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ABSTRACT

This action research project reports on the effects of classroom size on the quality of work conditions, academic achievement, and students' behavior. The kindergarten through third grade levels were targeted at three schools, one in a suburban setting and the other two in a growing rural area. For the 1999-2000 school year, the urban school had an average class size of 24.3 for kindergarten, 28 for first grade, and 27.7 for third grade, decreasing to 22, 18, and 25, respectively, for the 2000-2001 school year. For one of the rural schools, corresponding class sizes for 1999-2000 were 22.7, 22.6, and 22.7, increasing to 20, 24, and 30 for 2000-2001. Data were collected using questionnaires given to teachers, administrators, and school board members, and using classroom observations. Results show that teacher workloads became more manageable, and students received more individualized attention with smaller class sizes. Students' behavior and achievement generally improved. When class sizes were large, teacher and student morale declined along with quality of education. Less time was spent on task as stress and behavior problems mounted. Solutions to the class-size problem include using small class sizes (20 or fewer students) during primary years, and building more classrooms or using existing space and hiring more teachers. Appendices contain questionnaires and letters of permission used in the study. (Contains 29 references.) (RT)

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Classroom Size: Does it Make a Difference?

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A Descriptive Research Project Submitted to the Graduate Faculty of the

School of Education in Partial fulfillment of the

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Saint Xavier University & SkyLight Professional Development

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Dedication

We would like to thank our families and friends for all of the support that you gave us and allowing us to take the time to complete this overwhelming task. Also, thank you to all our coworkers who have been supportive, flexible, and encouraging throughout this project. A special thanks to C.M. Achilles for his expertise and generosity in providing us with publications and knowledge for this project. Thank you Barb Mulry for taking us under your wings.

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CHAPTER 1

PROBLEM STATEMENT AND CONTEXT

General Statement of the Problem

Rios stated that "Every educator would argue strongly that large classes have an adverse impact on education, learning, and society" (1998, p.1). Research findings state:

> Besides student test-score gains, small classes in primary grades offer quality results for a range of education issues, such as less retention in grade, safe schools, increased individual attention and time on task, higher graduation rates, more minority students applying to college, and reduced misbehavior. (Achilles, 2000 p. 5)

The question districts should ask is what type of classroom size benefits work conditions, academic achievement, and students' behavior. The targeted kindergarten through third grade levels demonstrated a need for a classroom size of 20 or fewer students. Evidence for the existence of the problem included school board members, administrators, and teacher questionnaires, classroom observations, and teacher interviews.

Immediate Problem Context

For this project three different sites were used. Each setting was described separately as Site A, Site B, and Site C. Site A was different from Sites B and C in that it was a suburb of a large metropolitan area, whereas Sites B and C were located in a growing rural area. Site A had a more diverse community and student population than Sites B and C. All sites were similar in that they were adjusting to an increased student population.

Site A

Site A was a kindergarten through fourth grade school in a suburb of a large metropolitan area. The racial/ethnic background was 43% Caucasian, 41.7% African-American, 9.3% Hispanic, 4.1% Asian/Pacific Islander, and 1.8% Native American. The total student population was 386. The percentage of low-income students was 29.8%. Attendance was 93.5%, and the mobility rate was 9.3%. At this site there were no chronic truants..

The average class size for the school year of 1998-1999 was 24.3 for kindergarten, 28 for first grade, and 27.7 for third grade. The average class size for year 1999-2000 was 22 for kindergarten, 18 for first grade, 22 for second grade, and 25 for third grade. A grant to reduce class size had been requested, received, and used to decrease the number of students in first grade to 18 in the 1999-2000 school year. The grant was used to decrease the number of students in second grade to 18 in the 2000-2001 school year. This acknowledged that the district had explored the class size issue and had found it important enough to implement the government grant available to them to reduce class size.

The total number of staff was 38, which included 1 principal, 1 secretary, 1 building clerk, 1 library clerk, 1 cafeteria employee, 1 playground and lunchroom supervisor, 3 custodians, 17 classroom teachers for grades kindergarten through fourth grade, 1 physical education teacher, 1 art teacher, 1 music teacher, 1 media information specialist and gifted teacher, 3 special education resource teachers, 2 teacher aides, and 2 Title I and Reading Recovery specialists. District employees who visit the site school included 1 computer technician, 1 media specialist, 1 band director, 1 nurse, 1 social worker,1 psychologist, 1 speech/language pathologist, and 1 speech/language therapy assistant. The average teaching experience for classroom teachers in

the district was 15.5 years. The percent of teachers possessing a bachelor's degree was 70.3%, and the percent of teachers possessing a master's degree and above was 29.7%.

Site A was a kindergarten through fourth grade elementary school. The school was a one level brick building that was built in 1963 by the same developer that built the surrounding subdivision. An addition was constructed in 1969. All rooms in the building were utilized for classrooms because of an increased student population in the community. Art and music instructors came to each classroom to teach. Another addition to the building was approved and funded for construction starting the 2000-2001 school year. The current building was designed in an "H" layout. The kindergarten, first, and second grades were on one side of the H, and the third and fourth grades were on the opposite side of the H layout. The gym also served as the cafeteria. At that time, Site A had no air conditioning in the building. All classrooms had one wall of modern windows that easily opened and lit the rooms. The main entrance faced a quiet neighborhood residential street. Traffic during student arrival and pickup was congested. Buses and cars had no off street parking. Improvements to relieve the congested traffic were scheduled to begin the 2000-2001 school year once construction of the addition had begun.

Site A provided the following programs for the students: regular academic classrooms, a special education pullout program, reading recovery, Title I, a reading specialist, a media information specialist, after school tutoring, free or reduced lunch, speech education, a gifted program, a psychologist, a librarian, a nurse, band, and social work services.

All classrooms had one or two computers by the end of September 2000. The computer lab had 26 I-Mac computers. All classes were scheduled for one weekly 40 minute visit to the lab with an additional optional weekly visit of up to 50 minutes. All computers in the lab were

connected to the Internet, and at least one computer in the classroom was connected to the Internet. There were two LCD computer projectors available to the teachers.

The total enrollment of school district Site A was 1,199. The racial/ethnic background of the district student population was 39.2% Caucasian, 49.6% African-American, 7.9% Hispanic, 2.5% Asian/Pacific Islander, and 0.8% Native American. Low-income students for the district were 29.4%, and the mobility rate for the district was 11.9%.

Site A offered two elementary schools for students in grades pre-kindergarten through fourth grade, one middle school for students in fifth grade and sixth grade, and one junior high for students in seventh grade and eighth grade. Only one administrative building was provided for this district. The schools fed into two different high schools. There was an active PTA in the district that raised money for donations to school, scholarships, and various activities and purchases. PTA volunteers arranged various fund-raisers to finance these expenses.

State Standards achievement Test performance scores were a major concern for the administration, school board, teachers, and staff. Any current teaching strategies or educational trends that would increase the Standards achievement performance scores were of interest to this district. Standards achievement test results for the 1998-1999 school year were displayed on the following figure:

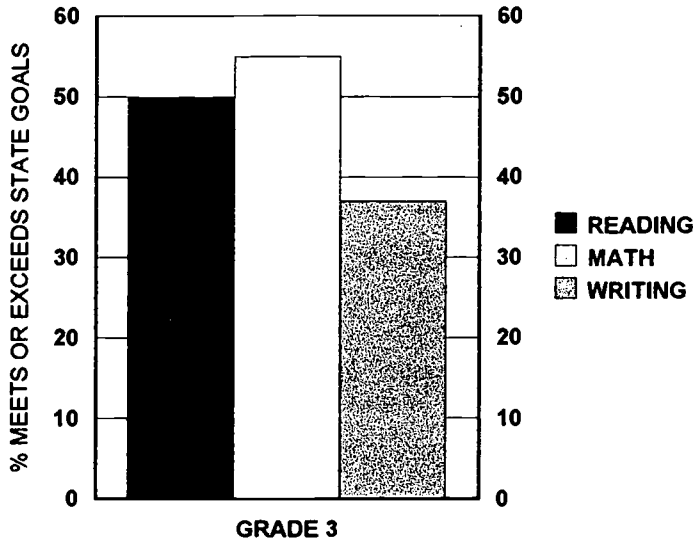

Figure 1. 1998-1999 Standard achievement test performance for Site A showed that 50% of students met or exceeded state goals in reading, 55% of students met or exceeded state goals in math, and 37% or more students exceeded state goals in writing.

Site B

Site B was a kindergarten through third grade school in a rural/urban community. The racial/ethnic background for this site was 97.1% Caucasian, 2.1% Hispanic, and 0.8% African American. The total student population at this school was 518. The Site had 6.9% low income students, 95.3% attendance rate, and 7.4% mobility rate. The chronic number of truants was six.

The Site B average class size for the 1998-1999 school year was 22.7 for kindergarten, 22.6 for first grade, and 22.7 for third grade. For the 1999-2000 school year, the average class size was 20 for kindergarten, 24 for first grade, 25 for second grade, and 30 for third grade. The school had at least five classes for each grade level.

The total number of staff members in Site B was 24, which included 1 principal, 1 secretary, 11 classroom teachers, 1 music teacher, 1 physical education teacher, 1 art teacher, 1 nurse, 1

psychologist, 1 social worker, 1 librarian, 1 Title I teacher, and 3 custodians. In this school district, the average teaching experience was 13 years. The percent of teachers possessing a bachelor's degree was 66.3%, and the percent of teachers possessing a master's degree and above was 33.8%.

Site B was built in 1926, and had a flat brick exterior. This site was the oldest building in the district. The building had no air-conditioning. During the summer of 2000, the site was carpeted to cover the older asbestos tile. At one time the building was a high school; however, it later was changed to a primary school. In 1963, there was an addition of another hallway built. All the classrooms in the school building were located on one floor and divided into two wings. Every classroom had at least three student computers and one teacher computer. Destination computers (mobile computers) were available to the teachers to be wheeled to the classrooms. Each classroom had a telephone.

Site B offered the following programs for its student population: a special education pull-out program, reading resources, social work services, a psychologist, a gifted program, speech/language services, and free or reduced lunch and milk. A teacher's aide was offered to the teachers when all classes of a specific grade level reached 25 students. During each school year, there was a volunteer tutoring program after school that provided students with extra instructional support. With the growth of community members that moved to the Site B town, Site C was approved to accommodate the increased number of students.

The local school district consisted of one administration office, one primary building, one elementary building, one middle school building, one high school building, and one alternate school for students from different areas. Total district enrollment of students was 1,500. All students fed into one high school. The district racial mix was 98.1% Caucasian, 1.3% Hispanic,

0.3% African-American, 0.2% Asian/Pacific Islander, and 0.1% Native American. The average income for families was $44,097 according to the figures from the 1990 census. Low-income students for the district were 7.5%, and the mobility rate for the district was 11.6%.

State Standards achievement test performance scores were a major concern for the administration, school board, teachers, and staff. Standards achievement test results for the 1998-1999 school year were as follows:

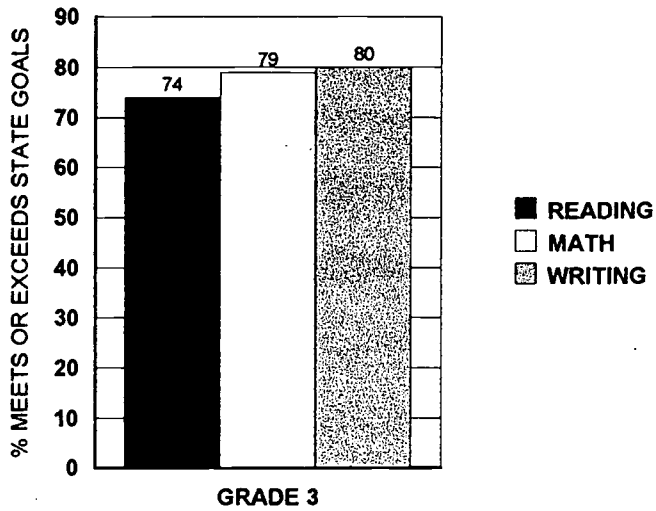

Figure 2 1998-1999 Standard achievement test performance scores showed that 74% of students met or exceeded state goals in reading, 79% or students met or exceeded state goals in math, and 80% of students met or exceeded state goals in writing.

Site C

Site C was a second grade through fifth grade school in a rural/urban community. Since Site C was a new building that opened the 2000-2001 school year, there was no 1998-1999 or 1999-2000 class size information and no 1998-1999 or 1999-2000 test score information. In Site C, the total number of staff members was 43, which includes 24 teachers, 2 secretaries, 1 principal, 1 assistant principal, 1 art teacher, 1 nurse, 1 music teacher, 1 speech teacher, 3

physical education teachers, 1 librarian, 1 social worker, 1 gifted, 1 LD resource teacher, 1 aide, 1 psychologist, 1 Title 1 teacher, and 3 custodians. Many staff members were shared between Sites B and C.

Site C offered the following programs for their student population: a special education pull-out program, reading resources, social work services, a psychologist, a gifted program, speech/language services, and free or reduced lunch and milk. A teacher's aide was offered to the teachers when all classes of a specific grade level reached 25 students. During each school year, there was a volunteer tutoring program after school for students to help them with extra instruction. Every classroom in this school was on one floor. The grade levels were divided up into four wings. All rooms were carpeted, air-conditioned, had telephones, and contained at least three computers per classroom. Computers had destination hookups. The fourth and fifth grade wing had a team conference area. This site was built to accommodate the growing population of this rural/urban community.

The local school district consisted of one administration office, one primary building, one elementary building, one middle school building, one high school building, and one alternate school for students from different areas. Total district enrollment of students was 1,500. All students fed into one high school. The district racial mix was 98.1% Caucasian, 1.3% Hispanic, 0.3% African-American, 0.2% Asian/Pacific Islander, and 0.1% Native American. The average income for families was $44,097 according to the figures from the 1990 census. Low-income students for the district were 7.5%, and the mobility rate for the district was 11.6%.

The Surrounding Community

Site A

According to a large metropolitan newspaper, the price of housing in Site A varied within the range of $90,000 to $150,000. Five sections comprise the community. The original homes in the community were built in the 1920s and 1930s. The section where the site school was located was annexed in 1961. Homes near the site school were brick split-levels, tri-levels, ranches, and condominiums. Other sections in the community were built and annexed in 1961, 1962, and 1968. The median home value was $97,500 and the median income was $77,829. There were 147 homes sold in 1999. The total population of the community was 8,979. Census information on the racial and ethnic background of the community was from 1990. The figures had changed greatly within the last ten years.

This community was originally settled in 1846. It was a typical small town of that time, with a blacksmith shop, wagon shop, post office, general store, and saloon. The town grew as the railroad grew. It also has a possible history as a fugitive slave underground railroad site.

There were several churches, a library, a new municipal building, a senior's center, a movie theater, two strip malls, and a community owned golf facility. It was nestled between forest preserves rich with wildlife. Community clubs included a Jr. Woman's Club, Boy and Girl Scouts, Lion's Club, Rotary Club, and a Historical Society. A growth in the population of the community caused several expansions in the school system. The planned addition to the Site A school would enable the district to accommodate the growing population.

Site B and Site C

At Sites B and C, which were in the same community, housing consisted of historic homes from the late 1880s and the early 1900s. There were also new larger homes, rental apartments,

townhouses, condominiums, and manufactured homes for adult living. The average rental price for a two bedroom apartment was between $475 and $600. The median value of a new home was $160,000 while the median value of an existing home was $150,000.

This town once was a small rural agricultural community, but this town started to grow and was the new place to live. The town had attracted new industry and was planning for growth in every way possible. Church life was very important to this town. There were 10 churches that served the spiritual needs of this community. Even though this community was growing, it still held the small town values such as neighborhood clubs. It offered a golf club, sportsmen's club, community center, Boy and Girl Scouts, Lions Club, Rotary Club, Woman's Club, Historical Society, Interfaith Organization, Homemakers Extension Association, community food pantry, American Legion, and a lake in the community.

At Site B and C there were many school/community issues. Since this was a growing town, the school system needed more room to hold all the students. The new school that was currently built to hold the second grade through fifth grade would hopefully solve the issue of the growing population in the town. This district also was trying to obtain and use as much technology as possible. The district allowed the teachers to take technology classes after school during different parts of the school year. They also offered technology classes for community members to take.

National Context of the Problem

As teachers, one wants to give students a fulfilling educational experience. Teachers want to be able to help, understand, and become an influential part of students' lives. Students need positive role models and need more individualized attention that is not always received in the home environment. Therefore it would be expected for young children to have immature

behaviors in the early years, which means the teacher is required to be a surrogate mother, counselor, or arbitrator along with the role of teacher (State Board, 1985). Many classrooms now are overcrowded and teachers are not able to give their students all the individualized attention that students need. Many schools are overcrowded and are already using every space that is possible. Achilles and Price said that young children need more space per person than adults because children often sprawl out (1999). According to Rios (1998), "I can state with full confidence that large class sizes have, are, and continue to wreck many positive advances in education and learning" (p.1).

As one can see from Rios (1998), large classroom sizes may not benefit students or teachers. Many factors affect education and learning. The four major factors that pose a concern with large classroom sizes include no knowledge of the problem, no knowledge of child development, lack of money, and not enough space because of population growth. Schools are faced with two major issues that involve the improvement of student achievement and how to use current education funds wisely (Achilles & Price, 1999). Large classes have a major impact on education, learning, and society (Rios, 1998).

Based on research, observation, and interviews, there seems to be an ongoing issue with how classroom size affects the learning and instruction of the students. The question districts should ask is what type of classroom size benefits work conditions, academic achievement, and students' behavior. Every school should commit to providing students with the best possible learning environment. Schools should use their best efforts to find the answer to what type of classroom size would benefit the learning and instruction of their students.

CHAPTER 2

PROBLEM DOCUMENTATION

Problem Evidence

To document the problem of the effect of class-size on work conditions, academic achievement, and students' behavior, as well as teaching and learning, the researchers used three types of data collection tools that included questionnaires to teachers, administrators, and board members and observations in small and large class-sizes. A total of 37 questionnaires were given to all kindergarten through third grade teachers in Sites A, B, and C. Fourteen questionnaires were given to teachers at Site A, 11 questionnaires were given to teachers at Site B, and 12 questionnaires were given to teachers at Site C.

A different questionnaire, was given to a total of seven administrators that included two from Site A and five from Sites B and C. The same questionnaire that was given to administrators was given to all 14 school board members. These included seven board members from Site A and seven board members from Sites B and C. A total of 12 classroom observations were made in all Sites, which included four from Site A, four from Site B, and four from Site C. For the purpose of this paper, class-size is defined as "the number of youngsters who regularly appear in a teacher's classroom and for whom that teacher is primarily responsible and accountable" (Achilles, 1999, p. 14).

The questionnaire for teachers documented their classroom experiences and found a common trend in work conditions, academic achievement, and students' behavior, as well as

teaching and learning. The questionnaires were distributed in the mailboxes of the teachers on a Monday asking them to return them by way of mailbox the following Friday. The teacher-researchers received 31 responses out of 37 distributed. The following figure indicates findings from the responses:

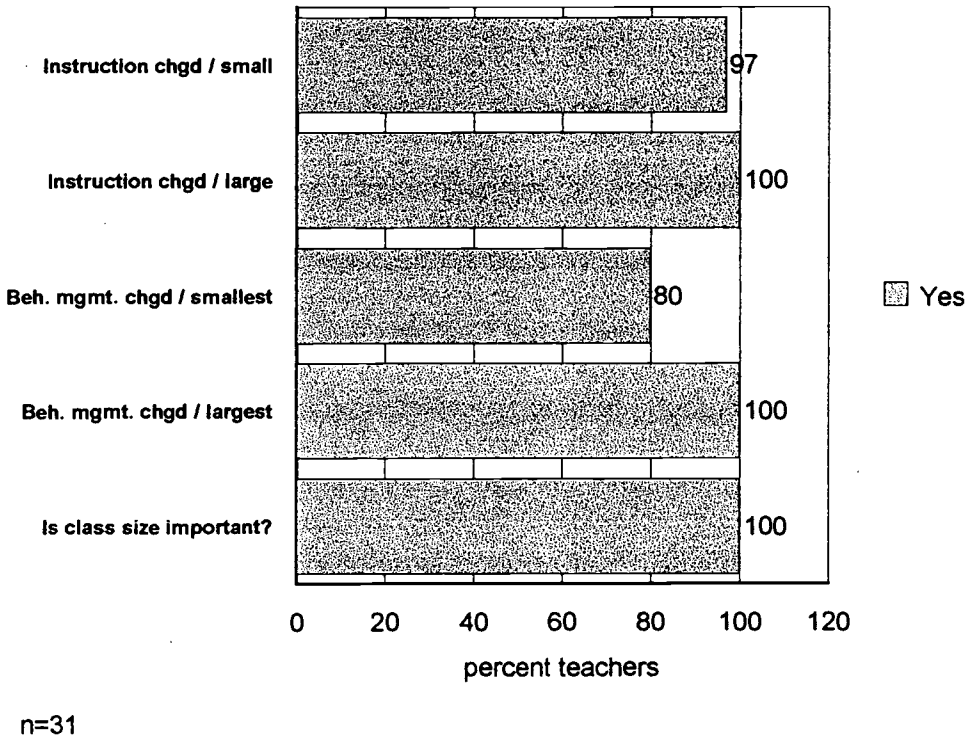

Figure 3. Teacher responses to questionnaires.

The questionnaires were returned by a total of 31 teachers. Out of the 31 teachers, 9 taught kindergarten, 7 taught first grade, 8 taught second grade, and 8 taught third grade. The average teaching experience for kindergarten teachers was 12.9 years, for first grade teachers was 11.8 years, for second grade teachers was 9 years, and for third grade teachers was 14.9 years.

The teachers stated on the questionnaires their lowest class-size for their current grade level. Among nine kindergarten teachers, classroom sizes ranged from 17 to 19. Among seven first grade teachers, classroom sizes ranged from 19 to 24. Among eight second grade teachers, classroom sizes ranged from 14 to 26. Among seven third grade teachers, classroom sizes ranged from 19 to 24. The teachers also stated their highest class-size for their current grade level. In kindergarten, the highest class-size was 32 students, in first grade the highest class-size was 32 students, in second grade the highest class-size was 28 students, and in third grade the highest class-size was 32 students.

An overwhelming majority of teachers felt that instruction changed when class-size was lowest and student academic achievement increased. One teacher replied, "It is definitely easier to feel you are making a difference when you have less students. You can spend more time tutoring the lower individuals." Other responses included that in a small class-size there was more hands-on activities, more cooperative learning, more individual help, more small group work, more opportunity to get to know students and their individual learning styles, and less expensive for the teacher to purchase materials. Teachers responded that students used more manipulatives, students were more relaxed, students spent more time on task, and students were more excited with the activities that took place.

All teachers agreed that teaching instruction changed when class-size was highest and student academic achievement decreased. A strong response from a teacher was:

> I feel when a class size is large, the whole class suffers. Some kids never get the concentrated help they need, while the higher students suffer because the teacher cannot spend time challenging them with extra activities. Therefore, the teacher suffers also because they feel they aren't meeting everyone's needs totally.

Teachers responded that in a large class-size there was less individualized attention, less hands-on and cooperative learning activities, less room in the class, and more stress, frustration and noise in the classroom. Teachers responded that it was difficult to find time for the extras in curriculum, difficult to write comments on graded papers, difficult to have a structured classroom, and had to have broader teaching goals in mind.

All kindergarten teachers felt that behavior problems increased with a large class-size. The majority of first, second, and third grade teachers said their behavior problems increased. One teacher said, "ABSOLUTELY! The noise level alone is amplified with more children. Although I used the same behavior plan, I felt that undesirable behavior breeds an audience." Other responses for behavior problems when teachers had a large class included that there were more people to manage, there was a more structured environment, more principal support was needed, and there were more creative incentives and consequences for students. Another teacher stated, "Noise levels and activity levels increase with numbers. They must talk louder and louder to be heard over others. They begin to bounce off of each other like heated molecules..." Teachers responded that a large class-size meant less personal space per child, students used more aggression, and students sought attention any way they could get it.

All kindergarten teachers felt their behavior problems decreased with a small class-size. The majority of first grade, second grade, and third grade teachers said their behavior problems decreased with the size of the class. One teacher commented, "There is definitely more order and control with classroom behavior when classes are smaller. You are better able to meet the students' needs." Other responses for behavior problems when teachers had a smaller class included that there were fewer behavior problems, behavior problems were more manageable and effective, teachers had more patience with students, and there was more freedom for

students and teachers. Teachers responded that students could be treated as individuals, students were more relaxed, and students reached classroom behavior incentives.

All of the respondents replied that class-size is an important issue to them. Those responses included that teachers were more able to meet the needs of all ability level students, teachers are more likely to have enough manipulatives, more time on task, a more peaceful environment, and more in control and effective as a teacher. The respondents replied that students would take risks in smaller groups, students build their trust and self-esteem, students are more cooperative, and students were more engaged in hands-on creative projects. The responses support the statement that a small classroom size benefits working conditions, academic achievement, and behavior of the students, as well as teaching and learning.

The responses to the questionnaires revealed that there is a definite trend in all categories towards the need for a small class size in kindergarten through third grades. The questionnaires revealed that the overwhelming majority of the teachers felt that the smaller the class size the greater the benefits for both teachers and students. The teacher questionnaires were very effective in documenting the need for smaller class sizes in kindergarten through third grade.

In addition to teacher questionnaires, administrators and school board members were given questionnaires containing seven questions. The questions were given to document the feelings of the administration and board members towards class-size and any trends that might be found among the responses. The questionnaires were distributed to personnel at the administration office and responses were either sent to the school site or mailed to the researcher. Ten responses were received out of 21. The responses are listed in the following table:

Table 1

Categorical Responses of Questionnaires from Administrators and School Board Members

Do you feel the size of the class has an effect on student behavior?	100% yes	0% no	0% yes/no
Do you feel the size of the class has an effect on teacher-student interaction?	100% yes	0% no	0% yes/no
Do you feel the size of the class has an effect on student achievement?	70% yes	0% no	30% yes/no (explained below)
Have you ever implemented any programs to reduce class-size?	100% yes	0% no	0% yes/no
Do you feel that it is important to spend the money on class-size reduction?	20% yes	0% no	80% yes/no (explained below)
Do you feel there is enough space in you district to accommodate the growing community?	20% yes	20% no	60% yes/no (explained below)

n=10

The data indicate that all of the respondents feel that class-size affects student behavior and student teacher interaction. Administrators and board members responded that more students in a room makes students feel others are intruding on their personal space, which makes them react in a negative way. Other comments included that larger groups of students tend to lead to more disruptions, less time for class instruction, and teachers have better morale with smaller class sizes.

Seventy percent of the respondents felt that class-size has an effect on student achievement. Administrators and board members stated that teachers who spend more time with students individually will have a positive effect on student achievement because more one-on-one gives the teachers better chance to increase areas of concern. One board member said, "Everyone knows the better student to teacher number will create better learning in almost all instance."

The remaining 30% of responses did not completely fit into either yes or no categories. One response included that class-size continues to be dependent on the quality of the teacher, however borderline students may be hampered, but good students can learn in a large populated class. Another comment included that research does not support smaller class-size and higher student achievement, but classes over 30 can have an effect.

All respondents have implemented programs to reduce class-size. Responses included that all Sites applied and received class reduction grants, Site A used the media center for part of the day to reduce the class-size, all Sites hired more teachers, Site B and C built new schools, and Site A added an extra class in grades kindergarten through second grade.

Twenty percent of the respondents felt that it is important to spend money on class-size reduction due to student behavior, student-teacher interaction, and student achievement. The remaining 80% felt that it is important to spend the money on class-size reduction, but money is not always available. A board member said, "Due to tax caps there is only so much money and property taxes are too high now." Another thoughtful response was, "A district must endeavor to identify the affordable class-size that maximizes student achievement." Comments included that money must be awarded judiciously keeping aware of all factors that are important to

student education, and that money may be spent on other considerations as well. A board member stated, "If the state sends money, I will agree to reduce class-size."

Twenty percent of the administrators and board members felt that there was enough space in their district to accommodate the growing community. Twenty percent felt that there was not enough space in their district; while 60% felt that there was not enough space, but plans for future development were in the process.

All of the respondents gave different numbers for the ideal class-size in grades kindergarten through third grade. The responses varied greatly. In kindergarten through third grade, 10% responded that the ideal size class was 20-22 students per class, 10% responded that the ideal size class was 20 students per class, 10% responded that the ideal size class was 18-22 students per class, 10% responded that the ideal size class was 18-20 students per class, 10% responded that the ideal size class was 15-21 students per class, 10% responded that the ideal size class was 15-18 students per class and 10% responded that the ideal size class was 14-18 students per class. Some respondents gave grade level classroom sizes. In kindergarten 10% responded that the ideal size class was 22-25 students per class, 10% responded that the ideal size class was 20 students per class, and 10% responded that the ideal size class was 15 students per class. In first through third grade, 10% responded that the ideal size class was 25 students per class, 10% responded that the ideal size class was 20 students per class, and 10% responded that the ideal size class was 17-20 students per class.

Reasons for their numbers included that students come in so many levels that it takes a while to sort out a curriculum to fit their needs. One administrator said, "It gives each child and the teacher time to feel good about themselves and students that feel good about themselves and

have a good self-concept do well in school both socially and achievement wise." Another comment included that this size is affordable and gives acceptable teacher-student interaction. The responses indicated that class-size has an impact on academic achievement, behavior of the students, and teaching and learning, but other factors such as teacher quality, priorities, and available money must be taken into consideration.

In order to document the extent of the problem of the need for a classroom size of 20 or fewer students in grades kindergarten through third grade and the effect on work conditions, academic achievement, and students' behavior, as well as teaching and learning, observation checklists were used. The choice for classroom observations were made by each researcher picking two classes of 20 or fewer students, and two classes of 21 and more students at each site. At Site A, one pick for small class-size was made because they were receiving a small class-size grant. The number of students for the observation was 15. The researcher at Site A had a varying class-size. This allowed for both small and large class-size observations. The researcher's class-size at Site B did not vary. It was used for two small class-size observations along with two observations in a different class with over 20 students. The researcher at Site C also had a varying number of students. This allowed for both small and large class-size observations along with one observation in another small class and one observation in another large class.

The checklist indicated that at least one student in each large class was not on task. Comments on checklists included students were tying shoes, playing in desk, not following along, talking to a neighbor, and the teacher had to constantly remind students to pay attention. The type of instruction was different in the small and large classes. More teachers used hands-on and cooperative learning in small classes as compared to large classes. More teachers

used cooperative learning for large class-size. Also, the observations showed less behavior problems in small classes.

The percentage of students that appeared to be comprehending the lesson was greatest in the smaller classes as opposed to the large classes. Comments from on all large and some small classes indicated that the teachers gave individualized attention when students needed extra help. Comments from researchers on the observations for small classes included all students were participating in the discussion and none of the students seemed confused. The following figure shows these differences between small and large class sizes:

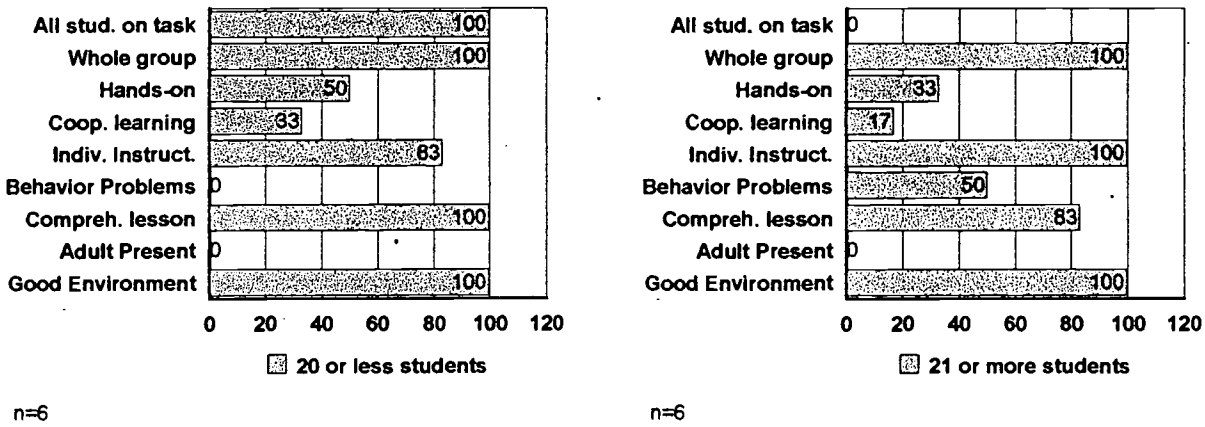

Figure 4. Observation checklists recording differences in large and small classes in kindergarten through third grade.

The panel on the left indicates the results of six classroom observations with 20 or less students, and the panel on the right indicates the results of six classroom observations with 21 or more students. The most significant differences in large and small classes were the number of students on task, and behavior problems. All students were on task in the 20 or less class, while

at least one student in each 21 or more class was observed to be off task There were no children showing inappropriate behavior in the 20 or less class, whereas half of the classes that had 21 or more students had at least one child showing inappropriate behavior. A comparison of both panels indicates that a class of 20 or less students benefits teachers, students, and learning.

Information from two state report cards at each site were taken to make a comparison of the test scores of third graders when the class-size showed a difference of approximately five students. This was public information that was distributed to parents of the students in the fall following the school year of the test date. It was gathered at the site school or the district office. Percentages are only from Site B because Site C was not operating until the 2000-2001 school year.

State standard achievement testing was performed on 90% or more third grade students at all site schools. State achievement testing was mandated by the Better Schools Accountability Law (Section 10-17a) of the School Code that required all public school districts to report on the performance of their schools and students through school report cards. Tests were given to the third grade students in the subject areas of reading, writing, and math.

The following table compares the test results from two different years at both Sites A and B. Results were found to show two different class-sizes at both sites; one year is smaller than the other.

Table 2

State Report Card Data from Site Schools Reporting Third Grade Students that Meet or Exceed State Standards.

	Site A 1995	Site A 1999	Site B 1999	Site B 2000
Class-size	23	27.7	22.7	29.4
Reading	80%	49%	74%	81%
Writing	98%	36%	80%	60%
Math	98%	54%	79%	89%

Site A n=45 1995 Site B n=139 1999
n=81 1999 n=146 2000

Note. Site B was a kindergarten though third grade building at the time of these test results. It changed to a kindergarten through first grade building in the 2000-2001 school year. Site C is not listed in the table because it was not open at the time of testing. It opened in the 2000-2001 school year as a second through fifth grade school.

This table shows that there is a considerable difference in the percentage of students meeting and exceeding the state standards when the class-size was smaller at Site A. There is a difference of 4.7 students in the class-size. Reading scores are 31% higher, writing was 62% higher, and math scores were 44% higher in the small class of 1995. This does not take into consideration students moving into and out of the district. There were 36 more students enrolled in the third grade 1999 school year than in the 1995 school year.

At Site B, there were 6.7 more students the 1999-2000 school year. Writing scores decreased 20% when the class-size was larger at Site B, there was an improvement of 7% in reading test scores, and 10% in math scores. Testing was given between the second and third terms of the school year.

The number of students increased in both school sites from the first to second test date. Both schools also show a larger number of students enrolled at the time of the second test date. Data does not take into consideration staff development programs or any other variables that may affect student achievement, but it does provides evidence that there is a relationship and existence of a problem between student achievement and class-size.

Probable Causes

The population growth of a typical community causes the student enrollment in classes to grow larger if additional teachers and classrooms are not added to the school building. The need for additional teachers and classrooms must be evident before teachers and classrooms are added to the school building. Administrators need the reassurance to know that adding more teachers and classrooms would be a good decision (Wang, 2000). Some districts may not realize how important it would be to add more teachers and classrooms, therefore, there is a need for more knowledge of how students would benefit from a smaller class-size. Schools generally are faced with two major issues: how to improve student achievement, and how to use education funding more wisely (Achilles & Price, 1999).

The main problem when class-size is computed could be that the staff count may not be figured correctly. Pupil-to-teacher ratio (PTR) data is often misinterpreted as the class-size (Achilles, 1998). The pupil-to-teacher ratio is the number of professionals in the school building divided by the number of adults in the building. PTR information would then be used to document how a lower class-size makes no effect on the learning. While researching the difference in reporting class-size data and the pupil-to-teacher ratio, Achilles found a 10 student difference between PTR and class-size. Using his research differential number of 10, if the PTR of a school is 17, the class-size is 27. If the PTR of a school is 15, the class-size is 25. This is a

significant difference in the number of students in a classroom. Chapter Three expands on this problem.

There may be many possible reasons why teachers and classrooms may not be added as the population of a community grows. Community members and administrators in school districts may not realize that class-size does make a difference in teaching and learning and class-size should be considered. The main comment that was addressed by teachers in the questionnaires is that in smaller class-sizes the students are usually better behaved and the students score higher academically. Egelson had the chance to watch a video tape of four first grade classrooms, which all had small class-sizes as cited in Achilles (1999). He noticed that students were rarely distracted and could concentrate on the teacher's lesson. The teacher never had to remind a student to pay attention, to stop bothering another student, or to stop an off-task behavior. This shows that children do benefit with small class-sizes because the teacher has the opportunity to spend more time to focus on academics rather than disruptive behavior.

Primary-aged children have not yet learned the common experiences in school activities and procedures that older children have learned (Illinois State Board of Education, 1985). Usually younger children who are still getting used to the school environment need the closeness of someone and need the individual time or instruction. These younger students need the immediate attention they always received in their home prior to entering school. The younger children need to be taught that they can not always get the attention and extra help that they want right away. The ability to work independently is acquired through learning reading and writing skills and through increased social and emotional maturity (Illinois State Board of Education, 1985).

Research has shown that students in small classes received higher scores in all their subjects and of achievement tests (Boyd-Zaharias & Pate-Bain, 2000). This may mean that the smaller classroom sizes in younger grades make a difference and students learn how to work independently. Students also exceeded in later grades after attending small classes in grades kindergarten through third grade.

Many districts do not have the money to have smaller classrooms sizes. Of course, implementing smaller classroom size would mean a greater expense. School districts need to hire more teachers and find more classroom space. School districts need to find a way to sell the program to the community. As cited in Hymon (1997), Herra said "You try to get the word out in relationship to the need, but it's hard for people to realize how great the need is" (p. 4). From the questionnaires that were passed out to administrators at Site A, B, and C schools, money and space are a main concern.

If school districts do not save money for this program, the expenses of large class-sizes will outweigh the cost of a lower class-size. Benefits of small class-size are discussed in detail in chapter 3. There are many expenses in a school district. A great amount of money is spent on technology, incentives, staff development and special projects. Achilles and Price (1999) feel that this money is basically spent on intuition, with little knowledge of how it will benefit student achievement. A group critical of technology in the classroom said, "Billions of dollars are spent on school computers and Internet connections deliver little long-term benefit and could be better spent on more teachers and other improvements" ("Group Wants Less Spending," 2000). Almon, former kindergarten teacher and head of the US branch of Alliance for Childhood said, "If we were spending so much money on other aspects of education with so little evidence of gain, we'd be ashamed of ourselves" ("Group Wants Less Spending," 2000). Rios

(1998) stated, "It is unconscionable and unfathomable how politicians and many citizens foolishly prefer to spend valuable resources on building, for example, a new sports stadium instead of investing in the future of our children" (p.2). If everyone had goals to use budgets wisely and improve student performance, the education of students may change greatly (Achilles & Price, 1999).

buildings. Basically, school districts need to think creatively when thinking of a place to find space.

When the California schools began implementing the classroom size reduction program, some districts looked for extra space in their schools. A school converted the cafeteria/auditorium into a classroom (Hymon, 1997). Four classrooms were added to the school by putting partitions up to divide the cafeteria/auditorium. A different school converted their teacher' lounges, auditoriums, libraries and common areas into classrooms (Hymon,1997). Creative thinking gives more options to school districts when money is not available to reduce the class-size.

Benefits of Class-Size Reduction

The main reason to have smaller classroom sizes is the long-term benefits to children. In small size classrooms, teachers can spend more time on basic skills, teachers can provide feedback to students, teachers can pinpoint students who need extra help, teachers can teach at a faster pace, and teachers can adapt their teaching strategies to their individual students (Hopkins, 1998). This means that fewer students are held back and fewer children are referred for special education, in result, school systems save money (Hopkins, 1998). Small classroom sizes also mean positive behavior, discipline, citizenship, and development. These nonacademic outcomes may have short and long term effects on school money. This means that fewer students are held back and fewer children are referred for special education, so school systems save money (Hopkins, 1998). As Barbara Nye said, "Is it worth it to spend $1,500 extra for a child not to fail, rather than spend $10,000 for a child to repeat a grade?" (as cited in Hopkins, 1995, p. 7). A national survey released in 1997 by the Educational Testing Service showed that spending money on small classes instead of spending the money on administration, school buildings or

hiring teachers with advanced degrees has greater achievement on math (Hopkins, 1998). Since lowering class-size in grades kindergarten through third grade would provide benefits, maybe increasing secondary class-size to reduce kindergarten through third grades would be a good trade off (Achilles & Price, 1999).

When teachers are experiencing stress from all their daily tasks, this stress makes it hard for them to get through the day. Teachers may feel they need a break from their busy day. This means school districts have to spend money on substitute teachers. If the additional stress is eliminated, they will not need a day off.

Achilles devised Table 4 that suggests some cost saving items that can be used to help with reducing class-size (Achilles & Price, 1999).

Table 4

Potential Checkpoints in Analyzing True Costs of Developing Reasonable-Sized (e.g., 18 or so) Classes in Primary Grades.

Item	Checkpoint for Cost Saving
Grade Retention	▪ Decreased number of students held back ▪ Decreased dropout rate later
Improved Student Behavior in School	▪ Decreased vandalism costs ▪ Fewer required corrective actions, such as Saturday school
Remediation	▪ Fewer expensive special projects ▪ Fewer students emphasized for shorter duration
Early ID of Learning Problems	▪ Reduced special education programs in later years ▪ Accurately targeted programs ▪ Possibility of increased costs in K and
Teacher Morale	▪ Increased attendance ▪ Reduced substitute costs
Creative Space Use	▪ Transportation - related costs
Community, Parent Involvement, Volunteers	▪ Small classes attract parents and volunteers ▪ Field trips (etc.) are less congested

Note. Adapted from "Can your district afford smaller classes?" School Business Affairs, 65 (1), p. 10-16, and from Achilles (1999) Let's Put Kids First, finally, Thousand Oaks, CA: Corwin Press, p. 148.

The benefits of small classroom size are clear. With less time on the reinforcement of positive behavior, more time would be spent on academics. Diminishing negative school behaviors in the early grades would benefit upper grades academically. With the detailed planning of staff members needed as a community continues to grow, less money will be spent. As Achilles stated, ":Let's put kids first, finally, by getting class-size correct" (Achilles, 1999, p. 117).

Methods of Assessment Regarding Class-size at Targeted Sites

In order to assess class-size attitudes and differences in small and large class-sizes, the following tools and procedures will be followed:

1. Questionnaires: Researchers will give questionnaires to all K-3 teachers at site schools. The questionnaires would ask background information such as currents class-size, grade taught, and largest and smallest class-size taught. The questionnaire also asks how instruction changes as class-size varies in the classroom. Researchers will also give questionnaires to superintendents, principals, and board members of the school sites to collect opinions and feeling of class-size, and if any programs have ever been implemented to reduce class-size.

2. Test scores: Site schools State Report Card test results will be used to compare the difference of scores depending on class-size.

3. Observation checklists: Researchers will observe two to three classes for 25 minutes each. The total number of classes will be six. Three of the classes will be classes containing 21 or more students, and three of the classes will contain 20 or under students. Researchers will be looking for behavior problems, individual instruction, how instruction is taught, comprehension, and learning environment.

CHAPTER 4

PROJECT RESULTS

Historical Description of the Research

This research project was designed to assess the effect of class-size on work conditions, academic achievement, and students' behavior, as well as teaching and learning. In order to accomplish this purpose, questionnaires were distributed to teachers in early October. Questionnaires were also distributed to the administration and school board members during the months of September and October. By the end of October, most questionnaires were collected. During the months of October and November, the classroom observations took place. Questionnaires and the observation check list are in Appendix E.

Questionnaires were distributed to teachers at the beginning of September. We expected difficulty receiving the responses due to a tremendous amount of teacher responsibility at the beginning of the school year. But the majority of the questionnaires were returned at all sites. When giving the questionnaires to the teachers, we found that most teachers were strongly opinionated about the issue of class-size. Comments from a questionnaire such as the following reflect this: "YES!!! All children deserve and need some one on one instruction during the day. It is very hard to do that with large class sizes!" Teachers were very clear and insightful with their responses. "I feel with a large class some of the students were academically held back or rushed. The environment of a large class is much more stressful, because of the demands of

each child's needs" is the response to the question, "When your class size was largest, did your teaching instruction change at all?" (see Appendix A for the complete teacher questionnaire).

The questionnaires for the administrators and board members were distributed in September and October and received by the end of October. Superintendents at all sites needed to approve the questionnaire that was given to the board members and include it in their monthly board member packet. The approval was given at all of the sites to distribute the board member questionnaires. These packets were given out at the monthly school district board meeting. Responses of these questionnaires were carefully thought-out, and it was evident that much time was given to reply to the questions. Sample answers include the following: "The fewer students, the more one on one time available. Research states that teachers with smaller class sizes have higher morale (and) feel better about themselves as teachers" and "Definitely, a large ratio diminishes the teacher's ability to customize her teaching to the pupils' learning style. Those students who don't connect with the teacher may have wandering minds or they may act out to connect with the teacher on a different level." Responses were either mailed to the researchers, sent to site schools, or picked up by the researchers at the administration office.

The choice for classroom observations was made by each researcher picking two classes of 20 or fewer students in each site and two classes of 21 and more students in each site. In Site A, one small class-size was observed because it was receiving a small class-size grant. The class contained 18 students. Observed classroom teachers were flexible and accommodated the researchers in order to make the observations. All observations were completed by the end of November. The checklist asked seven observable questions. The researcher would check yes or no for each question and write comments to support their choice. For example, a comment for

the question, "Are there many behavior problems?" was "It was loud when the Title I students (were) leaving. (It) interrupted the activity."

The researchers started organizing the data from the questionnaires and observations the end of November in order to document the problem of the effect of class-size on work conditions, academic achievement, and students' behavior, as well as teaching and learning.

Conclusions and Recommendations

Based on what we have observed, we recommend further emphasis on class-size research in the following four categories; prioritize money equitably, creative classroom planning strategies, redesign staffing plans, and community support.

Prioritize Money

Technology is an important factor in education today. Children need to know how to use technology effectively and efficiently in order to succeed in the future. But technology should not take priority over all other educational factors. "Billions of dollars (that) are spent on school computers and Internet connections deliver little long-term benefits and could be better spent on more teachers and other improvements" (Journal, 9-12-00). Achilles and Price (1999) stated that "Such massive expenditures are often based on intuition, with little or no compelling evidence that they will yield any demonstrable gains in student achievement" (p.10). Purchasing technology is a priority, but teachers must be trained to learn how to implement this technology in their classrooms or there will be no benefits to purchasing the technology.

Research does prove that small class-sizes in grades kindergarten through third grade does make a difference in many areas of achievement. School districts need to consider this research in order to spend money in the most equitable way. Discussing the amount of money spent on technology in education, Almon said, "If we were spending so much money on other

aspects of education with so little evidence of gain, we'd be ashamed of ourselves" (Journal, 9-12-00).

Creative Classroom Planning Strategies

Lowering class-size means that more classrooms are necessary. This does not always mean that more money must be spent. Achilles and Price (1999) said, "You should look at space rather than classrooms" (p. 14). School districts should look at vacant space to lease near commercial buildings. Basically, school districts need to think creatively when thinking of a place to find space.

A school can convert the cafeteria/auditorium into a classroom, use the music and art rooms, or use partitions to divide a cafeteria, auditorium, or library. Even though teachers would not like to loose their lounges, the benefits of a lower class size would outweigh the loss of a lounge.

The creative grouping used in the Michigan example can be used in other school districts. They turned their school into a six room, multiage learning community. In the learning community 90 students were assigned in a K-2 grouping, where the students stayed with a group of five teachers, two student teachers, and one paraprofessional aide (How Small Classes Help Teachers Do Their Best, 2000). This made the teacher-student ratio in this learning community 18 to 1. By using the strategy of Learning Communities, schools have the opportunity to keep class sizes small. Teachers stay with the same group for 3 years, which gives them the opportunity to really know their students. Learning communities also allow the students individual instruction time if needed.

If there is enough space, tables, and chairs in the classroom, work stations can be used to divide the students into small groups to work on specific skills. The entire class is divided into

groups of 3-5 and assigned a work station. The teacher provides a self directed activity that allows the students to master the required skill. Creative thinking gives more options to school districts when money is not available to reduce the class-size.

Staff Allocation

The difference between class size and pupil teacher ratio must be considered when school districts develop their staffing plans. The definition of class size as used throughout this paper is "the number of youngsters who regularly appear in a teacher's classroom and for whom that teacher is primarily responsible and accountable" (Achilles, 1999, p. 14). All school districts need to be consistent when planning staff allocations for the following year. Educators who do not have a regular classroom of students for the entire day should not be considered in the PTR figure. School districts can create more space and have a lower class-size when they relocate personnel and classrooms (Achilles and Finn, 1999).

If specialized teachers were given a class with a small number of students for the entire day, other teachers in the building would also have a smaller number of students that would allow both teachers to spend more individualized time with the students. This would open up the specialized areas to regular classrooms. As Achilles & Finn stated, "School districts also need to see if some positions are necessary. For example teacher aides, special subject teachers or media specialists, may not be needed to help increase student achievement" (1999).

The difference can be dramatic, as shown in the PTR chart in a coastal state to aide the principal in planning his school staff every year. The number used to figure the PTR was 38 professionals per student population totaling all positions on the table as opposed to 19 teachers per student population to compute the class-size figure using only the teacher position number.

Community Support

Community support is vital to the allocation of funds that the school district receives. The school plays a major factor when a person considers moving into a community. ISAT scores are published in major and local newspapers so that prospective residents can judge the credibility of the school, and therefore, the community. Real estate advertisements most often mention the school district. Knowing this, much effort must be made to convince the community to allocate funds to reduce the class size. Parents need to become informed of how crucial a role the small class size plays in education and ISAT scores. Many parents do not realize that the PTR can benefit their child's educational experience. Once the parents know and realize the importance of the PTR, schools will have something to sell to the community when a bond is presented to them. Empty nesters need to realize that a better schools benefit them by stabilizing a community and promoting growth within the community.

In his discussion of the amount of money a community spends, Rios states, "It is unconscionable and unfathomable how politicians and many citizens foolishly prefer to spend valuable resources on building, for example, a new sports stadium instead of investing in the future of our children" (p.2). The community also needs to spend money the most equitable way, which includes spending an equal share on education.

These suggestions are recommended in order to help solve the issue of a reduced class-size of 18 or less students in grades kindergarten through third grade. The school district needs to prioritize money equitably, use creative classroom planning strategies, redesign staffing plans, and gain community support. By giving more consideration to each of these strategies, a reduced class size will benefit the students, teachers, administrators, and community.

CHAPTER 3

THE SOLUTION STRATEGY

Literature Review

In order to discuss the strategies for the problem of the need for smaller class sizes in grades kindergarten through third grade, class-size is defined as "the number of youngsters who regularly appear in a teacher's classroom and for whom that teacher is primarily responsible and accountable" (Achilles, 1999, p. 14).

Differences in Pupil-to-Teacher Ratio and Class-Size

One of the problems with finding a solution for the problem is a misinterpretation of information. After reviewing the literature, the need to define class-size stated in the preceding paragraph was evident so that it would not be confused with the pupil-to-teacher ratio (PTR). Achilles (1999) defines the pupil-to-teacher ratio as:

> A derived estimate commonly computed by dividing the number of youngsters at a site, such as a building, by the number of professionals who work at or serve that site. The professionals might include special teachers, administrators, coordinators, food-service and transportation personnel, and maybe even volunteers to make the site's PTR attractive, say 10:1 (p.14).

All professionals in the building are not teachers who have a regular classroom. They include Title I teachers who work with a small group of students who are having difficulty with reading ability. Some other professionals who worked with small targeted groups included

speech pathologists, social workers, psychologists, nurses, office staff, teacher's aides, librarians and computer lab personnel. Art, physical education, and music teachers teach regular classes, but usually only for the mandatory required minutes. This clarification of the term class-size and the difference from PTR is a necessary first step when discussing the issue of class-size.

This difference has been promoted by Achilles, who has been an advocate of small class-size and has been actively involved with several nationally recognized studies, such as Project STAR and Success Starts Small, which are two major studies of class-size and student achievement. In addition, he has published more than 400 articles in the professional literature, including reports in Education Resources Information Centers (ERIC). During his research on class-size, he found that the difference between the PTR and class-size is often more than 10 students per classroom. Using this information, add 10 students to the PTR information reported to find the class-size. For example, if the PTR is 1:17, there are 27 students in each teacher's class. To figure the PTR data, one must take the total number of students in the school building and divide it by the total number of professionals that work in the same building. Addition is necessary to find the class-size, whereas division is the operation necessary to find the PTR (Achilles, 2000).

Achilles and Price (1999) stated that, "Reanalysis of large data sets using complex models and formulas show that changing the PTR does little to improve student outcomes. Carefully designed, controlled, and conducted studies have consistently shown that small classes positively influence both achievement and areas such as behavior, discipline, citizenship, and development" (p.13). Miles (1995) found a PTR of 13.2 in Boston, but the actual class-size as defined in the first paragraph of this chapter was 23.

A concise evaluation of PTR and class-size by Achilles (2000) reflects several major differences. The concept of the pupil to teacher ratio is that the teacher cannot provide the services that all students need and must use a special education professional. The special education professional works with the student in the classroom or pulls the student out of the class to work together for a limited amount of time. There is a loss of time on task for the student being pulled out of the class and the rest of the class while the interruption takes place. Responsibility and accountability for the special needs child also becomes difficult when the classroom teacher is not teaching the child the entire time. The outcome for students using special education professionals are marginal. An example is shown in the "production function" analyses; Title I evaluations by Boozer and Rouse (1995), Borman and d'Agostino (1996) Wong and Meyer (1998).

Whereas the concept of using the class-size data allows a competent teacher to meet the needs of most students with a reasonable case load. The class room teacher is responsible and accountable for the growth and development of academics, behavior, citizenship, and development of students. The teacher may use small focused learning groups.

Major Class-Size Studies

Project STAR is most frequently noted as one of the most important educational investigations to show the positive impact of small class-size. Project STAR was initiated by Pate-Bain in 1985. She taught English and speech classes in grades 7 to 11 for 20 years. She began thinking about how much more she accomplished when the class-size was low. She also noticed that every class contained students who were not prepared for grades 7 to 11. Her belief was that students would be better prepared to meet the requirements of grades 7 to 11 if they were given a better educational foundation in the early school years.

She believed that reducing class-size in the primary years would enable teachers to give the students more individual help in the basic skills of reading, writing, and beginning mathematics. This individual help would benefit the students throughout their school years. Any attempt by Pate-Bain to convince school boards or legislators was met by a response that it could not be proven that class-size makes a difference in learning.

Pate-Bain started researching available information on class-size. She even visited the Prime Time demonstration project in Indiana in 1982. After researching, she found that a teacher with 15 students in the classroom would produce much better learning and be financially feasible. She received a grant in 1984 to study classes with one teacher per 15 students in grades 1 through 3 at one school.

Her study was unable to show a positive impact because student mobility reduced the sample size. She needed a larger sample, so she visited legislators to convince them of her beliefs so that they would fund a study with a larger sample. She was successful, and the legislators agreed to fund a Student/Teacher Achievement Ratio or Project STAR for one year. This study would consider the effects of class-size on students in kindergarten through third grades. The study also sought to answer the question, "What is the effect of small classes on student achievement and development in the early primary grades?" Project STAR was a large-scale, longitudinal education experiment. The study provided a substantial $9 million for classroom teachers, and as of 1998, cost over 14 million dollars.

Pate-Bain, other academics, and members of the Tennessee Department of Education designed the study with nine key factors. One important key point was that every school included in the study had to have at least one of each of the three class types--small (13-17 students), regular (22-26 students), and regular with a full-time teacher aide (22-26 students).

This would allow the study to accommodate the within-school design (Boyd-Zaharias, 1999). The study would follow the children to track their Stanford Achievement Test and Basic Skills First test results throughout their educational years.

Boyd-Zaharias and Pate-Bain presented their primary findings of the kindergarten through third grade study at a class-size symposium on April 28, 2000 to the American Educational Research Association in New Orleans, Louisiana. They found that a small class-size demonstrated consistent positive results. These positive results were shown at kindergarten through third grade, at all school locations (rural, urban, inner city, suburban), and on every achievement measure (criterion referenced and norm referenced tests). They were consistently positive for all subjects that include reading, mathematics, science, social science, language arts and study skills. Students in the small-class exceeded their peers in regular and regular/aide classes (Boyd-Zaharias & Pate-Bain, 2000).

Students in the small STAR class groups consistently outperformed the students in the STAR Project with larger classes. The study involved approximately 11,600 students with at least one year of STAR exposure in kindergarten through third grade (Achilles, 1998). Researchers are still tracking children involved in this study dating from 1985. They were in grade 12 the 1997-1998 school year. Preliminary analysis of Project STAR data by Achilles and Finn (2000) found that at least three years in a small class were necessary for the benefits to be sustained through later grades, and that the benefits of having been in a small class in the primary years generally increase as the students progress through school.

According to Kreger and Whitmore (1999), research on Project STAR found that the greatest gains in test scores were shown by minority students and students on free lunch. The small classes narrowed the gap in educational performance between black and white students.

Mosteller, professor emeritus of mathematical statistics at Harvard University, describes Project STAR as one of the most important educational investigations completed. He also feels that because of the quality, magnitude, and duration of the controlled education experiment, all educators and administrators should become aware of the study and understand its implications. The database for Project STAR is used for studies on participation, retention in grade, achievement gap, test scores, class-size and discipline, and outstanding teacher analysis (Mosteller, 1995).

Project STAR and other class-size studies were able to identify several benefits to a small class-size. Teachers were able to give their students more individual attention and there was improved behavior by the students. There was more space in the classroom and more of the curriculum was covered. An improvement in achievement for all subjects tested and reduced in-grade retention was shown. The morale and stress of the teacher was improved. The teacher could make an early identification and remediation of special needs students. The interpersonal behavior between students was better and more parents were involved with the education of their child (Achilles & Sharp, 1998).

After these initial findings, policy makers and researchers started to ask second generation questions such as, "How much of a difference?" "Does the initial gain last" and "Is the initial gain cumulative?" (Achilles, 1999, p. 7.). Achilles and Finn (2000) reanalyzed the STAR data to find the difference between the average performance of students in small classes and students in larger classes. They used hierarchical linear models to find the data shown on Table 3.

Table 3

Final Small-Class Advantage in Months of Schooling

(Average GE of small classes minus average GE of regular classes)*

DURING PROJECT STAR (Stanford Achievement Test)

Test	Grade Level K	1	2	3
Mathematics	1.6 mos.	2.8 mos.	3.3 mos.	2.8 mos.
Reading	.5 mos.	1.2 mos.	3.9 mos.	4.6 mos.
Word Study Skills	.5 mos.	0.8 mos.	4.7 mos.	5.7 mos.

FOLLOWING YEARS (Comprehensive Tests of Basic Skills)

Test	Grade level 4	6	8
Mathematics	5.9 mos.	8.4 mos.	yr., 1 mo.
Reading	9.1 mos.	9.2 mos.	1 yr., 1 mo.
Science	7.6 mos.	6.7 mos.	yr., 1 mo.

GE=Grade Equivalent (10 months).

*Finn, J,. Gerber, S. B., Achilles, C. M., & Boyd-Zaharias, J. (May 1999). Short and Long term effect of small classes. Paper presented at the Conference on the Economics of School Reform, Israel.

Kreuger and Whitmore from Princeton University tracked Project STAR students who had taken the ACT and SAT college entry tests. They used these data to determine the impact of having attended a smaller class in elementary school on students' long-term educational outcome. They found that students in small classes were more likely to take the college entry

tests and apply for college. Prominent findings of the study from Kreuger & Whitmore (1998) were that:

The beneficial effect of smaller classes on college aspirations appears to be particularly strong for minority students, and students on free or reduced-price lunch. Indeed, attendance in small classes appears to have cut the black-white gap in the probability of taking a college-entrance exam by more than half. (p. 3)

The Health and Education Research Operative Services (HEROS), Inc. has found positive results of small class-size in the areas of student retention, high school graduation rates, student attendance, incarceration, and higher education (Boyd-Zaharias & Pate-Bain, 2000). Data from Project STAR also showed that more students from small classes graduate from high school on schedule and fewer students from small classes drop out of school. Students in small classes are more likely to take advanced classes, honors courses, rank higher within their graduating classes, and receive honors diplomas (Boyd-Zaharias & Pate-Bain, 2000).

Contrary to the findings of Project STAR, Hanushek (2000) who is a professor of economics and political science concludes in his research:

> Existing evidence indicates that achievement for the typical student will be unaffected by instituting the types of class-size reductions that have been recently proposed or undertaken. The most noticeable feature of policies to reduce overall class sizes will be a dramatic increase in the costs of schooling, an increase unaccompanied by achievement gains. (p.1)

Hanushek stated that although there has been extensive experience with class-size reduction, class-size reduction does not work. Because a few studies are used to support class-size reductions, they do not support a need for the nation to spend money on schools in a

haphazard and ineffective manner. Other main points that Hanushek made were that the pupil-teacher ratio and student performance have no relationship based on international experience and that there is no relationship between class-size and student performance based on extensive econometric investigation. A definition for the use of the terms pupil-teacher ratio and class-size for these statements was not evident.

Hanushek believes that Project STAR does not support overall reductions in class-size except perhaps in kindergarten. Further beliefs are that the quality of the teacher is much more important than class-size and that there are far superior approaches are available to increase student performance. Among suggestions for more approaches to class-size reduction spending, he suggested mandating more extensive random-assignment trials and evaluations of the low class-size, and developing a series of experiments that investigates alternatives such as merit pay and private contracting.

A Wisconsin study on class assignment and teaching assignments (WEAC) examined teacher load and workload, the teacher workday allocation, the special needs students impact on classroom instruction, and the effect of classroom conditions on teacher morale and stress. Allen and Helming (1991) found that almost one third of Wisconsin teachers had given much thought to changing teaching jobs, leaving teaching, or both. Contributing to high stress levels and high levels of job dissatisfaction among teachers was large class-size. He pointed out how the WEAC research offers new insights into the complex teacher workload. The study also gave suggestions how student achievement may be enhanced (Kickbush, 1996).

The NEA summarized the major class-size research reports. This summary finds many advantages to reduced class-size. These advantages include that economically disadvantaged students will achieve higher in a smaller class-size. This finding parallels Kreger and

Whitmore's (1999) findings mentioned earlier. The NEA found that smaller classes benefit students with lower academic ability. Also, it is possible that class-size affects the attitudes of students more than it affects achievement. Parallel to the findings of Achilles and Sharp, (1998) large class sizes lowers the morale and increases the stress of teachers. Further NEA analysis finds that the reduction of class-size must be under 30 in order to see gains (CLASS-SIZE, 1986).

Class-Size, Policy, & Legislation

A strategy to reduce class-size is to present information on child development to policy-making populations. Studies have found that younger children benefit with reduced class-size. According to Illinois State Board of Education (1985), young children need "...social interaction with small groups of children in order to help foster cognitive development and correct egocentric views of young children" (p.3). Child development theories show that preschool and elementary curriculums need to provide children with the opportunities to interact with peers in small groups and in many different situations and activities (Illinois State Board of Education, 1985).

However, children no longer respond to a traditional approach to teaching. Schools need to take more "...student-centered approach with small groups and individual projects produces students with better critical thinking skills" (Baron, 1999, p. 2). School organizations and concerned individuals need to get together and campaign for smaller class sizes. School unions need to demand that class sizes are smaller. School boards need to realize how important class-size is to teachers. In order for the school board to realize how teachers feel, teachers need to demand and express their feelings on class-size. Schools could host visitations for legislators and school board members to observe class-size reduction models. Meetings can be held to

inform parents, community leaders, and policy makers the benefits of reduced class sizes in kindergarten through third grade. (How Small Classes Help Teachers Do Their Best, 2000).

Although many policy makers agree that a small class-size is beneficial to students, some believe that the quality of the teacher is more important. One critic said, "I would rather have my child in a classroom with 35 children and an excellent teacher than in a classroom with only 20 children and a teacher who was below par" (Policy Report on Class-size, 2000).

Do school districts have the money to begin small classroom sizes in grades kindergarten through third grade? Achilles and Price (1999) believe that school districts should be asking "Can we afford not to implement smaller classroom sizes?" (p.13). There are several solutions to help school districts that lack money for this problem.

On January 27, 1998, President Clinton's State of the Union Address proposed to the United States the first ever national effort to reduce class-size in the early grades. The plan he proposed was a "...balanced budget to help hire 100,000 new teachers" (State of the Union Address, 1998, p.1) to lower class-size to 18 students in the United States. Clinton (1998) also proposed a "...school construction tax cut to help districts modernize or build 5,000 more schools" (p.1). Secretary of State Richard W. Riley stated (as cited in Hopkins, 1998) this proposal "...represents a greater increase in the federal investment in improving elementary education than any budget in the last thirty years" (p.2). It seems like President Clinton is hoping to improve education (Hymon, 1997).

There are class-size reduction grants available to school districts. Starting on July 1, 1999, the Department of Education sent Classroom Size Reduction funds to all states. The school districts apply directly to their state for the sub-grants. The program allows schools to improve student learning by hiring additional qualified teachers so that those children in early

elementary grades can attend small classes. The critics would say, however, that class-size wouldn't be an issue if schools would hire qualified teachers and then offer the teachers on going professional development (Policy Report on Class-size, 2000).

On July 1, 2000, the federal government issued $400 million and will issue a second installment of $900 million in October, 2000 to all states for a program to reduce class-size. All of these funds go to local school districts. This money presents an opportunity for districts to hire teachers to reduce class-size. If the districts use these funds to reduce class-size, studies have shown that students may increase achievement, and that teachers may increase instructional time. When class-size is reduced, teachers have more opportunity to get to know their students, more instruction can take place, teachers show more enthusiasm for teaching, and students have fewer discipline problems (Zahorik, 1999). Teachers have the opportunity to immediately deal with behavior. When less time is spent on discipline, more time is spent on instruction. Teachers also come to know students personally, and are able to understand each student's development and learning cycle with small class sizes (Zahorik, 1999).

Class-Size Reduction Examples

Gundry Elementary School in Flint, Michigan found a way to implement class-size reduction. They turned their school into a six room, multiage learning community. In the learning community 90 students were assigned in a K-2 grouping, where the students stayed with a group of five teachers, two student teachers, and one paraprofessional aide (How Small Classes Help Teachers Do Their Best, 2000). This made the teacher-student ratio in this learning community 18 to 1. By using the strategy of Learning Communities, schools have the opportunity to keep class sizes small. Teachers stay with the same group for 3 years, which

gives them the opportunity to really know their students. Learning communities also allow the students individual instruction time if needed.

California schools in May of 1996 were experiencing large class sizes. Governor Wilson of California, felt that something must be done to reduce class-size. He decided that he wanted all kindergarten through third grade classes to have 20 or fewer students. He devised a program that would give school districts $650 for each student in a reduced size classroom. Wilson also had an extra fund to help schools facing space problems. Many school districts were pleased that Wilson was taking an initiative to reduce class-size, however school districts found out $650.00 a student was not enough money to cover the cost of the program (Hymon, 1997).

California's classroom size reduction program had to tackle many problems while trying to reduce class-size. These may be similar problems that other school districts starting a classroom size reduction program may experience. The main way to reduce class-size suggested by this plan was to survey all the buildings in the district to see where and how classrooms could be added without spending a lot of money (Hymon, 1997). The districts at some California schools approved the use of the teachers' lounges, auditoriums, libraries, and common areas. Approval was given to allow 40 students in a classroom as long as two teachers were present in order to divide the class in half. Partitions could also be used to divide up the bigger rooms to add more classrooms without paying high construction costs.

Class-Size Difficulties and Strategies

Many school districts are spending a lot of money on technology, not on efficient change initiatives. However, critics of small class-size believe the costs of class reduction are too high and the money would be better spent on other school reforms (Policy Report on Class-size, 2000). Achilles and Price (1999) stated that "Such massive expenditures are often based on

intuition, with little or no compelling evidence that they will yield any demonstrable gains in student achievement" (p.10). We have the research to prove that small class-size in grades kindergarten through third grade does make a difference in many areas of achievement. School districts need to use this research in order to spend money in the most beneficial manner.

Lowering class-size may mean hiring more teachers and locating more classrooms. This means more money must be spent. School districts must consider their present staffs and PTR to see where eliminating and adding positions are possible. Achilles and Finn (1999) stated that "Schools currently have educators who are not teaching 'regular' classes and these teachers are part of the PTR" (p. 6). School districts can create more space and have a lower class-size when they relocate personnel and classrooms (Achilles and Finn, 1999). School districts also need to see if some positions are necessary. For example teacher aides, special subject teachers or media specialists, may not be needed to help increase student achievement (Achilles & Finn, 1999).

Since there is a difference between class-size and pupil teacher ratio, districts should think of their staffing plans (Achilles & Finn, 1999). A pupil teacher ratio (PTR) chart was used by a principal in a coastal state to aide him in planning his school staff every year. The number used to figure the PTR would be 38 professionals per student population totaling all positions on the table as opposed to 19 teachers per student population to compute the class-size figure using only the teacher position number.

School districts must depend on the community to fund the classroom size reduction program. Once school districts implement a classroom size reduction program and the community sees the results that lower class sizes produce, schools will have something to sell to the public when the bond to finance the program ends up on the next ballot (Hymon, 1997). Beginning to implement smaller class-size may involve a lot of money at first. The assistant

superintendent of one California school district said, "Overall we are going to have to invest more money into education if we are going to get the results the public is investing in" (Hymon, 1997, p. 3).

One main difficulty that many districts already have is a lack of space. When the population growth of the community begins, it does not help the space issue. Young children need space to stretch out and children need even more space than adults (Achilles & Price, 1999). There are some things that could be done to help create more space.

Reconfiguring the PTR (pupil to teacher ratio) is a way to reduce class-size. Schools currently have educators who are not teaching 'regular' classes, and these teachers are part of the PTR (Achilles & Finn, 1999). "If school districts relocate personnel and teaching spaces, this will help solve the space and personnel problem" (Achilles & Finn, 1999, p. 6). Relocating personnel and opening more teaching space will involve additional costs for the district and it will take time to organize.

If the school districts have the money, the space problem can be solved quickly. The districts can either plan to build a new school or purchase portable classrooms. Money for the portable classrooms is not always available. In one example, some California schools decided to purchase portable classrooms to reduce class-size. The district tried to pass a school bond to pay for the classrooms, but the bond did not pass. The assistant superintendent of business and fiscal services for the Oxford School District stated "You try to get the word out in relationship to the need, but it is hard for people to realize how great the need is" (Hymon, 1997, p. 4).

Since money is a main issue of not being able to have the additional space, there are other options. Achilles and Price (1999) said, "You should look at space rather than classrooms" (p. 14). School districts should look at vacant space to lease near commercial

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Appendices

Appendix A

Teacher Questionnaire

Questionnaire on Class Size

Dear Colleague,

The purpose of this questionnaire is to find out your thoughts and experiences with class size. I am working on a research project on class size for my master's degree. I would greatly appreciate your response to these questions on the attached sheet. Please put the completed questionnaire in mailbox by Friday.

Thank you,

1. What grade do you teach presently? _____ How many years have you taught in that grade level? _____

2. How long have you been a teacher? _____

3. What was the lowest class size you taught with that specific grade level?_____

4. What was the biggest class size you taught with that specific grade level? _____

5. What is your class size presently? _____

6. When your class size was the lowest, did your teaching instruction change at all? For example: Did you give each student more individual help? Did you use cooperative learning more often? Did you use more whole group or hands on teaching? Do you feel your students benefited academically? Etc.?

_____

_____

_____

7. When your class size was the largest, did your teaching instruction change at all? For example: Did you do more whole group or hands on teaching? Did you do more cooperative learning? Were you able to give individualized instruction to your students? Do you feel your students benefited academically? Etc.?

_____

_____

_____

Over please!

8. Did you find that you had more behavior problems when you had your largest class? For example: Did you change your behavior management plan? Did you have to use more incentives and consequences than you normally would? Why or Why not?

9. Did you find that you had more behavior problems when you had your smallest class? For example: Did you change your behavior management plan? Did you have to use more incentives and consequences than you normally would?

10. Do you feel the class size issue is important to you? Why?

k you so much for taking the time to answer these questions for me!

Appendix B

Administrators and Board Questionnaire

Questionnaire on Class Size

Dear Administrator,

The purpose of this questionnaire is to find out your thoughts and experiences with class size. I am working on a research project on class size for my master's degree. I would greatly appreciate your response to these questions on the attached sheet. I feel your input in this matter is very important. I will stop by on Friday to pick up your completed questionnaire.

Thank you,

For the purpose of this questionnaire, the definition of *"class size is the number of students a teacher faces and is responsible for in class day in and day out" (Achilles).*

1. Do you feel the size of the class has an effect on student behavior? Why?

2. Do you feel the size of the class has an effect on teacher – student interaction?

3. Do you feel the size of the class has an effect on student achievement?

4. Have you ever implemented any programs to reduce class size? Please explain.

5. Do you feel it is important to spend the money on class size reduction? Please explain.

Over please!

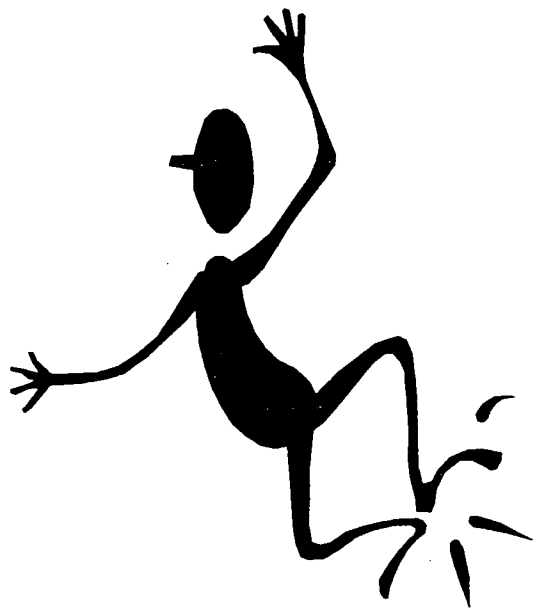
6. Do you feel there is enough space in your district to accommodate the growing community?

_____
_____
_____

7. What would be your ideal class size in grades K-3? Please explain.

_____
_____

ank you so much for taking the time to answer these questions for me!



Appendix C

Observation Checklist

OBSERVATION CHECKLIST

What grade is being observed?___ How many students are in the class?____
Time started -_____ Time finished- _____

	YES	NO	COMMENTS
Are all students on task?			
Is the teacher using whole group teaching?			
Is the teacher using hands on teaching?			
Is the teacher using cooperative learning?			
Is the teacher giving individualized instruction to some students?			
Are there many behavior problems?			
Does it seem like the students are comprehending the lesson?			
Was there another adult present? Who?			
Does the classroom seem to be a good learning environment?			

Appendix D

Permission Letter to Principal

SAINT·XAVIER·UNIVERSITY

Field-Based Master's Program
Saint Xavier University and SkyLight
Field-Based Master's Program

To: School Administrators

From: Program Research Staff

Date: June, 2000

Candidates for the degree of Master of Arts in Teaching and Leadership are required to identify a local educational issue and to design a project to address that issue, with a view to improving educational practice. The candidate listed below has designed an action research project and summarized that design in the attached preliminary abstract. You are encouraged to review this document and share any questions or comments you might have with the degree candidate. Members of the program staff are also available should you have further questions.

Please indicate, on the form provided, that you are aware and approve of the purpose and scope of the proposed project. The form may be returned to the candidate who will forward it to the university. Our best wishes for a successful school year, and we look forward to meeting you at the Research Exhibitions.

Sincerely,

Lynn Bush, Ph.D.
Assistant Professor
Saint Xavier University
708-298-3761

Esther Mosak
Executive Director, Off-Campus Programs,
School of Education
708-802-6214

Degree Candidate: _____

I have been made aware of the purpose and scope of the candidate's Action Research Project, and I approve of its implementation.

_____

Signature of School Official Date

Main Campus 3700 West 103rd Street ♦ Chicago, Illinois 60655
18020 South Oak Park Avenue ♦ Tinley Park, Illinois 60477 ♦ (708) 802-6215 ♦ FAX (708) 802-6208

Appendix E

Permission Letter to Parents

September 19, 2000

Dear Parent or Guardian,

I am currently working on my Master's Degree in Teaching and Leadership. As a part of the program, I am in the process of working on a research project on class size.

I chose class size as a topic in order to improve education for students. I am very excited to contribute to any improvement in education. The purpose of this research project is to observe and compare the teaching styles and interaction between teachers and students in large and small classrooms.

Since this is voluntary, I am asking for your permission to allow me to observe your child in the classroom. NO NAMES WILL BE USED AND ALL INFORMATION I COLLECT WILL BE CONFIDENTIAL, ANONYMOUS, AND WILL NOT AFFECT STUDENT GRADES. If you want your child to participate in this research project, please sign and return the form below.

If you have any questions or concerns, please don't hesitate to contact me.

Thank you,

I, parent /guardian of _____
give my permission to participate in this research project.

Signature_____Date_____

SIGNATURE PAGE

This Project was approved by

Barbara McKinney, M.A., Ph.D. Candidate
Advisor

Christina L. Dawley, M.M.
Advisor

Beverly Gulley
Dean, School of Education

U.S. Department of Education
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Signature: Robin Hunn-Sannito
Rinda Hunn-Tosi
Margaret Tessling

Printed Name/Position/Title: Student/FBMP

Organization/Address: Saint Xavier University
Attention: Esther Mosak
3700 West 103rd Street
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