

Reducing School Class Size

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A topic of debate among public education researchers and policy makers is the degree to which reducing class size impacts students' ability to learn. Some argue that it is a leading factor, while others contend that it makes only slight difference and doesn't justify the enormous expense. This brief, the second Utah Foundation brief covering Utah public education issues, highlights the strengths and weaknesses of efforts made to reduce class sizes throughout the country. Also, it considers the feasibility and consequences of reducing class sizes in Utah.

Current Research

The research that has been done on reducing class size yields fairly consistent results. Much of the recent research focuses on the impact of the 1998 Class Size Reduction program, a federal appropriation of \$1.2 billion in FY 1999 that allowed poor and minority schools to hire teachers in order to reduce class sizes in grades 1-3. Other significant programs have been state-sponsored and were initiated before the federal program. These have also been subjected to much review. They include Tennessee's STAR (Student-Teacher Achievement Ratio) program, Wisconsin's SAGE program (Student Achievement Guarantee in Education) program, and California's Class Size Reduction program, among others. These three are summarized below:

- **Tennessee**

The STAR program began in 1985 as an experiment to determine whether class size has an impact on student performance. It was found to be most successful among minority populations, with achievement gains there outpacing gains made by white students. Also, some evidence suggests that the benefits of the early grade interventions remained with the students into high school (Schwartz, 2003).

- **Wisconsin**

Specific outcomes of the SAGE program, which also noted achievement gains similar to Tennessee's, included teachers having greater knowledge of each of their students, spending less time managing their classes, having more time for instruction, being more enthusiastic about teaching, and individualizing instruction (Molnar, et al, 2000).

- **California**

California's class size reduction began in 1996, and offers several insights into problems that can arise with implementing class size reduction on a large scale. First, its results were not as impressive as Tennessee's or Wisconsin's. Although statistically significant, the increases were minor. Also, gains made by minorities were no greater than those made by whites. Second, California reduced class sizes all at once, depleting the supply of quality teachers, and forcing districts to hire uncertified teachers. This action further harmed struggling schools, because it provided an opportunity for the best teachers at those schools to transfer to schools with better conditions (Bohrnstedt, et al, 2000).

Utah's Class Size & Per Pupil Spending

The pupil-teacher ratio is sometimes used as a relative gauge of class size. Although it is not exactly the same, because it includes special education and part-time teachers, it does accurately represent the growth in student population relative to the growth in the number of teachers. Figure 1 compares Utah's pupil-teacher ratio with ratios from the other states.

Figure 1: Pupil Per Teacher Ratio by State, Highest to Lowest, 2001-02

| State | 2001-02 Pupil/Teacher Ratio (PTR) | State | 2001-02 Pupil/Teacher Ratio (PTR) |
|----------------|---|----------------|---|
| Utah | 21.8 | New Hampshire | 15.1 |
| California | 20.5 | Rhode Island | 15.1 |
| Arizona | 19.7 | Mississippi | 15.0 |
| Washington | 19.6 | Oklahoma | 15.0 |
| Nevada | 18.5 | Montana | 14.9 |
| Florida | 18.4 | Louisiana | 14.7 |
| Michigan | 17.9 | Texas | 14.7 |
| Oregon | 17.9 | Wisconsin | 14.7 |
| Idaho | 17.8 | Arkansas | 14.4 |
| Colorado | 17.1 | Kansas | 14.4 |
| Hawaii | 16.9 | Iowa | 14.2 |
| Alaska | 16.7 | Massachusetts | 14.2 |
| Indiana | 16.6 | South Carolina | 14.1 |
| Illinois | 16.5 | West Virginia | 14.1 |
| Tennessee | 16.2 | Missouri | 13.9 |
| Maryland | 15.8 | South Dakota | 13.9 |
| Minnesota | 15.8 | Connecticut | 13.8 |
| New Mexico | 15.8 | Nebraska | 13.6 |
| Kentucky | 15.6 | New York | 13.5 |
| North Carolina | 15.6 | Virginia | 13.2 |
| Pennsylvania | 15.5 | New Jersey | 13.1 |
| Alabama | 15.4 | Wyoming | 13.0 |
| Delaware | 15.4 | North Dakota | 12.5 |
| Ohio | 15.3 | Maine | 12.4 |
| Georgia | 15.1 | Vermont | 12.1 |

Source: Utah State Office of Education; NCES; US Census

Utah has consistently had the highest pupil-teacher ratio in the nation. For the 2001-02 school year, it had 21.9 pupils per teacher, which was 1.3 more than California, the next closest state, and 6.7 more than the median state value of 15.1.

Figure 2 includes a measure of the states' per-pupil spending for 2002-03. This information is provided, along with an analysis of what it would cost to raise Utah's ranking from #50 to another position. A Utah Foundation report issued in September 2002 provided the same analysis using 1998-99 data. During the four years from 1999 to 2003, Utah increased its per-pupil spending by \$550, or approximately 12%. However, other states increased their spending by as much or more. Had the other states retained their same per-pupil spending, Utah would now be ranked 48th. Instead, the gap has grown, and Utah now lags the nearest state by a 10% margin, rather than the 8% margin that existed four years ago.

Figure 2: Per Pupil Spending by State in Descending Order by Rank, 2002-03

| State | 2002-03 Per Pupil Spending (PPS) | Rank | Difference from Utah (per pupil) | Dollar Increase for Utah to Reach Rank (Millions) | % Increase in K-12 spending for Utah to Reach Rank | Total Students |
|----------------|--|------|--|---|--|-------------------|
| Utah | \$4,769 | 50 | -- | -- | -- | 484,677 |
| Mississippi | 5,235 | 49 | \$466 | \$225.9 | 10% | 493,507 |
| Arizona | 5,445 | 48 | 676 | 327.6 | 14% | 922,180 |
| Tennessee | 5,470 | 47 | 701 | 339.8 | 15% | 924,899 |
| Arkansas | 5,764 | 46 | 995 | 482.3 | 21% | 449,805 |
| Idaho | 5,789 | 45 | 1,020 | 494.4 | 21% | 246,521 |
| Alabama | 5,937 | 44 | 1,168 | 566.1 | 24% | 737,190 |
| Nevada | 6,134 | 43 | 1,365 | 661.6 | 29% | 356,814 |
| North Dakota | 6,173 | 42 | 1,404 | 680.5 | 29% | 106,047 |
| Oklahoma | 6,184 | 41 | 1,415 | 685.8 | 30% | 622,139 |
| Florida | 6,232 | 40 | 1,463 | 709.1 | 31% | 2,500,478 |
| Colorado | 6,244 | 39 | 1,475 | 714.9 | 31% | 742,145 |
| Louisiana | 6,270 | 38 | 1,501 | 727.5 | 31% | 731,328 |
| South Dakota | 6,442 | 37 | 1,673 | 810.9 | 35% | 127,542 |
| Kentucky | 6,449 | 36 | 1,680 | 814.3 | 35% | 654,363 |
| Missouri | 6,574 | 35 | 1,805 | 874.8 | 38% | 909,792 |
| North Carolina | 6,578 | 34 | 1,809 | 876.8 | 38% | 1,315,363 |
| Hawaii | 6,775 | 33 | 2,006 | 972.3 | 42% | 184,546 |
| Texas | 6,833 | 32 | 2,064 | 1,000.4 | 43% | 4,163,447 |
| California | 6,878 | 31 | 2,109 | 1,022.2 | 44% | 6,223,821 |
| Kansas | 6,906 | 30 | 2,137 | 1,035.8 | 45% | 470,205 |
| Montana | 7,080 | 29 | 2,311 | 1,120.1 | 48% | 151,947 |
| New Mexico | 7,093 | 28 | 2,324 | 1,126.4 | 49% | 320,260 |
| Iowa | 7,126 | 27 | 2,357 | 1,142.4 | 49% | 485,932 |
| South Carolina | 7,179 | 26 | 2,410 | 1,168.1 | 51% | 676,198 |
| Washington | 7,236 | 25 | 2,467 | 1,195.7 | 52% | 1,009,200 |
| Virginia | 7,452 | 24 | 2,683 | 1,300.4 | 56% | 1,163,091 |
| Nebraska | 7,547 | 23 | 2,778 | 1,346.4 | 58% | 285,095 |
| Illinois | 7,598 | 22 | 2,829 | 1,371.2 | 59% | 2,071,391 |
| Georgia | 7,633 | 21 | 2,864 | 1,388.1 | 60% | 1,470,634 |
| Minnesota | 7,832 | 20 | 3,063 | 1,484.6 | 64% | 851,384 |
| Maryland | 7,847 | 19 | 3,078 | 1,491.8 | 65% | 860,640 |
| New Hampshire | 7,926 | 18 | 3,157 | 1,530.1 | 66% | 206,847 |
| Indiana | 8,034 | 17 | 3,265 | 1,582.5 | 68% | 996,133 |
| Maine | 8,160 | 16 | 3,391 | 1,643.5 | 71% | 205,586 |
| Wyoming | 8,203 | 15 | 3,434 | 1,664.4 | 72% | 88,128 |
| Oregon | 8,280 | 14 | 3,511 | 1,701.7 | 74% | 551,480 |
| Ohio | 8,308 | 13 | 3,539 | 1,715.3 | 74% | 1,830,985 |
| Michigan | 8,611 | 12 | 3,842 | 1,862.1 | 81% | 1,730,668 |
| Wisconsin | 8,654 | 11 | 3,885 | 1,883.0 | 81% | 879,361 |
| Pennsylvania | 8,673 | 10 | 3,904 | 1,892.2 | 82% | 1,821,627 |
| West Virginia | 8,742 | 9 | 3,973 | 1,925.6 | 83% | 282,885 |
| Alaska | 9,430 | 8 | 4,661 | 2,259.1 | 98% | 134,358 |
| New Jersey | 9,596 | 7 | 4,827 | 2,339.5 | 101% | 1,341,656 |
| Delaware | 9,612 | 6 | 4,843 | 2,347.3 | 102% | 115,560 |
| Vermont | 9,798 | 5 | 5,029 | 2,437.4 | 105% | 101,179 |
| Massachusetts | 9,883 | 4 | 5,114 | 2,478.6 | 107% | 973,140 |
| Rhode Island | 10,216 | 3 | 5,447 | 2,640.0 | 114% | 158,046 |
| Connecticut | 10,517 | 2 | 5,748 | 2,785.9 | 121% | 570,228 |
| New York | 10,725 | 1 | 5,956 | 2,886.7 | 125% | 2,872,132 |

Source: Utah State Office of Education; NCES; US Census

Cost Analysis

A follow-up question to the above analysis might ask what the cost would be to reduce Utah class sizes by one. Figure 3 presents a breakdown of those costs. It considers reducing the pupil/teacher ratio for all class sizes, rather than just grades K-3, as the research would recommend. Note that the pupil/teacher ratio here is for 2002-03 data. These data were not available for the 50-state comparison in Figure 1.

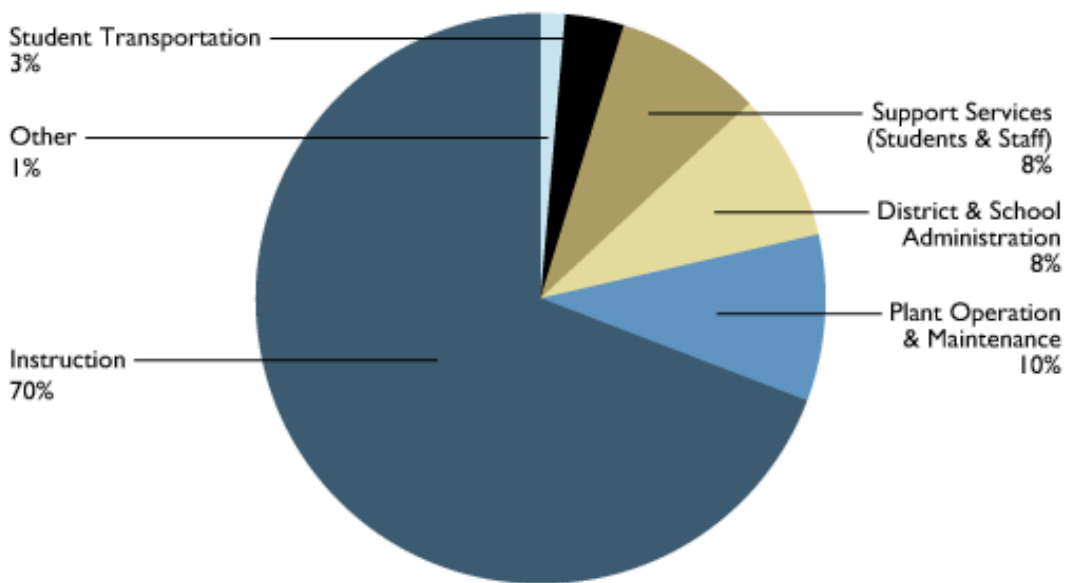
Figure 3: Costs to Reduce Class Size

| | |
|--|--------------|
| 2002-03 Pupil/Teacher Ratio (PTR) | 22.2 |
| Fall 2002 Student Enrollment | 481,143 |
| Average District Salary | \$36,627 |
| Average District Benefits | \$13,603 |
| Average Compensation Per Teacher | \$50,230 |
| # of Current Teachers | 21,636 |
| New Teachers Needed to Reduce PTR to 21.2 | 1,019 |
| x Average Compensation | \$50,230 |
| Estimated Cost of Reducing PTR by 1 | \$51,170,655 |

Source: Source: USOE; calculations by Utah Foundation

To put this figure in perspective, it is approximately 2.5% of the \$2 billion Public Education operations budget. Classroom instruction currently comprises 69% of Public Education's expenditures. As seen in Figure 4, using an extra 2.5% for additional instruction would take a significant portion from either student transportation, support services, administration, or building maintenance, if other funding were unavailable.

Figure 4: Utah Public Education Expenditures



Source: Source: USOE

Conclusion

Not surprisingly, because Utah ranks highest in class size, it also ranks lowest in per pupil spending. The correlation between the two variables is about as strong as one could hope to find using real-world data. The pattern of the 50 states shows an inverse relationship that has only a 7% chance of being explained by other variables. Clearly, if a public policy goal is to lower class size, a reliable way to do that is by increasing per-pupil spending. As noted earlier, however, the benefits of reducing class size are not universally acknowledged. Continued research, following the current wave of class size reduction, will likely make the costs and benefits more clear, allowing Utah and other states to make more informed decisions about how to spend their education money.

Endnotes

Bohrnsted, George W. and Edward Wiley and Brian M. Stecher. 2000. "The California Class-Size Reduction Evaluation: Lessons Learned." *National Research Center on Education in the Inner Cities Review*, 9(2): 11.

Molnar, Alex, Philip Smith, John Zahorik, Amanda Palmer, Anke Halbach, and Karen Ehrle. 2000. "Wisconsin's Student Achievement Guarantee in Education (SAGE) Class-Size Reduction Program: Achievement Effects, Teaching and Classroom Implications." *National Research Center on Education in the Inner Cities Review*, 9(2): 12-13.

Schwartz, Wendy. 2003. "Class Size Reduction and Urban Students." *ERIC Digest*. ERIC Identifier: ED472486. Available at <http://www.eric.ed.gov/>.

Special thanks to John Massey at Office of State Legislative Fiscal Analyst for providing references to some of the research on what would be needed to lower class size.

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