
Class Size Does Make a Difference

The authors review findings from Tennessee's four-year study of class size. They point out that, for reduction in student load to be educationally effective, finances must be provided for training teachers in small-group instruction.

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BY HELEN PATE-BAIN, C. M. ACHILLES,
JAYNE BOYD-ZAHARIAS, AND BERNARD McKENNA

DISSATISFIED with earlier research and wishing to have conclusive results, Tennessee's state legislature funded a \$12 million, four-year study of class size. Project STAR (Student/Teacher Achievement Ratio) analyzed student achievement and development in three types of classes: small classes (13-

17 students per teacher), regular classes (22-25 students per teacher), and regular classes (22-25 students) with a teacher and a full-time teacher aide. An important characteristic of the study was its longitudinal nature: Project STAR followed students from kindergarten in 1985-86 through third grade in 1988-89. In order to assess the effects of class size

in different school locations, the project included 17 inner-city, 16 suburban, eight urban, and 39 rural schools. Students and teachers were randomly assigned to class types.

HELEN PATE-BAIN (Tennessee State University Chapter) is a retired associate professor of educational administration at Tennessee State University, Nashville, where JAYNE BOYD-ZAHARIAS is a research associate with the Center of Excellence for Research in Basic Skills. C. M. ACHILLES (Triad North Carolina Chapter) is a professor of educational administration at the University of North Carolina, Greensboro. BERNARD McKENNA is an education consultant in Naples, Fla. The authors would like to thank John Folger, B. DeWayne Fulton, John Johnston, M. Nan Lintz, Barbara Nye, and Elizabeth Word for their contributions.

The main focus of the study was on student achievement as measured by three devices: appropriate forms of the Stanford Achievement Test (K-3), STAR's Basic Skills First Criterion Tests (grades 1-2), and Tennessee's Basic Skills Criterion Tests (grade 3). The study's most important finding was that students in the small classes made higher scores (the difference in scores was both statistically and educationally significant) on the Stanford Achievement Test and on the Basic Skills First (BSF) Test in all four years (K-3) and in all locales (rural, suburban, urban, inner city). Other relevant findings include the following:

- The greatest gains on the Stanford were made in inner-city small classes.

The highest scores on the Stanford and BSF were made in rural small classes.

- The only consistent positive effect in regular classes with a full-time aide occurred in first grade.

- Teachers reported that they preferred small classes in order to identify student needs and to provide more individual attention, as well as to cover more material effectively.

- The importance of the economic background of students was underscored by the finding that, in every situation, those students who were not economically eligible for the free lunch program always outperformed those students who were in the free lunch program.¹

BENEFITS OF SMALL CLASSES

To determine whether small classes had a cumulative effect, the top 10% of STAR classes for each year were categorized by class type. The number of small classes in the top 10% increased each year from kindergarten through third grade. In kindergarten, small classes made up 55% of the top-scoring 10% of STAR classes. By third grade, small classes made up 78% of the top 10%. This finding strongly suggests a cumulative and positive effect of small classes on student achievement in grades K-3.

During the course of the study more than 1,000 teachers participated in year-end interviews. Their comments revealed a number of ways that instruction benefited from small class size.

1. Basic instruction was completed more quickly, providing increased time

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for covering additional material.

2. There was more use of supplemental texts and enrichment activities.

3. There was more in-depth teaching of the basic content.

4. There were more frequent opportunities for children to engage in firsthand learning activities using concrete materials.

5. There was increased use of learning centers.

6. There was increased use of practices shown to be effective in the primary grades.

A common benefit cited by teachers in small and regular-plus-aide classes was that they were better able to individualize instruction. These teachers reported increased monitoring of student behavior and learning, opportunities for more immediate and more individualized reteaching, more enrichment, more frequent interactions with each child, a better match between each child's ability and the instructional opportunities provided, a more detailed knowledge of each child's needs as a learner, and more time to meet individual learners' needs using a variety of instructional approaches.

FURTHER QUESTIONS

Jeremy Finn and C. M. Achilles noted: "This research (STAR) leaves no doubt that small classes have an advantage over larger classes in reading and mathematics in the early primary grades." They

also pointed out that, "although this experiment yields an unambiguous answer to the question, 'Is there a class-size effect?', other questions remain unanswered."² In this article, we take a first look at some additional questions, such as, Do the benefits of small-class participation continue in later grades?

Lasting Benefits Study. Project STAR proved that reduced class size in grades K-3 significantly enhanced student achievement. To determine if those positive benefits continue for the STAR students as they progress through the higher grades, the Tennessee State Department of Education appointed the Center of Excellence for Research in Basic Skills at Tennessee State University to conduct a Lasting Benefits Study (LBS).

All students who participated in Project STAR third-grade classes were eligible for LBS observation in the fourth grade. The LBS fourth-grade sample contained 4,230 students in 216 classes. Although all students had participated in STAR during the third grade, they may not have been STAR participants in previous grades.

For consistency in statistical analysis, the LBS fourth-grade sample was categorized by the location of the school the students had attended in third grade. Academic achievement of LBS fourth-grade students was measured by the Tennessee Comprehensive Assessment Program (TCAP) test battery. Since 17 schools that had participated in Project STAR did not administer the TCAP test battery during the 1989-90 school year, students from these schools could not be LBS fourth-grade participants.

The TCAP includes both a norm-referenced test (NRT) and a criterion-referenced test (CRT). The Comprehensive Test of Basic Skills (CTBS/4), published by CTB/McGraw-Hill and nationally normed in 1988, constituted the NRT component, which indicates students' proficiencies in reading, language, mathematics, study skills, science, and social science. The CRT component was "customized" for Tennessee to assess skill levels attained from the state's mathematics and language arts curriculum. The CRT component indicates students' mastery levels (mastery, partial mastery, or nonmastery) in language arts and mathematics content.

The LBS analysis yielded clear and

consistent results from both the NRT and the CRT test scores. Students who had previously been in small STAR classes demonstrated significant advantages on every achievement measure over students who had attended regular classes. Further, these results favoring small classes were found to be consistent across all school locations. The positive effects of involvement in small classes are pervasive one full year after students return to regular-size classes.³

Effective teachers. In order for educators to make the best use of class-size reductions, they must be aware of what constitutes effective teaching. The Project STAR “within-school” design, which required each participating school to contain at least one class of each type (small, regular, regular-plus-aide), reduced major sources of variation in student achievement attributable to school effects. The class was the unit of measurement, not the individual student. This design made it possible to identify the effects of teachers and of classroom in-

struction on student achievement.

In order to determine the characteristics and instructional styles of effective teachers, STAR researchers observed and interviewed 49 first-grade teachers whose classes had made the greatest gains. The teachers selected for observation and interviews were those whose classes scored in the top 15% of scaled-score average gains in reading and math for each of the four school types.

These teachers consistently displayed similar affective behaviors and characteristics. Their enthusiasm was obvious as they engaged in “acting,” demonstrating, and role-playing activities. The teachers frequently expressed positive attitudes toward children, emphasized positive behavior, praised success, and used humor to promote learning and to motivate students. A love of children seemed to permeate their professional repertoires.

The most effective teachers engaged their students through the use of creative writing, hands-on experiences, learning centers, and math manipulatives. They

provided immediate feedback. They practiced Lee Canter’s assertive discipline or some variation of it and made it clear that they had high expectations for their students. They maintained good communication with parents.

In addition to these common behaviors and characteristics, class size appeared to have been a contributing factor to the success of the most effective teachers. Only eight of the 49 (16%) taught regular classes of 22-25 students. Twenty-three (46%) taught small classes of 13-17; seven (14 %) taught classes of 18-21; and 12 (24 %) had full-time instructional aides in regular-sized classes. The 22-25 class size may be smaller than the norm in many states. If so, these results are conservative.

Two of the teachers in the STAR program, one from a rural school and the other from an inner-city school, provide concrete illustrations of what constitutes effective teaching. Pat McAndrews is a first-grade teacher in a rural school. Her classroom is a beehive of purposeful

activities. She wants children to enjoy school, and she challenges them with motivational games, films, stories, and puppets. She encourages peer tutoring as a way to help students master difficult concepts. For one of her creative writing assignments, which called for students to write a story about a magic hat, she made hats out of styrofoam cups and gave one to each student to decorate. Her 250 teacher-made games, available for use in the learning centers, show her creative and organizational skills. She edited all the first-grade educational television lessons to fit her curriculum.

McAndrews keeps up regular communication with the families of her students. At the beginning of each six weeks, she sends home a letter to explain the material to be covered. Each week students take home a folder of their work to be signed and returned. She telephones family members to discuss good as well as poor behavior. If there is no phone in the home, she visits. She capitalizes on an advantage enjoyed by rural teachers, which is that they know most of the families of their students through informal community and social activities.

Helen Dortch teaches at an inner-city school in Memphis. She works hard to build a good self-concept in her students, many of whom come from poor and broken homes. She gives each student a plaque that reads, "No one can make YOU feel inferior without your consent."

To release tension Dortch has her students "break dance" while holding on to the backs of their chairs. She rewards correct answers by saying, "You're smart!" and leading the class in a round of applause. Vocabulary lessons are a daily ritual. Dortch uses auditory, visual, comprehension, and context exercises. She believes that every child can succeed and is willing to work with each student individually until a task is mastered.

Dortch maintains communication with the home through individualized notes, telephone calls, and home visits. She gives parents her home phone number. She sends home deficiency forms before each report card to enable parents to help students catch up. She enlists family volunteers to accompany her on selected Saturdays when she takes the entire class to cultural events such as plays and concerts at nearby LeMoyné University or visits to Beale Street, a local historic area.

LESSONS FROM THE STAR STUDY

Project STAR and the LBS established that there are benefits to be gained in small classes. Project STAR also found that these benefits are greater when the teachers possess certain characteristics and use certain instructional styles.

In spite of claims by some policy makers that America doesn't need to spend more money on education, studies such as STAR and the LBS continue to point up the fact that additional funds are needed to attain high-quality education in this country. It takes money to cut down on the number of students per teacher and to enable teachers to develop particular characteristics and learn to use effective instructional strategies. It is short-sighted to attack class-size research mainly on the ground that classes smaller than the norm will be costlier than larger classes. Research continues to be needed to help identify appropriate sizes, mixes, or organization of classes for achieving various purposes and outcomes of education. The class-size debate should continue, as we believe that educators still do not know all the answers to the class-size questions.

Some critics contend that class-size reduction is no more than a means for education associations to placate (or increase) their memberships or to make teachers' work less demanding. Other views are that class-size reduction is too expensive for the results achieved and that other procedures are more "cost effective."⁴ Such arguments, frequently replete with policy implications but seldom based on sound research or theory, apparently assume that class-size research is "intended" to reduce class size to some number that has been mystically set as "correct." This line of reasoning appears to begin with the idea that education is a mass-production, industrial-age enterprise, best conducted in assembly-line fashion with large numbers of relatively passive children who are fed specified "facts" and molded for economic purposes.

We have a different premise. We view education not as a mass-production effort, but as a personal and individual experience. The model is not the factory. The focus is on serving clients. Class-size research is not an attempt to reduce class size; at its best it is an effort to find ap-

propriate casework loads, because much of sound educational practice consists of individual instruction, coaching, mentoring, and tutoring. The challenge has been well-stated by Benjamin Bloom: "Can researchers and teachers devise teaching/learning conditions that will enable the majority of students under group instruction to attain levels of achievement that can at present be reached only under good tutoring conditions?"⁵ Class-size studies attempt to find an economical alternative to one-to-one instruction.

One of the biggest questions that remains is how best to share the expertise of those teachers who are recognized as being effective. Communication among classroom teachers is one of the weakest links in our education system. How can we make improvements in this area? How can we provide more inservice programs that will allow teachers who have never experienced small classes to spend time observing and consulting with effective teachers of small classes? How will teacher preparation programs be different if typical class size moves from 25-30 students to 15-18 students?

Providing teachers with an appropriate student load will make possible the individualized and personalized instruction that is the basis of sound education. However, if this reduction in student load is to be educationally effective, finances must be provided for all present and future teachers to be adequately trained in small-group instruction.

1. Elizabeth R. Word et al., *The State of Tennessee's Student/Teacher Achievement Ratio (STAR) Project: Technical Report* (Nashville: Tennessee State Department of Education, 1990). Copies of the report can be obtained from the Center of Excellence for Research in Basic Skills, Tennessee State University, 330 10th Ave. N., Nashville, TN 37203-3401.

2. Jeremy D. Finn and C. M. Achilles, "Answers and Questions About Class Size: A Statewide Experiment," *American Educational Research Journal*, Fall 1990, pp. 573-74.

3. Barbara A. Nye et al., *The Lasting Benefits Study: Fourth Grade Technical Report* (Nashville: Center of Excellence for Research in Basic Skills, Tennessee State University, 1991). Copies of the report can be obtained from the Center of Excellence for Research in Basic Skills, at the address given in note 1.

4. Tommy Tomlinson, "Class Size and Public Policy: The Plot Thickens," *Contemporary Education*, Fall 1990, pp. 17-23.

5. Benjamin S. Bloom, "The 2 Sigma Problem: The Search for Methods of Group Interaction as Effective as One-to-One Tutoring," *Educational Researcher*, June/July 1984, pp. 4-16. K