Project STAR

The Tennessee Student/Teacher Achievement Ratio Study

Background & 1999 Update

WHAT IS THE DIFFERENCE BETWEEN CLASS SIZE & PUPIL TEACHER RATIO?

- Class size and pupil teacher ratios (PTR) are not the same. Arguments using these two terms as synonyms are flawed. Class size is the number of children in a teacher's room daily for whom the teacher is accountable. The PTR is generated by dividing the number of students at one site by all educators, including administrators, counselors, special teachers, etc., and other adults who serve the site. The average class size is often 10 or more students larger than the PTR. Class size reduction does help students in many ways. PTR does not influence student outcomes.

WHAT IS STAR?

- A large-scale, four-year, longitudinal, experimental study of reduced class size, that is considered "one of the most important educational investigations ever carried out and illustrates the kind and magnitude of research needed in the field of education to strengthen schools." [Frederick Mosteller, Professor Emeritus of Mathematical Statistics at Harvard University (Summer/Fall 1995). *The Future of Children: Critical Issues for Children and Youths*, 5(2), p. 113-127.]
- Sound research which "leaves no doubt that small classes have an advantage over larger classes in reading and math in the early primary grades." [Finn, J. D., & Achilles C. M. (1990, Fall). Answers and questions about class size: A statewide experiment. American Educational Research Journal, 27(3), 557-577.]
- Robert Slavin, John Hopkins University, an AERA reactor, praised Project STAR's design and integrity and called it a "watershed event" in research.

HOW WAS THE STAR STUDY DESIGNED?

- All Tennessee schools were invited to participate.
- Each school had to have at least one of each of the three class types: small (13 to 17 students), regular (22-26 students), and regular with a full-time teacher aide (22-26 students) for the within-school design.
- The study included 79 schools in 42 systems. This resulted in over 6,000 students per grade level.
- Schools from inner-city, rural, urban, and suburban locations were included in the experiment.
- All students and teachers were randomly assigned to their class type.

HOW WERE STAR FUNDS OBTAINED AND USED?

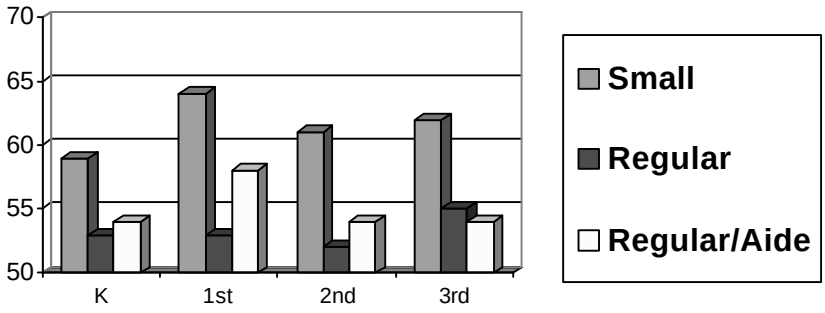
Helen Pate-Bain presented Tennessee Legislators with the positive results from her class-size study that had been conducted within one Metropolitan Davidson County school. Pate-Bain obtained a $12 million dollar legislative appropriation to complete STAR. Out of $12 million, $9,679,879 were used for teacher and teacher aide salaries.

WHAT WERE THE MAIN FINDINGS FROM STAR?

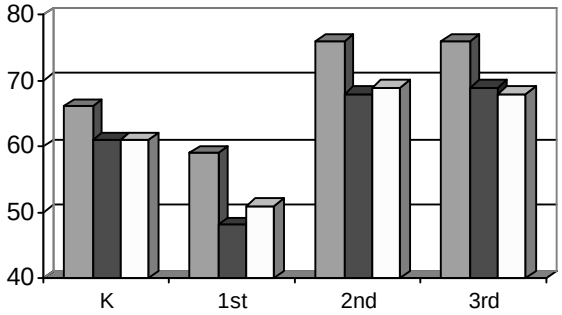
- At each grade level (K-3), and across all school locations, the small classes made the highest scores on the norm-referenced Stanford Achievement Test and the criterion-referenced Basic Skills First Test. These results were both statistically and educationally significant.

Results on the Stanford Achievement Test

STAR Reading Percentile Ranks, Kindergarten - Grade 3, 1985-1989



STAR Math Percentile Ranks, Kindergarten - Grade 3, 1985-1989



WHAT WERE OTHER IMPORTANT FINDINGS FROM STAR?

- The greatest gains on the Stanford Achievement Test were made in inner-city small classes.
- The highest scores on the Stanford Achievement Test and the Basic Skills First test were made in rural small classes.
- Of the classes that scored in the top 10% on the Stanford Achievement Test in Total Reading:
  - 18 of the top 33 Kindergarten classes were SMALL classes (Year 1)
  - 22 of the top 34 First Grade classes were SMALL classes (Year 2)
  - 23 of the top 34 Second Grade classes were SMALL classes (Year 3)
  - 25 of the top 32 Third Grade classes were SMALL classes (Year 4)
- Inner-city (predominantly minority) students in small classes always outscored inner-city students in regular and regular/aide classes. This suggests that small classes are very beneficial to minority students. Non-free lunch minorities in suburban small classes performed as well as non-free lunch whites.
- The effective teacher research (Bain, Word, Lintz, 1989) revealed certain teaching practices, characteristics, and communication skills that when combined with small classes produce more effective learning:

  - Creative Writing, Hands on Experiences, Learning Centers, Use of Manipulatives
  - Good Listener, Immediate Feedback, Monitoring, Preplanned Instruction, Well Organized
  - Assertive Discipline, High Expectations, Peer Tutoring, Reteaching
  - Effective Communication with Parents, Love of Children
  - Enthusiasm, Flexibility, Patience, Sense of Humor
  - Ability to establish effective communication with the home
  - Ability to involve the family in the education of their children
  - Ability to teach parents how to teach their children
  - Ability to make home visits

WHAT POLICY IMPLICATIONS RESULTED FROM STAR?

- Tennessee's school finance plan, the Basic Education Plan, includes incentives for school systems to reduce class sizes to 20 or fewer students in the early primary grades (K-3).
- Approximately 20 states across the U.S. and several foreign countries have used the STAR findings to initiate steps toward smaller classes.

WHAT IS THE CURRENT STATUS OF PROJECT STAR?

Recent analyses show that at least three years in a small class are necessary in order for the benefits to be sustained through later grades. Further, the benefits of having been in a small class in the primary years generally increase from grade to grade. The effects of small classes, expressed in easy-to-understand terms (months of schooling) using the "grade-equivalent" scale which is familiar to educators, parallel those reported earlier. In terms of months of schooling, students in small classes exceed their counterparts in regular classes in every grade and are about a half year (2.8 - 5.7 months) ahead in their school work by the end of grade 3.

Advantages of Attending a Small Class in K-3
Reported in Months of Schooling

	Reading	Math	Word Study Skills
Kindergarten	.5 months	1.6 months	.5 months
Grade 1	1.2 months	2.8 months	.8 months
Grade 2	3.9 months	3.3 months	5.7 months
Grade 3	4.6 months	2.8 months	4.7 months

In grades 4, 6, and 8 – after all pupils returned to regular-size classes – results showed that students who entered small classes in kindergarten had better long-term outcomes than those who began in first grade. Also, there were statistically significant differences in achievement between students who attended small classes for one, two, three, or four years. Long-term effects are significant *on some tests in some grades* (4, 6, and / or 8) for pupils who attended small classes for *three years*, and *on all tests in all grades* for pupils who attended small classes for *four years*.

Long-term Advantages of Attending a Small Class for Four Years (K-3)
Reported in Months of Schooling

	Reading	Math	Science
Grade 4	9.1 months	5.9 months	7.6 months
Grade 6	9.2 months	8.4 months	6.7 months
Grade 8	1 Yr. 2 mo.	1 Yr. 1 mo.	1 Yr. 1 mo.

(Finn, J.D., Gerber, S.B., Achilles, C.M., Boyd-Zaharias, J., 1999)

WHAT WAS THE IMPACT OF SMALL CLASSES ON COLLEGE PLANS?

- **ACT and SAT**: **43.7%** of small-class, **40.0%** of regular-class, and **39.9%** of regular / aide-class students took either the ACT or SAT exams. Since most colleges in the U.S. require students to take either the ACT or SAT exam to be admitted, these findings suggest that lowering class size in the elementary school grades raises the prospect that students will attend college.

- 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.**
- Past studies found that average test scores tend to decline when more (weaker / marginal) students take the ACT or SAT exams. However, attending a small class appears to raise the probability that students write the ACT or SAT exam without lowering the overall average score of students who take the exam (Krueger and Whitmore, 1999).

WHAT IS NEXT FOR PROJECT STAR?

- The Tennessee Legislature and private foundations have funded HEROS, Inc. to conduct follow-up studies through the end of the STAR students' high school graduation and beyond. The full-scale study of the effect of small primary classes (K-3) on long-term social outcomes includes research related to higher education, juvenile detention and adult prison rates, and welfare and employment security. This research is still in progress.
- **Preliminary findings** show more students from small classes completed honors courses (higher-level mathematics, honors English, and foreign languages) during high school than regular or regular / aide-class students. Therefore, more small-class students received an honors diploma upon high school graduation than either the regular or regular / aide-student cohorts.
- Overall, more small-class students graduated from high school on schedule than students who attended regular or regular / aide classes. It also appears that fewer small-class students drop out of high school when compared to students who attended regular or regular / aide classes. (HEROS, Inc.: Pate-Bain, H., Fulton, B.D., & Boyd-Zaharias, J., 1999)

HEROS, Inc. announced release of the first public version of the Project STAR small class size research database. The database is accessible via the World Wide Web at **www.telalink.net/~heros.** This web site also features up-to-the-minute information on the official Project STAR longitudinal research results.

For more information on Project STAR, please contact: Jayne Boyd-Zaharias, Director, Health & Education Research Operative Services (HEROS), Inc., PO Box 1271, Lebanon, TN 37088-1271
Phone: (615) 449-7904, FAX: (615) 449-9793, e-mail: heros@telalink.net

Website: http://www.telalink.net/~heros

Helen Pate-Bain, Chairperson: (334) 540-7012

HEROS, Inc. is a 501 (c) (3) nonprofit organization.