The Difference between Class Size and Pupil/Teacher Ratio

by Charles M. Achilles, Ed.D.

Any discussion of the impact of class size reduction on student performance must begin with a clear understanding of the difference between class size and pupil-teacher ratio.

Picture an elementary school with 10 teachers and 300 students. Each teacher has 30 students. The school has a principal, guidance counselor, and physical education, art, and music teachers. All of these people are traditionally counted as "teachers" when calculating pupil-teacher ratio – even though they may not be in the classroom at a given moment. Ten teachers plus five other educators equals 15 educators, for the purpose of calculating pupil-teacher ratio.

- **The average class size in this school is always 30.**
- **The pupil-teacher ratio in this school, however, is 20:1** (300 students divided by 15 educators).

Some additional definitions from researchers are helpful:

- **Class Size** – The number of students for whom a teacher is primarily responsible during a school year (Lewit & Baker, 1997, p. 113).
- **Pupil-Teacher Ratio (PTR)** – is the number of students in a school or district compared to the number of teaching professionals (McRobbie et al., 1998, p. 4). In some venues all educators are included, including counselors, etc.

The problem with the writings of class size critics

For example, Professor Eric Hanushek, an economist at the University of Rochester, who often is cited as an "expert" on class size, admits in *The Evidence on Class Size* (1998)[1] that "pupil-teacher ratios are not the same as class sizes," and that "data on pupil-teacher ratios reflect the total number of teachers and the total number of students at anytime, not the utilization of these…." (p. 12)

Hanushek stated that "many people correctly note that typical class sizes observed in schools tend to be larger than the measured pupil-teacher ratio. The only data that are available over time reflect pupil-teacher ratios. This situation is quite natural, because reporting on actual class sizes requires surveying individual districts about their assignment practices." (p. 12)

The reason, of course, is that data generally available in large databases are PTR data. Valid and reliable ways to get class size data are: 1) to count the students in a class and/or; 2) to establish class sizes and to monitor them as in Tennessee's Student Teacher Achievement Ratio (STAR) study. Surveys of districts usually give PTR data.

Hanushek also noted that "in order to support calls for class size reductions, there has been a tendency to pick and choose among available studies and evidence." (p. 1) How, then, did he

[1] The Evidence on Class Size (1998). Rochester, NY: W.A. Wallis Institute.

provide "evidence" on class size using the PTR studies? He did not. At best, his work offers some insights into PTR "evidence" and some differences between PTR and class size.

Class size studies

Well controlled class size studies are relatively new. Some examples are STAR (1985-1989); and STAR derivative and follow-up studies (approximate years):

- Lasting Benefits Study (LBS) (1989-1995)
- Project Challenge (1989-1994)
- STAR Follow-Up Studies (1997-1999)
- Participation Studies of STAR (1990,1994)

Other well designed and monitored class size studies include:

- Project SAGE (WI), ongoing
- Burke County (NC), ongoing
- Success Starts Small (NC) Classroom Observation (1994)
- Fairfax County (VA)

Large-scale Class Size Reduction (CSR) events and evaluations are occurring in, for example, California, Nevada, Texas, Tennessee, Wisconsin and Utah. Pilot studies are taking place in South Carolina, Michigan, and other states. Most earlier studies, however, were studies of PTR. *Those* studies formed the base for early "class size" studies and *The Evidence on Class Size* submitted by Hanushek.

How Project STAR differed

In STAR, class sizes were set as part of the experiment. Small classes were randomly established in the 13-17 student range. **The class size and PTR in a STAR classroom were the same only when the single classroom is considered.** Even in STAR, when PTR is computed at the building level, the PTR for all classes – small **(S)**, regular **(R)** and regular with aide **(RA)** – is exactly the same: The class size distinction disappears and the favorable PTR will hide the preponderance of large classes.

EXAMPLE: Consider "Widget Elementary School," participating in Project STAR. It has 529 students in grades K-5 – and 261 in grades K-2 which are shown in detail (see attached chart). Kindergarten (K) has four STAR experimental classes with 86 students randomly assigned to 2 (S), 1 (R), and 1 (RA) classes. (If Widget Elementary were not participating in STAR, there would be 3 K classes for 86 students.) Grades 3-5 with three classes per grade (as in grades 1 and 2) have 268 students and 9 teachers.

Ten other educators including administrator, counselor, media specialist, Title I, etc. also work at Widget.

- The 10 other educators and 19 regular classroom teachers give Widget a PTR of 529 divided by 29 positions, or **18.2**.
- Only two of Widget's 19 classes—the two STAR (S) classes in K have fewer than 18.2 students.
- Other classes have 10-11 more students than the school's PTR of 18.2. The **class size** range is 27-30 in non-STAR classes.

In most STAR schools, the (R) classes that served as the control group in the experiment were smaller than the classes in the rest of the grades in the school. This occurred because one STAR guideline was that no student should have less of an education opportunity from participating in STAR than if STAR were not in that child's school.

If STAR were not in Widget, the three kindergartens for 86 students would average about 29. By participating in STAR and even being in the (R) class, a student would be in a smaller class than if STAR were not at Widget.

This example shows clearly some problems with substituting PTR for class size. The study by Miles (1994) in Boston and other studies of *class size* show that class size and PTR are, in Hanushek's (1998) own words, "not the same."

The STAR study provides solid, experimental evidence of a "class size" effect, its longevity, its academic and non-academic benefits, and the continuing growth of students who start schooling in small classes (15 or 18:1) in K or grade one.

"Widget Elementary" – Class Size vs. Pupil/Teacher Ratio in a STAR School

Grade and Classes	(n)
Kindergarten N=86 (STAR)	
Small	16
Small	16
Regular	27
Regular-Aide	27
Grade 1 N=88	
A	29
B	30
C	29
Grade 2 N=87	
A	29
B	29
C	29
Totals (K-2)	
Students	261
Teachers	10
Totals (3-5)	
Students	268
Teachers	9

Computation *	
Total Students	N=529

Other Educators	
Title	N
Principal	1
Counselor	1
Media Specialist	1
Special Education	2
Title I	3
Art	.5
Music	.5
Physical Education	.5
Gifted	.5
Total "Other"	10
Total Regular	19
Total Educators	29

PTR = 529÷29 or 18.2

* This excludes aides (n=4), secretary (n=1) and nurse (n=.5) whose salaries could add the equivalent of 3 more professional positions, providing a PTR of 529 ÷ 32 or 16.5. Widget Elementary, a STAR School has 261 students in grades K-2, and 529 students, K-5.

STAR in other states…

As STAR results are becoming known, they are slowly being put to use. About 20 states have moved toward small classes. **Tennessee**, the site of STAR, has STAR-related class sizes. Here are a few other class size examples.

- **Wisconsin** began the Urban Initiative that included Student Achievement Guarantee in Education (SAGE) that is following the STAR design and growing in scope each year.
- In 1997-1998 **Michigan** began a pilot class size effort using the idea of targeting funding to classes with high proportions of low-performing, potentially at-risk students.
- **Utah** has been quietly reducing class sizes, first in the primary grades and then moving the small classes into the higher grades.
- **Nevada** drew heavily from STAR to implement small classes. With rapid population growth squeezing facilities, Nevada often put two teachers in the same room with 30 or more students.
- **California's** massive statewide CSR has generated lots of attention. Early evaluation results show some students benefits.
- **Texas** really began before STAR was completed with the passage of House Bill 72 that limited class sizes in grades K-4 and got their Class Size Reduction (CSR) going.

Other states have drawn on STAR results to begin class size reduction in various ways either at pilot sites or on a larger scale: **Florida, Illinois, Indiana, New York**, and **Oklahoma**. Currently more states are moving forward with STAR-inspired class size legislation and initiatives, including **Iowa, Minnesota**, and **South Carolina**.

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