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ABSTRACT

Confusion over the concepts of class size and pupil-teacher ratio (PTR) creates a conundrum for researchers, policy makers, and practitioners. An examination of how these two concepts are different is presented in this paper. A review of the literature suggests that class-size reduction makes a positive overall difference in student achievement, whereas an increase in the PTR is associated with lower student achievement. To explore this finding, a study on the two concepts was performed using 104 elementary schools and 12 secondary schools. The results show that class-size reductions do influence student outcomes positively but that PTR changes do not influence student outcomes significantly. A number of recommendations for future research are made, such as the importance of professional and policy persons using the terms PTR and class size with precision; that researchers continue to conduct studies on both PTR and class size; that researchers reanalyze prior studies using consistent definitions; and that policy-related research focus on ways to benefit students directly. Some implications for funding, policy implementation, probable roadblocks, and plans for future studies are provided. Contains 26 references. (RJM)

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ED 419 290

ATTEMPTING TO UNDERSTAND THE CLASS SIZE AND PUPIL-TEACHER RATIO (PTR) CONFUSION: A PILOT STUDY

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ATTEMPTING TO UNDERSTAND THE CLASS SIZE AND PUPIL-TEACHER RATIO (PTR) CONFUSION: A PILOT STUDY

AASA, Conference Within a Convention 2/28/98.

Introduction: A Curious Conundrum

Confusion in the concepts of class size and pupil-teacher ratio (PTR) causes considerable consternation and a continuing conundrum for researchers, policy makers, and practitioners. Studies using PTR and class size with student achievement as the outcome have constantly produced nearly opposite findings and conclusions. In some situations, these two terms have been used interchangeably and as synonyms. (They are not). When this happens, study results are murky at best and contradictory at worst.

Until these two terms are used with precision, both the people who contend that class size makes a positive difference in student outcomes and those who contend that pupil-teacher ratio (PTR) does not make a difference will be correct. This unusual and conflictual situation can lead to such confusing concepts and conclusions as the often-cited idea that "money doesn't matter" in education improvement or that "class size does not matter" in student achievement. Both statements may be correct if researchers use PTR as a proxy for class size in the research. Both statements are wrong if researchers use actual class size as the basis for their research. In actuality, class size is not easy to determine with accuracy in large-scale research or databases unless it is checked with the class teacher for accuracy.

An example of the confusion in the terms appears in a chapter by Card and Krueger (1996). In juxtaposed sentences, Card and Krueger say:

> Figure 5.4 displays the cost-state relationship between the difference in returns to education between Blacks and Whites and the difference in pupil-teacher ratio for Black and White men born between 1910 and 1939. The downward-sloping relationship signifies that the differential payoff to a year of education was greatest for those from states where Black schools lagged furthest behind White schools in class size. (pp. 128-129, Emphasis added).

Card and Krueger use pupil-teacher ratio and class size interchangeably. The conclusion seems to support that small classes are important. In 1910-1939 however, class size and PTR may have been nearly the same.

Even a former Department of Education official (assistant secretary) fumbles the PTR and class-size distinction. Finn (1997) uses the terms as synonyms (incorrectly) to advance his privatize/high-tech "solutions" for education. By imprecise use of the terms, Finn can support an agenda to solve "problems" that won't exist if he uses the terms correctly.

> A policy decision to employ more teachers (such as by reducing pupil-teacher ratios which have fallen from 27-to-1 to 17-to-1 over the past 40 years) is obviously different from a decision to hold class size constant but pay teachers more – or invest more in technology. (pp. 48, 36; Emphasis added).

Delineation between PTR and class size comes from separate Office of Educational Research and Improvement (OERI) publications from the US Department of Education. [The former Assistant Secretary's data do not agree with data from the department where he worked. Finn said 17-1; the OERI said that 20-1 is closer]. Table 1 presents the OERI data showing a class size of 23.2 for all schools and a PTR of 19.9 for elementary schools and of 16.4 in secondary schools. Unfortunately, as shown later, the discussion accompanying the data gets cloudy.

Table 1 About Here

The 1996 Pocket Projections of Education Statistics (NCES 96-660) shows that in 1995-96 the PTR in the United States was approximately 18.8 for public schools and 16.3 for private schools. According to the footnote, this information was derived by a computation using enrollment by organizational level. In the 1997 Teachers' Working Conditions (NCES 97-371) the average class size for public schools in 1993-94 was reported as 23.2 in public schools and 19.6 in private schools. This information was derived from a "Schools and Staffing Survey" teacher questionnaire. In a questionnaire, we assume that teachers report the number of youngsters that they actually have in their classrooms. If so, 23:1 may be class size, yet in this discussion of class size is the statement (emphasis added) that "pupil-teacher ratios at the secondary level in the United States are high compared to those in other countries" (p. 5). The overall class size may be distorted downward if teachers of small, specialized classes responded to the survey. Class size in Teacher's Working Conditions is not reported by school level (e.g., high school), and small secondary classes will affect the data.

In Boston, Miles(1995) found a PTR of 13.2, but in interviews with teachers, Miles found that "most students spend the majority of their time in classes having more than 23 students" (p. 477, emphasis added). Miles (1995) noted that, "Regular education class sizes average 22.7 and vary substantially

around this average from 10 to 33." (p. 477). Miles' class size (about 23) and the U. S. Department of Education's 23.2 are quite similar.

Boozer and Rouse (1995) help explain that money may not matter in terms of PTR, but that it may matter in terms of class size. They found differences between PTR and class size and student outcomes were different for each. They concluded: "Once again, we find that the pupil-teacher ratio does not (statistically) increase in schools with a larger proportion of Black students, but that the average class size does" (p. 8). They continue with, "We find that the pupil-teacher ratio has essentially no effect on the test-score gains of students. On the other hand, students in schools of larger than average class sizes have significantly smaller test score gains." (p. 8, Emphasis added). In other words, class size, not PTR, is important for student achievement; small classes do have a positive influence on student outcomes and PTR changes don't. The authors' statement, "The fact that school average class size matters but pupil-teacher ratio does not. . ." (p. 9) cuts to the heart of the matter.

More Than an Academic Issue:

Concern for precision in using these terms is far more than academic. Confusion between PTR and class size leads to the contradictory conclusions that money does not matter and that it does. (Numerous authors appear in the "References" section to support both positions). The conclusion that as PTR changes there is little or no student gain leads to erroneous educational policy decisions that are harmful to students, costly to the public, and that deter serious attempts at education improvement. The mathematics, semantics, and common language usage are all messed up. * Recently, Lewit and Baker (1997) addressed the topic in some detail.

The U. S. Department of Education (1997) reported that class size was 23.2 and that for about the same time the PTR was 18.8 in elementary school (U. S. Department of Education, 1996). This 4.4-point differential is about half of the class-size difference that caused positive achievement gains in Tennessee's STAR [Student-Teacher Achievement Ratio] experiment (Word et al., 1990).

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* In common use of the language there is potential for confusion; it is easy to think that when PTR decreases, there is a resultant decrease in class size. The contrary is true: as ratio increases, the number of students will decrease. Class sizes of 1:15 are smaller than classes of 1:25, 1:25 provides a smaller ratio (.04) than does 1:15 (.067).

As Boozer and Rouse (1995) pointed out, students in schools where there are higher PTRs tend to have lower scores, and students in schools with smaller class sizes tend to have higher scores. Schools with high PTRs in the Boozer and Rouse study had high proportions of students who needed special and remedial assistance.

Project STAR in Tennessee was a carefully constructed and monitored longitudinal and experimental study of class size. (Word et al, 1990; Finn and Achilles, 1990; Achilles, 1997; Achilles, 1997-98). STAR results clearly established a positive small-class effect ranging from approximately an effect size (ES) of .3 for all students, and of .7 for minority students.[1]

The consensus of the research reviewed for this paper is that class-size reduction makes a positive overall difference in student achievement, and that an increase in the PTR does not make a positive overall difference in student achievement. To the contrary, increase in PTR is associated with lower student achievement. Both class size reduction and PTR increases influence education costs in similar ways but education outcomes in different ways. Although the terms are often used as synonyms, a) the use of the funds is very different, and b) in one case measurable achievement gains are obtained. On the one hand one can conclude that a change in PTR which costs money does not lead to a positive gain in student achievement (e.g., Hanushek, 1995, 1996; Murnane & Levy, 1996; Finn, 1997) and one can also conclude that a change in class size which costs about the same amount of money does lead to a positive change in student achievement (Word et al., 1990; Finn & Achilles, 1990, etc.): Money doesn't matter, but money does matter.

Plan for The Current Research: An Overview

The continuing confusion in the research and policy literature over PTR and class size suggested the need to understand and to clarify the conundrum of how both groups of what appeared to be reasonable researchers and research results could be correct and yet provide conflicting results. To start, the researchers attempted to clarify the problem, to seek help from prior research and literature and to conduct a pilot study to verify the existence of a

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[1] Although STAR was tightly controlled and monitored, student mobility caused class sizes to become larger or smaller over time than the original experimental conditions of a small-class (S) range of 13-17 and a regular-class (R) range of 22-26. In this incremental "creep," (S) became larger and (R) became smaller. This clearly influenced the magnitude of the differences between (S) and (R). Appendix A shows estimates of STAR class sizes each year. Re-analysis of data with the "out-of-range" classes (designated as "B" in the table) removed shows positive effect sizes (ES) each year, ranging from .33 to .71 for the total samples. (Boyd-Zaharias, Achilles, Nye, Bain & Fulton, 1995, p. 120).

problem before embarking upon a rather detailed study. The study reported here was the pilot study.

From one graduate class (n=18) one author (Achilles) obtained data on local schools and districts as an indicator of a class size/PTR difference. From these initial data, Achilles and Sharp drafted an instrument to codify the collecting of such data. This draft instrument was reviewed by approximately 80 elementary-school administrators in 7 states (IN, OH, KY, MI, SC, GA, FL) to refine the questions and terminology so that the instrument could be used reliably by administrators from various states. The present draft of the data-collection form is in Appendix B.

In locations throughout the United States, Achilles then used the instrument to collect data from graduate students who also were school administrators. Resulting data allowed researchers to distinguish between class size and PTR in each building for which there were data. This was done using the total population of the students and categorizing the educators in the building as "regular" and other. "Regular" teachers had a set membership of "regular" youngsters in their classrooms. These teachers daily faced a fairly constant number of youngsters for whom they were specifically responsible. (In a few cases superintendents provided data for entire districts. These data are entered on the summary table as separate units and so designated).

"Other" teachers taught students with special needs; taught specialty courses such as Title I, art, music; or provided other education assistance (e.g., media, guidance, administrators, aides). Dividing the population of youngsters in the building by the number of regular classroom teachers gave an estimate of class size. Dividing the number of youngsters by the total number of professional personnel serving that site derived a PTR estimate for that building.

The Sample and Data Collection

This pilot study employed a convenience sample. The sites from which we obtained useable data are presented in Table 2. Respondents represented 116 schools (104 elementary, and 12 secondary) covering pre-K to grade 12 in Canada and 12 states: AL, AZ, FL, GA, IN, MI, OH, CA, CO, KY, SC, WA. Data were also obtained for one Canadian Province (British Columbia) and one large school system in IN for elementary grades (K-6) only.

Table 2 About Here

Achilles distributed the instrument in Educational Administration graduate classes taught for Nova Southeastern University (NSU) and for

Eastern Michigan University (EMU). He discussed the instrument with participants and answered questions about the data requirements. Participants provided the data at the next class session when the instruments were collected following a discussion of PTR and class-size differences.

The principal author and graduate assistant reviewed the completed forms. They transferred data to a matrix, and computed both class-size and PTR estimates.

Limitations

This pilot study will precede a more "structured" study by school level. Although care was taken in data collection and handling, the data were obtained in a "convenience" sample. As shown in Table 2, six of the 12 "states" are represented by from 1-4 schools (not even systems), so any analysis by state is clearly inappropriate. Tabulations in Tables 3-4 are simply averages of averages, and not weighted.

The Results

Table 3 shows data collected for this study in the aggregate. Table 4 presents data for this pilot study and from several other studies that show PTR and class size differentials. The information in Tables 3 and 4 shows differences between class size and PTR, and that there is some consistency in these differences among the states, the sites, and the various studies. Results are consistent with information obtained in the literature and research review.

Tables 3 & 4 About Here

Discussion of the Differences Between PTR and Class Size

In this study, there were considerably more elementary schools (n=104) than secondary schools (n=12) represented. This is satisfactory given the state and federal interests in small classes in grades K-3. Differences between class sizes and PTR in the elementary schools are 8-10 pupils. This is the difference between the STAR Small (S) and Regular (R) classes that produced effect-size differences of .3 - .7.

- The differences are real, at about 10 pupils in all categories.
- According to Boozer and Rouse (1995) PTR change does not influence student outcomes significantly.
- Class-size reductions do influence pupil outcomes positively.

- Thus, it may be possible both to influence student outcomes positively, and to have nearly enough qualified teachers, etc. through site-based staffing decisions related to student needs.

One Meaningful Way to Activate the Mystery of Site-Based Decisions

One way to address the PTR and the class-size differences is to activate meaningful teacher involvement in site-based decision making. Teachers and administrators can analyze the staffing patterns of their schools and compare actual staffing with preferred class sizes in early primary grades. This entails considering a school's pupil population and differences between the number of "regular" teachers and the total numbers of educators serving the site. Based upon context and research data (space, number of personnel, class-size research) educators can determine new class sizes and staffing arrangements and use professional knowledge to design a plan to serve the students at the site. By increasing the number of "regular" teachers and by reducing the number of "special" teachers or by deploying staff in different ways, the administrators and teachers can "restructure" on a research-driven knowledge base. Appendix C includes an adaptation of a worksheet used in such deliberations at the Draper Middle School, Rockingham County, NC by the principal and faculty (Hansel, 1997).

Recommendations to Remedy the PTR and Class-size Confusion

If all recommendations for improvement could be as unambiguous as those derived from this study, clear research and policy might converge to result in radical changes in the allocation of resources for education.

1. Professional and policy persons should use the terms PTR and class size with precision.

2. Researchers should continue to conduct studies on both PTR and class size, but use clear, cogent, and concise definition of the terms.

3. Researchers should re-analyze prior studies using the consistent definitions of class size and PTR as a base for policy decisions.

4. Policy makers should use the results once the confusion has been corrected for class-size and for PTR decisions. Both decisions may add costs; class-size decisions will also effect positive outcomes in achievement and development if applied in early grades.

5. Policy-related research should focus on how to do what research has shown to benefit students directly, and teachers and others indirectly.

Funding and Policy Implications

Clarity in using the terms PTR and class size should lead to important improvement in education. For example, classes of about 15 early primary children provide one way to address education quality (better outcomes), equality (all pupils get the same resources) and equity (pupils typically hard to teach receive more benefits from the equal treatment than do other pupils). (Achilles, 1997; Achilles, Finn, & Bain, 1997-98). Some changes that may accrue are listed below.

- Class-size demonstrations will help teachers learn and apply teaching techniques particularly useful in small classes.
- Policy emphasis will change from PTR to class size.
- Teacher accountability: Teachers will be responsible for pupils in their classes rather than sending pupils to "special" classes and believing that the "special-class" teachers are accountable for students outcomes.
- Systemic change will build upon 1:15 in early grades. This change will include such things as parent involvement, redefinition of use of other adults in classrooms, etc.
- Benefits of early primary classes of 1:15 will affect students, teachers, and others, and these factors should become education outcomes.
- Facilities/space will become flexible for early primary grades.
- There will be no major cost differential between pre 1:15 and post 1:15 if a) PTR teachers are re-assigned, b) administrators are creative about space use, c) retention-in-grade reductions follow 1:15, d) early identification of student special needs leads to immediate assistance and remediation.

Why is clarifying the PTR and class-size issue so important in terms of teaching and in helping to understand why class size may influence outcomes and PTR does not?

- Class size, or actual number of students assigned to the classroom teacher often affects classroom discipline, time on task, individual assistance, use of a variety of small-group learning experiences, classroom management. Teachers reported using fewer project-based activities that require students to develop higher-order thinking skills in larger classes (over 20) in grades K-5 than in smaller classes. (Nye, 1997)
- Nye (1998) suggested that one reason for the positive effects of small classes on student achievement is the relationship of this educational

intervention to direct classroom instruction. Efforts like one or two computers in a classroom, used occasionally on a single concept or subject, or in unsystematic, one-shot teacher training (called professional development) are not likely to affect achievement in the same way as a direct intervention like assuring a manageable number of students for one teacher, so that teachers can demonstrate best practices for teaching and learning in the classroom.

- Clarity of these issues may help explain how and why students in small classes achieve more than students in larger classes, and how teachers teach differently in classes of different sizes. The speculations provided above have been verified in a year-long observational study of "Life in a small class" (Achilles, Kiser-Kling, Owen, & Aust, 1994) and by observations in "Hands-on-Science" and in other early-education interventions conducted at Tennessee State University.

- Some findings of the many studies related to STAR (see Appendix D) may also be influential in determining other benefits related to resolving the class size and PTR conundrum.

Plans for Future Study

Researchers plan to conduct a controlled study of PTR and class size in one state. Results from that in-depth analysis using appropriate sampling procedures will be compared to results of this pilot study and to results of other studies in a manner similar to the procedures used in this pilot study. Beginning with this paper, we'll conduct a dissemination plan to get the information widely known. Other analyses will compare teaching practices in smaller and in larger classes to determine some reasons why students in smaller classes do better on measured outcomes of schooling.

Probable Roadblocks

Predictable and probable roadblocks to using the research-based knowledge will be teachers who will all insist on the same-sized classes everywhere and doing business as usual, administrators who will not "rock the boat" or use research as a basis for decisions, advocates and purveyors of special or pet projects that smaller classes may make obsolete, professors who do not read and know the research so they cannot teach it to students, school boards with special-interest agendas (I know of one youngster somewhere who . . .), the incredible pressure of tradition and resistance to change, people who speak of systemic change but continue to "tinker" etc. To get the results of the class-size work into practice, especially by changing the PTR into class-size units, will take extraordinary leadership skills. There is a real challenge. Who will accept it? Soon?

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Table 1. Comparisons of Average Class Size and of Pupil-Teacher Ratio (PTR) from U. S. Department of Education Documents.

1. PTR (Based on enrollment by organizational level). *

School Level	1983-84	Estimate 1994-95	Projected 2005-06
Elementary	19.9	18.8	17.8
Secondary	16.4	14.7	14.4

2. Class Size, 1993-94 (From "Schools and Staffing Survey"). **

School Type	Average	School Size	
		up to 150	150 or more
Public	23.2	15.4	24.5
Private	19.6	—	—

* NCES 96-660, p. 2 ** NCES 97-371, p. 4

Table 2. Distribution of Sample for the Pilot Study of PTR and Class-Size Differences (9/97-2/98).

Location	Sample by Schooling Level		Total
	Elementary	Jr./Secondary	
AL	3	2	5
AZ	25	—	25
CA	2	1	3
CO	10	—	10
FL	4	1	5
GA	1	0	1
IN	6	0	6
KY	1	0	1
MI	7	0	7
OH	10	0	10
SC	26	4	30
WA	1	—	1
CANADA	8	4	12
TOTAL	104	12	116

Table 3. Differences in Average Class size and PTR by School Level Obtained in Pilot Study, 9/97-2.98, in 11 States and Canada.

Location	Elementary (AVE)			Secondary (AVE)		
	PTR	CL. SIZE	DIFF.	PTR	CL. SIZE	DIFF.
AL	13	19	6	17	34	17
AZ	18	33	15	—	—	—
CA	15	29	14	23	30	7
CO	15	24	9	—	—	—
FL	17	25	8	13	17	4
GA	16	23	7	—	—	—
IN	15	24	9	—	—	—
KY	16	22	6	—	—	—
MI	16	27	11	—	—	—
OH	15	26	11	—	—	—
SC	13	23	10	12	19	7
WA	18	28	10	—	—	—
CANADA	14	24	10	15	21	6
TOTAL	201(15) 13	327(25) 13	126(10) 13	80(16) 5	121(24) 5	41(8) 5

Table 4. Comparisons of PTR and Class Sizes From Various Sources.

Source/ Category	Years	Reporting Category					
		ELEM	SEC	PUB	PRIV	TOT	RANGES
Present Study	97-98						
• PTR		15	16	—	—	—	12-18
• CL. Size		25	24	—	—	—	17-34
U. S. Dept. Ed.	1983 - 2006 (EST)						
• PTR	83-84	19.9	16.4	—	—	—	—
	94-95 Est	18.8	14.7	—	—	—	—
	05-06 Proj	17.8	14.4	—	—	—	—
• CL. Size		—	—	23.2	19.6	—	—
Miles Study	1995						
• PTR		—	—	—	—	13.2	
• CL. Size		—	—	—	—	23+	10-33
District Response	97-98 (27,000)						
• PTR		16	N/A	16	N/A	N/A	N/A
• CL. Size		22	—	22	N/A	N/A	N/A
B. C. Gov.	96-97	(1788 schools in 80 systems)					
• PTR		—	—	—	—	16.9	10.5-20.0
• CL. Size		23.4	24.5	—	—	—	7.9-29.4

— = No data; N/A = Not Applicable; NR = Missing Data

APPENDIX A. Distribution of STAR classes by grade (K-3) by designation S (Small), R (Regular), and RA (Regular and Aide), each year of the study showing "drift."

		K (n classes)			1 (n classes)			2 (n classes)			3 (n classes)		
		S	R	RA	S	R	RA	S	R	RA	S	R	RA
	11										2		
	12	8			2			3			2		
	13	19			14			16			15		
A	14	22			18			27			17		
	15	23		1	31			32			31		
	16	31	4		16	1		29	1		31		1
	17	24	4	1	33	1		19			27		
	18		1	2	6	2		6			10	1	
B	19		7	6	3	4	3	1	3	3	5		4
	20		6	6	1	10	6		2	1		9	13
	21		14	12		18	18		7	11		11	12
	22		20	20		27	15		23	21		13	16
	23		16	21		19	20		20	21		10	14
	24		19	14		16	11		22	25		15	14
	25		6	6		7	9		9	15		116	15
C	26		4	3		5	9		6	7		5	12
	27		1	6		2	4		4	1		5	8
	28			1		1	2		1	0		2	6
	29					1	2		2	2		2	2
	30					1	1						
TOT		127	99	99	124	115	100	133	100	107	140	90	107
		325			339			340			337		

A= range for (S); B= "out of range"; C= range for both (R) and (RA) classes.

Actually, these numbers represent the number of students who took the test; classes could have been larger, but not smaller.

APPENDIX B

DATA COLLECTION FORM: PUPIL-TEACHER RATIO & CLASS SIZE

State: _____

School Level: Elem. Mid.or Jr. High HS K-8 K-12 **Grades:** _____
(Circle One)

Building Enrollment: _____

(Do not include self-contained special education student enrollments: EMH, LD-SC, EH-SC, BD-SC, TMI, XMI, POHI, etc.)

Aides -- Adults who work with regular, remedial, or special education teachers.
Regular Classroom Teachers -- Teachers who teach in traditional/regular or inclusionary PreK-12th grade classrooms.
Support Teachers -- Certified teachers who support the regular program (e.g., LD, EI, EMI, Title I, Resource Room, or any other special ed. classroom teacher whose position supports the regular program).
Specials Teachers -- e.g., PE, Media Specialist/Librarian, Art, Music, Foreign Language
PTR -- Pupil / Teacher Ratio (Includes all adults in building who work with students,- e.g., counselors, social workers, administrators, teachers, aides, support & specials teachers.) Compute on FTE basis.
Class Size -- The number of children on a regular PreK- 12 teacher's active attendance book.
PreK -- Pre-Kindergarten; also: Early or Young-Fives, Developmental, Begindergarten (school-aged children)

DATA FORM: *Use Full Time Equivalence (FTE) where appropriate.*	TOTAL (N)	FTE
Regular Classroom Teachers		
Aides		
Support Teachers		
Specials Teachers		
Administrators, Counselors, Psychologists, etc.		
Secretaries		
Other Support Professionals *(Do not count School Nurse or Central Office Staff.)*		
TOTAL PROFESSIONAL STAFF		
TOTAL NON-CERTIFIED STAFF		

PLEASE MAIL TO: **C. M. ACHILLES, EdD** **E-Mail: achillec@fcae.nova.edu**
Please complete 1 form per building
Pittman Hall, Ed. Leadership Dept.
Eastern Michigan University
by_____. **Ypsilanti. MI 48197 (313) 487-0255**

THANKS!

OFFICIAL USE: DO NOT WRITE IN THIS BOX.

PTR: _____ **CLASS SIZE:** _____

Clsize mwsowwchk 1197

1/98

APPENDIX C: Sample Worksheet to Convert PTR to CLASS SIZE in a Site-Based Decision Activity. *

GRADES K-5. ENROLLMENT = 760

CATEGORY	N
ADM. & COUNSELORS	4
CLASSROOM TEACHERS	32
SPECIALISTS (LD, AG, ESOL, ETC.)	12
AIDES (15) (3= 1 TCH)	5
TOTAL POSITIONS	53

760 ÷ 32 = 24; 760 ÷ 53 = 14

760 ÷ ? = ?

SITE-BASED DECISION?

---

* Adapted from Steve Hansel's work in Rockingham County, NC, 1997.

Appendix D. Samples of Studies Derived from and Building upon Classed as "Subsidiary" (directly from STAR), "Ancillary" (buildin database) and "Related" (usually involving STAR researchers).

CATEGORY, TITLE & PURPOSE *	DATE(S)	AUTHOR(S) OR PUBLICATION
STAR (Many sources)	1985-1989	Word, et al., 199 Finn & Achilles,
Subsidiary Studies		
• Lasting Benefits Study	1989-Present	Nye et al., 1991-
• Project Challenge (TN)	1989-Present	Nye et al., 1991-
• Participation in Grades 4, 8	1990, 1996	Finn, 1989, 1993 Finn, et al., 1989 Finn and Cox, 19
• Follow-up of STAR students	1996-1998	HEROS (1997)
Ancillary Studies (Use or extend STAR. Some dissertations.)		
• Retention in Grade	1994	Harvey, 1994
• Achievement Gap	1993-1995	Bingham, 1993
• Value of K in Classes of Varying Sizes (test scores)	1985-1989	Achilles, Nye, Ba
• School Size and Class-Size Issues	1985-1989	Nye, K., 1995
• Random v. Non-Random Pupil Assignment and Achievement	1985-1989	Zaharias, et al.,
• Class Size and Discipline in Grades 3,5,7	1989, 1991, 1996, etc.	Several studies. Hibbs (1996).
• Outstanding Teacher Analysis (top 10% of STAR teachers)	1985-1989	Bain et al., 1992
Related Studies		
• Success Starts Small: Grade 1 in Chapter 1 (1:14, 1:23) Schools	1993-1995	Achilles et al., 19
• Burke Co., NC Study	1992-1998	Achilles et al., 19
• Education Production Functions	1996-1997	Krueger, A. B. (1

* This list is not complete. It provides samples of the types of studies d authors appear in the references in the exact way listed here. This tabl several STAR reports in substantially this same form. For a list of all re Achilles (1996b).

WORKSHEET: CONVERSION OF CURRENT STAFFING INTO OPTIONS FOR CLASS-SIZE ADJUSTMENTS (K-3 OR K-5, ETC.)*

(COMPLETE FOR YOUR SCHOOL OR SYSTEM)

CURRENT STAFF ALLOCATIONS	POSITIONS (n)
REGULAR CLASSROOM TEACHERS K-5 (OR K-3, ETC.)	_____
TEACHER ASSISTANTS (EST. 2.5 PER TEACHER)	_____
SPECIALTY PERSONS	
A. MEDIA/LIBRARY	A. _____
B. GUIDANCE	B. _____
C. ADMINISTRATION	C. _____
D. SPECIALISTS (e.g.)	D. _____
1. LANGUAGE(S)	1. _____
2. PHYS. ED.	2. _____
3. MUSIC/ART	3. _____
4. TECHNOLOGY	4. _____
5.	5. _____
6.	6. _____
7.	7. _____
E. TITLE I	_____
F. OTHER TITLES	_____
G. EXCEPTIONAL CHILDREN	G. _____
1.	1. _____
2.	2. _____
3.	3. _____
H. OTHER	H. _____
TOTAL AVAILABLE FOR CONSIDERATION:	_____

* ADOPTED FROM STEVE HANSEL, PRINCIPAL, DRAPER ELEMENTARY SCHOOL, ROCKINGHAM COUNTY., NC.

Appendix D. Samples of Studies Derived from and Building upon STAR, Classed as "Subsidiary" (directly from STAR), "Ancillary" (building on STAR database) and "Related" (usually involving STAR researchers).

CATEGORY, TITLE & PURPOSE *	DATE(S)	AUTHOR(S) OR PUBLICATION DATE
STAR (Many sources)	1985-1989	Word, et al., 1991 Finn & Achilles, 1990
Subsidiary Studies		
• Lasting Benefits Study	1989-Present	Nye et al., 1991-1996
• Project Challenge (TN)	1989-Present	Nye et al., 1991-1996
• Participation in Grades 4, 8	1990, 1996	Finn, 1989, 1993; Voelkl, 1995 Finn, et al., 1989, 1990 Finn and Cox, 1992
• Follow-up of STAR students	1996-1998	HEROS (1997)
Ancillary Studies (Use or extend STAR. Some dissertations.)		
• Retention in Grade	1994	Harvey, 1994
• Achievement Gap	1993-1995	Bingham, 1993
• Value of K in Classes of Varying Sizes (test scores)	1985-1989	Achilles, Nye, Bain
• School Size and Class-Size Issues	1985-1989	Nye, K., 1995
• Random v. Non-Random Pupil Assignment and Achievement	1985-1989	Zaharias, et al., 1995
• Class Size and Discipline in Grades 3,5,7	1989, 1991, 1996, etc.	Several studies. Hibbs (1996).
• Outstanding Teacher Analysis (top 10% of STAR teachers)	1985-1989	Bain et al., 1992
Related Studies		
• Success Starts Small: Grade 1 in Chapter 1 (1:14, 1:23) Schools	1993-1995	Achilles et al., 1995
• Burke Co., NC Study	1992-1998	Achilles et al., 1994
• Education Production Functions	1996-1997	Krueger, A. B. (1997)

* This list is not complete. It provides samples of the types of studies done. Not all authors appear in the references in the exact way listed here. This table appears in several STAR reports in substantially this same form. For a list of all references, see Achilles (1996b).

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