

Alaska State Legislature

House of Representatives

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Representative Harry Crawford
District 21

SPONSOR STATEMENT: HOUSE BILL 23

House Bill No. 23 would establish a grant program to support the voluntary participation of schools to reduce their classes to 15 students per teacher for the grades of kindergarten through third. This act may be known as the Time to Teach Act and has benefits for children, schools, teachers, and society as a whole.

Research conducted by Project STAR, a Tennessee based study, and the SAGE Program in Wisconsin both used the class size of 15 students and mapped those students' achievements using standard tests over five year periods starting in kindergarten and continuing through fourth grade. Students test scores rose in nearly every area compared to students in larger classroom settings. Teachers had an easier time teaching students, and maintained more control which led to less disciplinary action and disruption.

Class size reduction in the two studies mentioned above also led to higher test scores later in school and much higher rates of high school completion and a greater likelihood to pursue collegiate careers. The trends exposed by these studies had a greater impact on minority students as they benefitted greatly from the increased teacher availability and more direct student-teacher interaction.

The Time to Teach Act would provide the opportunity for schools to decide for themselves how, and when, they would implement the changes in class sizes. The flexibility allowed under this act will encourage strong local community support and involvement and will encourage custom tailored plans for each school. In addition to the class size reductions the Time to Teach Act will require schools to study the program over a five year period in order to determine its effectiveness and practicality both for the schools themselves and for the state of Alaska.

HOUSE BILL NO. 23

IN THE LEGISLATURE OF THE STATE OF ALASKA

TWENTY-SIXTH LEGISLATURE - FIRST SESSION

BY REPRESENTATIVES CRAWFORD AND GARA

Introduced: 1/20/09

Referred: Education, Finance

A BILL

FOR AN ACT ENTITLED

1 **"An Act establishing a grant program to support voluntary class size reduction."**

2 **BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF ALASKA:**

3 * **Section 1.** The uncodified law of the State of Alaska is amended by adding a new section
4 to read:

5 SHORT TITLE. This Act may be known as the Time to Teach Act.

6 * **Sec. 2.** AS 14.17 is amended by adding a new section to read:

7 **Sec. 14.17.485. Class size reduction funding.** (a) As a component of and in
8 addition to other available public school funding, a school is eligible to receive a class
9 size reduction funding grant under this section in an amount that would increase the
10 base student allocation under AS 14.17.470 to \$8,000 for each student enrolled in
11 grades kindergarten through three in the school. The department shall annually
12 increase the amount of the base student allocation described under this subsection to
13 the extent of increases during the second preceding calendar year in the Consumer
14 Price Index for all urban consumers for the Anchorage metropolitan area compiled by
15 the Bureau of Labor Statistics, United States Department of Labor. The index for

1 January 2003 is the reference base index.

2 (b) A school is eligible to receive a class size reduction funding grant under
3 (a) of this section if the governing body of the district approves a policy to require a
4 class size of not more than 15 students, as adjusted under (c) of this section, in grades
5 kindergarten through three and the governing body of the district enters into and
6 complies with an agreement with the school on a form approved by the department
7 that

8 (1) covers a minimum of a five-year period in which the reduced class
9 size is maintained;

10 (2) requires the completion of a study that

11 (A) tracks the academic progress and achievement of students
12 attending a school in the district with a reduced class size under this section;
13 and

14 (B) compares the academic progress and achievement outcome
15 of students enrolled in a school without a reduced class size with the academic
16 progress and achievement of those students taught in a classroom with a
17 reduced class size under this section; and

18 (3) requires the employment of a teacher who possesses a valid teacher
19 certificate in a reduced size classroom who is qualified to teach in an area of the
20 expertise of the teacher and the employment of at least one special education aide
21 assigned to a classroom with a student with a disability.

22 (c) For purposes of calculating the class size under this section, a student who
23 is identified by the district as a child with a disability counts as two students.

24 (d) The department and a parent of a child enrolled in a school in the district
25 may file a complaint in a court of competent jurisdiction for an injunction to require a
26 district to comply with and enforce the class size requirements of this section,
27 including an order to hire additional eligible classroom teachers necessary to meet the
28 maximum class size under (b) of this section.

29 (e) For purposes of the reduction required under AS 14.17.400(b), funding
30 authorized under (a) of this section is treated the same as the state share of public
31 school funding under AS 14.17.410.

1 (f) In this section,

2 (1) "child with a disability" has the meaning given in AS 14.30.350;

3 (2) "class size" means a group of students taught in a regular classroom
4 by one classroom teacher who possesses a valid teacher certificate; "class size" does
5 not include team teaching by two or more classroom teachers in one classroom of
6 more than one group of students if the group exceeds 15 students.

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District 21

House Bill No. 23: Voluntary Class Size Reduction Sectional Summary

Sec. 1 Short Title. This Act may be known as Time to Teach Act

Sec. 2 Adds a new section to (AS 14.17) to include funding for reducing class sizes. Schools would receive a class size reduction grant that would increase the base student allocation to \$8,000 for each student in grades kindergarten through three.

Only schools maintaining a class size of no more than 15 in grades kindergarten through three would be eligible for grants.

Schools must maintain this class level for a minimum of five years and academic progress and achievement must be studied by the school in comparison with classrooms that have not adopted the 15 student maximum.

Teachers placed in these classrooms must have a valid teaching certificate and at least one special education aide must be placed in a classroom with a student with a disability.

A student with a disability will count as two students.

A parent of a child may file a complaint in court to require a district to comply with and enforce the class size requirements of this Act.

Funding for reduction shall be treated the same as the states share of public school funding.

The location of the definition of "child with a disability" may be found in AS 14.30.350

The definition of "class size" is defined.

ANCHORAGE SCHOOL DISTRICT
ANCHORAGE, ALASKA

ASD MEMORANDUM #120 (2007-2008)

December 3, 2007

TO: SCHOOL BOARD
FROM OFFICE OF THE SUPERINTENDENT
SUBJECT: CLASS SIZE REPORT 2007-2008

ASD Goal: Establish and maintain a supportive and effective learning environment by providing safe, caring, barrier-free schools.

PERTINENT FACTS:

This report for the 2007-2008 school year is divided into the following categories: Elementary Education, Middle School Education, High School Education, Special Education, Bilingual Education, and Charter Schools. In addition, the administration has compiled information on class sizes in the alternative programs and the student-to-counselor ratio at the eight major high schools.

Each major department in the Instructional Division has provided detailed information on class sizes and, at the high school level, the counselor-to-student ratio.

ELEMENTARY EDUCATION

Class size information for the elementary schools is summarized in Attachment A. This information is based on enrollment data on September 28, 2007. Overall, class sizes in the various categories are within one percent of last year's percentages, with the exception of the 27-30 category, which decreased by two percent (from 14 percent in 2006-2007 to 12 percent in 2007-2008).

A comparison chart of the last eight years for classes of 30 and higher is displayed in Attachment B. This number increased slightly in 2007-08. Teacher assistant time has been allocated to assist in large classes.

Attachment C compares kindergarten through third grade and fourth through eighth grade class sizes for the past three years, 2005-2006, 2006-2007 and 2007-

08. In kindergarten through third grade, class sizes increased in the under 18 and 18-20 categories, decreased in the 21-23 category and remained stable in the 24-26 and 27-30 categories. In the fourth through eighth grades, the number of classes in the under 18 category decreased slightly, the percentage of classes in the 18-20 category decreased, the number of classes in the 21-23 category increased by 2 percent and in the 24-26 category there was an increase of 6 percent. Concurrently, the percentage of classes in the 27-30 category decreased by 6 percent. Classes in the 31-32 range increased slightly.

The staffing divisors are 20.50 in kindergarten, 21 in first grade, 24 in second and third grades and 27 in fourth, fifth and sixth grades. The targeted ratio is 18:1 in kindergarten and first grades with class size reduction positions.

Attachment D is a summary of the information presented in Attachment C. Attachment E contains part-time student data.

Attachment F illustrates the positive effect of class size reduction positions in kindergarten and first grades across the elementary division.

Overall in the elementary division class sizes are very close to optimal in terms of budgeted staffing ratios. The forty-five class size reduction positions funded through Title IIA of the NCLB grant have provided significantly lower class sizes in many kindergarten and first grade classrooms across the elementary schools. Additionally, many Title I schools utilize Title I funds to lower class size.

MIDDLE SCHOOL EDUCATION

On September 28, 2007, the middle school division noted slight changes across all class size reporting categories. Percentage changes fell between 0.14 percent and 2.81 percent with the greatest changes reported for class sizes of 21-25 and 31-35. A four-year comparison of class sizes across the mid-level division is attached. The average core class size remains constant from last year to this year at 26 students. Attachment G shows a class size analysis for each of the middle schools.

Across the division, schools reported a total of 114 classes with 36 or more students. The majority of these classes are physical education and music/art showing 73 and 25 classes respectively.

Since September 28, three of the nine core classes with over 36 students have been decreased to below 35 students and 22 of the 256 core classes with 31-35 have been reduced to below thirty. .

MIDDLE LEVEL CLASS SIZE FREQUENCY

PART I - 2004-2005 Class Size Frequency					
Class Size	1-20	21-25	26-30	31-35	36+
Number of All Classes	179	287	546	393	114
Percentage of All Classes	11.80%	18.90%	35.90%	25.90%	7.50%

PART II - 2005-2006 Class Size Frequency					
Class Size	1-20	21-25	26-30	31-35	36+
Number of All Classes	343	262	489	281	114
Percentage of All Classes	23.00%	17.60%	32.80%	18.90%	7.60%

PART III - 2006-2007 Class Size Frequency					
Class Size	1-20	21-25	26-30	31-35	36+
Number of All Classes	254	343	511	304	133
Percentage / All Classes	16.44%	22.20%	33.07%	19.68%	8.61%

PART IV - 2007-2008 Class Size Frequency					
Class Size	1-20	21-25	26-30	31-35	36+
Number of All Classes	265	310	557	352	114
Percentage of All Classes	16.58%	19.39%	34.85%	22.02%	7.13%

AVERAGE CLASS SIZE BY ACADEMIC AREA

<i>Class size by area for a four-year period</i>				
SUBJECT	AVERAGE	AVERAGE	AVERAGE	AVERAGE
	2004-2005	2005-2006	2006-2007	2007-2008
LANGUAGE				
ARTS	24.57	20.79	23.95	24.70
MATH	25.97	23.62	24.41	25.44
SCIENCE	28.23	27.56	27.71	27.59
SOCIAL STUDIES	27.07	25.80	26.54	25.89
WORLD				
LANGUAGES	28.06	25.72	24.44	24.21
MUSIC/ART	31.83	29.66	29.17	30.55
PE	42.14	42.74	43.13	40.18
CAREER TECH.	27.95	24.59	26.53	24.85

Polaris K-12 # of Classes					
	1-20	21-25	26-30	31-35	36+
	35	44	22	1	0
	28.92%	36.36%	18.18%	.82%	
TEACHING AREA	# OF SECTIONS	# OF STUDENTS	AVERAGE CLASS SIZE		
Language Arts	13	300	24		
Math	13	217	17		
Science	14	281	21		
Soc. Studies	17	338	20		
For. Language	3	62	21		
Music	15	341	24		
PE	17	387	23		
Art	12	292	24		
Advisory	13	277	21		
Study Skills	4	101	25		

PART-TIME STUDENTS:

Currently, there are two part-time students attending one class each in the nine standard middle schools. There are no part-time students enrolled at Polaris K-12 this school year.

SCHOOL NAME	NUMBER OF STUDENTS	NUMBER AT .25%	NUMBER AT .50%	NUMBER AT .75%	NUMBER AT OTHER %
Central	0	0	0	0	0
Clark	0	0	0	0	0
Goldenview	0	0	0	0	0
Gruening	0	2	0	0	0
Hanshaw	0	0	0	0	0
Mears	0	0	0	0	0
Mirror Lake	0	0	0	0	0
Romig	0	0	0	0	0
Wendler	0	0	0	0	0
Polaris	0	0	0	0	0
TOTALS	0	2	0	0	0

HIGH SCHOOL EDUCATION

In general, utilization of allocated teachers and the development of the master class schedules are local school decisions. Some items, such as holding ninth and tenth grade core classes to a smaller size and providing immediate remediation for struggling students are directives, which all schools are expected to follow. Additionally, schools are instructed to minimize the number of classes under 20 students and those over 35 students. Attachment H shows a class size analysis for each of the high schools and alternative schools.

On September 28, 2007, the high schools reported 564 classes under 20, a decrease of 21 from last school year; and 126 classes over 36 students, an increase of seven sections as compared to the 2006 total. The majority of the sections below 20 students are in math and language arts classes, a direct result of the prescriptive remediation efforts. Classes of 36 or more are generally physical education (77 percent), with a lesser number in music (15 percent). Attachment X contains District wide high school average class size as reported by content area. School-to-school variations are due to student interest and school-based scheduling decisions.

Alternative Schools

Class sizes at AVAIL, Benny Benson, COHO Continuation, Crossroads, King Career Center, MYC and SAVE are all under 30. Steller Secondary has three sections above 30 all others are below 30. Polaris K-12 class sizes are provided in the middle school section.

High School Counselors

Every high school student has been assigned a certificated counselor according to his or her alpha group or according to their academic house. Indian Education community counselors (non-certificated), career guides (non-certificated), and career resource counselors (non-certificated), continue to support qualified students and families as they interact with alpha counselors. Certificated bilingual counselors are assigned to four of the high schools, based upon their specific populations. The Partners for Success program, funded by the Cook Inlet Tribal Council, provides a counselor (non-certificated), and a family advocate (non-certificated), at East and Bartlett High schools.

Average and Range of Counselor Loads by School

<u>School</u>	<u>Average Number of Counselors</u>	<u>Range</u>	<u>Number of Counselors</u>
Bartlett	211	190-298	8.0**
Chugiak	270	240-301	5.0
Dimond	260	240-300	7.0
East	274	248-340	8.0**
Eagle River	432	432	2.0
Service	269	225-311	7.0*
South	354	308-380	5.0
West	264	232-353	7.0**

* Department heads and bilingual counselors are often assigned fewer counselees.

** Number may include certificated bilingual, Partners for Success and gifted counselors.

High School Part-time Students

Seventeen part-time students are currently enrolled in the high schools while also attending a private or correspondence school, UAA, or being home-schooled. Part-time students requested placement in fine arts, some upper level math and science classes, the vocational programs at KCC, and JROTC. No part-time student was refused placement and all received full consideration in selection of classes.

SPECIAL EDUCATION

The Anchorage School District provides comprehensive educational services through the Special Education Department to all children who experience disabilities and have additional needs beyond those which can generally be met by the regular classroom program. Special education services are provided in all Anchorage School District schools, including alternative schools, optional schools, charter schools and special school programs. Services are designed by an IEP team in the least restrictive environment, including the parent as a contributing member. IDEA requires that a continuum of special education placements is available which includes: support in the regular classroom supervised by special education personnel, direct service by special education personnel in the regular classroom, pull-out time from the regular classroom with service from special education personnel self-contained special education classrooms, a special school, home or hospital instruction or instruction in an institution. Since all components of the continuum cannot be provided in every neighborhood school, the IEP teams make every effort to provide the appropriate services for a student in a setting as close to his/her normal classroom as

possible. In addition to providing the necessary special education services, the IEP team may determine a need for related services. Related services may include speech therapy, occupational therapy, physical therapy, counseling, specialized nursing services, audiology services and transportation.

Early Childhood Special Education (Preschool)

Preschool SpEd Program	Teacher/Student Staffing Ratio	Range of Current Enrollment	Average PTR	Number of Classes
<i>Itinerant Preschool (CARE)</i>	1 Teacher: 25 L1	5-17 per team	10.75:1	4 Teams
<i>Communication Classes (2-Day)</i>	1 Teacher: 8 L1 x 4 sessions = 32 students	4-5 students - per session	18.5:1	8 sessions
<i>Self-Contained Classes (4-Day)</i>	1 Teacher: 8 L2/L3 x 2 sessions = 16 students	5-7 students per session	10:1	26.5 teachers/ 53 sessions
Autism (Pre-K/K)	1 Teacher: 6 L3 (Pre-K & K) (full day)	3-6 students per class (Pre-K/K)	4.3:1 (Pre-K/K)	6 full day classes (Pre-K/K)

Key Points:

- Staffing ratio for preschool is based on am/pm sessions unless otherwise noted as full day i.e. one teacher for two sessions of eight students each
- CARE teams provide special education services in community settings
- Preschool autism classes provide services for preschool and kindergarten students; kindergarten students are included in above numbers to accurately reflect teacher caseloads
- Preschool special education services begin at age three rather than by school year; eligible students are enrolled throughout the school year
- Ninety-two students are scheduled for preschool assessments are scheduled between October 26 and December 20, 2007

Elementary Special Education

Elementary SpEd Programs	Teacher/Student Staffing Ratio	Range of Current Enrollment	Average PTR	Number of Classes
Resource (K-6)	1 Teacher:20 L1 1 Teacher:12 L2 1 Teacher: 8 L3		17.4:1	136 teachers: (11 gen. ed, 125 special ed)
<i>Extended</i>	1 Teacher: 10	4 - 9 students	7.6:1	10 classes

<i>Resource (K - 6)</i>	L2/L3			
Intensive Needs	1 Teacher: 8 L3	4 - 7 students	6.1:1	20 classes
Autism (grades 1-6)	1 Teacher: 6 L3	3 - 6 students	4.2:1	13 classes

Key Points:

- The number of students requiring special education services and supports for more than 50% of the school day continues to increase.
- Extended Resource, Autism, and Intensive Needs Classes are designed to provide full-day support required by a student's IEP.
- The number of students needing specialized autism classes continues to increase.

Mt. Iliamna School

Mt. Iliamna Program Pre-K - 4th Grade	Teacher/Student Staffing Ratio	Range of Current Enrollment	Average PTR	Number of Classes
<i>Behavioral Support Classes K - 4</i>	1 Teacher: 10 L3 students	5 - 9 per class	6.7:1	7
<i>Learning Centers K - 4</i>	1 Teacher: 6 L3 students	6 - 7 per class	6.2:1	4

Key Points:

- Behavioral support classes provide small group instruction; while learning center classes provide highly individualized support to assist students in development of social and behavioral skills.
- Mt. Iliamna supports children with social/behavioral needs from Kindergarten through fourth grade (preschool services have been relocated)
- As of October 26, 2007, the distribution by grade for the 72 elementary students was: K = 7; First = 14; Second = 15; Third = 18; Fourth = 18.
- Estimated enrollment by end of second quarter is 84 which is an increase of 31 percent over last fall
- On count date, Mt. Iliamna enrollment was 10 students above projections.
- Classes above represent scope of behavioral support program at Mt. Iliamna; specialized settings within Mt. Iliamna have different staffing ratios

Middle School Special Education

Middle School SpEd Programs	Range of Caseloads	Average PTR	Number of Classes
Resource	12-18 students	14:1	61 teachers
Life Skills 1	7-13 students	10:1	4.5 classes
Life Skills 2	4-8 students	6:1	5 classes
Autism	5-9 students	8:1	2 classes

High School Special Education

High School Special Ed Programs	Range of Caseloads	Average PTR	Number of Classes
Resource	15-25 students	17:1	80.5 teachers
Life Skills 1	9-15 students	11:1	10 classes
Life Skills 2	4-9 students	6:1	7 classes
Autism	6-11 students	8:1	2 classes

Alternative Special Ed Programs 7-12	Range of Enrollment	Average PTR	Number of Classes
Resource	12-27 students	17:1	11 teachers

Continuation/ COHO/Outreach	Range of Enrollment	Average PTR	Number of Classes
Resource	5-13 students	10:1	2 teachers

ACE/ACT

ACE/ACT Programs	Range of Enrollment	Average PTR	Number of Classes
ACE	15-25 students	20:1	3 teachers
ACT	10-17 students	11:1	6 teachers

Special Schools Program

Special Schools Program	Range of Enrollment	Average PTR	Number of Classes
Residential	9-18 students	13:1	15.5 teachers

Whaley School

Whaley School/ABA	Range of Enrollment	Average Class Size/CaseLoad	Number of Classes
Intensive Behavior Classes	4-8 students	6 students	24 teachers

Key Points:

3 elementary classes

21 secondary classes, including elective teachers

Related Services

Class size information across all related services programs is based on enrollment data from October 17, 2007. The total number of students receiving a related service is 4,587, representing an overall decrease of 103 students from the same time last year.

Speech-Language Services

The total number of students receiving IEP speech-language services is 2806, representing an increase of 55 students from last year, of which 846 students receive speech-only services and 1960 are special education students with speech. The number of students requiring assistive technology to support communication continues to increase, with at least 60 students using dedicated devices as stipulated by their IEPs.

School Psychology Services

Caseloads for school psychologists are determined by multiple issues other than school enrollment, i.e. the number of evaluations typical to a school, the number of functional behavioral assessments and manifestation determinations, and other special factors. Typically a school psychologist may be assigned to one secondary school and one elementary school while others are assigned to two elementary schools. The total number of students receiving IEP psychology services is 121, representing a decrease of 23 students from last year. The overall demand for psychology services in the schools increases yearly in response to discipline situations and crisis response.

Occupational Therapy/ Physical Therapy/ Adapted Physical Education

The number of students receiving OT (750), PT (216) and/or Adapted PE (459) is 1425, representing an increase of 31 students from last year. Average caseloads are 30 students for PT, 32 students for OT and 60 students for APE. Providers are highly itinerant, serving students in 4 to 12 sites each.

Hard of Hearing and Audiology Services

Thirty-five students receive services as hearing impaired, and/or 132 receive audiology services, totaling 167 which is a decrease of 55 students from last year. This decrease is likely due to a continued staff shortage for audiology. Most students receive itinerant services in their neighborhood schools, with the exception of students with cochlear implants who receive services in special classes at Williwaw Elementary.

Blind/Visually Impaired Services

Sixty-eight students receive BVI services, representing an increase of two students from last year. Average caseload size per specialist is 13 students. While the total number of students remains fairly consistent, there are increasing numbers of young Braille readers and students requiring advanced technology in order to access curriculum.

Alaska State School for Deaf and Hard of Hearing

The Alaska State School for Deaf and Hard of Hearing (ASSDHH) serves students of the state of Alaska through a program of comprehensive services supported by the District and the Department of Education and Early Development. Services for students ages three through 22 are provided in coordination with special education services of the District at Russian Jack Elementary School, Hanshew Middle School, East High School, and the ACE/ACT program. Students receive specialized instruction by ASSDHH staff and support in order to access general education at each of these sites. Enrollment in the Alaska State School for Deaf and Hard of Hearing generally fluctuates between 50 and 60 students. Enrollment as of October 27, 2006 is 56.

- Class sizes range from four to seven students at Russian Jack.
- Class size at Hanshew is seven.
- Teachers at the secondary level of ASSDHH are case managers for five to seven students each at the following locations; EHS, ACE, ACT, KCC.

BILINGUAL/MULTICULTURAL EDUCATION PROGRAM

Historically, enrollment of limited-English-proficient (LEP) students in the Bilingual/Multicultural Education Program (BMEP) has steadily increased; however, there was a decrease in enrollment this year because of state regulations regarding exiting students for progress. Attachment 1 (10-Year Historical Enrollment Chart) provides the total number of students receiving service during each designated school year. As of October 25, 2007, the 4,672 students identified and placed to receive services (Attachment 2) is much lower than the count last year in October 2005 of 6,625. There are 2,755 students in

grades K-6, and 1,917 students in grades 7-12 (also including sixth graders at Mirror Lake and Begich middle schools). Eight hundred and four students are new-to-the-district (NTD), which is slightly lower than the number of NTD in 2005-2006. Students receiving service from the BMEP speak 95 different languages. Table I shows the Enrollment of LEP Students by language spoken. As indicated in Language Charts 1 and 2, the top five languages are Spanish (1,294 or 27 percent), Samoan (754 or 16 percent), Hmong (657 or 14 percent), Tagalog (605 or 13 percent), and Yupik (222 or 5 percent).

An intensive articulation process from elementary to middle school and from middle school to high school has continued to gauge staffing decisions. In past years, students were exited from the program (if that were the need) and others were more closely monitored to make sure they were assessed and properly placed on the next level. Currently, students are being exited according to state requirements based on student proficiency for one year on the English Language Proficiency Assessment in the areas of listening, speaking, reading, and writing.

Elementary Bilingual Education students of limited-English-proficiency are enrolled at all schools, and bilingual staff members are assigned to all elementary schools in the district. The existing staffing standard attempts to provide a student/staff ratio (SSR) of 30:1, albeit, relatively high in comparison to the overall district SSR. The primary modes of delivery, as articulated in the board and state approved Plan of Service, consist of both individual or small group (two to eight students) tutorial, and in-class delivery. The current data reflect inequities in SSR in some schools. This is due to the fact that the assessment and placement of students is still in progress with a high number of students on the pending list. Once all assessment is complete, students will be transferred from the pending list, assigned to the appropriate language proficiency designation, and placed in appropriate service. The final reporting in November will reflect a more accurate picture of actual students scheduled for services. Upon receiving this information, decisions will be made to shift staff, if at all possible, from schools with low enrollments to schools with increased enrollments.

Due to the variables in enrollment districtwide of LEP students and changes made in the assessment of LEP students, there is a significant impact on the staffing at all schools.

Students in Eagle River receive service on a weekly basis by the resource teacher assigned to the school. These schools are Alpenglow (four students), Birchwood (five students), Eagle River (thirteen students), Homestead (four students), and Ravenwood (eight students).

On the elementary level, Bilingual Learning Centers are located at schools with a high concentration of LEP students (generally 90 or greater). Fourteen sites on the elementary level have been identified, including Rogers Park which was added this year: Creekside Park (54), Fairview (117), Government Hill (153), Klatt (68), Lake Hood (96), North Star (103), Mountain View (115), Muldoon (91), Rogers Park (65), Tudor (73), William Tyson (169), Williwaw (131), Willow Crest (94), and Wonder Park (68). Due to the number of students who exited due to progress and because of boundary changes, some of these schools are down in enrollment, so the assignments of teachers will need to be monitored for possible changes in the coming school year. There are 14 full-time teachers assigned to these schools, with one half-time teacher assigned to Eagle River schools as an itinerant teacher.

Each elementary learning center is staffed with one certificated teacher, as well as tutors who are non-certificated. They provide service to students with low English-language-proficiency. Tutors who work under the supervision of school principals and the bilingual supervisor staff the remaining elementary schools. Resource teachers visit these schools as well and work directly with non-English proficient (NEP) students in those schools to provide technical assistance to tutors and regular classroom teachers on an ongoing basis. There are 86.5 elementary tutor positions currently filled, with 2 positions unfilled, making the count 88.5 to be fully staffed.

Middle school bilingual education staffing consists of 2.0 FTE bilingual/ESL certificated counselors, 12.8 FTE certificated teachers, and 15.25 FTE tutors. Staffing for the middle school is a challenge because of the need to avoid homogenous grouping on teams. Challenges faced by the BMEP on the middle school level are reconfiguration of space and reallocation of staff resources to support the curriculum philosophy, which is so closely tied to curriculum strategies, appropriate forms of collaborative teaching, and coordination of services necessary to meet the unique needs of LEP students. Hence, staffing remains a major concern and issue at all middle schools. Clark Middle School students are attending Begich Middle School during construction of the new Clark Middle School with the largest concentration of LEP students, 154 (down from 316 last year), which is similar to Romig, with 151 students (down from 194 last year). Mears at 52 (down from 146 last year) and Hanshew at 57 (down from 151 last year) have significantly lower enrollments as well. Wendler, from 121 last year to 115 this year, and Goldenview, from 37 to 26, experienced little change, while Central increased slightly from 71 to 77. The middle schools in the Eagle River area show decreases, and they continue to have relatively low enrollments; Gruening (eight) and Mirror Lake (three). These two schools share a 1.0 FTE bilingual tutor.

The difficulty in staffing on the middle school level is providing a teacher or tutor for each of the teams, since LEP students are spread over all teams. The issue of obtaining ESL teachers who are highly qualified in several content areas is also a challenge.

High school bilingual education staffing consists of 8.0 FTE bilingual/ESL certificated counselors, 16.0 FTE certificated teachers, and 16 FTE filled positions of high school tutors. All high schools provide ESL courses and tutorial assistance for students, depending upon their level of English language proficiency. Due to student's limited English proficiency skills, ideally, class size should be capped at fifteen students maximum. Historically, East has the largest number of LEP students on this level, but has experienced from 521 students last year to 388 at the present time. Enrollment of LEP students at West has decreased from 384 last year to 261 this year. Currently, Bartlett has 176 LEP students, and Dimond has 117 LEP students. Service numbers have been growing for the last couple of years and BMEP will be taking a closer look at the needs of that school for the next school year. Staffing at Service should be similar to other high schools with similar needs; however, it is not. These schools have decreased in numbers of LEP students due to exiting for progress.

The changing demographics in ASD have brought the challenge of addressing the needs of low-literacy immigrant students. The Newcomers' Center (NC) was developed for students who are new to the country and need more intensive language and cultural assistance, and is in the eleventh year of existence. Students enroll in a combination of social studies and English language arts classes. Cognitively, students at the NC are generally three years or more below their age-appropriate grade level. Many factors contribute to this: students come from poor rural areas where education is not readily available; some have not used print in their native language; some are victims of war and postwar poverty which bars many from formal education. Currently, there are students in two separate sessions (42 in the morning and 42 in the afternoon session). There are three students on the wait list for the AM session and five on the wait list for the PM session. All of the students are monolingual speakers of another language. They have no school experience in US schools and limited, if any, schooling at all in their native countries. Students enrolled in the NC attend the center for half day and the other half-day attend classes at the area middle and high schools.

With bilingual/ESL counselors in five of the high schools and one at the Newcomers' Center, LEP students receive comprehensive support services that address the affective as well as intellectual aspects of their overall development. In addition to promoting linguistic and cognitive growth, LEP students receive exposure to occupational, career awareness, and vocational components that

offer functional, hands-on experience, and job readiness skills at the secondary level.

CHARTER SCHOOLS

As of September 28, 2007, there are seven charter schools approved by the School Board and in operation in the Anchorage School District. Lower class sizes and more personalized instruction characterize each of the programs.

Aquarian Charter School had an enrollment of 352 students in grades K-6 as of September 28, 2007. Aquarian is in its eleventh year of operation and is currently housed at 1705 West 32 Avenue.

Aquarian is designed as a rigorous academic program that integrates the arts, gifted services, science and foreign language into all curriculum areas. Community service projects are an integral part of this school's social learning projects, assisting many local agencies. A cap of 24 students per classroom is part of this school's charter, with a part-time teaching assistant at every grade level.

Grades

Kindergarten	60	Fourth Grade	49
First Grade	54	Fifth Grade	43
Second Grade	58	Sixth Grade	36
Third Grade	52		

Total Aquarian Charter School Students Enrolled **352**

Eagle Academy Charter School opened in September 2005 and is located at 10901 Mausel St., Suite 101, in Eagle River. In its third year of operation, it leases classroom and office facilities in a non-District facility. Eagle Academy offers an academically challenging program requiring mastery of performance standards before students progress to the next level of curriculum. Math and language arts instruction groups students by achievement level rather than by grade level. Eagle Academy's curriculum meets or exceeds Alaska's State standards. The students by grade level as of September 28, 2007 are as follows:

Grade	# of Students		
Kindergarten	25	4 th grade	25
1 st grade	25	5 th grade	23
2 nd grade	25	6 th grade	19
3 rd grade	25		

Total Eagle Academy Charter School Students Enrolled **167**

Family Partnership Charter School's office is located at 401 East Fireweed Lane, Suite 100. The enrollment as of September 28, 2007, was 522 students: 174 for kindergarten through sixth grades and 348 for grades seven through twelve. This charter school has an individualized program, and class sizes vary from one to small groups of students working with one teacher as part of their contract with the ASD certificated teacher. In its 11th year of operation, the Family Partnership Charter School leases office facilities in a non-District facility in order to accommodate parents and students in a more centralized location. The students by grade level are as follows:

<u>Elementary</u>		<u>Secondary</u>	
Kindergarten	14	Seventh	45
First	18	Eighth	50
Second	26	Ninth	50
Third	22	Tenth	67
Fourth	28	Eleventh	59
Fifth	27	Twelfth	77
Sixth	39	Total	348
Total	174		

Total Family Partnership Charter School Students Enrolled 522

Frontier Charter School has an office at 400 West Northern Lights Blvd. The enrollment as of September 28, 2007, was 334 students; 150 for K-6 and 203 for grades seven-twelve. This charter school has an individualized program. The focus is helping parents understand how their children learn as assessed through the Frontier Learning Profile. Frontier class sizes vary from one student to small groups of students working with one teacher as part of their contact with the school. In its third year of operation, the Frontier Charter School leases office facilities in a non-District facility in order to accommodate parents and students in a more centralized location. Students by grade level are listed below:

<u>Elementary</u>		<u>Secondary</u>	
Kindergarten	16	Grade 7	12
Grade 1	21	Grade 8	37
Grade 2	16	Grade 9	33
Grade 3	22	Grade 10	30
Grade 4	29	Grade 11	26
Grade 5	18	Grade 12	53
Grade 6	21	Total	191
Total	143		

Total Frontier Charter School Students Enrolled 334

Highland Tech Charter School had an enrollment of 244 students in grades seven through twelve as of September 28, 2007. The school is in its fifth year of operation and is currently leasing space at the ASD Education Center. The school is a standards-based program and promotes a project-based learning environment, which integrates technology, connectivity and student-centered content into the classroom. The students by grade level are as follows:

Grade 7	32	Grade 11	37
Grade 8	33	Grade 12	50
Grade 9	50	Total	244
Grade 10	42		

Total Highland Tech Charter School Students Enrolled **244**

Rilke Schule German School of Arts and Sciences is a K through 8 school that focuses on high academic achievement by engaging each child through an enriched language curriculum taught primarily in German. The school is in its first year of operation and is temporarily located in the Change Point Church facility at 6689 Seafood Drive. Their new building at 650 International Airport Road is scheduled for completion in late December or early January. The enrollment as of September 28, 2007 was 177 students in kindergarten through eighth grade.

Kindergarten	38	Fifth Grade	12
First Grade	28	Sixth Grade	16
Second Grade	23	Seventh Grade	11
Third Grade	25	Eighth Grade	2
Fourth Grade	22		

Total Rilke Schule Charter School Students Enrolled **177**

Winterberry Charter School is located at 508 W Second Avenue on the corner of Second Avenue and E Street. The enrollment as of September 28, 2007, was 171 students in kindergarten through seventh grade. The school has two half-day kindergarten classes, two grade four classes, one combined grade six and seven class, and one of each of the remaining grades. This year is Winterberry's third year of operation.

Kindergarten	32	Grade Four	29
Grade One	27	Grade Five	18
Grade Two	25	Grade Six	11
Grade Three	24	Grade Seven	4

Total Winterberry Charter School Students Enrolled **171**

CC/RG/PM/LV/MH/JS/CG/CB/mh

Attachments

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The Tennessee Study of Class Size in the Early School Grades

Frederick Mosteller

Abstract

The Tennessee class size project is a three-phase study designed to determine the effect of smaller class size in the earliest grades on short-term and long-term pupil performance. The first phase of this project, termed Project STAR (for Student-Teacher Achievement Ratio), was begun in 1985, when Lamar Alexander was governor of Tennessee. Governor Alexander, who later served as secretary of education in the cabinet of President George Bush, had made education a top priority for his second term. The legislature and the educational community of Tennessee were mindful of a promising study of the benefits of small class size carried out in nearby Indiana, but were also aware of the costs associated with additional classrooms and teachers. Wishing to obtain data on the effectiveness of reduced class size before committing additional funds, the Tennessee legislature authorized this four-year study in which results obtained in kindergarten, first, second, and third grade classrooms of 13 to 17 pupils were compared with those obtained in classrooms of 22 to 25 pupils and in classrooms of this larger size where the teacher was assisted by a paid aide. Both standardized and curriculum-based tests were used to assess and compare the performance of some 6,500 pupils in about 330 classrooms at approximately 80 schools in the areas of reading, mathematics, and basic study skills. After four years, it was clear that smaller classes did produce substantial improvement in early learning and cognitive studies and that the effect of small class size on the achievement of minority children was initially about double that observed for majority children, but in later years, it was about the same.

The second phase of the project, called the Lasting Benefits Study, was begun in 1989 to determine whether these perceived benefits persisted. Observations made as a part of this phase confirmed that the children who were originally enrolled in smaller classes continued to perform better than their grade-mates (whose school experience had begun in larger classes) when they were returned to regular-sized classes in later grades. Under the third phase, Project Challenge, the 17 economically poorest school districts were given small classes in kindergarten, first, second, and third grades. These districts improved their end-of-year standing in rank among the 139 districts from well below average to above average in reading and mathematics. This article briefly summarizes the Tennessee class size project, a controlled experiment which is 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.

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Because we have all gone to school, we each have ideas about how to improve the system. For example, James Garfield once said that a pine log with a student on one end and Mark Hopkins, a beloved president of Williams College, on the other would be an ideal university. But if we want to improve school systems, we need to consider what changes may be practical and effective. Setting aside the discomfort of outdoor logs during New England winters, would Garfield's design have made effective use of President Hopkins's time? Aristotle, even when tutoring the young Alexander before he was called "the Great," is believed to have had more than one student per class.

The size of the class is largely under control of the school system, and its choice influences the size and number of classrooms and the number of teachers required, and so class size is naturally a concern of parents, teachers, and school administrators. Everyone is concerned that the pupils receive adequate attention and that the teachers are able to control their classes. Some courses seem to need more teachers per student than others. For example, classes in carpentry or cooking, in which hazardous tools and equipment are used, may require closer supervision than a class in arithmetic.

The effects of class size on children's learning have been studied, usually without reaching definitive conclusions. Most research on class size has compared the performance of pupils in classes of different sizes in such cognitive subjects as reading, mathematics, or social studies. Designing and executing these studies is difficult not only because parents may object to variation in the treatment of children but also because of the constraints that must be imposed if anything of value is to be learned from the investigation. Groups to be compared following different treatments need to be equivalent at the start. The treatments must be carefully described and delivered. Suitable measures of performance must be chosen. Beyond all this, a healthy atmosphere toward the investigation must be created; otherwise, the study can be easily sabotaged. It does not take many unwilling workers or full-time grumblers to spoil a research program.

In the 1980s, conditions favorable for a study of class size evolved in the state of Tennessee. Governor Lamar Alexander had established education as a top priority for his second term. Members of both the state legislature and the educational community in Tennessee had been intrigued by a modest-sized study in the state of Indiana, called Project Prime Time, which investigated the effect of reduced class sizes in kindergarten and first and second grades. For example, Bain and Achilles¹ report that, in Project Prime Time, (1) students in smaller classes scored higher on standardized tests than did those in larger classes, (2) the smaller classes had fewer behavioral problems, and (3) teachers of smaller classes reported themselves as more productive and efficient than they were when they taught larger classes.

The Tennessee legislators and teachers were also aware of an investigation by Glass and colleagues² which reviewed the vast literature on the effects of class size on learning using a special quantitative method called

meta-analysis. The results of this investigation suggested that a class size of 15 or fewer would be needed to make a noticeable improvement in classroom performance. At the time of the Glass study, the effect of class size on performance was controversial because many studies in the literature differed in their outcomes. The new methods used by Glass and his colleagues were not accepted by all professional groups. At the same time, there were ongoing discussions about the lesser cost and possibly equal effectiveness of placing paid teachers' aides in elementary classrooms. Because of the additional expense associated with a reduction in class size for early grades, members of the Tennessee legislature decided that any proposed innovation should be based on solid information and, therefore, authorized a four-year study of class size which would also examine the cost-effectiveness of teachers' aides. The legislature appropriated \$3 million in the first year for a study of pupils in kindergarten and then appropriated similar amounts in subsequent years for the project, which carried the acronym STAR (for Student-Teacher Achievement Ratio).³

The study was carried out in three kinds of groups: (1) classes one-third smaller than regular-sized classes, (2) regular-sized classes without a teacher's aide, and (3) regular-sized classes with a teacher's aide. By comparing average pupil performance in the different kinds of classes, researchers were able to assess the relative benefits of small class size and the presence of a teacher's aide. The experiment involved many schools and classes from inner-city, urban, suburban, and rural areas so that the progress of children from different backgrounds could be evaluated.

Study Design and Execution

Personnel from four Tennessee universities helped design and execute the Tennessee study, which was carried out in three phases (see Box 1). Each year, \$2.5 million was spent on additional teachers and teachers' aides. The remaining funds were used to gather and analyze the data and to carry out other obligations imposed by the enabling legislation.

Legislation for the STAR experiment required that studies be made of classes in inner-city, suburban, urban, and rural schools. Because the legislators did not define these types of residential areas, the study makers had to invent categories appropriate for Tennessee and their experiment. To do so, they placed inner-city and suburban schools in the category of *metropolitan* areas. Inner-city schools were defined as those in which more than half of the students received free or reduced-price lunches. Schools in outlying areas of metropolitan cities were called *suburban*. In nonmetropolitan areas,

schools in towns of more than 2,500 serving primarily an "urban" population were called *urban*, and the rest were classified as *rural*.

To be eligible to participate in the experiment, a school was required to sign up for four years and to have at least 57 children for any given grade (to comprise a small class of 13 and two classes of 22). This constraint assured the ability to make comparisons among the three kinds of classes within a single school. Participating schools received no extra support other than funds for additional teachers and aides and had to supply the extra classrooms. In any given calendar year, the experiment was carried out in one grade only, and this minimized the number of new classrooms needed. No new textbooks or curricula were to be introduced. Although 180 schools offered to participate, only 100 were large enough to qualify, and 79 actually participated in the kindergarten year.

The treatments planned for the program were started in 1985, beginning with

Box 1

The Tennessee Class Size Project

The Tennessee project on the effectiveness of small classes and of teachers' aides has had three phases:

Phase 1

1985–1989. The educational system of Tennessee carried out a four-year experiment, called Project STAR (for Student-Teacher Achievement Ratio), to assess the effectiveness of small classes compared with regular-sized classes and of teachers' aides in regular-sized classes on improving cognitive achievement in kindergarten and in the first, second, and third grades.

Phase 2

1989–. The Lasting Benefits Study (LBS) was an observational study of the consequences of the experimental program on children when they returned to regular-sized classes in the fourth, fifth, and sixth grades and beyond. This research phase asked whether the children who started in the smaller classes performed better in later grades. Only students who had been in the experiment (Phase 1) could contribute data to this second phase.

Phase 3

1989–. Project Challenge implemented the small classes in kindergarten and in the first, second, and third grades in the 17 districts of Tennessee where children are highly at risk of dropping out early. These districts have the lowest average incomes in the state.

kindergarten and continuing each year through first, second, and third grades. The classes were of three types: (1) small, 13 to 17 pupils; (2) regular size, 22 to 25 pupils; and (3) regular size with a teacher's aide. The small classes averaged

A teacher's aide had no specific duties but helped each teacher of a regular-sized class in whatever way the teacher wished. Some aides participated in teaching, others prepared materials and kept records, and some carried out all of these duties. Teachers' aides were paid.

The study findings apply to poor and well-to-do, farm and city, minority and majority children.

15 pupils, down about 35% from the average regular size of about 22 or 23. During the first year, the study involved about 6,400 pupils in 108 small classes, 101 regular-sized classes, and 99 regular-sized classes with teachers' aides.

Within a school, pupils and teachers were assigned to classes at random each year to ensure that classes came from equivalent populations and that teachers did not choose their classes. In a study of this kind, randomization protects against all variables that might matter, whether they have been identified or not.

Analysts report that attendance was about 95%, independent of school location, type of class, or minority or nonminority status.

Table 1 indicates the composition of the experimental groups by giving a breakdown of schools by city type and of classes by city type and ethnicity at the end of the first grade (second year of the experiment). This table shows participation by 6,572 pupils in 331 classes at 76 schools and is important because it indicates that enough pupils were studied to enable researchers to reach a conclusion. Ultimately, the findings from the investigations repeated themselves at least qualitatively in nearly every large cell of Table 1, suggesting that the study findings apply to poor and well-to-do, farm and city, minority and majority children. The magnitude,

Table 1

Composition of the First Grade Cross-Sectional Sample in the Second Year of the Tennessee Experiment				
	Location			
	Inner City	Urban	Suburban	Rural
Number of schools	15	8	15	38
Number of classes				
All majority students	0	18	28	119
All minority students	65	0	13	0
Mixed classes	5	23	21	39
TOTAL CLASSES	70	41	62	158
Number of students	1,495	804	1,214	3,059

Source: Finn, J.D., and Achilles, C.M. Answers and questions about class size: A statewide experiment. *American Educational Research Journal* (1990) 27,3:557-77.

control, and duration of the experiment illustrate the sort of investigations that are needed to improve education in the schools.

Examining and Interpreting the Findings

In assessing student performance, two types of tests were used: (1) standardized tests, which have the advantage of being used nationally but the disadvantage of not being directly related to any particular curriculum or course of study; and (2) curriculum-based tests, which reverse the advantages and disadvantages of standardized tests. Curriculum-based tests measure more directly the student's increased knowledge of what was actually taught, but they give little indication of where local results stand in the national picture.

The first graders took two standardized tests in reading: (1) the Stanford Achievement Test (SAT) for word study skills and reading, and (2) the Tennessee Basic Skills First (BSF) test for reading, a curriculum-based measure. In mathematics, first graders took one SAT (standardized) and one BSF (curriculum-based) test.

When an experiment applies a new treatment or employs a new method, one

way of comparing the effects of this new approach with those previously achieved using old treatments or methods is by expressing individual test scores in terms of standard deviation (see Box 2) and then expressing group differences as effect sizes (see Box 3). Here, *effect size* is defined as the difference between means divided by the standard deviation for individuals in the regular classes without aides. Thus Table 2 shows the effect sizes for small classes compared with the average of the

Both math and reading scores show a benefit of about one-fourth of a standard deviation.

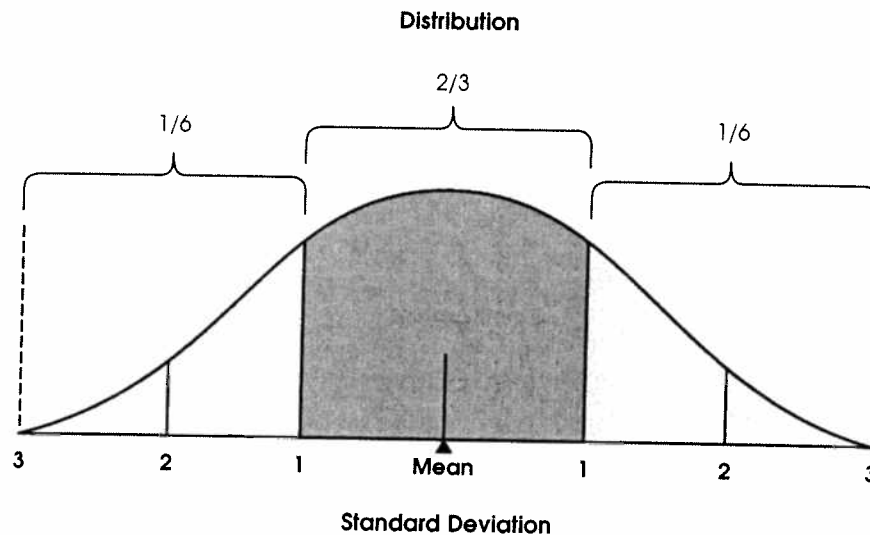
performance of the regular-sized classes with and without aides for the standardized tests. Both math and reading scores show a benefit of about one-fourth of a standard deviation. On the curriculum-based tests (BSF), reading scores improve by about one-fifth of a standard deviation and math scores by only one-twelfth.

To interpret the gains represented by these effects, it is useful to consider a pupil who, without a special treatment such as attending small classes, would achieve about the average score, say at the midpoint or 50th percentile, of all students.

Box 2

Standard Deviation

When considering distributions of quantities such as heights of people, family incomes, and scores on standardized tests, it is often useful to think first of the typical person, family, or score and then to represent that typical one by either the *mean* (average) of the numbers or the *median* (value of the middle measurement).



This drawing is of a distribution about the mean. The total area between the curve and the horizontal axis is one (or 100% of the measurements, incomes, or scores). For distributions that are approximately symmetrical, about half of the measurements lie to the right of the mean and half to the left. The slightly asymmetrical mountain-shaped (or bell-shaped) curve indicates roughly the way that many types of measurements distribute themselves in large populations, with the height of the curve representing the density of the scores at various positions. Typically, the distributions are dense in the middle and are less dense as one moves farther from the middle in either direction.

For many common distributions of everyday quantities, it is convenient to relate the mean and a measure of variability called the *standard deviation* to the fraction of measurements falling within a symmetrical interval about the mean. For example, this drawing indicates that the proportion of measurements falling in the interval that goes from one standard deviation to the left of the mean to one standard deviation to its right is about two-thirds. This number is not exact but is a rough approximation for distributions that are shaped generally like the one pictured.

What about the interval that includes the mean plus or minus two standard deviations? In the same approximate sense, this interval contains about 95% of the measurements for many distributions occurring in practice. If the interval is extended to three standard deviations each way from the mean, it will include nearly all—almost 100%—of the measurements.

What would a gain of one-fourth of a standard deviation do for such a pupil? That pupil would move from the 50th percentile of all pupils up to the 60th percentile, thus surpassing an additional 10% of the population beyond the 50% that were exceeded originally. Thus, an increase of one-fourth of a standard deviation can amount to considerable gain in performance.

In the study report, the average performance of small classes was compared with the average for all regular-sized classes with or without an aide. The resulting gain is shown in the first line of Table 2. The second line of that table shows the effect size of the gain from having an aide in the regular-sized class compared with the performance in the regular-sized class without an aide. When the effect of the small class is compared with that of the regular-sized class without an aide, the numbers in the first row of Table 2 increase to 0.30, 0.25, 0.32, and 0.15, respectively.

When performance of classes with an aide is compared with that of regular-sized classes without an aide, the gain averages about one-twelfth of a standard deviation. In other words, the average gain associated with an aide is about 35% of the gain achieved by reducing class size from regular to small.

Of special interest is the effect of class size on minority students. At the end of the second year of the experiment, in small classes compared with regular-sized classes and regular-sized classes with an aide, the effect size for minorities was about double that for majorities, averaged over the four tests. This extra gain occurred only in the first two years of the experiment; thereafter, the gains of both groups were about the same.

The original plan of the study was that all students would remain in their class types for all four years of the experiment. But after the first year, parents of students in regular classes objected to the continuation of the assignments. As a result of discussions with parents and with the people guiding the experiment, in the second year, students in the regular-sized classes with and without the teacher's aide were randomly reassigned half to classes with a teacher's aide and half to ones without,

but the assignments to small classes remained unchanged. Such changes were not allowed in later years. It was the view of the advisory group from the four universities that continued changes would make it impossible to interpret the results of the experiment. As a result of the changes that had been allowed, at the end of the second year, there were four situations in the regular classes for those who had attended kindergarten and first grade: (1) two years without an aide, (2) two years with an aide, (3) first year without an aide and second year with an aide, and (4) first year with an aide and second year without.

Schools had an influx of children in first grade who had not attended kindergarten the first year of the experiment. (Subsequently, kindergarten became required in Tennessee.) These children had to be assigned to the experiment in participating schools. This led to some separate analyses of results from kindergarten and first grade (for years one and two of the experiment) and of results from first, sec-

Of special interest is the effect of class size on minority students. The effect size for minorities was about double that for majorities.

ond, and third grades (for years two, three, and four of the experiment) to increase the numbers of students who experienced the same circumstances. (The rerandomization before the second year of the experiment shuffled some people between regular-sized classes with an aide and those without. Consequently, starting in the second year of the experiment, pupils could be classified according to their having experienced regular-sized classes with and without an aide.)

One way of summarizing results gives the percentile ranks for the average score based on national norms for the test. Table 3 shows the results for small classes, regular-sized classes, and regular-sized classes with a teacher's aide for both Total Reading SAT and Total Math SAT. Averaged over the four grades, the small classes gained a little more than eight percentiles over the regular-sized classes

Box 3

Effect Size

When an experiment applies a new treatment whose consequences are to be compared with those of the old or standard treatment, the difference in their consequences is often called the *size of effect* of the new treatment. For standardized tests, information is usually available which gives the distribution of scores for members of large populations who take the tests. Frequently, these distributions look like the common distributions described in Box 2. They are shaped approximately like distributions called Gaussian, or normal, in English-speaking countries. (When used in this way, the term *normal* means "usual, customary, or related to the norm" and does not connote an ideal situation or a desirable state of being.) The shapes of these curves are often well described by a formula that requires knowing only their mean and standard deviation.

Suppose that the national mean of a certain test is 500 and that its standard deviation is 100. Suppose as well that a new method of teaching produces higher test scores in an experimental group than would have been achieved without it, say a distribution with a mean of 550 instead of the usual 500. One way of thinking about this situation is to view the effect as shifting the original distribution to the right by 50 points—essentially adding 50 points to everyone's score.

To interpret the value of this gain requires knowing how variable the scores are. If, for example, the standard deviation is 1,000 instead of 100, then 50 points does not look like much of a gain; but if the standard deviation is 10, a gain of 50 points is astounding because it represents a gain of five standard deviations, when a gain of only three standard deviations would take a student from an average score to one of the best scores that had ever been made.

One interpretable quantity is the gain represented as a fraction of the standard deviation of the original distribution. In this example, the fractional gain would be $50/100 = 0.5$, or half a standard deviation. An improvement of half a standard deviation would move people who were originally at the mean, which is also about the 50% point on these distributions, up to about the 69% point. Thus, a person who originally scored higher than half the population would now score higher than 69%.

This particular ratio of gain to the standard deviation is often called the *effect size*, a technical term that has a more specific meaning for such tests than the general notion of *size of effect*, which refers to any method of describing changes. In practice, effect sizes of half a standard deviation are rare.

Although effect sizes of the magnitude of 0.1, 0.2, or 0.3 may not seem to be impressive gains for a single individual, for a population they can be quite substantial. For example, a 0.2 effect size corresponds in the United States to the difference between the average heights of 15-year-old versus 16-year-old girls. For large numbers of girls of each age, this average difference may seem small, but most people notice it.^a An effect size of 0.3 corresponds to about 30 points on a SAT verbal or mathematics standardized test.

How much does computer-based instruction help students learn when it is offered as an adjunct to traditional teaching in certain settings? A review of 59 studies finds a mean effect size of 0.25 for computer-based instruction.^b And, as a result of this finding, computer-based instruction is viewed as an extraordinarily promising innovation—one that might revolutionize education.

Sources:

- ^a Cohen, J. *Statistical power analysis for the behavioral sciences*. 2nd ed. Hillsdale, NJ: Erlbaum, 1988.
^b Kulik, J.A., Kulik, C.C., and Cohen, P.A. Effectiveness of computer-based college teaching: A meta-analysis of findings. *Review of Educational Research* (1980) 50:525–44.

Table 2

Gains in Effect Sizes from Small Classes				
Gains in effect sizes from small classes in first grade compared with all regular-sized classes and from regular-sized classes with an aide compared with regular-sized classes without an aide				
	SAT Reading	BSF Reading	SAT Math	BSF Math
The effect size on performance in small classes compared with performance in regular-sized classes with or without an aide	.23	.21	.27	.13
The effect size on performance in regular-sized classes with an aide compared with regular-sized classes without an aide	.14	.08	.10	.05

Source: Finn, J.D., and Achilles, C.M. Answers and questions about class size: A statewide experiment. *American Educational Research Journal* (1990) 27,3:557-77, Table 5.

without aides in reading and a little less than eight percentiles in mathematics. The addition of an aide to a regular-sized class results in a slight gain in both reading and math over the regular-sized class without an aide.

In the third year of the four-year study, questions were raised about the persistence of effects when children returned to regular-sized classes, as they would in fourth grade, and so an additional sum was appropriated for a three-year follow-up observation called the Lasting Benefits Study (LBS). As a part of this study, researchers observed the performance of children who had been in the three types of experimental classes during kindergarten and the first, second, and third grades after they returned to regular-sized classes in the fourth, fifth, sixth, and later grades.

In a paper presented at a meeting of the North Carolina Association for Research in Education at Greensboro, North Carolina, Achilles and colleagues reported on the Lasting Benefits Study.⁴ These authors found that, in the fourth and fifth grades, the children who had originally been in small classes scored higher than those who had been in regu-

lar-sized classes or in regular-sized classes with a teacher's aide. In the fourth grade—the first year after return to regular-sized classes—the effect size was about one-eighth of a standard deviation, averaged across six different cognitive subjects studied, and in the fifth grade, it was nearly two-tenths of a standard deviation, again averaged across six subjects. Within each grade, the different subjects produced almost the same effect size, though the

In the fourth and fifth grades, the children who had originally been in small classes scored higher than those who had been in regular-sized classes.

observed gain was somewhat larger for the fifth grade. Curiously, in both of these years, the effect size systematically favored the regular-sized classes previously without a teacher's aide over those previously with an aide, though the difference was small, averaging about 0.03 over all subjects in both grades. The encouraging finding is that early experience with the smaller class size seems to have had a continued effect beyond the moment when the children returned to regular-sized classes.

Table 3

Summary of Project STAR Results in Terms of the Percentile Ranks of Average Scores Based on National Test Norms				
	Percentile ^a			
Grade level	K	1	2	3
Total reading SAT				
Small	59	64	61	62
Regular without an aide	53	53	52	55
Regular with an aide	54	58	54	54
Total math SAT				
Small	66	59	76	76
Regular without an aide	61	48	68	69
Regular with an aide	61	51	69	68

^a Percentile ranks are based on Stanford's multilevel norms.

Source: Word, E., Johnston, J., Bain, H.P., et al. *Student/Teacher Achievement Ratio (STAR): Tennessee's K-3 class size study*. Nashville: Tennessee Department of Education, Figures 1 and 2.

As a consequence of the systematic findings of improvement in performance of pupils in small classes over those in regular-sized classes, Tennessee implemented reduced class sizes for beginning students in kindergarten and first, second, and third grades in a program called Project

ematics. Before the small classes were introduced, these districts had been performing well below the average for the state in mathematics; after the intervention, they moved above the average.

It should be noted that the gains recorded here are not part of a carefully controlled experiment; they are consequences of installing the program. For this reason, the comparisons are not as well equated as they were in the original investigation. To measure experiment gains would require carrying out new class size experiments in the districts where the program is being implemented. Belief in the continuing benefits of the program is based on the uniform improvement found in the experiment for all types of classes in all types of cities. The additional evidence based on norms during the implementation phase, while reassuring, must be regarded as weaker because this new investigation is less well controlled.

An additional way to report the progress gives the average rank of the test scores of the 17 Tennessee districts in Project Challenge (among the 139 districts) for the years reported so far (1989–1993) in reading and mathematics. The results reported by Achilles, Nye, and Zaharias⁶ for the second grade are shown in Table 4.

Belief in the continuing benefits of the program is based on the uniform improvement found in the experiment for all types of classes in all types of cities.

Challenge (refer to the description of Phase 3 in Box 1) in the 17 school districts with the lowest per capita income and the highest percent of free or reduced-price lunch participation among students.

In the summary report for Project Challenge, Nye and colleagues observe that, in the school districts where small classes were installed in kindergarten, first, second, and third grades, both the reading scores and the math scores improved, compared with previous performance by children in these districts and with other schools in the state.⁵ The gains in effect sizes were 0.4 for reading and 0.6 for math-

Table 4

Average Second Grade Ranks for the 17 Districts Among the 139 School Districts for Early Years of Project Challenge				
Subject	Year			
	1989-90	1990-91	1991-92	1992-93
Reading	99	94	87	78
Mathematics	85	79	60	56

Source: Achilles, C.M., Nye, B.A., and Zaharias, J.B. Policy use of research results: Tennessee's Project Challenge. Paper presented at the Annual Convention of the American Educational Research Association, San Francisco, April 1995. Available from the Center of Excellence for Research in Basic Skills, College of Education, Tennessee State University.

When these districts are ranked from 1 to 139, where 1 indicates best academic performance and 139 indicates the worst, the average rank for all districts is 70. Note that in mathematics, the average rank for 1991-92 and for 1992-93 is below 60 (and so above the median) so that the 17 districts have shown a startling improvement as well as a gain of 20 ranks in reading for second grade. The same report mentions that the corresponding analysis of first grade shows that the 17 districts were better than average in both reading and mathematics in 1992.⁷

In summary, the evidence is strong that smaller class size at the beginning of the school experience does improve the performance of children on cognitive tests. Observations from the Lasting Benefits Study confirm that the effect continues into later grades when children are returned to regular-sized classes. In addition, the implementation of the program for the economically poorest districts seems to be improving the performance of children in these districts by noticeable amounts. In regular-sized classes, an aide produced some gain in kindergarten and in the first, second, and third grades; but when students returned to regular-sized classes, the gain from aides did not persist. After the small classes were implemented in all 17 school districts, no further observations were made about the in-classroom value of paid teachers' aides.

Special Concerns

During the course of the experiment, researchers made two substantial departures from the basic plan: they rerandomized regular-sized classes during the second year and moved incompatible children. In addition, researchers instituted a teacher training program between the second and third year.

As reported earlier, one departure from the original plan occurred in the second year, when the children in regular-sized classes were rerandomized to regular-sized classes with an aide and regular-sized classes without an aide. Such a change applied to all who had entered the experiment in kindergarten. From the point of view of

Second-Year Rerandomization in Regular-Sized Classes

those beginning in kindergarten, it created four rather than two regular-sized groups of classes for analysis and comparison, as described above. After the second year, the children in regular-sized classes continued with their second-year assignment. This change complicates the analysis for all children except those whose assignments remained unchanged and makes it difficult to assess accurately the effectiveness of having or not having a teacher's aide.

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Moving Incompatible Children

One benefit reported from the Indiana study was that behavioral problems were reduced in the smaller classes. Nevertheless, in Project STAR at the end of the first year, 48 students moved from small kindergarten classes to regular classes with an aide, and 60 moved to regular classes without an aide.⁸ Thus, the number of students moved from small classes was 108 of 1,678 students.⁹ This move was intended to separate incompatible chil-

It is impossible to assess the impact of this reassignment on the experiment; and, in fact, it may have had little impact because the affected students may have been removed from the analysis altogether.

The Teacher Training Program

The added feature in Project STAR came between the second and third years, when it was decided to give a special training course to 57 teachers. The enabling legislation had specified teacher training. Essentially, all teachers were getting some additional training as a routine matter in Tennessee, but apparently it was felt that the legislation called for something special. The participating teachers in 15 selected Project STAR schools were all given a total of three days of special training. The training was the same for all teachers selected; their assignment to small or regular-sized classes had not yet been made.⁸ When one considers that 30% of these teachers already had 20 years of teaching experience and only four had fewer than 3 years of experience, a three-day training program seems modest. As it turned out after the training, the classes with trained teachers performed the same as did the classes with untrained teachers.

Having fewer children in class reduces the distractions in the room and gives the teacher more time to devote to each child.

dren and "to achieve sexual and racial balance,"¹⁰ the latter a puzzling remark in view of the purported emphasis on randomization. No mention is made of what was done about incompatible students who were already in regular-sized classes. Perhaps there was nowhere to move them if there was only one small class or perhaps children seem more incompatible in small classes. A school administration planning to reduce class sizes might want to keep this potential difficulty in mind.

Class Size Drift

In addition, the sizes of the classes drifted a bit as time went on. Some small classes

became larger than their intended upper bound, and some regular-sized classes became smaller than their intended lower bound. The overall outcome of these violations of the original distributions should be to underestimate the effectiveness of the small classes compared with that of the regular-sized classes.

Assessing the Implications of the Study

Smaller Class Size

Why does smaller class size help teaching and learning? Reducing a class from 23 to 15 reduces the number of children in the room by about one-third. Having fewer children in class reduces the distractions in the room and gives the teacher more time to devote to each child. However, the impression one gets from reading papers emerging from Project STAR is that at least some teachers and administrators engaged in the study think of themselves as dealing with a start-up phenomenon. When children first come to school, they are confronted with many changes and much confusion. They come into this new setting from a variety of homes and circumstances. Many need training in paying attention, carrying out tasks, and interacting with others in a working situation. In other words, when children start school, they need to learn to cooperate with others, to learn to learn, and generally to get oriented to being students. These observations fit neatly with several current theories of education, including the idea of frames and scripts.¹¹⁻¹⁶

The experiment showed that the minority groups gained more than others in the first two years of the experiment; and although the last two years showed benefits comparable with those of the majority, there was a falling off of benefit. Some statements in the report by Word and colleagues³ suggest that much of the gain from the small classes was achieved in the first two years. The data presented in Table 3 do not show the falling off, but other summary tables from the study might.

Optimum Class Size

The idea of an ideal, or optimum, class size is open to question. This investigation

did not provide information about a variety of class sizes. Within the ranges of what is affordable, it is reasonable to suppose that smaller classes are preferable for beginners. But some desired training probably could not be accomplished in classes of such small sizes as one or two pupils even if they were affordable. Learning to work in a group is important and requires the presence of others.

Persistence of Beneficial Effects

In the Lasting Benefits Study,⁴ a continuation of studies evaluated the performance of students from small classes as compared with the performance of students from regular-sized classes or regular-sized classes with an aide after all students had returned to regular-sized classes. The results always favored the students from smaller classes. One year later (1989-90), the effect sizes ranged from 0.11 to 0.16 ($n = 4, 230$) in the fourth grade, and then, in subsequent years, from 0.17 to 0.34 ($n = 4, 639$) in the fifth grade, from 0.14 to 0.26 ($n = 4, 333$) in the sixth grade, and

The students who were originally in smaller classes continued to perform better than the students from regular-sized classes with or without a teacher's aide.

from 0.08 to 0.16 ($n = 4, 944$) in the seventh grade. Data from the eighth grade have been gathered and are being analyzed. Thus, year after year, the students who were originally in smaller classes continued to perform better than the students from regular-sized classes with or without a teacher's aide.¹⁷

Conclusion

Compelling evidence that smaller classes help, at least in early grades, and that the benefits derived from these smaller classes persist leaves open the possibility that additional or different educational devices could lead to still further gains. For example, applying to small classes the technique of within-class grouping in which the teacher handles each small group separately for short periods could strengthen

the educational process (essentially a second-order use of small class size). The point is that small classes can be used jointly with other teaching techniques which may add further gains.

Because a controlled education experiment (as distinct from a sample survey) of this quality, magnitude, and duration is a rarity, it is important that both educators and policymakers have access to its statistical information and understand its implications. Thought should be given by both public and private organizations to making sure that this information is preserved and well documented and that access to it is encouraged. The Tennessee three-phase study calls attention to the statewide con-

trolled experiment as a valuable device for assessing educational interventions and, thereby, improving school systems.

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ANSWERS TO THE ARGUMENT THAT CLASS SIZE REDUCTION COSTS TOO MUCH

Reducing class size is a long term investment which pays substantial returns.

Class Size vs. Pupil Teacher Ratio

When answering the argument that class size reduction costs too much, you must first explain the difference between Class Size and Pupil Teacher Ratio (PTR). **Class Size** is the number of students who regularly appear in a teacher's classroom and for whom that teacher is primarily responsible and accountable. **PTR** is a derived estimate commonly computed by dividing the number of students in a school by the number of professionals who work at or serve that school (e.g., counselors, special teachers, administrators, librarians, etc.). The difference between Class Size and PTR is about 9 or 10 students. In a school with a PTR of 16:1 you will find class sizes of about 25 or 26. (For additional information read the structured abstract of Mark Sharp's dissertation. The abstract can be found on the Reduce Class Size Now web site- http://www.reduceclasssizenow.org/sa_articles/SA9.pdf.)

Collect the Following Data to Make Your Case

- Number of Students
- Number of Schools
- Number of Title I schools
- Number of Welfare Families
- Per Pupil Expenditure
- Number of Retainees for each Grade Level
- Number of Dropouts for each Grade Level
- Annual Cost of State Incarceration
- Amount of Federal, State, and Local Education Funding

Class Size Reduction Should be Implemented in Phases

- During the first year of implementation reduce class sizes in kindergarten, first grade, and second grade.
- The second year of implementation, reduce class sizes in third grade and fourth grade.

Initial Costs

- Teacher Salaries
- Classroom Space

Return on the Investment

Krueger's (2002) analysis of STAR's class size experiment "suggest[s] that the internal real rate of return from a seven-student reduction [from 22 students to 15 students] in class size in the first four years of primary school is about 6%. At a 4% discount rate, every dollar invested in small classes yields about \$2 in benefits." (For additional information read the structured abstract of Alan Krueger's analysis. The abstract can be found on the Reduce Class Size Now web site- http://www.reduceclasssizenow.org/sa_articles/SA13.pdf.)

- *Teacher Morale*- increased attendance; reduced substitute costs; reduced "burnout"
- *Teacher Incentive*- attract and retain quality teachers
- *Parent and Community Involvement*- attract parents and volunteers; better communication between teachers and parents; field trips (etc.) less congested and require fewer volunteers (1 teacher and 2 volunteers can take a class on a field trip)
- *Improved Academic Achievement*- better test scores; helps close the racial achievement gap
- *Fewer Retentions*- number of students "held back" decreases; schools pay double for every grade a student repeats
- *Fewer Dropouts*- unemployment rate for dropouts is 4 times greater than for high school graduates
- *Improved Student Behavior*- vandalism costs decrease; expulsions and suspensions decrease; fewer discipline problems; fewer classroom disruptions
- *Early Identification of Learning Disabilities*- special education programs reduced in later years; programs accurately "targeted" to most needy students
- *Improved High School Graduation Rates*- adults without high school diplomas earn 42% less than high school graduates
- *Increased College Entrance Test-taking Rates*

Sample Plan for Implementation of Class Size Reduction in SMART District

- Year 1 implementation: reduce class sizes in kindergarten, first grade, second grade
- Year 2 implementation: add third grade and fourth grade

Example of Class Size Reduction in SMART District

Number of Students in District: 3,487	Total Number of Classroom Teachers: 206
Number of Students in K-4: 1,358	Number of Classroom Teachers K-4: 62
Per Pupil Expenditure (PPE): \$7,985	Beginning Teacher Salary: \$30,964
Revenue: Local- \$7,575,308	State- \$17,801,278
	Federal- \$2,483,260

Costs

Additional Classrooms- Additional space not needed. Classroom space was found by reorganizing existing classroom and building space and in some cases by using two teachers per room.

Additional Teachers- Year 1: Kindergarten – Grade 2: 9 teachers added to reduce classes from 22 to 18
9 teachers added at \$30,964 each = \$278,676 in costs
Year 2: Grades 3 – 4: 5 teachers added to reduce classes from 22 to 18
5 teachers added at \$30,964 each = \$154,820 in costs

Total Cost for Additional Teachers: \$433,496

Estimated Savings from Decreased Retentions

38 K-2 Students Retained (Year 1:Pre-Implementation)	27 K-2 Students Retained (Year 1:Post-Implementation)
48 K-4 Students Retained (Year 2:Pre-Implementation)	34 K-4 Students Retained (Year 2:Post-Implementation)
86 K-4 = \$686,710 (\$7,985 PPE X 86)	61 K-4 = \$487,085 (\$7,985 PPE X 61)

\$686,710 - \$487,085 = \$199,625 Saved Due to 30% Decrease of Retainees

Payment for Implementation

Savings \$199,625 + Federal \$233,871 = \$433,496

Note: Costs of teachers can be reduced by reassigning support teachers (e.g., reading, math, special, etc.) to a small class of their own. With classes of 18 it is possible for one paraprofessional to assist two teachers.

Additional Educational and Economic Benefits

- High school graduation rates for lower socioeconomic (SES) students improved from 70.2% (no small classes) to 88.2% if students had small classes in grades K-3; graduation rates for higher SES students improved, but less dramatically (83.7% to 87%). *Finn, Gerber, and Boyd-Zaharias, 2004*
- College test-taking rates for African-American students who had been in a small class in K-3 were statistically significant, reducing the gap between the rates of African-American and white students in taking the ACT or SAT college-entrance tests by 54%. If taking college-entrance exams equates with the person's actually attending college, then the large gains for minority students can have economic benefit from earnings and reduced need for social services. *Krueger and Whitmore, 2000*
- If all students were in a small class in grades K-3 for one to four years . . . the black-white test-score gap would fall by 38% in grades K-3, and by 15% thereafter. *Krueger and Whitmore, 2001*

Nationwide Costs of NOT Reducing Class Size

- Each year's dropouts will cost the country over \$200 billion during their lifetimes in lost earnings and unrealized tax revenues (Catterall, 1985).
- High school graduates, on the average earn \$9,245 more per year than high school dropouts (Employment Policy Foundation, 2002).
- In today's workplace, only 40% of adults who dropped out of high school are employed (Alliance for Excellent Education, 2003).
- 75% of America's state and 59% of America's federal prison inmates are high school dropouts (Harlow, 2003).
- A 1% increase in high school graduation rates would save approximately \$1.4 billion in incarceration costs, or about \$2,100 per each male high school graduate (Alliance for Excellent Education, 2003).
- The estimated tax revenue loss from males ages 25 – 34 who did not complete high school would be approximately \$944 billion, with cost increases to public welfare and crime at \$24 billion.
- A National Center for Education Statistics study found high school dropouts were more than twice as likely to receive public assistance as high school graduates who did not go on to college (Smith et al., 1996).