted and talented program, percentage of students qualifying for free or reduced lunch status, percentages of ethnic background, and percentage of males for each class. The overall model predicted 47.2% of the variance in reading achievement, which was revealed to be statistically significant, F(7, 121) = 15.474, p < .05. See Table 5 for results. Analysis of individual predictors revealed that the percentage of gifted students in the class (Beta = .398, p < .05), the percentage of economically disadvantaged

students in the class (Beta = -.202, p < .05), and the class size (Beta = .216, p < .05) were significant predictors of reading achievement. Higher reading scores were found in classes with higher percentages of gifted students. Lower reading scores were found in classes with higher percentages of economically disadvantaged students. Higher reading scores were found in larger classes.

Table 5

*Regression of Reading Achievement on Class Size and Various Student Covariates*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Variable | b | se | Beta | 95%CI | t |
| Constant | 835.01 | 19.072 |  | 797.25, | 872.76 | 43.78\*\* |
| Extroverted | -6.70 | 17.677 | -.091 | -41.70, | 28.30 | -.38 |
| Introverted | -28.42 | 16.817 | -.389 | -61.72, | 4.87 | -1.69 |
| Disabled | -11.86 | 14.100 | -.082 | -39.77, | 16.06 | -.84 |
| Sex | 3.52 | 9.811 | .024 | -15.90, | 22.94 | .36 |
| Gifted | 51.32 | 8.683 | .398 | 34.13, | 68.51 | 5.91\*\* |
| ED\* | -13.66 | 5.850 | -.202 | -25.25, | -2.08 | -2.34\*\* |
| Class Size | 1.01 | .320 | .216 | .38, | 1.65 | 3.17\*\* |

Note. R² = .472, adj R² = .442, F = 15.47\*, df = 7,121; N = 129

\*ED = economically disadvantaged

\*\*p < .05

As with previous correlation analyses, additional multiple regression analyses were conducted to determine whether filtering the data to only include class sizes of a set minimum would affect the magnitude and direction of the relationship. For this analysis, only class sizes of fifteen or more students per teacher were used. The overall model predicted 42.6% of the variance in reading achievement, which was revealed to be statistically significant, F(7, 114) = 12.105, p < .05. See Table 6 for results. Analysis of individual predictors revealed that the percentage of gifted students in the class (Beta =

.429, p < .05) and the percentage of economically disadvantaged students in the class (Beta = -.231, p < .05) were significant predictors of reading achievement. Higher

reading scores were found in classes with higher percentages of gifted students. Lower reading scores were found in classes with higher percentages of economically disadvantaged students. However, class size was not a significant predictor of reading achievement. When only data from classes of fifteen or more students were used, a relationship was no longer evident between class size and reading achievement.

Table 6

*Regression of Reading Achievement on Class Sizes of 15 or More Students and Various Student Covariates*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Variable | b | se | Beta | 95%CI | t |
| Constant | 848.98 | 18.365 |  | 812.60, | 885.36 | 46.229\*\* |
| Extroverted | -3.15 | 16.521 | -.046 | -35.88, | 29.58 | -.191 |
| Introverted | -22.59 | 15.687 | -.331 | -53.66, | 8.49 | -1.440 |
| Disabled | -13.40 | 13.039 | -.106 | -39.23, | 12.43 | -1.028 |
| Sex | -.50 | 9.283 | -.004 | -18.89, | 17.89 | -.054 |
| Gifted | 48.23 | 8.095 | .429 | 32.19, | 64.26 | 5.958\*\* |
| ED\* | -14.02 | 5.475 | -.231 | -24.87, | -3.17 | -2.561\*\* |
| Class Size | .24 | .374 | .047 | -.50, | .98 | .638 |

Note. R² = .426, adj R² = .391, F = 12.11\*, df = 7,114; N = 122

\*ED = economically disadvantaged

\*\*p < .05

To analyze whether filtering the data to only include class sizes of a set minimum would affect the magnitude and direction of the relationship between class size and mathematics achievement, all class sizes that contained fourteen or fewer students were eliminated from the data set. A bivariate correlation analysis was conducted to examine whether there was a relationship between the dependent variable of mathematics achievement and the independent variable of class size. In class sizes of at least fifteen students per teacher, class size was not associated with classroom mean mathematics scores. Descriptive statistics and correlations results are presented in Table 7.

Table 7

*Descriptive Statistics and Correlations Between Class Sizes of at Least 15 Students and Mathematics Scores*

|  |  |  |
| --- | --- | --- |
| Variable | Class Size | Math Score |
| Class SizeMath Score | ---.14 | --- |
| Mean | 19.74 | 833.79 |
| SD | 2.36 | 18.59 |
| Note. n=122 |  |  |
| \*p< .01 |  |  |

Analysis of the relationship between mean classroom mathematics scores and class size resulted in mixed findings depending upon which class sizes were considered. A positive relationship was found for classroom mean mathematics scores and class size when all class sizes were included (r =.308, N = 129, p < .01). For classes of fifteen students or more per teacher, no relationship was found between classroom mean mathematics scores and class size (r = .14, N = 122, p > .01). Subsequent analysis focused on understanding the relationship further.

A multiple regression analysis was conducted to examine the relationship between the covariates and the dependent variable of mathematics achievement. The covariates for the analysis were the following: class size, percentage of students as being identified for the gifted and talented program, percentage of students qualifying for free or reduced lunch status, percentages of ethnic background, and percentage of males for each class.

The overall model predicted 43% of the variance in mathematics achievement, which was revealed to be statistically significant, F(7, 121) = 13.041, p < .05. See Table 8 for results. Analysis of individual predictors revealed that the percentage of gifted students in the class (Beta = .340, p < .05), the percentage of Introverted students (Beta = -.518, p<.05), and the class size (Beta = .214, p < .05) were significant predictors of mathematics achievement. Higher mathematics scores were found in classes with higher percentages of gifted students. Lower mathematics scores were found in classes with higher percentages of Introverted students. Higher mathematics scores were found in larger classes.

Table 8

*Regression of Mathematics Achievement on Class Size and Various Student Covariates*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Variable | b | se | Beta | 95%CI | t |
| Constant | 833.02 | 29.879 |  | 773.87, 892.18 | 27.88\*\* |
| Extroverted | -17.97 | 27.693 | -.163 | -72.79, | 36.86 | -.65 |
|  Introverted | -57.02 | 26.346 | -.518 | -109.18, | -4.86 | -2.16\*\* |
| Disabled | -7.41 | 22.089 | -.034 | -51.14, | 36.32 | -.34 |
| Sex | 16.64 | 15.370 | .075 | -13.79, | 47.06 | 1.08 |
| Gifted | 66.09 | 13.603 | .340 | 39.16, | 93.02 | 4.86\*\* |
| ED\* | -14.30 | 9.164 | -.140 | -32.44, | 3.84 | -1.56 |
| Class Size | 1.51 | .501 | .214 | .52, | 2.51 | 3.02\*\* |

Note. R² = .430, adj R² = .397, F = 13.041\*, df = 7,121; N = 129

\*ED = economically disadvantaged

\*\*p < .05

As with previous correlation analyses, additional multiple regression analyses were conducted to determine whether filtering the data to only include class sizes of a set minimum would affect the magnitude and direction of the relationship. For this analysis, only class sizes of fifteen or more students per teacher were used. The overall model predicted 37.1% of the variance in mathematics achievement, which was revealed to be statistically significant, F(7, 114) = 9.624, p < .05. See Table 9 for results. Analysis of individual predictors revealed that the percentage of gifted students in the class (Beta =

.368, p < .05), and the percentage of Introverted students in the class (Beta = -.494, p. < .05) were significant predictors of mathematics achievement. Higher mathematics scores were found in classes with higher percentages of gifted students. Lower mathematics scores were found in classes with higher percentages of Introverted students. However, class size was not a significant predictor of mathematics achievement. When only data from classes of fifteen or more students were used, a relationship was no longer evident between class size and mathematics achievement.

Table 9

*Regression of Mathematics Achievement on Class Sizes of 15 or More Students and Various Student Covariates*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Variable | b | se | Beta | 95%CI | t |
| Constant | 852.43 | 29.835 |  | 793.33, 911.54 | 28.571\*\* |
| Extroverted | -15.09 | 26.840 | -.142 | -68.26, | 38.08 | -.562 |
| Introverted | -52.28 | 25.485 | -.494 | -102.77, | -1.80 | -2.052\*\* |
| Disabled | -8.74 | 21.184 | -.044 | -50.70, | 33.23 | -.413 |
| Sex | 11.94 | 15.082 | .060 | -17.94, | 41.81 | .792 |
| Gifted | 64.14 | 13.151 | .368 | 38.09, | 90.19 | 4.877\*\* |
| ED\* | -13.47 | 8.894 | -.143 | -31.09, | 4.15 | -1.515 |
| Class Size | .48 | .607 | .061 | -.723, | 1.68 | .790 |

Note. R² = .371, adj R² = .333, F = 9.624\*, df = 7,114; N = 122

\*ED = economically disadvantaged

\*\*p < .05

# Qualitative Data

A researcher-developed questionnaire was used to collect qualitative data regarding the second overarching research question: What are teachers’ perceptions of class size as it relates to academic achievement? Analysis of the qualitative data was done using a process described by Merriam (2009). The first step was to identify segments within each response that were related to the research questions. Segments of data were words or phrases that could answer the research questions and could provide significant information. Each segment of data was then compared to the next segment and analysis focused on identifying repeated themes within the data. From the repeated themes, categories were established for the response segments. Each response segment was then assigned to a category until all segments had been labeled. Revision of the categories was then done, resulting in some categories being eliminated and some being added until all response segments were assigned to categories. To facilitate the final response segment coding and analysis of data, the researcher sought to have as few categories as possible while still being able to assign all response segments to a category and to answer fully the research questions. Once the categories were established, the researcher re-coded all survey data based on these codes. A table for each category was then created, listing all categories and sub-categories for each survey question, the percentage of responses for each category, the number of occurrences for each category, and the number of occurrences for each sub-category of data.

The first constructed response question asked the teachers to state how their instructional activities would differ in a class of 15 students compared to 30 students. Responses are summarized in Table 10. Of the 51 respondents, 45% indicated that teachers would use more small group activities (e.g., small group assignments, less whole group activities, more partnered pairs activities, etc.) within a class of 15 students compared to a class of 30 students. For the category of more small group activities, being able to easily use small group arrangements for student assignments was the response most often provided by respondents as to how their instructional activities would differ in a class of 15 students compared to a class of 30 students. Sample responses stating that teachers would be able to use more small group activities included these phrases: “more small group instruction rather than whole group,” “more small group activities and lessons,” and “better structure for groups to work.”

Table 10

 *Types of Instructional Activities for Class of 15 Students*

Number of

|  |  |  |
| --- | --- | --- |
|  | Percentage ofRespondents1 | Times CategoryReferenced2 |
| More Small Group ActivitiesEasier to Make Small Groups for Work | 45.1 (23) | 18 |
| More Group Projects |  | 14 |
| Less Whole Group Activities |  | 10 |
| More Partnered Pairs Activities |  | 6 |
| More Centered Groups |  | 2 |
| Other More Small Group Activities |  | 1 |
| More Hands-on Activities More Manipulative Use | 43.1 (22) | 15 |
| More Project-based Activities |  | 8 |
| More Interactive Technology Use |  | 5 |
| More Experiments |  | 1 |
| Less Pen and Pencil Activities |  | 1 |
| More One-on-one InstructionMore Individual Student Attention | 37.3 (19) | 14 |
| More Time Spent with Each Student |  | 10 |
| More Differentiated InstructionMore Explicit Instruction for Struggling Students | 27.5 (14) | 12 |
| More Instruction Based on Levels |  | 8 |
| More Likely to Reach Upper Students |  | 6 |
| Less Teaching in the Middle |  | 6 |
| More Instruction Based on Interest |  | 1 |
| More Individually Based Lessons |  | 1 |
| Other More Differentiated Instruction |  | 1 |

*Note:* The "Other" category of responses is for responses that could not be identified by one of the main category labels.

1 Numbers in parentheses indicate the number of respondents out of 51.

2 This column is a simple count of the number of times a specific instructional activity was mentioned as to how the respondent's instructional activities would differ in a class of 15 students compared to a class of 30 students. Due to the fact that respondents may have listed several different activities, the column sum may exceed 51.

Additionally, 43% of the responses indicated teachers would use more hands-on activities within a class of 15 students compared to a class of 30 students. Responses coded for inclusion in the more hands-on activities category included: “use more math manipulatives,” “more projects and hands-on activities,” and “more hands-on experiments.” Included in the types of instructional strategies that teachers would use in a class of 15 students compared to a class of 30 students was more one-on-one instruction, which was identified by 37% of respondents. Being able to do more differentiated instruction (e.g., instruction based on levels, interest-based instruction, individually based lessons, etc.) was indicated by 28% of respondents.

When asked about how classroom management plans would differ in a class of 15 students compared to a class of 30 students, 35% of respondents stated that their classroom management plans would be less strict (e.g., less rigid routine, more flexibility for teacher and students, more student movement, etc.). Of the 51 respondents, 25% stated that their classroom management plans would not change due to differing class sizes. Being able to allow more student freedom (e.g., choice in activities, independence, etc.) was also indicated by 24% of the respondents as a way their classroom management plans would change with differing class sizes. For 16% of respondents, class sizes of 15 students would allow them to provide more positive reinforcement (e.g., able to buy more tangible rewards, more chances to reward behavior, more opportunities for praise, etc.).

Table 11 presents these results.

Table 11

*Ways Classroom Management Plan Would Differ for Class of 15*

|  |  |  |
| --- | --- | --- |
|  | Percentage of Respondents1 | Number of TimesCategory Referenced2 |
| Less Strict | 35.3 (18) |  |
| Less Rigid Procedures |  | 14 |
| More Flexible |  | 12 |
| More Student Movement During Activities |  | 7 |
| Other Less Strict |  | 2 |
| No Changes | 25.5 (13) | 13 |
| More Student Freedom | 23.5 (12) |  |
| More Student Choice in Activities |  | 12 |
| More Student Independence |  | 3 |
| Other More Student Freedom |  | 1 |
| More Positive Reinforcement | 15.7 (8) |  |
| More Money to Purchase Rewards |  | 6 |
| More Chances to Reward Behavior |  | 6 |
| More Opportunities to Provide Praise |  | 4 |

*Note:* The "Other" category of responses is for responses that could not be identified by one of the main category labels.

1 Numbers in parentheses indicate the number of respondents out of 51.

2 This column is a simple count of the number of times a specific classroom management strategy was mentioned as to how the respondent's classroom management plan would differ in a class of 15 students compared to a class of 30 students. Due to the fact that respondents may have listed several different strategies, the column sum may exceed 51.

Previous qualitative data collection focused specifically on the areas of classroom instruction and classroom management. Teachers were also asked to explain how they felt class size affected student achievement. See Table 12 for the results. Of the 51 respondents, all respondents indicated that smaller class sizes had a positive impact on student achievement and provided reasons why they felt small class sizes led to increased

student achievement. One of the ways that smaller classes affected student achievement was due to the teacher’s ability to provide more individualized instruction in smaller classes. This reason for increased achievement was provided by 80% of the respondents. Sample responses for the reason of being able to provide more individualized instruction for students in small classes included these phrases: “when I work with a child one on one concepts are usually grasped quickly,” “allow teachers to monitor student achievement more closely, accurately, and quickly,” and “smaller classes make it possible for more individual help from the teacher.” Having less management issues (e.g., fewer distractions, fewer interruptions, fewer instances of student conflict issues, etc.) in small classes was cited by 26% of the respondents as another reason for increased achievement in small classes. Sample responses for the reason of less classroom management issues included the phrases: “can pick up on problems sooner with less,” “would be able to better monitor students not following directions or misbehaving,” and “more distractions and personality issues between students that appear in larger classes.”

Table 12

 *Reasons Why Smaller Classes Have Increased Student Achievement*

Number of Times

Percentage of Respondents1

More Individualized Instruction 80.4 (41)

Category Referenced2

|  |  |
| --- | --- |
| More One-on-one Time with Each Student | 32 |
| More Differentiation of Instruction | 21 |
| More Time to Meet Individual Needs | 8 |
| Other More Individualized Instruction | 4 |
| Less Management IssuesBetter Able to Monitor Behavior | 33.3 (17) | 14 |
| Fewer Distractions |  | 9 |
| Stronger Relationships with Students |  | 6 |
| Fewer Interruptions |  | 3 |
| Less Student Conflict |  | 2 |
| Other Less Management Issues |  | 2 |

*Note:* The "Other" category of responses is for responses that could not be identified by one of the main category labels.

1 Numbers in parentheses indicate the number of respondents out of 51.

2 This column is a simple count of the number of times a specific effect was mentioned as to how the respondent felt class size affected student achievement. Due to the fact that respondents may have listed several effects, the column sum may exceed 51.

Finally, teachers were asked to identify their ideal class size and explain why. All 51 respondents indicated that class sizes of 20 or less students per teacher were the ideal. Ideal class sizes ranged from 10 to 20 with the mean being 14.92. The majority of respondents (65%) identified that it is easier for the teachers to provide individualized instruction (e.g., one-on-one time with each student, differentiated lessons, immediate feedback, etc.) in classes of 20 or less students per teacher. Being able to use more group instruction (e.g., easier to divide class into small groups, easier to monitor groups, easier to plan small group activities, etc.) was another reason stated by 43% of the respondents

as to why small classes had higher levels of achievement than large classes. Classes of 20 or less students were cited as ideal by 29% of respondents due to them being easier to manage student behavior (e.g., easier to watch all students, fewer distractions, more physical space, etc.). Table 13 presents these results.

Table 13

 *Reasons for Class Size Less Than 20*

Number of Times

|  |  |  |
| --- | --- | --- |
|  | Percentage ofRespondents1 | CategoryReferenced2 |
| Easier to Provide Individualized Instruction More One-on-one Time with Each Student | 64.7 (33) | 28 |
| More Differentiation of Instruction |  | 16 |
| More Immediate Feedback for Student |  | 6 |
| Other Easier to Provide Individualized Instruction |  | 4 |
| Easier to Use Group InstructionEasier to Divide Class Into Small Groups | 43.1 (22) | 20 |
| Easier to Monitor Groups |  | 16 |
| Easier to Use Paired Instructional Groups |  | 5 |
| Easier to Plan for Group Instruction |  | 3 |
| Other Easier to Use Group Instruction |  | 1 |
| Easier to Manage Student Behavior Easier to Watch All Students | 29.4 (15) | 14 |
| Fewer Distractions |  | 11 |
| More Space in Classroom |  | 8 |
| Other Easier to Manage Behavior |  | 3 |

*Note:* The "Other" category of responses is for responses that could not be identified by one of the main category labels.

1 Numbers in parentheses indicate the number of respondents out of 51.

2 This column is a simple count of the number of times a specific reason was mentioned as to why the respondent felt classes less than 20 were ideal. Due to the fact that respondents may have listed several reasons, the column sum may exceed 51.

# Summary

The purpose of this study was to determine the magnitude and direction of the relationship between class size and academic achievement as measured by the reading and mathematics sections of the CGS for secondary school students. In order to accomplish this purpose, a multiple regression analysis was conducted. Quantitative data in the form of student data records from 204 secondary school classes in nine public school located in Abuja were collected and analyzed.

Initial correlation analyses indicated a positive relationship between class size and academic achievement. Regression results showed that the percentage of gifted students, the percentage of economically disadvantaged students, and the class size were significant predictors of reading achievement levels. For mathematics achievement levels, regression results showed that the percentage of gifted students, the percentage of Introverted students, and the class size were significant predictors. With initial results being contradictory to expectations and previous research, further analyses were conducted and involved filtering the data to only include class size of at least 15 students per teacher.

For both reading and mathematics achievement, class size was not associated with achievement. Regression results showed that the percentage of gifted students and the percentage of economically disadvantaged students were significant predictors of reading achievement in classes of at least 15 students per teacher. For mathematics achievement, regression results showed that the percentage of gifted students and the percentage of Introverted students were significant predictors.

In addition to the purpose of determining the magnitude and direction of the relationship between class size and academic achievement, this study also sought to collect and analyze teachers’ perceptions regarding the relationship of class size and their classroom instructional and management practices. Survey data revealed teachers felt that smaller classes would affect their instructional practices by increasing the use of small group instructional arrangements, hands-on activities, one-on-one instruction, and differentiation of instruction to meet the needs of all students. In regards to how class size affects their classroom management practices, 26% of the teachers felt that class size did not affect their classroom management plans. Of the remaining respondents, teachers indicated that smaller classes would allow their classroom management plans to be less strict, have more student freedom, and have more positive reinforcement. Survey data also revealed that all respondents believed that smaller class sizes had a positive impact on student achievement due to the teachers being able to provide more individualized instruction and having less classroom management issues. All 51 respondents identified class sizes of 20 or less students per teacher as being ideal due to such class sizes being easier to provide individualized instruction, easier to use group activities, and easier to manage behavior.

**CHAPTER V**

**SUMMARY, CONCLUSIONS, AND IMPLICATIONS**

# Summary

A lack of consistent, contemporary research analyzing the relationship between class size and academic achievement provided the motivation for the sequential mixed methods (QUAN-qual) study. The purpose of this study was to determine the magnitude and direction of the relationship between class size and academic achievement as measured by the reading and mathematics sections of the CGS for secondary school students . Additionally, secondary school teachers’ perceptions regarding how class size affects their classroom practices and routines were collected and analyzed.

# Analysis and Discussion of Research Findings

Data collection for the study was two-fold. Quantitative data from 3,812 secondary school students in 204 classrooms was collected from nine public school in Abuja. Student data included achievement and demographic data. Additionally, qualitative data through a researcher-developed questionnaire was collected from secondary school teachers teaching in the same nine public school.

# Quantitative Research

For the quantitative section of this study, the following overarching research question guided the data collection and analysis: What is the relationship between class size and academic achievement as measured by the CGS for secondary school students in public secondary schools? In order to understand the relationship between class size and academic achievement, there were two sub-questions related to the overarching research question.

Data analysis for the quantitative section began with the descriptive statistics being computed for the sample. This initial analysis revealed that the smallest class sizes in the sample were primarily comprised of students with disabilities, or English Learner students, or both. To avoid confounding the accuracy of the study’s findings, all data for students with disabilities and English Learner students was removed. The elimination of the students with disabilities and English Learner students data resulted in many of the smaller classes being removed from the data; however, classes as small as seven students still remained. Personal interview data revealed that the remaining small classes were the result of EIP classes, decreases in projected enrollment, and class size reduction policies.

The first quantitative research sub-question stated the following: What is the degree of the relationship between class size and reading achievement on the CGS for secondary school students? Bivariate correlation analyses revealed a positive relationship between class size and reading achievement (r = .328, N = 129, p < .01). For reading achievement, regression results showed the overall model predicted 47.2% of the variance in reading achievement and was statistically significant, F (7,121) = 15.474, p < .05. The percentage of gifted students in the class (Beta = .398, p. < .05), the percentage of economically disadvantaged students in the class (Beta = -.202, p< .05), and the class size (Beta = .26, p < .05) were significant predictors of reading achievement.

These results indicated that as class sizes increased, reading academic achievement also increased. This contradicted some of the previous class size studies. Gilman and Antes (1985) reported significant gains in reading achievement for the students who participated in Indiana’s Project Prime Time reduced class size study.

Project STAR researchers (Achilles et al., 1995) also reported significant increases in reading achievement for students who were in classes of 13-15 students per teacher compared to students who were in classes of 22-25 students per teacher. Reduced class size studies also reported significant increases in reading achievement for students in small classes compared to students in large classes.

Due to the unexpected positive relationship between class size and academic achievement, further analyses were conducted to try to identify an explanation for the data indicating a positive relationship instead of a negative relationship. The filtering of the data set to include only class sizes of at least 15 students per teacher revealed no relationship between class size and reading achievement (r = .15, N = 122, p > .01).

Regression results showed the overall model predicted 42.6% of the variance in reading achievement and was statistically significant, F (7, 114), = 12.105, p < .05. The percentage of gifted students in the class (Beta = .429, p < .05) and the percentage of economically disadvantaged students in the class (Beta = -.231, p < .05) were significant predictors of reading achievement.

These results indicated that in classes of at least fifteen students per teacher, class size was not associated with classroom mean reading scores.

The second quantitative research sub-question stated the following: What is the degree of the relationship between class size and mathematics achievement on the CGS for secondary school students ? Bivariate correlation analyses revealed a positive relationship between class size and mathematics achievement (r = .308, N = 129, p < .01). For mathematics achievement, regression results showed the overall model predicted 43% of the variance in achievement and was statistically significant, F (7,121) = 13.041, p < .05. The percentage of gifted students in the class (Beta = .340, p. < .05), the percentage of Introverted students in the class (Beta = -.518, p < .05), and the class size (Beta = .214, p < .05) were significant predictors of mathematics achievement.

As with the analyses for reading achievement, the results of this study indicated that as class sizes increased, mathematics achievement also increased.

Once again, additional analyses were conducted to try to identify an explanation for the data indicating a positive relationship instead of a negative relationship between class size and mathematics achievement. The filtering of the data set to include only class sizes of at least 15 students per teacher revealed no relationship between class size and mathematics achievement (r = .14, N = 122, p > .01). Regression results showed the overall model predicted 37.1% of the variance in mathematics achievement and was statistically significant, F (7, 114), = 9.624, p < .05. The percentage of gifted students in the class (Beta = .368, p < .05) and the percentage of Introverted students in the class (Beta =-.494, p < .05) were significant predictors of mathematics achievement.

As with reading achievement, the filtering of the data to only include class sizes of 15 or more students indicated class size was not associated with classroom mean mathematics scores. Previous class size studies also reported that the relationship between class size and mathematics achievement as not being statistically significant.

# Qualitative Research

For the qualitative section of this study, the following overarching research question guided the data collection and analysis: What are teachers’ perceptions of class size as it relates to academic achievement? In order to understand the relationship

between class size and academic achievement, there were two sub-questions related to the overarching research question.

The third research sub-question stated the following: What are the perceptions of secondary school teachers regarding class size and instructional methods? Being able to utilize more small group activities was identified by 45% of the respondents as one way that their instructional practices would differ in a small class of 15 students compared to a large class of 30 students. For 43% of respondents, being able to increase the use of hands-on activities was another way that their instructional methods would differ in small classes compared to large classes. Completing the four survey response categories for how instructional practices would differ in a small class compared to a large class were increased one-on-one instruction and better differentiation of instruction.

Previous studies regarding teachers’ perceptions regarding class size and instructional methods resulted in similar responses to this study. As in this study, being able to use more hands-on activities in small classes compared to large classes was identified by teachers as one way that their instructional practices differed due to class size (Blatchford et al., 2007; Halbach, et al., 2001; Smith, et al., 2003). The increased use of small group activities in small classes compared to large classes was another similarity between this study and previous ones (Blatchford, et al., 2007; Graue, et al., 2007). Being able to provide students with more individualized instruction in small classes versus large classes was a difference noted by respondents in this study and in others (Blatchford et al., 2002; Cakmak, 2009; Graue, et al., 2007; Smith, et al., 2003). Like teachers in other studies, the teachers in this study also noted that they are better able to differentiate their instruction in smaller classes compared to larger classes (Nye &

Hedges, 2002). One difference in the responses of this study’s respondents and previous studies’ can be found in the depth of content covered. The teachers surveyed in this study did not indicate that smaller class sizes would enable them to provide in-depth curriculum coverage. However, being able to provide more in-depth content coverage in small classes compared to large classes was noted in teacher interviews and surveys for previous studies (Halbach et al., 2001).

The fourth research sub-question stated the following: What are the perceptions of secondary school teachers regarding class size and classroom management? For 26% of respondents, their classroom management plans would not be affected by class size.

Having a less strict classroom management plan was one way that 35% of the respondents identified their classroom management plans would differ in a small class of 15 students compared to a large class of 30 students. Being able to allow students more freedom was another way that 24% of respondents identified that their classroom management plans would differ. Completing the four survey response categories for how classroom management practices would differ in a small class compared to a large class was the ability to provide more positive reinforcement.

Teachers in this study had similar responses regarding how class size would affect their classroom management plans to teachers in previous studies. Blatchford et al. (2007) found that teachers did not feel they had to focus on the rules and consequences of the classroom management plan, resulting in a classroom environment that was not as strict, in small classes compared to large classes. Differences in how teachers viewed class size as affecting their classroom management plans can also be seen when comparing this study to previous studies. In previous studies, respondents focused on how the lack of physical space in large classes resulted in teachers not being able to effectively separate disruptive students to prevent discipline problems (Blatchford et al., 2002; Blatchford et al., 2007). Teachers within this study did not indicate how being able to use physical separation as a classroom management strategy would be affected by class size. Being able to prevent discipline problems through the personal relationships established with the students was also identified as a benefit of smaller classes for teachers in previous studies (Egelson et al., 1996; Halbach, et al., 2001). The use of personal relationships as a deterrent for misbehavior in small classes was not identified by respondents in this study as a way that class size affects their classroom management plans.

Additional qualitative data analysis focused specifically on how teachers perceived the relationship between class size and academic achievement. All 51 respondents in the survey felt that smaller class sizes had a positive impact on student achievement. Two main reasons were identified as to why teachers stated that smaller class sizes resulted in higher academic achievement levels. The first reason was that smaller classes allow teachers the opportunity for more individualized instruction. The second reason was that smaller classes have less classroom management issues. All 51 respondents also identified classes of less than twenty students per teacher as being the ideal class size. In classes of less than twenty students per teacher, respondents identified three main reasons for this class size. Classes of less than twenty students were identified as being easier to provide individualized instruction to all students, easier to incorporate small group activities, and easier to manage student behavior.

Teachers in previous studies also indicated a preference for small classes, and that academic achievement was facilitated by smaller class numbers (Blatchford et al., 2002; Cakmak, 2009; Egelson et al., 1996; Smith, et al., 2003; Nye & Hedges, 2002). As in this study, the opportunity for more individualized instruction was also identified as a benefit of smaller class sizes by teachers in previous studies (Blatchford et al., 2002; Cakmak, 2009; Graue, et al., 2007; Smith, et al., 2003). Teachers in previous studies similarly identified another advantage of small classes was fewer distractions and less classroom management issues (Blatchford et al., 2007; Cakmak, 2009; Halbach et al., 2001). Respondents in this study also stated that being able to establish in-depth relationships with the students in small classes compared to large classes was another factor influencing their preference of small classes. In previous studies, teachers also identified the facilitation of personal relationships with students as an advantage of small classes, resulting in higher achievement levels and lower management issues (Blatchford, et al., 2003; Cakmak, 2009; Egelson et al., 1996; Halbach, et al., 2001).

# Conclusions

Educational leaders need effective academic strategies to increase student achievement. Reduced class sizes is one method that some previous research has suggested as being able to increase student achievement, especially for at-risk students. However, for every class size study that indicated increased achievement for students in smaller classes, another class size study can be found refuting these findings. Adding to the class size conflict is the fact that adding additional teachers to reduce class sizes results in the need for additional funding. During the economic recession of the twenty-first century, increasing funding for any intervention, especially one as contradictory as reducing class sizes, is an arduous task.

Therefore, contemporary research was needed regarding the relationship between class size and academic achievement in public secondary school classrooms. The study found a positive relationship between class size and academic achievement when all class sizes were included in the sample. When all class size data was included, higher mean reading and mean mathematics scores were found in larger classes. However, class size was not a significant predictor of academic achievement in classes of 15 or more students per teacher. Class size was a significant predictor of academic achievement when all class sizes were included due to the fact that the smaller classes in the study were mainly comprised of students identified as being at-risk of not passing the CGS. The findings of this study do not support the reduction of class size to increase academic achievement. The study also found that teachers in public classrooms prefer small classes. Survey data indicated that teachers support small classes because they feel small classes allow them the opportunity to increase their use of hands-on activities, one-on-one instruction, small group instruction, which could lead to increased academic achievement. Reducing class sizes is a strategy that would be supported by the survey research of this study.

# Implications

The purpose of this study was to determine the magnitude and direction of the relationship between class size and academic achievement as measured by the reading and mathematics sections of the CGS for secondary school students in public schools. In addition to contributing to the existing body of educational research on the relationship between class size and academic achievement, this research fills a void in the present literature caused by a lack of contemporary research and a lack of research focusing on public schools in Abuja. For educational leaders wanting to increase academic achievement in public schools, the results of this study indicate that class size is not a significant predictor of academic achievement in classes of at least 15 students per teacher. When all class sizes were included in the data set, class size was a significant predictor of academic achievement.

The purpose of this study was also to analyze the perceptions of secondary school teachers regarding how class size affects academic achievement. This research further contributes to the existing body of educational research regarding how class size affects the classroom instructional and management practices of teachers. For educational leaders wanting to increase academic achievement in public schools, the results of this study indicate that teachers feel that small class sizes are better for academic achievement. The results of this study suggest that teachers in small classes are more likely to provide students with the individualized, engaging activities needed to increase achievement than teachers in large classes. Being able to devote more time to the instruction of students rather than the behavior management of students is another benefit of smaller classes identified in this study. According to teacher survey data, decreasing the number of students in the class could result in increased achievement due to the teachers’ ability to differentiate instruction more and provide in-depth curriculum coverage.

The implications from this study could be important not only for educational leaders but also to any secondary school principal who is searching for answers regarding the relationship between class size and academic achievement. The need to improve academic achievement is prevalent throughout the nation, and from this study, educational leaders can gain insight regarding how larger class sizes affect teachers’ instructional practices. Having the time and ability to meet the needs of all students in a class is necessary for achievement to increase, and from this study, teachers preferred class sizes of less than twenty students as they perceived classes larger than this as hindering their abilities to provide all students with the quality educational experiences they deserve.

# Recommendations

Based on the findings of this study analyzing the relationship between class size and academic achievement, the following recommendations are made for future researchers and educational leaders:

1. Since the majority of small classes in the study consisted of students who were at- risk of not passing the CGS, another study should be conducted analyzing the relationship of class size and academic achievement in which the smallest classes are not comprised solely of special needs students. Further research needs to be conducted analyzing class size data in which the student populations of the small classes are representative of the entire student population.
2. Further study also needs to be conducted regarding the relationship of class size and academic achievement for students with disabilities and English Learner students. Data is needed regarding the relationship between academic achievement for these special groups of students and class size.
3. A study analyzing the relationship between class size and academic achievement should be conducted using pre- and post-test achievement data for secondary school students. Using pre- and post-test data would allow educational leaders the opportunity to make a more accurate judgment regarding how class size affects academic achievement.
4. A study comparing the actual classroom practices and routines of teachers within small classes to those of teachers within large classes should be conducted to see if and how class size affects the classroom practices and routines.
5. For educational leaders responsible for developing class size policies, the information from this study should be used as evidence that if small classes are only comprised of students who have special needs, like students with disabilities or English Learners, the achievement scores of those classes are not going to support reducing class sizes. Achievement gains of these small classes will be less than those of larger classes that are not comprised of only special needs students. However, this is not to say that such classes may not have value in meeting the needs of the students. Class sizes should be based on the specific needs of the students and not simply on whether achievement scores support the class size.
6. Since teachers indicated that small classes are better for academic achievement due to the more individualized instruction they are able to implement and the reduction in classroom management issues associated with larger class sizes, educational leaders need to provide teachers with more professional learning addressing these issues.

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