Variables Impacting Student Performance within Small and Large Classrooms

By

Marilee Buffum

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Supervised by

Dr. Diane Barrett

School of Arts and Sciences
St. John Fisher College

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Abstract

This paper focuses on the discussion of whether small class sizes are more beneficial to student learning than larger class sizes. Research exists that supports both the small and the large classroom; presenting information that shows enhanced learning in the classroom can be attributed to several factors. This paper examines the current research, (along with additional methodology taken from a small sample size of three different area high schools). The data reflect the views and opinions of students, teachers and community members. Findings show that there is some correlation between class size and student outcomes; there are some definite opinions about class size from both teachers and students. The variables surrounding student achievement are too numerous to make sufficient conclusions.
Dedication

I would like to dedicate this final research paper to my good friend and mentor, the late Dr. William Libertson. As I am preparing to graduate and receive my Masters Degree I am reminded of the encouragement and generosity that my friend had so willingly given me over the ten years that I worked for him. Dr. Libertson shared in my decision to go back to school and was not only an incredible source of knowledge and inspiration, but a fine example of a dedicated man who spent his life caring for others. He provides continually strength to me in my life, through past examples and personal memories which will remain with me as I accomplish this goal and continue my own lifelong learning.
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Variables Impacting Student Performance within Small and Large Classrooms

Learning and education are lifelong experiences. Although people learn on their own throughout their lives, a society supports the institution of education to formalize the transmission of important knowledge and the preparation of young students for later life (Achilles, 1999). Formal education starts early in life with the desired outcomes of building decision-making skills with a hope to initiate the lifelong learning process.

The performance of students in the public education system is an extremely important factor for the future of America. It goes to the heart of future economic growth, role in the global economy, standard of living and, ultimately, national security. While the population of the United States is measurably growing, the competitive landscape with foreign nations such as India and China are also growing. The demographics of the country are continuing to shift resulting in class size variability which has, in due course, an impact on how students are taught and learn in different environments.

The educational system in America today has been scrutinized from all points of view. Focus on government mandates, state standards and school learning objectives have led school systems to direct and redirect changes that in effect, trust to eliminate educational pitfalls and negative outcomes. Change has been a common theme for decades. The 1960’s and 1970’s brought about an emphasis on child-centered learning, discovery, and inquiry. Inclusive special education legislation in the 1980’s led to the government’s emphasis on an interdisciplinary common curriculum and detrating in the early 1990’s (Hargreaves & Goodson, 2006). Subsequently, by the mid 1990’s, America turned back to a standards-based, subject defined, content-loaded, and high-stakes tested
curriculum. This culminated in the federal legislation of No Child Left Behind policy which forced school systems to examine how to meet the needs of every individual child within a single classroom.

As emphasis has been placed on meeting the needs of each child, the debate on appropriate class size continues to be researched and examined with regard to how its effect shapes student achievement. Reaching understandings about class size influences is an important goal as America tries to initiate change and reform. Advocates of smaller classes claim that the advantages are substantial. Oppositional viewpoints are convinced that teachers and what they do inside the classroom is the real key to student success, regardless of the size of a class. The role of class size in relation to student achievement in American education continues to be a contentious but highly important issue. It is a topic that has multiple facets of complexity.

This study will examine the variables that affect class size. The research examines whether or not smaller class sizes lead to student learning as well as other variables within the classroom that may affect the outcomes of student achievement.
A substantial amount of controversy exists over the impacts of class size in the United States’ educational institutions. On the one hand, educators and parents argue the benefits of small class sizes; declaring greater student achievement, higher quality teacher-student interaction and utilization of more innovative teaching strategies. Legislators and policymakers challenge the benefits, claiming that smaller classes produce minimal results while incurring large costs to government and local tax payers (Lewis, 2008). Those who oppose limits to class size argue that funding could be partial or more effectively used elsewhere. Additionally, some parents and members of larger school districts state a preference for smaller class sizes, but at the same time do not want to bear the heavy tax implications that might arise if class size were to be reduced. Regardless of the positive or negative impacts of class size on student performance, when it comes down to tax payer dollars, there are strong opinions and they can change. One thing for certain is that public education will need to address the requirements of both small and large class sizes in the 21st century and utilize positive teaching methods to create positive educational experiences.

This literature review will discuss important factors on how class size is established in the educational system and subsequent variables that influence student performance in both a small and large class size environment. It is important to understand the link between how class size is established and how educational goals and incentives are accomplished. There are many factors that affect these outcomes. This literature review will explore how and why advocacy for smaller classes is so prevalent, how large classes face various challenges that are clearly different from smaller classes.
and how interactions between teachers and pupils play a significant role in the overall achievement objectives in an educational environment. Additionally, this paper will discuss the effects of mandated implementations of small class reductions as well as examine the need for further substantial research in this area.

**Factors Determining Class Size**

The class sizes throughout the American educational system are indisputably varied. From state to state, or county to county, the factors that influence how many students will be placed into a classroom are numerous. The evolution of the United States economy through the past 100 years has seen a migration from origins of a rural agricultural base, to more urban concentrations resulting from the Industrial Revolution (Wardwell, 1994). In the past 30 years, America has experienced a suburban sprawl and resulting exodus from city neighborhoods and a corresponding loss of both population and economic base (Anonymous, 2001). The public education district formation and associated funding models need to adapt as these demographic shifts continue to occur. Consequently, these demographic changes and resulting population base of each community play a role as to how school districts are divided up and how each class is shaped within the school itself. Rural, urban and suburban areas have wide variations in population, socio-economic factors, business growth and corresponding local tax payer base to fund education.

The factors influencing class size include the student population, available classroom facilities and economic funding of each school district. Additionally, there are federal and state mandates that establish guidelines for minimum and maximum class
Variables Impacting sizes as well as student to teacher ratios to meet various student needs (Lewis, 2008). School district revenue has a significant impact in this situation. Schools districts are funded by state and federal aid as well as local tax payer funding. Initially, schools are given a small amount of funding from the federal government, followed by significant additional funding from its state budget allocation for public education. The balance of needed revenue comes from a school tax levy in the community within the specific school district. The deficit occurs when individual school budgets need more capital even after federal and state aid is accounted for. Ideally, communities strive to keep the tax levy rate relatively stable, so as to not heavily increase tax mandates on local residents and businesses for schooling each year (Wyss, Tai, & Sadler, 2007). The annual school budget vote and associated local school tax levy changes, often corresponding with the school board vote, can be controversial.

Less students per class requires additional classes, which requires additional teachers, additional support, a larger budget, a possible higher tax levy from the community and subsequently more space to house additional classrooms. If a large school district, with adequate local support, already has this advantage the subsequent issues may not be so impending. However, in a lower economic community where the demographics require much more state economic aid and tax payer support, these additional requirements may present enormous economic and social policy issues (Hargreaves & Goodson, 2006). A single mandate to lower class size may, in effect, bring on serious changes within the school district itself, and often those changes require additional funding that may not be easily available. In contrast, in smaller rural communities, class sizes may have a small number of students and may involve grouping
several grades within one classroom. The dynamics of how a class is created is complicated and dependent on numerous factors within a particular region.

It is clear that public education needs to address the needs of both small and large class sizes in the 21st century, because the nation is continually moving in different directions with regards to population growth and economic stability. An important factor for the future is that change needs to be viewed as a reflection of the past. Focus needs to be addressed on how benefits from the past bring positive changes in sustainability of educational improvements for the future.

Advocacy for Small Classes

In recent years, there has been much attention to the elementary classroom moving towards a smaller number of students. In 1998, President Clinton admonished that:

Now we must make our public elementary and secondary schools the best in the world…and every parent already knows the key, good teachers and small classes. Tonight I propose the first-ever national effort to reduce class size in the early grades…With these teachers, we will reduce class size in the first, second, and third grades to an average of 18 students in a class. (Achilles, 1999, p. 4)

Since Clinton’s proposal almost ten years ago, many states have advocated for smaller classrooms.

Research has consistently shown that teachers tend to agree that smaller classes can give them more of an advantage. Findings from several studies have indicated that
when teachers are asked about class size, they voice that fewer numbers lead to more advantages; specifically, more use of time, more effectiveness on what they do, more use of supplementary enrichment activities and overall availability to help and encourage each student (Pedder, 2006). In a 2005 survey conducted by the Ontario College of Teachers, nine out of ten teachers and administrators believed that reducing class sizes would have the greatest impact on improving student achievement (Robertson, 2005). This is a concern that America as well as other countries see as real issue in our educational systems. Smaller classes have been seen by many as the answer to several of the educational problems, including falling graduation rates, poor academic performance and teacher burn out in large over active classrooms where management can be an issue. Class size has been studied in America as well as other countries for more than a century. There have been numerous findings that show both pros and cons on this issue, and the debate continues.

Glass, Smith (1978) and Robinson (1990) are three authors who reviewed over 100 studies which examined class size. As stated by Finn and Pannozzo (2003), the general consensus on these reviews was that when class sizes consisted of less than twenty pupils, there was improved academic performance. Effects were shown most dramatically in the lower elementary years and especially among students from lower income homes. These findings were substantiated in Tennessee’s Project STAR (Finn & Pannozzo, 2003). The STAR project was initiated in 1985 by Lamar Alexander, the governor of Tennessee who wanted to assess the usefulness of small classes in elementary grades. This project included 79 elementary schools in 42 different districts. The students were randomly assigned to small classes of thirteen to seventeen pupils,
larger classes consisting of twenty-two to twenty-six pupils, and a third class with regular
numbers commonly between seventeen and twenty two, assisted by an aide. The study
continued for four years, following students from kindergarten to the fourth grade.

Results from the study found that, students in the smaller classes performed better
academically than the students in the larger classes. Testing in subject areas such as
math, reading, science, social studies and spelling showed that pupils in the smaller
classes outperformed the students in the larger classes. Additionally, it was shown that
minority students also made higher gains in smaller classes (Finn & Pannozzo, 2003).
Teachers reported that they were able to give more attention to students in a smaller
classroom environment and there was less time allotted to classroom management issues.
As a subsequent result of the findings of the STAR project, many states began to question
whether they should invest funding to reduce class size in their school districts. Achilles,
the STAR principal investigator, argued that conscientious educators should consider
smaller classes as an investment in the futures of both the students and society (Wyss,
Tai, & Sadler, 2007).

A common benefit cited by teachers with small classrooms or classrooms with
additional aides, was the ability to individualize instruction. This seemed to be a
common theory when looking at the research on the benefits of class size. Teachers
reported (Glass & Smith, 1978) increased monitoring of student behavior and learning,
more enrichment, more interaction with each pupil, more detailed knowledge of each
child’s ability and better use of time management both within and outside of the
classroom. Therefore, it was argued that, less numbers indicate more productivity.
Additionally, there was some support from research that there is a connection between the size of a class and teacher self perceptions. In an analysis by Glass and Smith (1978) teacher morale was found to be higher in thirty comparisons between smaller and larger classes. Teachers in twenty five of these classes indicated to favor the small class and cited that attitudes in the classroom were better, satisfaction with performance of teaching was higher and the argument was made that there was more caring towards the pupils, as well as a lower stress level when class numbers were low (Glass & Smith, 1978). Class size reduction has been suggested by a number of researchers as a way to lessen the effects of economic and social inequities, to increase academic achievement and to strengthen the foundational skills students develop (Graue & Hatch, 2007).

*Implementing Class Size Reduction*

In recent years, class size reduction, especially at the elementary level, has been a topic of debate in the nation’s school improvement agenda. The federal government, as well as over twenty states, now has initiatives for class-size reduction (Lewis, 2008). Teachers unions have advocated this as well. In a time when America was accused of falling short of other countries with regards to standardized scoring, the topic of how to improve student learning included looking at class size. Demands made of government movements such as No Child Left Behind increased pressure on schools to raise test scores and increase academic performance while still maintaining the individual needs of the student. These issues have sparked debates on appropriate class size and have polarized school communities. The question was raised as to how these initiatives would be funded as well as whether the cost of reducing class sizes is worth its weight.
The state of Vermont, which had the lowest student-teacher ratio in the nation in 2006, provided a good example of a choice between balancing highly effective education and the cost of a small classroom. To maintain this low class ratio, the cost per student in 2006 was $11,608 while the national average was $8,700 (Wyss, Tai, & Sadler, 2007). The sacrifice here, as the state Tax Commissioner pointed out, was that in order for this low student-teacher ratio to continue, property taxes remained high in the state of Vermont. It was a choice that many communities had to bear. The question is whether the advantage of a small classroom is worth the cost of the individual taxpayer; which is a difficult problem to solve since it is based mostly on opinion. This is not necessarily the only concern. The state of California participated in a state-wide class-size reduction effort in 1996. Class sizes were reduced in grades kindergarten through third, and within two years the percentage of uncertified teachers rose from 2% to more than 12%. For low income students, the number of uncertified teachers was even higher, more than 20% (Brewer, Krop, Gill, & Reichardt, 1999). Thus, the mandated change for small classrooms resulted in a rapid increase in demand for teachers, which had an adverse effect on teacher quality.

Even if most of the consequences of class size reduction have been positive, implementing small classes within a large school has given rise to additional variables. If the district is large to begin with and classes are mandated to become smaller, several questions arise, such as where do the additional teachers come from, does the budget support additional teachers, and when these teachers are hired with identical certifications, what happens if and when the number of students decrease, leaving an excess of teachers with the same credentials. The increase in staff and the need for
additional classroom space can stress already fragile school systems. An idea which may appear rewarding at first can sometimes backfire. In the case of California, where the percent of un-credentialed teachers increased, a secondary negative aspect occurred when classroom space was taken from programs such as special education and art as well as from computer labs and libraries. Many schools were forced to install portable buildings at a cost higher than what was reimbursed by the state (Graue & Hatch, 2007).

Furthermore, a common occurrence in large schools seemed to be that an increase in funding mandates for small class sizes resulted in a decrease of course sections offered and therefore an increase in the class size of the remaining available classes (Toth & Montagna, 2002). A challenge exists on how to toggle back and forth between numbers, the budget and mandated expectations.

Large schools and small schools each have their own individual dynamics. The question arises whether reducing the actual class size within a large school really changes the overall effectiveness of learning and achievement. In a survey conducted by Gerald Bracey in a high school of over 2,500 students, the number-one complaint they reported about their high school experiences was that they hated the anonymity of the large school (Bracey, 1998). While it is possible to have small classes in a large school, the effects of the overall peer relationships and interaction within a large community might have some valued weight. Large schools take on certain advantages such as the range of courses offered, more diversity in extracurricular clubs and activities, and research has shown that a larger school can operate less expensively than two smaller schools that house the same number of students. A small school requires everyone to take the same curriculum, regardless of his or her interests, abilities or social background. All of these variables
add to the overall social dynamics of a school; how the students relate to one another, how they relate to the teacher and ultimately how a pupil feels in a particular environment. These variables do affect learning capabilities and they are not necessarily considered when only looking at changing individual class size.

*Large Classroom Facts and Challenges*

Large classes have continued to be reality in many areas of the country. As population numbers increase and funding may decrease, large classes will still be prevalent. The need for good strategies within these classrooms must be met. The dynamics of a large class go beyond the numerical adjustment. Large classes mean students with more learning styles, more anonymity, various attitudes and values, differences in academic and intellectual ability, and a broad spectrum of readiness to learn with possibly more indifference. At the elementary levels, this can be a harrowing situation, especially when teachers have a large number of students that rely heavily on individual attention. At the secondary level, when independence is not such an issue, large classrooms may be more manageable, but more time may be spent on implementation of management strategies. Where large class sizes are more prevalent, challenges exist on how to prepare, focus and invite attention and enthusiasm from a large crowd, along with the daunting task of excessive grading (Stanley & Porter, 2002).

It is not reasonable however to expect that classes at the secondary or even college level will be mandated in the future to have numbers less than twenty. With this in mind, engaging large classes becomes a necessary effort in trying to find new or useful strategies that can benefit both the teacher and the classroom.
According to Stanley and Porter, “Good teaching in large classes is challenging and rewarding for both the student and the instructor” (2002, p.184). Good teaching can be achieved in a large classroom and does not necessarily have to be so intimidating. Planning early and being prepared are key tactics. Having the right tools available, space requirements met, scheduling in order and classroom amenities with the necessary technology at hand, can create positive more controllable classes. Managing time well is important, and can be done by ensuring that details are met, while developing appropriate goals, timelines and learning outcomes. Clarifying course expectations and reviewing policies with students can add to the general flow of good class supervision. Additionally, it is important to seek advice and counsel from other seasoned teachers who have had large classes in the past and can offer suggestions on strategies that worked well.

A study conducted by Shapson and Wright in 1980 investigated the effects of four different class sizes in grades four and five (Shapson & Wright). Using class sizes at 16, 23, 30 and 37, the study investigated teachers’ expectations, the attitudes and opinions of participants, a variety of classroom variables and student achievement in reading, math, art, english, and student self perception. The study was conducted in the Metropolitan Toronto area over a period of two years with a total of sixty-two classes examined. Although the math scores were higher in lower class sizes, there were no class size effects that showed consistent results from the other subjects. Shapson stated that there was “very little relationship between class size and classroom activities and very little relationship between class size and pupils’ attainments” (Shapson & Wright, 1980, p. 149). Regardless of any connection with class size, there is a good deal of evidence
which suggests that there are other factors in the classroom which affect student learning. Research indicated that larger classes do not have adverse effects on student learning because teachers will alter their instruction style to teach more formally to a whole class environment (Blatchford & Martin, 1998). Teachers might restrict curriculum, tighten down on covering the basics of a topic, or focus on clear decisive classroom management in order to have control over a bigger crowd. These are not necessarily bad things, they are just different techniques. Maintaining a goal of maximizing student attainment to each individual’s potential, achievement in a large class is more challenging. While teaching techniques and technology certainly can aid in this effort, the variances offered within a large group of students each offer its own challenges. These can include student ability, language, cultural differences and other socio-economic factors (Englehart, 2007).

The demands placed on a teacher in a larger classroom will be larger as well. Physical education classes are a good example of this struggle. Daily physical education from kindergarten through the twelfth grade is recommended by the 1996 Surgeon General’s Report (Hastie, Sanders, & Rowland, 1999). Concerns within these classes have been that the numbers are continually increasing. Large classes within the physical education department are sometimes just an accepted expectation. But while the demand for physical education is credible and worthwhile, the same problem exists of how to manage large numbers, how to rely on useful strategies to compensate and how to balance requirements with expectations.

In science, expectation of the student focuses on developing the capacity for analytical thinking, comprehension of concepts presented, with ability to apply their
knowledge and problem-solving skills (Alonso, Stellas, & Galagovskyll, 2007). Large classrooms give rise to the same questions and considerations. Whether science, math, art, foreign language or physical education; looking at how levels of participation are assessed have to be weighed by what measure of success is determined to be the best outcome. More importantly, it would be valuable to study research that examined the relationship between large classes and student engagement, and to what extent teachers compromise students’ academic work for cooperation with the managerial system.

Economist Eric Hanushek was a prominent outspoken individual who opposed class size reduction. His contention was that, given a cost-efficiency analysis, class size reduction is not a viable option for increasing student achievement (Englehart, 2007). He wrote that, mandated teacher to pupil ratio policy is “…not only not meaningful educationally…it is wasteful. If those funds were used for more productive purposes, we could get a lot more in those circumstances” (Hanushek, 1997, p. 294). Hanushek used three quantitative analyses to support his theories. First, he used data from the National Assessment of Educational Progress (NAEP) to provide an argument that discusses how this data shows that despite decreasing pupil to teacher ratio, academic performance has been stagnant (Hanushek, 1997). Second, Hanushek took data from the Third International Mathematics and Science Study (TIMSS) to show that there is evidence which contradicts the benefits of class size reduction. The TIMMS data indicated that internationally, there is largely a positive relationship between pupil to teacher ratio and test scores. This actually indicates a conflict between what educators believe here in the United States, versus internationally the suggestion that students perform better in large classes (Hanushek, 1997). Third, Hanushek stated econometric studies to argue in
Variables Impacting opposition to class size reduction. After reviewing 277 studies through 1994, his review showed that 85% indicated a negative or insignificant relationship between student outcomes and pupil to teacher ratio (Hanushek, 1997). Of course each of these charges by Hanushek has been equally retorted by educational reviews. Despite the challenges, he has remained an advocate against class size reduction. Hanushek comments, “more serious reform is required if we are to realize the full benefits of our schools” (Hanushek, 1994, p. 8)

Success of both Teacher and Student

Skeptics to the small class debate argued that there is no guarantee that a small classroom gives rise to higher student learning. The dynamics are different in a large versus a small classroom. More time may be allotted to focus on more individual attention, but there are no automatic benefits to student learning or increased opportunities between teacher and pupil in a smaller class (Wyss, Tai, & Sadler, 2007). There are many factors that need to be researched including, but not limited to, the quality of teacher interaction, academic ability of the student, pupil attention and students who are disengaged to begin with, curriculum coverage, teacher ability at management and pupil to pupil interaction and self confidence. Additionally, the argument exists that the seasoned teacher can recognize increased opportunities for both small and large classes in a way in which they can promote and support learning outcomes, as well as recognize constraints and difficulties in both.

Kennedy and Siegfried (1997) stated that the influence of class size on achievement depends upon the measure of achievement, that results of studies surveyed
conclude, that when measures of knowledge are used, the large class method is as effective as the small class methods. In other words, it is not just class size that determines the overall success of a student.

Student engagement is an important goal for educators. Engagement in the classroom is a psychological process of attention, interest, investment, and an effort on the student’s behalf (Marks, 2000). Although research on engagement in the classroom is limited, is it suggested that students who consistently demonstrate a strong sense of engagement have a positive relationship to performance in the classroom (Blatchford, 2003). Developmentally, engagement is a process learned at an early age where the individual focuses attention in active response to their environment, other people, events, and other aspects of their surroundings. How children and adolescents choose to give forth their attention depends on many factors: their natural inclinations, the satisfaction they have derived from learning to do so, and the value they attach to the activity which requires their attention (Marks, 2000).

Academic progress can be related to class size but so can social and behavioral adjustment. The importance of a child’s early social and academic adjustment to school has been recognized for some time. Research has been conducted on factors influencing successful transition into elementary school and a child’s adjustment into further years with regards to their performance in the early years. One theme of the smaller class size advocate is that it might be expected that in a large class, there are more children bidding for the teacher’s attention, therefore there will be more distractions and children will be more likely to be inattentive and off-task (Blatchford, 2003). Student engagement at school therefore, should be considered as one of the many variables that affect learning
outcomes in the classroom. Research has shown that engagement depends on the personal background of students. With higher levels of socioeconomic status, engagement among elementary, middle, and high school students is also higher (Finn, Achilles, & Boyd, 2001).

Equivalent to how and with what background a student enters the classroom, how a teacher presents himself or herself is also a main factor that has been questioned. It has been argued, what a teacher does, matters. How teachers interact, how they maintain management and how they are perceived are additional factors into how a student achieves learning. Teachers change their approach within both large and small classes. An article that examines this idea states,

Smaller classes provide opportunities for teachers to engage in practices that improve student achievement. Some teachers take advantage of these opportunities; others do not. When teachers take advantage of these opportunities, the likelihood of increasing student achievement is greater. When teachers fail to take advantage of these opportunities, it is smaller. It is what teachers do in and with smaller classes that make the difference, not simply being in smaller classes. (Graue & Hatch, 2007, p.673)

Rosenthal and Jacobson (1968) argued that teachers treat pupils differently according to the expectations they have for their potential academic achievement. In other words, teacher interaction tends to favor students whom teachers expect to achieve well academically over their peers. The attitude that a teacher projects in the classroom can certainly affect how students perceive being treated and that in turn can affect student
performance. Additionally, disaffected pupils (students who exhibit a non-caring attitude) can interpret complex messages from a teacher that their failure is due to their lack of ability. These students may then lose self esteem and become increasingly disengaged (Pedder, 2006). The power that a teacher has in the classroom is not given ample attention to with regards to adequate research.

_The Need for Further Research_

The class size debate has been an ongoing issue for many years. While research exists to support that smaller class sizes give rise to greater student performance, there is also ample evidence to show that students in large classes perform just as well. It becomes a contentious issue and the fact remains that class size is an incredibly complex subject. The resulting situation is that class size reduction “might be effective for some types of students but not others, it might be effective for some subjects but not others, and its effectiveness might depend on a whole host of other variables” (Bracey G. , 1999, p. 246). The need for further research is imperative in order to understand how class size reduction is affected by, and influences the additional contextual factors which clearly surround the issue.

Melvin Borland, writing for the Department of economics at western Kentucky University states that “the results of attempts to empirically identify the relationship between the variables class size and student achievement are mixed at best” (Borland, Howsen, & Trawick, 2005, p. 73). He goes on to say that research has typically been hindered by at least four factors: First, the use of a student versus teacher ratio as the measure of class size resulting in measurement error, second, estimations, resulting from
the failure to control for family effects or student innate ability, third, the general failure
to take into account class size with respect to student achievement and last, the use of an
incorrect functional form when specifying the relationship between class size and student
achievement (Borland, Howsen, & Trawick, 2005).

It appears that a growing number of researchers agree that more research needs to
collected. While the research feeds more debate, the debate will continue to feed more
research. Realizing the full impact of how all these different dynamics contribute to a
student’s level of performance, it is important to change the research dynamics to adapt
to those needs. A study must go beyond simply describing changes, or lack of change.
New studies need to look at achievement outcomes with respect to changes in class size,
but additionally with respect to all the other dynamics within the classroom. Research
must also provide some insight as to what changes in the process of teaching. Little has
been done so far to link mediators to outcomes within studies. Rather than generalizing
from a large sample size or generalizing from large outcomes, it makes sense to limit
sample size and limit settings to single-site studies where research can work in synergy
with small groupings to find relatively small outcomes, but efficient ones. Additionally,
a study needs to be closely connected to its given context. Class size is an exceptionally
complicated construct which likely operates differently depending on the particular
setting in which it is situated (Englehart, 2007). Two important questions remain for
further research: How does class size influence learning and achievement outcomes, and
what contextual variables interact with class size to produce those outcomes?
Summary

It is clear that the debate over class size will continue in the foreseeable future. Research has shown that both sides of this debate are substantiated and supported by purposeful information about how a student relates to the school environment they are placed in. Factors determining class size are continually changing. Information from the past provides the educational system with both positive and negative aspects to consider in the years to come. Mandates from government and state legislation continue to require constant change and as the world examines what is more beneficial for the child, it is hoped that there is an efficient way to combine both efforts. While advocacy for the small class is prevalent, it is shown that this issue reveals a more extensive and complicated need for continued research. Even though there is strong evidence to support smaller classes do make an impact on student performance, small classes alone will not automatically produce higher achieving students. Other factors suggest it is what happens within the classroom between teachers and students that have the most effect on a student's achievement. Large classes do have numerous challenges but there is ample support that higher success can be achieved with the right tools and methods.

Meaningful educational reform continues to be a valid concern in America. Deeper transformations than just class size reductions need continued research. Smaller class sizes are just one strategy, but research should aim to generate useful insights into how knowledge for a range of different purposes can best be promoted in both small and large classes.
Methodology

Controversy over class size continues to be a topic which has rendered much discussion. Research has provided positive reinforcement to the argument that smaller class sizes are linked to higher student achievement as well as preferred by many teachers. On the other hand, there is ample research that has shown that student learning is not necessarily dependent on the size of a class, but other factors including, but not limited to: teacher pupil relations, teacher and student ability, socio-economic factors, curriculum coverage, management capabilities and confidence levels of both teacher and student. The class size debate is an important topic in the educational system because as reform and change takes place in the years to come, it is essential that the public school systems in this nation advance and remain competitive with the rest of the world. If there is a possibility of change for the better, research is valuable to direct the public school systems in the appropriate direction. If smaller classes prove to be more beneficial for students, it is clear that each district will need to make necessary changes that will benefit future generations.

Participants

This study included several teachers at the high school level who have taught both large and small classes. Teachers were randomly selected based on their willingness to participate in the study and to provide opinions. A variety of content areas were reflected, with teachers from several departments within the school settings. The sample sizes of the participants include teachers from all ages and teachers with varying levels of experience. All participants were requested to provide opinions, and answer a survey.
Additional participants included a sample of tenth grade students from the same high school. These participants were asked to answer six questions as a ticket out the door method. The purpose of gathering this information from students was to gather some insight as to how students view this topic. The final participants included a sample size of parents from community households in the same district as the polled teachers and students. They were asked to complete a survey requesting opinions on variables that affect student performance, preferences on class size at the local high school, and if they would be willing to pay more tax dollars to mandate lower class sizes. The intention of all the collected data was to provide insight into the relationship between how the students and teachers view this subject and how the parents in the community view their own invested interest in the local public education system with regards to class size.

Additional participants within the methodology consisted of six teachers from three different high schools. Two of the teachers were from a suburban high school, two were from a rural high school and two were from an urban high school. They were asked if they would share available statistical data from their past two years of teaching. All six teachers taught a combination of sophomores and juniors in Regents Biology. The data included the number of students in a class, grades from each marking period during a given year and the amount of IEP’s and 504 plans within each class. The purpose of the statistical data was to observe potential trends or correlations between class size and possible impacting variables with regards to different socio-economic locations.

The location of this part of the study included three area high schools from three different school districts. Two of these teachers taught in a district that was a high needs-based school in an urban city area. This high school housed seventh through twelfth
grade and had a wide variety of diversity with approximately 1870 students. The majority of students were African American at 62 percent. The largest household income bracket at 26.5 percent, were families which had an income less than 15,000 dollars a year. Enrollment of special needs students was at 62 percent (see appendix A).

Two additional teachers taught in a second high school residing in a large district of middle to upper class families in the suburbs, where 89.3 percent of students were Caucasian. This high school had approximately 1500 students but housed only grades ten through twelve. The largest percentage of family income was 21.3 percent making between 100,000 to 149,000 dollars per year. Enrollment of special needs students compared at 6.8 percent (see appendix B).

The last two teachers taught classes in a high school that was located in a rural area community, in a district with a mixed combination of high needs and middle class families of students. The high school enclosed grades nine through twelve with a population of students at 705. Enrollment consisted of 96.2 percent Caucasian students with 25.2 percent of families falling in the range of 50,000 to 74,000 dollars as an annual household income. Special needs enrollment compared at 16.7 percent (see appendix C).

*Instruments and Materials*

A substantial part of this research included two main surveys. The first survey was sent out electronically to the previously selected teachers from the high school discussed. The questions on the survey requested answers and opinions related to the advantages of large classes as well as the advantages of small classes. Additionally, the
survey asked for information about other factors that the teacher felt might contribute to the learning experience in the classroom (see Appendix D).

The second survey was sent out electronically to parents in the community which housed the same targeted high school. Research has shown that parents prefer and sometimes advocate for small class sizes. The survey requested a variety of answers including whether the household had school age children, at what ages, where they attended school and overall opinions about the school district they resided in. In addition, the survey asked about other factors that might have an effect on learning outcomes in the classroom. Several questions focused on class size and a final question was asked about whether that particular household would be willing to pay more taxes to mandate lower class sizes within the school district (see Appendix E). The intention of the survey was to compare how community members might already feel about the public schools in their areas with how much vested interest they might have if the opportunity to reform and change class size was reflected in an increase of their annual school tax.

The final set of materials involved gathering some opinions from anonymous students. As a ticket out the door method, questions were asked to the targeted tenth grade students about preferences on large and small classes. Specifically, the questions asked opinions on whether or not the size of a class might have an effect on their own individual learning ability within that class (see Appendix F). The intention of the ticket out the door was to reference answers from the students with the answers given by the teachers and members of the community.
Data Collection

Collection of data included answers from both surveys, opinions from the ticket out the door and specific statistical data from the selected teachers within the three targeted high schools. The teachers from these classes provided data from the last two years regarding yearly grades of students as well as information on how many Individual Education Program substituents and 504 plans were in the class. The data was collected from both large and small classes. The information was given strictly in numerical form and did not reveal names of students.

Analysis of data included applying weighted metrics to all responses from the surveys as well as the ticket out the door. The data collected in the surveys included demographics, answers and opinions regarding to advantages and disadvantages to large and small classes, other factors which might affect student performance and satisfaction regarding the overall school district policies. This information was collected and compared to the actual statistical data provided by the area high school teachers.

Procedures

An electronic survey was developed for the purpose of gathering teacher opinions using an Internet survey tool (surveymonkey.com). The link to the survey was sent via email. Results were obtained and analyzed. Each survey was inspected individually, while the identity remained anonymous.

An additional electronic survey was developed for the purpose of gathering parental opinions using the same tool. The demographic information shown in Appendix B clearly outlines that the economic averages provide the ability of the suburban
communities to fund reduced class sizes through increased budgets and homeowner support. In contrast, the average homeowner in both the urban and rural districts would be more challenged to self direct funds for this purpose, but would rely in state aid and school district spending policies. Because of this factor, the parental opinion survey was sent only to the suburban parental subgroup in order to focus on the issue of community funding support for smaller classes. This is the same district in which the teachers and students were polled. The completed surveys were analyzed using weighted metrics as well as individual comments.

Student opinions were gathered using a ticket out the door questionnaire for both large and small class sizes this same suburban district. The survey provided common questions to each group and was applied at the end of the class period ensuring that there were no other variables introduced that could impact the responses. A manual analysis was applied by tabulating individual survey responses, by groups, and also consolidating comments. The analysis also incorporated any significant factors that could impact student achievement such as IEP’s or 504 plans.

Student metrics including grades, test and quiz scores, and IEP codes were provided by the various teaching subgroups outlined earlier. These metrics were analyzed by comparing actual grade outcomes with the sizes of the class they were obtained from. The purpose of this procedure was to identify any trends that indicate if there was a correlation between smaller class sizes and higher student achievement.
Results

The initial survey was sent out to teachers in a local suburban school district. Fifty four teachers responded to the survey. Eleven questions were compared and contrasted to obtain the following information.

One of the first questions asked the teachers about the range of class size they were currently teaching. Answers revealed that the classes consisted of a variety of students. Findings showed that there was an equal amount of teachers who taught classes between 25 and 30 students, and those who taught classes of 20 to 25 students, with only 3% of the teachers instructing classes of less than 15 students. In contrast, an additional question asked the teachers what they thought the ideal size of a class should be. Fifty eight percent of these teachers answered that the ideal size of a class would fall somewhere between 15 and 20 students, while 24% stated that 20 to 25 students in a class was ideal. The remainder 18% answered with 15 students or lower.

When asked about the importance of class size in relation to student success, 67% of these teachers replied that this was extremely important. Additionally, when asked if they had seen an actual correlation between higher student performance and smaller classes, 72% answered that yes, they had observed this sometime during their teaching experience. The survey included a question that informed them that research had shown that smaller class sizes often lead to greater student performance. When asked if they agreed with this statement, 89% replied positively. However, the subsequent question informed the teachers that research had also shown that it was not class size necessarily that led to student performance but rather, other factors within the classroom that had
more of an effect. When asked again if they agreed with this statement, only 43.6% replied positively. The opportunity was given in the survey to rate other factors that might have an influence on student performance, and remarkably, all 54 teachers agreed that there were other significant factors that had an impact on student performance. Specifically, 100% of all 54 teachers agreed that student/teacher interaction was an important factor, while 94.5% rated classroom management as the next important factor, and self confidence of the student was the next highest rated factor with 81.8%. It is interesting to note that this data shows that the majority of teachers felt that class size was a crucial issue for student success, but when asked if there were other factors involved, 100% of the teachers felt there were numerous other factors that influenced student achievement.

The survey included two opinion questions. The first question asked the teachers to list two advantages to teaching a smaller class and the next question asked them to list two advantages to teaching a larger class. Answers to the first question consisted of several repeat comments including, but not limited to: smaller classes allowed more one on one interaction with students, allowed ability to make personal connections with students, offered less distraction with classroom management and less time restraints for labs and group work. Small classes meant less outside grading, added capacity to assess students, and lastly, enabled the teacher with better comprehension of how to differentiate instruction. On the opposing side, answers to how a large classroom offered advantages, included comments such as: large classrooms offered more diversity, better use of talents during group work and more students could offer more discussion, students have to learn to be more self-reliant instead of depending on the teacher, and some teachers did
mention that the costs of a larger class probably offers benefits to the school district. However, more than 25% of the teachers commented here that they could not think of any advantages to teaching a large class over a smaller one. The majority of answers in this section clearly favored the smaller class size.

A similar public survey was sent to community members in the same suburban school district, with forty responses tallied. Eighty five percent of the households surveyed had school age children that attended the schools within the district. This was a large school district, with relatively large class sizes that constituted on average 25 students or more in a class within both the middle and high schools. Eighty two percent of these households reflected that they had had positive experiences with the schools in the district and 64% agreed that the class sizes in the district were reasonable. While the majority of parents agreed the class sizes in their district were reasonable, the answer to the next question asking about the importance of class size reflected that 58% thought it was very important, while 43% felt that it was somewhat important. Something to note, here the parents stated that class size was substantially important, at the same time they felt like the class sizes were reasonable at numbers averaging 25 per class. In contrast, the majority of teachers in this same district felt that the ideal class size fell between 15 and 20 students.

The next question on the survey given to the community members, asked if the state should mandate smaller class sizes. Forty percent agreed here, but 38% disagreed. This does not mirror a wide majority, but is consistent with the previous answers which stated that these same households felt that class sizes were reasonable within their district. Additional questions revealed the households acknowledging that a typical grade
of A and B was the most common achievement for their student, and 67.5% answered that they felt their tax money was put to good use, with 53.8% stating they would pay more taxes if they knew that it would help improve their child’s school. The opposing 46.2% would not. Again, this is not a wide margin with regards to paying extra taxes, possibly reinforcing the notion that these households agreed that the overall performance of the school and the specific class sizes are reasonable.

The significance of the public survey was to take a district that knowingly had larger class sizes and compare the thoughts of the parents to the thoughts of the teachers within the same district. The data shows that although the majority of teachers would prefer smaller class sizes, 64% of the parents who participated in the survey replied that these same class sizes were reasonable. The data also reflects that these particular households constituted students that averaged A’s and B’s as grades. Given that these particular students already had higher grades, further research would be beneficial to compare data from households where students received lower marks and households that comprised different demographics.

Part of the methodology included asking students to fill out a ticket out the door which consisted of six questions. Data was collected from 300 high school students within the same suburban district as the polled community. The students were provided ahead of time with the information that a class size of over 25 students could be considered large. Out of these 300 students, 96% of them replied that the majority of their classes in the high school were large classes. When asked if they preferred small or large classes, 70% indicated a preference to small classes, 23% replied that they preferred large classes and 7% of the students indicated that they had no preference. It is important
to note here that while the majority of students were taught in large classes, the majority replied that they preferred a small class.

When the students were asked about the benefits of both a large and a small class, some common answers were provided. Students felt that the advantages to a small class included less distraction, environments that were easier to learn in, less talking, a more hands-on experience, more comfort in the room, a safer place to ask questions, offered closer relationships and the most common answer: there was more teacher attention in a smaller class. The advantages to a larger class included comments such as, ability to make more friends, more opinions from peers, easier to work within a group, easier to blend into the crowd, ability to meet more people, more diversity, can rely on friends for help, large groups are more fun than a smaller class and the comment that one is not called on as much in a larger class. The variety of answers to both questions was informing, but it might be worth noting that the answers to the benefits of a large class seem to be more focused on social aspects rather than learning.

The final part of the methodology included examining a portion of factual data obtained from a few willing teachers. Six teachers participated in this part of the research by providing two years worth of grades and statistical data for analysis. The data reflects a very small sample size so it is hard to draw conclusive factual information from this research alone. However, the data does suggest some trends that can be considered. Referring to the data tables below, it is noticeable that the suburban area classes reveal a larger amount of students, a smaller number of IEP’s and 504 plans, and a higher average on the Regents Exam scores for both years of data. The rural area shows slightly smaller classes but lower scores on the Regent Exam. More importantly however, there are
higher numbers of coded students here in the rural area. Additionally, it is important to note that the urban area has a similar average class size to the suburban area, a higher number of coded students in these classes, while the test scores are significantly lower.

Table I

2006-2007 Regents Biology Classes

<table>
<thead>
<tr>
<th>Area</th>
<th>Teacher 1</th>
<th>Teacher 2</th>
<th>Teacher 3</th>
<th>Teacher 4</th>
<th>Teacher 5</th>
<th>Teacher 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Class Size</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>26</td>
<td>27</td>
<td>21</td>
<td>19</td>
<td>24</td>
<td>21</td>
</tr>
<tr>
<td># of IEP’s &amp; 504 Plans</td>
<td>4</td>
<td>5</td>
<td>9</td>
<td>7</td>
<td>9</td>
<td>11</td>
</tr>
<tr>
<td>Average Regents Exam Grade</td>
<td>80</td>
<td>76</td>
<td>75</td>
<td>76</td>
<td>63</td>
<td>65</td>
</tr>
</tbody>
</table>

One could extract from this data that both class size and the percent of coded students might impact student performance. Both of these metrics have a potential negative impact on student/teacher interaction, which is the common stated benefit of small class sizes from both the teacher and student surveys. However, from this data, the percent of coded students seems to have a very large impact on regents test scores (performance). Potentially, when only one of these factors is high, effective teaching techniques as well as classroom aides can result in student/teacher interaction being maintained. However, if both of these areas are high, the resulting barriers to student/teacher interaction may become too great and resulting student performance
suffers. The following data from years 2007 to 2008 reflect the same trends as the previous year.

Table II

2007-2008 Regents Biology Classes

<table>
<thead>
<tr>
<th>Area</th>
<th>Teacher 1</th>
<th>Teacher 2</th>
<th>Teacher 3</th>
<th>Teacher 4</th>
<th>Teacher 5</th>
<th>Teacher 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Class Size</td>
<td>27</td>
<td>24</td>
<td>19</td>
<td>19</td>
<td>24</td>
<td>23</td>
</tr>
<tr>
<td># of IEP’s &amp; 504 Plans</td>
<td>5</td>
<td>5</td>
<td>6</td>
<td>5</td>
<td>8</td>
<td>7</td>
</tr>
<tr>
<td>Average Regents Exam Grade</td>
<td>79</td>
<td>81</td>
<td>77</td>
<td>76</td>
<td>63</td>
<td>65</td>
</tr>
</tbody>
</table>
Discussion

Although research exists that clearly reinforces both sides of the class size debate, the intent of the methodology was to extrapolate any trends or common links between teachers, students and community members. The survey data shows that there is some common agreement between teachers and students alike with regards to class size. The majority of both teachers and students in the surveys stated that a benefit of smaller class sizes was increased student/teacher interaction. The studies cited in the literature review reflected this same suggestion: that student/teacher interaction becomes one of the greatest influences within the classroom. The data collected reinforces this notion.

An interesting anomaly seemed to appear when comparing the ideal class size for teachers taken from the survey results. The majority of teachers (58%) indicated that the optimal student class size would be between 15 – 20 students. However, the factual data also shows that the majority of teachers (78%) taught classes with 20 – 30 students. This disparity leads to the belief that the majority of teachers believe that their classes are too large based on the simple metric of the number of students in the class and not based on any other factor including the number of special need students, classroom management or teaching techniques. Based on classroom experience within the teaching profession and individual experience, the teachers already have a preconceived notion of acceptable class size and what constitutes a size outside of these boundaries. Teachers only responded with 43.6% affirmation that other factors within the classroom had more of an effect on student performance. This implies that the remaining respondents, 56.4%, do agree that classroom size is the largest contributor to student performance in the classroom.
Analysis of the factual data indicates that the suburban school district has the largest class sizes, but they also have the smallest percent of coded students. A higher degree of student/teacher interaction can be maintained through effective management and other teaching methods. The rural district shows a large percent of coded students; however they had the smallest overall class sizes. With the addition of mandated classroom aids, the student/teacher interaction can be maintained. Finally, the urban district had relatively large class sizes and a very large percent of coded students. Both of these factors, when combined, have a negative impact on student/teacher interaction and on subsequent test scores and overall student performance. This analysis is consistent with the results of the teacher survey with 100% of respondents indicating that student/teacher interaction was an important factor so student achievement and 94.5% rating classroom management as the second most important factor.

While the survey sent to suburban community members was not fully representative of each demographic, the responses do provide some interesting data for discussion. While the school district of the test community did have a large average class size (25 students per class), the students had relatively high performance with A’s and B’s being scored by the majority for those families responding to the survey. The families direct responses to the question of the impact of class size on student performance reflect a roughly even split between the issue being important to performance or not. Factors that may be influencing this balanced response could include the reflected grades of the students in the class, motivation to keep local school taxes reduced through keeping classes larger, a lack of involvement of community members in the school system or the relative higher results on standardized tests to those of other districts. In any case, the
sampled community respondents were significantly less sure that class size was important to student performance than those of responding teachers.

The student survey analysis reinforces that small class sizes are preferred (96%) versus having a large class size (4%). Students cited several reasons for this preference, but most pointed to the smaller class sizes providing more interaction with the teacher.

The three different perspectives; those of the teacher, student and community members, lay the foundation for a reinforcing cycle. Teachers have a strong belief and preference for smaller class sizes as do the majority of students. This environment leads to increased student/teacher interaction and results in higher performance in the classroom. This high performance creates a positive impression of the educational outcome and, therefore, the associated class sizes. This student performance based cycle is reinforced through the community school budget approval process and is only broken when student performance begins to break down. At this point, the system of teachers, administrators and community members must, again, address the balance between student performance, class room size and other variables impacting student/teacher interaction.

Clearly, the methodology in this paper can only be interpreted as a wide generalization because the sample size is relatively small and does not reflect the rural and urban districts as equally as the suburban area. Further research would be valuable to provide equal sampling of these demographics. However, the data obtained does concur with trends that are shown in other research: in particular, the significant importance of teacher and student interaction and the relative negative impact on classroom size on this metric. Again, the factual data also indicates that it is not necessarily class size alone that
negatively impacts student performance, but also the relative percentage of students with
coded needs that results in less student and teacher interaction and, therefore, student
performance.

Research from the literature reinforces these notions. Studies by Glass and Smith
(1978) produced common statements from teachers revealing opinions that there was
more interaction with each pupil in a small class. Additionally, teacher self perceptions
were linked to smaller class sizes because morale and attitude was positive. This, along
with a lowered stress level, gave rise to a heightened ability to increase academic
achievement and strengthen student skills (Glass & Smith, 1978). Furthermore, Kennedy
and Siegfried (1997) argued that the influence of class size on achievement depends upon
the measure of achievement. The measurement of which, is determined by a myriad of
factors that already exist in the classroom.
Conclusion

As stated in the introduction to this paper, an emphasis has been placed on meeting the needs of each child within our educational system. The debate on appropriate class size continues with regard to how it shapes or benefits student achievement versus the associated resource cost to maintain specific levels. Continual research specific to the impact of class size and its influence on student achievement is vital to our educational system as we implement reforms to improve the quality of education.

Research reveals that there are a multitude of influences on student achievement in the classroom. Very few argued that larger classes are positive and most would assert that the advantages of small classes are clear. More importantly, it was agreed that all the influences combine to cause an effect on student learning. This paper has examined these variables which effect student learning and how they relate to class size. The data found some consistent trends which seem to indicate that class size may have a direct impact on student learning, but more importantly, the data suggests that it is how the class size impacts the interaction between a teacher and a student. Both teachers and students who were asked to participate in the study replied that a clear benefit to smaller class sizes was more one on one interaction between the teacher and the student. Additionally, the data collected from the last two years from the suburban, rural and urban high school show consistent trends that reflect this same idea. The classes that produced higher scores on assessment where those classes that were either smaller in size or classes that were larger but would have required more assistance because of coded students; a direct link to teacher/student interaction.
State mandated guidelines currently exist in the educational system that attempt to maintain an acceptable amount of student/teacher interaction. For example, school districts have limits on the amount of total students per classroom and there are also limits to the amount of students with 504 plans and IEP’s before additional aids in the classroom are required. Hypothetically, taking all of the variables within a classroom as being equally important (including class size), it ultimately may come back to the amount of student/teacher interaction which determines if those variables create positive or negative influences on student performance. It therefore makes perfect sense that a small class size will produce better learners because the ratio of teachers to students is optimal and a higher amount of student/teacher interaction is achieved. This is only one possibility however and the research has shown that the variables that do affect student learning within the classroom are numerous. As a result, future research is still needed.

This paper has tried to extrapolate common trends from a very small sample size. More substantial evidence needs to be collected while focusing on larger numbers for future research. Since there are countless variables that could affect student learning, it would be appropriate to examine these variables, each as a single metric and how they might relate to class size. For example, this paper did not focus on socio-economic factors such as school dropout rate, free lunch programs which indicate household income, amount of single versus dual parent households or even percentages with regards to race and diversity. All of these factors most definitely play a role in student achievement, but they may also have a secondary effect when combined with class size.

Furthermore, there are countless instructional strategies that exist today which are available to help teachers and instructors with large classrooms. Research in these areas
could offer new insights with grouping, collaborative learning techniques and ways to minimize the large classroom challenges. Suggestions for future research would be to examine some of these other variables and how they might impact small or large class classrooms and student success.

In conclusion, this methodology offered some interesting insights. Most of these insights led to new questions, as research often does. If it was to be repeated in the future, some suggestions would be valuable. The surveys and opinions of the teachers, students and community members all came from one suburban area. Ideally, the survey should include a rural and urban area as well. These opinions would then reflect the greater majority while including more diversity and thus offer a more realistic viewpoint of all three areas involved. By limiting the opinions to only suburban participants, the research is limited by demographics alone.

Additionally, six teachers with two years of statistical data will not reflect substantial conclusions. Ideally, mapping out years of test scores and comparing them to the amount of coded students in a classroom, and class size will clearly offer more authenticity. If this methodology was to be repeated, a larger sample size of teachers would be needed and a larger sample size of data. In addition, it would be valuable to include other disciplines, more diverse age groups of students and the experience of the teacher.

The class size debate is not over. There is adequate reinforcement to both sides of the argument. As our nation grows and the need for higher education continues as a whole, class sizes will be scrutinized with regards to student performance. The final
revelation as to whether small class sizes lead to better student outcome has not been
heard and no one study will produce all the answers. Therefore, it is essential that
research continues to use a variety of methods and perspectives to persist in the endeavor
of conclusive evidence, leading to better teaching methods and higher quality attainment.
References


Appendices

Appendix A

Demographics for high school with high needs in an urban setting

Students per Grade

Enrollment of Ethnic Groups

Household Income Distribution
Appendix B

Demographics for High School in middle to upper-class suburban setting

Students per grade

Enrollment of Students with Special Needs

Enrollment of Ethnic Groups

Household Income Distribution
Appendix C

Demographics for High School in Rural Area

Enrollment of Ethnic Groups

![Enrollment of Ethnic Groups Graph](image1)

Household Income Distribution

![Household Income Distribution Graph](image2)

Enrollment of Students with Special Needs

![Enrollment of Students with Special Needs Graph](image3)
Appendix D

Public School Questionnaire – Teacher Survey

1. What type of high school do you teach in?
   - □ Urban
   - □ Suburban
   - □ Rural

2. What grade level do you teach?
   - □ Elementary
   - □ Middle
   - □ High School

3. How important do you think class size is in relation to student success?
   - □ Extremely Important
   - □ Relatively Important
   - □ Not that important

4. On average, how many students do you have per class?
   - □ Under 15
   - □ 15-20
   - □ 20-25
   - □ 25-30

5. In your opinion, what is the ideal class size?
   - □ Under 15
   - □ 15-20
   - □ 20-25
   - □ 25-30

6. Please list at least two advantages that you feel you might have teaching a smaller class.

7. Please list two advantages you might have teaching a larger class.

8. In your teaching experience, have you seen a correlation between higher student performance and smaller classes?
   - □ Yes
   - □ No
   - □ Unsure
9. If you were told that research indicated that smaller class sizes led to greater student achievement, would you...

☐ Agree with this statement ☐ Disagree with this statement ☐ Feel uncertain about this statement

10. If you were told that research indicated that it is not class size that necessarily leads to increased student achievement, but what goes on in the classroom, would you...

☐ Agree with this statement ☐ Disagree with this statement ☐ Feel uncertain about this statement

11. In your opinion, which of these other factors have an impact on student performance in the classroom?

☐ Student/Teacher Interaction ☐ Socio-economic status ☐ Peer Relationships

☐ Self confidence of the student ☐ Self confidence of the teacher ☐ Classroom management

☐ Learning capability of the student

12. Please rate these other factors in order of importance as to how they affect student achievement in YOUR classroom?

<table>
<thead>
<tr>
<th>Class size</th>
<th>Very Important</th>
<th>Somewhat Important</th>
<th>Slightly Important</th>
<th>Not at all Important</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student/Teacher interaction</td>
<td>Very Important</td>
<td>Somewhat Important</td>
<td>Slightly Important</td>
<td>Not at all Important</td>
</tr>
<tr>
<td>Socio-economic status</td>
<td>Very Important</td>
<td>Somewhat Important</td>
<td>Slightly Important</td>
<td>Not at all Important</td>
</tr>
<tr>
<td>Peer relationships</td>
<td>Very Important</td>
<td>Somewhat Important</td>
<td>Slightly Important</td>
<td>Not at all Important</td>
</tr>
<tr>
<td>Self Confidence of the Student</td>
<td>Very Important</td>
<td>Somewhat Important</td>
<td>Slightly Important</td>
<td>Not at all Important</td>
</tr>
<tr>
<td>Self Confidence of the Teacher</td>
<td>Very Important</td>
<td>Somewhat Important</td>
<td>Slightly Important</td>
<td>Not at all Important</td>
</tr>
<tr>
<td>Learning capability of the student</td>
<td>Very Important</td>
<td>Important</td>
<td>Slightly Important</td>
<td>Not at all Important</td>
</tr>
</tbody>
</table>
Appendix E

Public School Questionnaire – Community Survey

1. Please tell us where you live.
   City/Town __________ State __________

2. How long have you lived in this town?

3. Do you have school age children?

4. Which type of school does your child attend and what grade level?
   Elementary _____ Middle_____ High School _____

5. What is your impression of the public school system in your district?
   Positive _____ Negative_______ Unaffected______

6. If your child/children attend private school(s), or you are considering placing your
   child/children in private school, why have you made this choice?
   Low student/teacher ratio____ More enrichment classes____ Improved academic
   skills____ Other____

7. If the public schools in your district offered these characteristics, would you enroll your
   child/children in the public school system?

8. How important do you think class size is? (Teacher/Student Ratio)
   Very Important_____ Somewhat Important_____ Not that Important____

9. In your opinion, are the class sizes in your child's school district reasonable?

10. Do you feel that the state you live in should mandate smaller class sizes in public
    schools?

11. How important do you think class size is to your child's overall performance?
    Very Important_____ Somewhat Important_____ Not that Important____

12. What is a typical grade that your child achieves?
    A’s and B’s ____ B’s and C’s ____ C’s and D’s ____ D’s and F’s ____

13. Do you feel that your school tax money is put to good use?

14. If you could help improve your child’s school (or the school that resides in your district if
    you do not have children) by paying more school tax, would you consider this?
15. If you knew that an increase in your tax dollars was being spent on reducing class sizes, would you willing pay more school tax?

Appendix F

Ticket Out The Door

Please answer the following questions based on your own opinions.

➤ Are most of your classes in the high school large or small?
_____________________________________________________

➤ Do you prefer a large or a small class?
_____________________________________________________

➤ Please give an explanation to the question above. (why you prefer large or small classes)
________________________________________________________________________________________________
________________________________________________________________________________________________

➤ In your opinion, do you think class size has any effect on your ability to learn in the classroom? Explain
________________________________________________________________________________________________
________________________________________________________________________________________________

➤ Please give 2 advantages to having a large class:

a.________________________________________________________________

b.________________________________________________________________

➤ Please give 2 advantages to having a small class:

a.________________________________________________________________
b.________________________________________________________________________