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Abstract

Class size has been an ongoing educational issue that has ebbed and flowed. School officials are faced with a variety of funding pressures and often class size is considered to meet fiscal constructs. Is there evidence that smaller classes have benefits over larger classes and that small class sizes are cost effective? Crucial to this issue of class size is the question: What are tie findings of research studies on class size and student learning?

CLASS SIZE AND ITS CONSIDERATIONS FOR AT-RISK STUDENT ACADEMIC ACHIEVEMENT

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Class Size and its Considerations for At-Risk Student Academic Achievement

Class size has been an ongoing educational issue that has ebbed and flowed. School officials are faced with a variety of funding pressures and often class size is considered to meet fiscal constructs. Is there evidence that smaller classes have benefits over larger classes and that small class sizes are cost effective? Crucial to this issue of class size is the question: What are tie findings of research studies on class size and student learning?

Class size can mean a variety of different things to diverse populations. The pupil-teacher ratio is defined as the numerical ratio between the total school enrollment and the total number of professional staff members that are assigned to a school (Varner, 1968). It is more accurate to look at class size as the number of students that a teacher instructs at one time or by dividing the number of students present in the room by the number of teachers in the room (Bourke, 1986).

Class size can also be termed as "crowding." Beyond a certain point the high density of students in a classroom can likely bring about repeated violations of personal space. These violations may hinder task

performance regardless of the learning task parameters (Welden et al., 1981).

Studies of class size have appeared in the educational literature throughout the twentieth century. Despite diligent research there has been continuing controversial data. It is the researcher's quest to sort this research literature and examine how it relates to the "at-risk" student.

When viewing effective teaching practices the focus is on a small set of instructionally related features that appear to have a positive impression on student learning. Class size and "at-risk" research are two such features that should be implemented when considering any educational programming (Leinhardt & Bickel, 1987).

At-Risk Definition and Discussion

The category, "at-risk", presently refers to a broad range of student characteristics. These traits are associated with a high probability of not achieving success in school (New York City Board of Education, 1990). In general these students are usually low achievers. They may have a lower self-esteem with differences from their more successful peers in task performance, cultural aspirations, and life experiences. It is estimated that two-thirds of "at risk" students

are Black and Hispanic and are from families at the poverty level. Furthermore, many suffer from family trauma or physical, emotional, alcohol, or drug abuse (New York City Board of Education, 1990).

The effects of "at-risk" students are complex and are presumably related to a series of incidents rather that one isolated event (Schwertfeger, 1983). Continuing research has identified demographic, familial, personal, and educational items that can be used to identify "at risk" students. These factors still do not help foretell which students among those "at-risk" will probably drop out of school. Accurate and reliable data is difficult to obtain, but it is estimated that the national dropout rate presently in grades nine through twelve is estimated at 25-30% (Smith & Ament, 1990).

A look at sociological trends may assist the school personnel in making decisions about class size in reference to "at-risk" students. The one word that seems to encompass the undertaking of raising children in the 1990's is "change." As compared to the 1950's, the children in the 1980's spent less time each day with adults, watched television quite a bit more, relied more upon their peers and possibly grew up lonely with more stress (Weisberg, 1988). This change in childhood

behaviors will continue to affect our educational institutions.

When 1995 rolls around it is expected that three-fourths of the mothers of school age children will be employed. Galinsky (1990) further suspects that difficult jobs of the future may have a spill-over tension effect on the children at home.

The terms "single-parent family" and "blended family" have been used in the literature and press with various tones of meaning. This type of family is the result of divorce, re-divorce, death of a spouse and unwed parents. It has been suggested that educators develop an operational definition which could be applied to present traditional relationships, such as in a military family where one parent is often absent from the home (Shreeve et al., 1985) or a family where one parent commutes on the weekends.

Divorce, remarriage and re-divorce probably peaked in the late 1970's. Even so, the occurrence of divorce in the United States is expected to remain among the highest in the world (Norton & Moorman, 1987). During the current decade, it is predicted that 60 percent of all children will sometime live in a single-parent home (Galinsky, 1990). Within these families the children can become confused about values and discipline because

of tension, adjustment, resentment, and conflict that may arise over loyalties (Weisberg, 1988).

The impact of single-parenthood and blended family parenthood on school performance has been studied recently. Kinard and Reinherz (1986) found evidence of fourth-grade children in recently disrupted single-mother families that had greater problems in some but not all areas of school achievement and performance than children in early disrupted single-mother families or children in never disrupted two-parent families. Teachers rated productivity as the greatest problem among the children of recently disrupted families. Kinard and Reinherz (1986) further suggested that the negative effects of divorce and separation do not match children's inborn abilities, but instead their performances and accomplishments in terms of school tasks.

The absence of the father in the home may have negative indications for the school achievement of the children who live in that home. The age of the child when the father leaves the home is crucial when later learning and cognitive functioning are considered. It is very significant for those children who are under five years old when the father leaves the home. At this age there is an impact on future intellectual functions

(Schwertfeger, 1983).

Even gifted children are vulnerable to the negative effects on school achievement connected with single parenthood. In fact these talented students may not be as easy to locate as the children from a traditional home using traditional identification methods (Gelbrich & Hare, 1989).

In a study of 119 students, Chalker and Horns (1986) found indications that students living in single-parent or blended family homes may have lower achievement scores due to other variables such as maturity and development. In this study of children in grades two through five, fifth graders were perceived as experiencing preadolescent changes that could affect achievement as much as the family structure.

Within cognitive development and school achievement there may be times where less than positive family interactions and other variables persist in single-parent and blended families. These interactions during vulnerable learning periods for both genders can affect later achievement (Schwertfeger, 1983).

These studies give indications that short-term educational concerns are evident for the educational institutions to deal with. Without more extensive longitudinal studies of children in disrupted families

though, few conclusions can be made about the lasting educational effects in school performance. (Kinard & Reinherz, 1986) Unless an urgent effort by educators is pursued to identify and overcome the negative effects of lack of adult interaction, a possible generation of students may be fated to achieve significantly less than they are capable of achieving (Shreeve et al., 1985).

In a recent survey 38% of the women surveyed had had at least one experience of sexual abuse before the age of 18 (Russell, 1984). These women responded that they were affected at least moderately. How sexual abuse affects children has shown to have some unclear impressions. When 46 sexually abused girls from ages 6-14 were compared to 46 non-abused girls who were matched in age, race, family income, and family structure, the sexually abused girls demonstrated lower school achievement (Einbender & Friedrich, 1989). At this time, research using comparisons for abused and unabused boys is unavailable.

It has even been suggested by Finkelhor (1991) that the AIDS trend will raise the numbers of children as sexual partners. This panic could be similar to the venereal disease epidemics of the late 19th century which resulted in an increase of child prostitution as men looked for clean partners.

Looking at AIDS closer indicates some changes in past trends. The ratio of female to male AIDS patients has doubled in the last four years, with the female cases going from 17 percent of the adolescent cases in 1987 to 39 percent of the cases in 1991. AIDS is the sixth leading cause of death among 15- to 24-year-olds. How many teens are infected with HIV is unclear, but during the past three years, the cumulative number of 13- to 24-year-olds with AIDS increased 77 percent. Teenagers have many feelings of invulnerability when it comes to sexual behavior changes. They think they can be rescued from a disease such as AIDS, because emotionally they are still children (Kantrowitz, et al., 1992).

Drugs, and especially alcohol, have been a part of role models' lives in American sports, entertainment, and business for a long time. Americans consume about 60 percent of the world's illicit drugs with young people posing the most acute problem. In a country-wide survey in 1986 of high school seniors, it was shown that the level of involvement with illicit drugs is greater in our nation than can be found in any other industrialized nation (Berger, 1988).

Studies show that better-educated people are turning away from drugs while the poor and less-educated

have continued or increased their use of drugs. This shift of drug abuse becoming more of a lower-class problem has also been accompanied by the type of drug that has become more popular. The change from heroin to cocaine usage has generated more parents who are willing to abandon food, water, and child to take care of their crack habit. In New York City alone, the number of cases of neglected or abused children rose 30 percent from June 1985 to June 1986 due to the use of crack by parents (Berger, 1988).

Furthermore, tests have shown that drugs interfere with mental abilities. Drugs can cause the users to have lower grades in school. Students on drugs often get into trouble with teachers and principals and even drop out of school (Berger, 1988). Generally, adolescents who use drugs exhibit a regression of school achievement (Hundleby, 1982).

Poverty is another discouraging trend that is related to educational success. Data collected suggests that there has been a notable increase of poverty during the 1980's (O'Hare, 1985). Even more alarming is the fact that for the lower classes, it is getting more difficult to get out of poverty (Wilson, 1987).

When poverty is linked to children it has been found that about 40 percent of the nation's poor are

children (Hodgkinson, 1988). When the income of single-parent families was examined by Keough (1986) it was found that 62 percent of these families had annual incomes of less than $10,000. Poverty estimations for the homeless children are difficult to acquire. These children usually do not attend school on a regular basis because school district residency requirements and transportation problems present barriers (Klauke, 1989). If the poverty conditions carry on or even worsen, Finkelhor (1991) predicts that this poverty will continue contributing to child abuse.

The problems that pre-term infants experienced in the past dealt mostly with survival and severe handicapping conditions. There has been a shift of emphasis from the technological survival rate to the increased incidence of less obvious educational difficulties in the classroom. The factors that might contribute to poor school achievement by these children result in handicapping conditions such as learning disabilities and behavior problems. These educational considerations may not become visible until the school years, but can represent significant problems in educational achievement (Mohoy et al., 1988).

About 90 percent of the mildly disabled students receive most of their education in regular classes.

This outcome is the result of the Education for all Disabled American's Act (P.L. 94-142) of 1975. It requires that handicapped children be identified and presented a free appropriate public education within the least restrictive environment. Aksamit (1990) believes there is difficulty in distinguishing these mildly handicapped students from low achieving children who are at risk for school failure due to environmental differences. Therefore, the over-identification of at-risk children as mildly handicapped needs to be remedied in order for students to be successful in general education.

Class Size Viewed Historically

Historically, class size has been viewed in the various classrooms since as early as 1902. More than 70 studies were conducted between 1900 and 1975. During these years the interest towards class size ebbed and flowed with the last 25 years standing out as high interest years (Cooper, 1989).

In the beginning of national education, educators used their intuition and experiential judgment and established a rule of thumb. There was usually a ratio of one teacher to twenty-eight or thirty students. This practice became so widespread that it found its way into the professional literature without any research to back

it up (Educational Research Service, Inc., 1978).

In 1954 Stover reported that contemporary administrative policies on class size in most schools was a matter of efficiency and profitableness. Local factors such as birth rate, finances, and physical facilities determined class size policy. Research was not usually used, but instead suggestive measures were taken from other school districts. The policy was usually a suggestion of ranges. Sometimes the policy was a statement that defined an absolute maximum such as "We don't permit classes over..." (Educational Research Service, Inc., 1978).

Recently teacher worries have become teacher priorities. Studies have supported the issue that class size tends to affect teachers' feelings of effectiveness and their morales (Varner, 1968). Meeting the needs of students was one of the three inventory items that teachers responded to which had the highest mean scores on a separate study (French, 1991). These kinds of teacher priorities are shaping some class size policies of school boards because of collective bargaining and revenue limits.

On the other hand, even when the issue of class size is a priority, there is more demand for lowering taxes than for lowering class size. It seems that

proving that small class size improves achievement is not enough in these times of revenue and limited spending. If the issue of small class size is important enough for educators to pursue then there will probably have to be bartering to finance such endeavors because the prospects of more money in education are dismal (Glass et al., 1982).

Between 1900 and 1940 the research studies utilized used short-term and immediately measurable pupil achievement as their criterion. Most favored small classes with some words of caution. Education was in a period of when the class size answer meant millions of dollars (Ross and McKenna, 1955).

The National School Boards Association (1973) research report reviewed literature that revealed agreement on the cost of reducing class size as being expensive. Opinion on the educational value of class size reduction was varied. Of the fourteen references and five supplemental references the following generalizations were formulated. Small reductions will probably make little difference in student achievement, but will probably positively increase teacher attitudes and performance. Economic considerations must be considered when reductions in class size is contemplated. Lastly, that the nature of the criteria

used for evaluation may have influenced conclusions on the effect of reducing class size.

A review of class size that has received considerable attention was carried out by Glass and Smith (1978). Glass (1982) described the meta-analysis approach used in the 1978 study as "data analysis applied to quantitative summaries of individual studies" and is aimed at generalization. It is a "process of surveying and analyzing in quantitative ways large collections of studies" and "may very well be applied to the findings of a literature of controlled experimental studies, each of which has a valid claim on a causal conclusion" (Glass, 1982, p. 93).

This massive literature study (Glass and Smith, 1978) included almost all of the twentieth-century research on class size and student achievement. In all there were a total of 725 effects from 77 different studies. From these, Glass and Smith (1978) removed the studies that did not have good experimental controls. Fourteen studies remained with 109 effect measures comparing small and large classes.

Glass and Smith (1978) analyzed the data from the fourteen studies and concluded that there was a stronger relationship between class size and achievement. When classes were reduced to 15 students, student achievement

improved from the 50th to 65th percentile. When class size was further reduced to 10, achievement was again improved about another one-half a standard deviation.

The meta-analysis approach has been considered a major breakthrough in summarizing conclusions from many years of research on a particular topic. Even so, Glass and Smith's (1978) (Glass et al., 1982) meta-analysis study has been criticized. Weaknesses in their research design were identified on grounds that most of the studies dealt with class size as an isolated variable when there were actually many complex related variables. Such variables included pupils, teachers, subject matter, and teaching methods. Rather than inconclusive, the research has been more incomprehensive (Educational Research Service, Inc., 1978).

Furthermore, Glass and Smith (1978) standardized achievement scores across studies by dividing the mean difference in achievement between two classes by an estimate of the within-class standard deviation and assumed it to be the same for both classes. They claimed that this procedure allowed comparisons of achievement in large and small classes even when the achievement test evaluated different knowledge and skills that were scored in different ways (Slavin, 1984).

The Educational Research Service (1978) report was criticized on grounds of highlighting studies which questioned the usefulness of small classes. These studies were reported in a way that lowered their important communication that smaller classes are better (Stinnett, 1982).

Much of the Glass and Smith (1978) study was directed to very small classes such as one-to-one tutoring. If these representations were to be removed, class size reduction even down to 15 or 20 would have shown little impact. It seems that classes need to be reduced dramatically to a size of one to three students before a significant achievement gain is produced (Odden, 1990).

Educational Research Service, Inc. (1980) failed to provide any new evidence relating to class size research. Their emphasis was on educational policy and their assistance as directed to school officials such as school board members and administrators. Sound decisions pertaining to class size involved many references to school budget and spending.

Slavin (1989) investigated the primary evidence related to the effects of class size on student achievement as pertaining to the Glass and Smith Meta-Analysis published in 1982 and the Educational Research

Service Reviews published in 1978 and 1986. He concluded that neither adequately considered the quality of the critical evidence. Slavin used an abbreviated form of a review technique called "best-evidence synthesis". This technique combined elements of meta-analysis with narrative review and focused on concerns of study characteristics and quality.

From this technique Slavin (1989) concluded that providing low achievers with one-to-one tutors for a part of their school day is most likely the most effective instructional strategy we have. Even with groups of 3-6 students, most teachers tend to revert to the perusal of large numbers of worksheets and whole-group instruction. Simply reducing class size is probably not going to solve the achievement problems of at-risk students unless class size is reduced to one for some part of the students' school day.

A more organized study (Robinson and Wittebols, 1986) detailed studies by eighteen major topical areas of concern such as level of schooling, content area, and type of student. This latter study found that class size did make a difference. For 22 or fewer students in grades K-3 there was improved student performance. In grades 4-8, five of the ten studies reported finding student achievement greater in smaller classes. In

grades 9-12 the results were fairly nonexistent. There were no firm conclusions made across the content area since most studies measured mathematics and reading.

The Robinson and Wittebols (1986) study was criticized for including research with methodological weaknesses. Secondly, they did not cite a quantitative measure of the degree of change on student achievement made by smaller classes. Despite some unsound methodology, this study, at best, can be used as a secondary source for approving research-based class size reduction policies (Odden, 1990). The positive outcomes of Robinson and Wittebols (1986) research is that the data and accompanying conclusions were more accessible, understandable and useful to school officials than ever before in making decisions related to class size.

Witherspoon-Parks (1988) focused a study on an experimental group of 50 students who had been in a class size of 15 for three years, a control group of 93 students, and a blind control group drawn from 35 Nashville schools. In this three year longitudinal study the greatest gains in reading and mathematics achievement were made in first grade. These gains were not lost in second and third grade. Witherspoon-Parks (1988) proposed that the lack of significant gains in second and third grades could have been the effect of

the low scores of borderline students who possibly would have failed in a class of 25, but were able to minimally succeed in a small class.

Even though there was no significant difference in percentages of objectives mastered in reading and math in the Witherspoon-Parks study, there were some evidence of other positive factors. Without any statistical analysis the experimental teachers were more positive than the control group as indicated in the teachers' logs. It seemed that the teachers' attitudes were affected by class size. Additionally, there was a significant decrease of negative student behavior in the classes of fifteen as compared to the control group (Witherspoon-Parks, 1988).

In 1989 Burde investigated reading and mathematics achievement with class sizes of 16-20 students and larger class sizes of 30-34 students. The Michigan Educational Assessment Program was the achievement tool used for 400 randomly selected grade four students. The data from this study was not able to support an inverse relationship for class size and achievement. Burde felt that due to high mean achievement scores with relatively low standard deviations led to an inability of the Michigan Educational Assessment Program to provide by design a normative distribution in the statistical

measures of his study. There was a possible underestimation of both relationships and differences in class size and achievement. Despite the design biases, Burde suggested recommendations for further refined study to support the study hypothesis.

In separate studies by Shannon (1989), Hallinan and Sorensen (1985), and Cahen (1983) there was evidence that class size does make a difference in student achievement. They cautioned against using the same instructional practices that are employed in a large class size.

In a complementary study three years of research were utilized with four primary classrooms having two parallel teams. Changes occurred when class size was reduced. The teachers and students were generally happier and more productive in small classes. Despite smaller class sizes the classroom instruction or the design of the machine remained the same (Cahen, 1983).

With smaller class sizes teachers can make use of more effective teaching styles and techniques within the classroom to promote learning. There are ways that class size in its relationship to both length and quality of instruction can work together. These ways include reassigning teacher administrative and organizational tasks to secretarial staff or volunteers,

minimizing time spent on controlling student behavior by handling misbehavior outside the classroom, and effective instructional grouping within the class population (Hallinan and Sorensen, 1985).

Basal readers have come to be regarded as part of the typical American reading instruction. This is where teachers usually lead students arranged in three reading groups through a variety of activities that are directed by the basal reader. Small classes taught in this way showed approximately 50% off task behavior. There are sources that Shannon (1989) believes that teachers of reading must take advantage of if a smaller class will benefit from increased opportunities to engage in teacher-directed instruction and practice. The basal reader can be supportive in effective reading instruction rather than the sole resource and center of the instruction. Small class size within literate environments allows students of varying abilities to interact with each other in order to develop their abilities to be lifelong readers with the teacher's guidance.

Class Size and Quality of Instruction

It must be remembered that reduction in class size itself is no guarantee that the quality of instruction and consequently student achievement will be improved.

Reasons for lack of change of student achievement when class size is reduced include mandated curriculum, too narrowly defined assessment, inflexible rules of administrators, and teachers who may need help in creating better instructional environments, new models, and new techniques (Glass et al., 1982).

Greater effects on achievement by reducing class size are measured when teachers are trained to take full advantage of having fewer students. When class size and altered teacher techniques happen simultaneously the results of achievement are even greater (Willis, 1990). Ongoing supervision to ensure that the improved techniques for smaller classes are applied on a day-to-day basis in the classroom is essential. It is probable that few children benefit from smaller classes if inexperienced or inflexible teachers persist in using the same instructional methods that were used in larger classrooms (New York City Board of Education, 1990).

In addition to educating and reeducating teachers, other professionals will require attitude and behavior changing. The administrators, central office personnel, and non-teaching specialists will benefit from education and staff development (Stinnet, 1982).

Class Size Programs Supported With Limited Research

The characteristics of the effective programs that

appear to benefit at-risk students are included in numerous strategies identified in current literature. They include the intent to move beyond conventional instructional approaches and have an emphasis on prevention, an energetic effort to engage students, and an integration of teacher/parent ownership policy into all aspects of the educational process (New York City Board of Education, 1990).

Tools, techniques, and increased opportunities for small group instruction have been used to improve the small class without the benefits of valid and reliable research. In California a staggered schedule has been implemented in some schools. One-half of the class is present first thing in the morning for reading while the other half stays later in the afternoon for reading (Glass et al., 1982).

Because teachers themselves have determined small classes so important in Saginaw, Michigan, some have personally given up pay raises. The extra money was then used to help pay for the employment of more teachers (Educational Research Service, Inc., 1978).

In separate school systems in California and Colorado a weighted formula is used. This formula is utilized to determine class size. Each student is grouped into one of fifteen categories based on the

pupil's educational and behavioral background. The student ratings are determined and considered by a review committee of teachers and administrators. Those classrooms that are considered "overcrowded" are offered assistance such as teacher aides, half-time substitute teachers, volunteers, and additional instructional materials. It is their way of appreciating and taking advantage of small classes and adjusting to larger classes (Educational Research Service, Inc., 1978).

Bloom (1984) has proposed a unique approach to class size research. He has attempted to identify and validate teaching methods and conditions that can promote improved student learning. Class size remained at a constant 30 students and other instructional methods and factors were varied. Ways of raising student learning to approximate levels found in good one-to-one tutoring situations were detected. Bloom (1984) found that teachers' use of the feedback and corrective procedure of mastery learning in conventional size classes of thirty can result in greatly increasing student achievement.

There is not a single school model able to meet the many different needs of the rural area. One of rural schools' most unique features continues to be their small size and spatial seclusion. The small class size

of rural schools is one of their inborn strengths despite that the evidence is mixed on student performance (Hobbs, 1988).

Four hundred at-risk students are enrolled in an alternative program in Simi Valley, California. These are students who have not succeeded in a traditional high school environment. The goal at Apollo High School is to increase students' self-esteem with the belief that self-esteem produces achievement. Teachers and administrators structure the school environment so that the students' basic needs of survival, belonging, power, freedom, and fun are met. The system is considered the major source of problems for at-risk students. The fixing of this system is accomplished with students' help as the staff provides them with the four A's: Attention, Acceptance, Appreciation, and Affection. In order to carry out these goals class size is small (Greene and Uroff, 1989).

The results of a three-year survey of Apollo students showed that the Apollo approach is working. Instead of "stepping up" the programs that failed students in the past, efforts are focused on the students themselves. Learning experiences that are satisfying students' needs are programmed for Apollo High School students. In terms of motivation and

striving for success 86 percent of the students are graduating from high school after they enter Apollo High School (Greene and Uroff, 1989).

A number of private companies are getting into the public school system. The plan of Education Alternatives Inc. (EAI) is to replace the traditional public school system with lean management, quality service, and satisfied customers. One of the variables that John Golle insists upon from his company is small class size. The two initial model schools are two company owned elementary schools- one in Eagan, Minnesota with the other in Paradise Valley, Arizona (Conlin, E., 1991). These "Tesseract" curriculums were recently expanded when a Florida elementary school was added to its assets.

Similar to the EAI goal of minimizing waste and inefficiency in the public school is a privately owned firm in Illinois called Ombudsman Educational Services. This company has contracts with 23 school districts to educate at-risk students who are on the verge of dropping out or being kicked out of school. Non-instructional time is pared to a minimum with low student-teacher ratios (Tucker, 1992).

Preece, (1987) developed a model of the relationship between class size and achievement based on

the assumption that a teacher adjusts the style and pace of a lesson to the least able student in the class. This is a sensible approach if the least able student in the class is to cope with the work. The lesson to be learned from this model in reference to class size is not so much the merit of individual tutorials, but the value of homogeneous ability classes although there is concern about social development. This proposed model accounts for the finding that the relationships between achievement effect size and class size is independent of age, ability of students, and achievement test used.

These preceding innovative approaches to class size presently have limited or no research to support them. They do hold some interesting promises for future investigative studies. Looking more closely at them may provide some more answers for the class size appropriate for students.

Research Based Class Size Programs

Nationwide there are small class size programs that have conducted research on the effectiveness of class size on student achievement. The at-risk student is the focus of these instructional programs.

Program Prime Time in Indiana believes that smaller class size increases the amount of individual attention that teachers are able to give to students. Not only is

the attention to students greater, but students receive more immediate feedback (Mueller et al., 1988).

Prime Time reduced class sizes in kindergarten through third grade. The state legislature appropriated funds to study the effects of this strategy. Over a longitudinal time period performance gains were documented by using mean scores from three achievement tests (Odden, 1990).

Even though achievement gains were observed for Prime Time students achievement test scores such as Cognitive Abilities Test, Iowa Tests of Basic Skill, and Stanford Achievement Test should not be the only means of measuring long-term effect for small class size with any program. Factors such as socioemotional status, creativity, and problem-solving abilities can also furnish indicators of the advantages of reduced class size (McGiverin et al., 1989).

In a 1987 evaluations of the Prime Time program achievement gains were found to be small but consistent. (Willis, 1990) The gains that were found might have been the effect of novelty of the state program, teacher expectations, or the belief of second grade teachers that failure to produce student gains could result in the possible negative effect of a return to larger classes (McGiverin et al., 1989).

These Prime Time findings make a strong case for small class size in the primary grades. The costs are challenging, but for those districts with at-risk students it would be well recommended to pay the price. Students with learning disabilities, minority students, and all other categories of at-risk students can possibly receive benefits from smaller teacher-student ratios (Mueller et al., 1988).

Tennessee based Project Star also reduced class size in kindergarten through third grade. The state legislature funded the research and had gathered four years of data as of 1990. Two studies show that the reduction in class size did not produce very large gains in student performance as the students progressed in grade hierarchy (Odden, 1990).

Using socioeconomic status based on free or reduced cost lunch (low SES) or pay full price (high SES) it was found that there was no consistent evidence to indicate that small classes help low SES students more than they help high SES students. In many of the comparisons both of level and of gain, the high SES students were helped more by small classes than were the low SES students. A possible explanation for this phenomena is that teachers do not concentrate the extra time per student they have in a small class on the low SES student. Instead they

spread it over all students in the class (Folger, 1989).

The director of the west Tennessee portion of Project Star reported that the teachers of small classes said they could cover more material and do more instruction that was individualized. Classroom management was reported as easier with students being more cooperative and more willing to take risks. In many instances the teachers commented that the small class was "like a family" (Willis, 1990).

When referring to cost effectiveness of reduced class size with the Star Program, Folger (1989) suggested looking at the value of teachers' job satisfaction. A teacher who is more satisfied may stay in teaching longer at that school and reduce the expenses of bringing new personnel into the system. Because teachers' morale and job satisfaction is increased with a small class size, some dollar value could be allocated to this to reduce the differential cost of producing more student learning.

The Early Grade Improvement Program (EIGP) was implemented in the 1985-86 school year in New York City. Those schools that had insufficient space to reduce class size through creation of new classes were given EGIP funds to implement paraprofessional assistance to classroom teachers or to furnish two teachers per class.

The goal of this program was to improve pupil achievement in the early grades by reducing class size in grades one through three. Data was collected over two years from 27 responding school districts. Twenty-five of these districts reported improvements in students' cognitive achievement and academic skills. Eight districts noted more emphasis on learning centers with less frequently reported emphasis on language development, thinking/reasoning skills, use of manipulatives by children in developing mathematical concepts, focus on the writing process, and improved classroom climate accompanied by increased adult-pupil interaction (Schulman and Jarvis, 1988).

Occupational education curriculum has been carefully examined by researchers for a relationship between drop-out rates for at-risk students and the curriculum. The findings of two separate studies indicate that occupational education classrooms usually have lower teacher-pupil ratios than found in typical classrooms. Evidence has been examined that points to one of the characteristics for retaining students in occupational classrooms is lower teacher/student ratios (Smith et al., 1990).

Advantages and Strengths of Smaller Class Size

It is suggested that the readers think of examples

of how group size affects their own lives (Glass et al., 1982) when considering the manyfold advantages and strengths of small class size for the students. Student attention rates or time on task are higher as class size becomes smaller (Glass et al., 1982). This means that students participate more actively in various types of learning activities. There is the potential for greater individualization of instruction for students (Robinson and Wittebols, 1986) including encouraging, counseling, and monitoring (Odden, 1990). Students seem to be more attentive to their classwork and have more homework. They have to wait less time to receive help or have their papers checked (Odden, 1990). Students have more turns at everything and equipment is not spread as thinly (Cahen, 1983).

In smaller physical education classes there is usually unlimited equipment availability. Skill practice is the vehicle for instruction in these classes, rather that scrimmage. Skill practice indicates more intensive individual interaction with the skill than can be found in the employment of skills as demonstrated in a scrimmage (Hastie and Saunders, 1991).

Pupils of lesser academic abilities tend to achieve more in smaller classes. The research results are mixed when students of average or higher academic skills are

compared in large and small class sizes (Robinson and Wittebols, 1986). There is a strong indication the performance of minority students is increased in the small-class setting (Finn and Achilles, 1990). Smaller classes can positively affect the academic achievement of economically disadvantaged. (Robinson and Wittebols, 1986)

Other possible benefits to pupils of small class programming might include the improved socialization of children to the school environment. There is also the possibility that the small class advantage may affect other subject areas besides reading and math (Folger, 1989).

For teachers the benefits of a small class size are encouraging. With fewer students there is a potential to allow the teacher to devote more time to individual pupils for reteaching and checking quickly for understanding. Order is easier to maintain and accordingly teachers are able to teach for a greater percentage of the time and feel relaxed doing it (Cahen, 1983). Less makeup work is assigned and monitored because student absences are usually proportionately lower (Odden, 1990). There are more teacher follow-up questions in smaller classes (Bourke, 1986) with more "wait time" after asking questions. Both of these

behaviors are related to higher achievement (Odden, 1990).

There is more direct interaction in smaller classes (Bourke, 1986). Often teachers' enthusiasm and satisfaction is enhanced when there are fewer students to instruct. This can be perceived by the students and be influential in their own motivation for learning (Finn and Achilles, 1990).

Parents of children in small classes are assured that their children are receiving the attention he or she deserves (Robinson and Wittebols, 1986). Small-class parents were significantly more likely to report that their child's school progress was above their expectations than were parents of children in larger classes. These parents also were more likely to report that their child's teacher was available for consultation and conferencing (Mueller et al., 1988).

Due to the present declining birthrate in the United States (Finkelhor, 1991), enrollment in the schools will decrease class size. If this decrease continues, resulting staff reductions along with school consolidations may occur. In this scenario class size may increase again. Asking for small reductions in class size within consolidations will cost a school system many dollars (Educational Research Service, Inc.,

1978). Looking at the rising cost of education is one disadvantage of class size that school officials pay very close attention to. They want to know if a small class size is cost effective (Robinson and Wittebols, 1986).

Disadvantages of Smaller Class Size

An uncommon disadvantage of a small class size can occur at certain points in the life of a learner. Incorrect class size may increase rather than decrease dependency of a student. This amount of dependency could occur if a teacher is unable to guide and supervise the efforts at independence of a small class of children at the same time (Cahen, 1983).

Current Trends of Class Size

The current trend when considering class size is to look more closely at instructional methods as they relate to the various students in the classroom. Webb (1991) suggests that the experiences of students in small groups can influence their learning. Furthermore, he proposes that the best small group setting is the one in which students can freely admit what they do and do not understand. The students can consistently give each other opportunities to demonstrate their level of understanding. As teaching becomes more learner centered with multiple projects, emphasis on writing,

reading comprehension, thinking skills and student engagement, smaller classes will likely be needed (Odden, 1990). The on-going question being asked is that which deals with the conditions of best class size for what ends and under what circumstances (Varner, 1968).

Conclusions

The relationship between class size and at-risk students is a function of many factors. Class size can depend upon the subject matter, nature of the teaching process used, characteristics of the students, teacher understanding and morale. These are only a few of the relevant variables that have been studied over the years of educational research with various levels of conclusions. The importance of class size cannot be underestimated.

The increased numbers of at-risk pupils in schools has raised school officials' concerns in areas of achievement and school budget. It has been determined that these children experience many educational difficulties and in the past were not expected to be successful in the traditional class size setting at school.

Small class size has been suggested as a mode of preventive intervention for the at-risk students. It

could be useful in reducing the occurrence of learning problems as associated with at-risk behaviors of students and their school performance.

Within the small class size domain researchers have indicated that the teaching style of the educator is probably one of the variables that has had the least change. Traditionally, teachers have taught the same way regardless of whether there were fifteen or thirty students in their classrooms. It seems logical then, that teachers obtain the training necessary that will utilize maximum use of their skills and abilities in the small class size setting.

The issue of whether benefits outweigh the costs involved in small class sizes can be viewed in this way. The public desires quality education to be cost efficient. In order to have quality education Americans must be willing to pay for it. Education is expensive. Tax money, contributions and tuitions are expended in order to support programs that are planned to reduce school failure for at-risk children. To fail to substantiate these endeavors will be more expensive in the future in terms of dollars and human potential if changes are not made now. America cannot manage morally or economically if we continue to permit the presence of an underclass society where poverty, drug abuse,

divorce, disease, and under-education are the norm.

For children who are forming their own attitudes that determine whether they apply themselves to learning tasks, smaller class sizes may have hidden advantages. If reducing class size for at-risk students within the general curriculum can result in fewer retentions, fewer referrals to special education, fewer special services, and maybe even fewer dropouts then maybe policymakers and educators should look more closely at how costs weigh against benefits. In the future, academic achievement of individual children may not be the most important benefit when large class size is compared to small class size. Instead, the child's attitude and self-esteem may be the most impressive gains when class size is reduced. Only further studies can determine if that is the case.

Because no single class size seems to be the best for all levels of education, all subjects, or all students, then innovative teaching styles and class size restructuring will need to be developed that maintain current and accurate research. With continuing innovation and succeeding research our educational programming can more closely echo the concerns society has about the best education for our nation's future leaders.

REFERENCES

Aksamit, D. (1990). Mildly handicapped and at-risk students: The graying of the line. Academic Therapy, 25(3), 277-89.

Berger, G. (1988). Drug abuse: The impact on society. New York: Franklin Watts.

Bloom, B. (1984). The search for methods of group instruction as effective as one-to-one tutoring. Educational Leadership, 41, 4-17.

Bourke, S. (1986). How smaller is better: Some relationships between class size, teaching practices, and student achievement. American Educational Research Journal, 23(4), 558-571.

Burde, R. H. (1980). A study of the relationship of class size and student achievement on the Michigan Educational Assissment Program fourth grade test (Doctoral Dissertaion, Western Michigan University, 1989). Dissertation Abstracts International, 50-07A, 1858.

Cahen, L. S. (1983). Class size and instruction: A field study. New York: Longman, Inc.

Chalker, R. N. & Horns, V. (1986). Family status and school achievement. Memphis, TN: Annual Meeting of the Mid-South Educational Research

Association. (ERIC Document Reproduction Service No. ED 277 139)

Conlin, E. (1991). Educating the market, Inc., 13(7), 62-67.

Cooper, H. M. (1989). Does reducing student-to-instructor ratios affect achievement? Educational Psychologist, 24(1), 79-98.

Educational Research Service (1978). Class size: A summary of research. Arlington, VA: Educational Research Service, Inc.

Educational Research Service (1980). Class size research: A critique of recent meta-analyses. Arlington, VA: Educational Research Service, Inc.

Einbender, A. J. & Friedrich, W.N. (1989). Psychological functioning and behavior of sexually abuse girls. Journal of Consulting and Clinical Psychology, 57(1), 155-57.

Finkelhor, D. (1991). The lazy revolutionary's guide to the prospects for reforming child welfare. Child Abuse and Neglect: The International Journal, 15, 17-23.

Finn, J. D. & Achilles, C. M. (1990). Answers and questions about class size: A statewide experiment, American Educational Research Journal, 27(3), 557-577.

Folger, J. (1989). Three policy relevent findings from Project STAR. San Francisco, CA: Annual Meeting of the American Educational Research Association. (ERIC Document Reproduction Service No. ED 307 696)

French, N. K. (1991). Elementary teachers' perceptions of stressful events and stress-related teaching practices. Perceptual and Motor Skills, 72, 203-210.

Galinsky, E. (1990). From our president. Raising children in the 1990's: The challenges for parents, educators, and business. Young Children, 45(2), 67-69.

Gelbrich, J. A. & Hare, E. K. (1989). The effects of single parenthood on school achievement in a gifted population. Gifted Child Quarterly, 33(3), 115-17.

Glass, G. V. (1982). Meta-analysis: An approach to the synthesis of research results. Journal of Research in Science Teaching, 19(2), 93-112.

Glass, G. V., Cahen, L. S., Smith, M. L., & Filby, N. M. (1982). School class size: Research and policy. Beverly Hills: Sage Publications.

Glass, G. V. & Smith, M. L. (1978). Meta-analysis

of research on the relationship of class size and achievement. San Francisco: Far West Laboratory for Educational Research and Development.

Greene, B. & Uroff, S. (1989). Apollo High School: Achievement through self-esteem. Educational Leadership, 46(5), 80-81.

Hallinan, M. T. & Sorensen, A. B. (1985). Class size, ability group size, and student achievement. American Journal of Education, 84(1), 71-89.

Hastie, P. A. & Saunders, J. E. (1991). Effects of class size and equipment availability on student involvement in physical education. The Journal of Experimental Education, 59(3), 212-224.

Hobbs, D. (1988). Rural school improvement: Bigger or better? Journal of State Government, 61, 22-28.

Hodgkinson, H. (1988). The right school for the right kids. Educational Leadership, 45(5), 10-14.

Hundleby, J. D. (1982). Adolescent drug use and other behaviors. Journal of Child Psychology and Psychiatry and Allied Disciplines, 23(1), 61-68.

Kantrowitz, B., Hager, M., Cowley, G., Beachy, L., Rossi, M., Craffey, B. Annin, P., & Crandal, R. (1992, August). Teenagers and AIDS. Newsweek,

pp. 44-49.

Keough, K. E. (1986). Scenario 2000: Intercepting the future. Alexandria, VA: National Association of State Boards of Education. (ERIC Document Reproduction Service No. ED 291 161)

Kinard, E. M. & Reinherz, H. (1986). Effects of marital disruption on childrens' school aptitude and achievement. Journal of Marriage and the Family, 48(2), 285-93.

Klauke, A. (1989). Coping with changing demographics (ERIC Digest Series Number EA45). Eugene, OR: University of Oregon, Publication Sales, ERIC Clearinghouse on Educational Management. (ERIC Document Reproduction Service No. ED 315 865)

Leinhardt, G. & Bickel, W. (1987). Instruction's the thing wherein to catch the mind that falls behind. Educational Psychologist, 22(2), 177-207.

McGiverin, J., Gilman, D. & Tillitskie, C. (1989). A meta-analysis of the relation between class size and achievement. The Elementary School Journal, 90(1), 47-56.

Mohay, H., O'Callaghan, M., Burns, Y., &d Tudehope, D. (1988). School achievement, behavioral adjustments, and health at nine years of age in a population of infants who were born preterm or required prolonged mechanical ventilation. Sydney,

Australia: Australian Developmental Conference. (ERIC Document Reproduction Service No. 301 335)

Mueller, D. J., Chase, C. I., & Walden, J. D. (1988). Effects of reduced class size in primary classes. Educational Leadership, 45(5), 48-50.

National School Boards Association. (1973). Class size. Evanston, IL: National School Board Association

New York City Board of Education, Office of Research, Evaluation, and Assessment. (1990). Beyond remediation: School based strategies for reducing educational risk (Research Brief #3). Brooklyn, NY: Author.

Norton, A. J. & Moorman, J. E. (1987). Current trends in marriage and divorce among American women. Journal of Marriage and the Family, 49(1), 3-14.

Odden, A. (1990). Class size and student achievement: Research-based policy alternatives. Educational Evaluation and Policy Analysis, 12(2), 213-227.

O'Hare, W. P. (1985). Poverty in America: Trends and new patterns. Population Bulletin, 40(1).

Preece, P. F. (1987). Class size and learning: A theoretical model. Journal of Educational Research 80(6), 377-79.

Robinson, G. E. & Wittenbols, J. H. (1986) Class size research: A related cluster analysis for decision

making. Arlington, VA: Educational Research Service, Inc.

Ross, D. H. & McKenna, B. (1955). Class size: The multi-million dollar question (Study No. 11) Columbia University: Institute of Administrative Research.

Russell, D. (1984). Sexual Exploitation. Beverly Hills: Sage Publications.

Schulman, R. B. & Jarvis, C. (1988). Early grade improvement program, 1986-87. Brooklyn, NY: New York Board of Education, NY. Office of Educational Evaluation. (ERIC Document Reproduction Service No. ED 295 754)

Schwertfeger, J. (1983). Research concerning young children of divorced parents and recommendations for teachers (ERIC Document Reproduction Service No. ED 242 409)

Shannon. P. (1989). Class size, reading instruction, and commercial materials. Reading Research and Instruction, 28(3), 18-29.

Shreeve, W., Goetter, W. G. J., Norby, J. R., Bunn, A., Stuedkle, A. F., de Michele, B., & Midgley, J. K. (1985). Single parents and student achievement-- A national tragedy. Eastern Washington University. (ERIC Document Reproduction Service No. ED 262 028)

Slavin, R. E. (1984). Meta-analysis in education: How

has it been used? Educational Research, 13, 6-15.

Slavin, R. E. (1989). Class size and student achievement: Small effects of small classes. Educational Psychologist, 24(1), 99-110.

Smith, D. L. & Ament, P. A. (1990). At-risk secondary students and the impact of occupational therapy. Carson City, Nevada: Nevada State Department of Education; Planning, Research, and Evaluation Branch. (ERIC Document Reproduction Service No. ED 317 780)

Stinnett, P. (1982). The politics of lowering class size: A school board member's view. In G. V. Glass, School class size (pp. 87-92). Beverly Hills: Sage Publications.

Stover, F. B. (1954). Administrative policies on class size. Doctoral dissertation, Teachers College, Columbia University.

Tucker, W. (1992). Foot in the door. Forbes, 149(3), 50-51.

Varner, S. E. (1968). Class size. Washington, D.C.: Research Division, National Education Association.

Webb, N. W. (1991). Task-related verbal interaction and mathematics learning in small schools. Journal for Research in Mathematics Education, 22(5), 366-89.

Weisberg, P. G. (1988). Symposium: Social implications

and alternatives for families and children in the next decade. Salt Lake City, Utah: Association for Childhood Education International Convention. (ERIC Document Reproduction Service No. ED 293 636)

Welden, D. E., Loewy, J. H., Winer, J. I., & Elkin, D. J. (1981). Crowding and classroom learning. Journal of Experimental Education, 49(3), 160-176.

Willis, S. (1990). Is smaller better? ASCD Update, 32(5), 1-2.

Wilson, W. J. (1987). The truly disadvantaged: The inner city, the underclass, and public policy. Chicago: University of Chicago Press.

Witherspoon-Parks, M. E. (1988). Effects of class size (1:15) on the teaching/learning process in grade three. (Doctorial Dissertation, Tennessee State University, 1988). Dissertations Abstract International, 51-02A, 405.