THE RELATION BETWEEN DISTRICT SIZE AND STUDENT ACHIEVEMENT: SUMMARY

Tom Deeter, Lead Consultant

Background—The Maine state legislature recently enacted P.L. Chapter 240, which:

- Reduces the number of school districts from around 318 to around 80
- Established a minimum size of 2,500 for most Regional School Units (RSU), the new name for reorganized districts
- Provides exceptions to the 2,500 minimum, reducing that to 1,200 students.

A primary reason for this action was to reduce administrative costs, and trim about $36.5 million from the education budget. A secondary reason was to improve student achievement. If a school administrative unit was an "efficient, high, performing district," they could avoid consolidation. This designation required a district to contain at least three schools identified as "higher performing," and system administrative costs were less than 4 percent of its total per-pupil expenditures.

Prior to his departure, Ted Stilwill suggested the consolidation of Iowa school districts containing fewer than 350 students.

Focus—Considering the opinion that forcing school consolidation would reduce administrative costs and improve student achievement, a study was undertaken to examine the relations between a school district's number of students (hereafter referred to as n-size), the and the number and percent of proficient students.

Methodology—Several research questions were investigated:

- What is the correlation between n-size and the number of proficient students?
- What is the correlation between n-size and the percent of proficient students?
- Using cross-group comparisons, is the achievement of students in some decile groups greater than the achievement of students in other decile groups?
- How big is the difference between decile groups?

In preparation to analyze the data, I attempted to "normalize" the data a bit. Because there are very many school districts with a small number of students (e.g., an average n-size is around 750), and a few districts with a very large number of students, a distribution was developed that first ranked the districts from low to high by n-size, after which a cumulative frequency distribution was created. This enabled the sorting of districts into deciles, each representing about 10 percent of the students in the state. Each district was placed in a specific decile, and that position was matched with all students and subgroups for future analyses. Using 2006-2007 data, this yielded the following groupings:

Less than 10% of total population: 141 districts
10% to <20% of total population: 73 districts
20% to <30% of total population: 52 districts
30% to <40% of total population: 35 districts
40% to <50% of total population: 26 districts
50% to <60% of total population: 16 districts
60% to <70% of total population: 10 districts
70% to <80% of total population: 6 districts
80% to <90% of total population: 4 districts
90% to <100% of total population: 2 districts

Results and Discussion—

- What is the correlation between n-size and the number of proficient students?

  It should be to no one's surprise that there is a strong positive correlation between the number of students in a district and the number of proficient students. The more students a district has, the greater the probability that more of them would be proficient. All coefficients were greater than .90, and highly statistically significant.

- What is the correlation between n-size and the percent of proficient students?

  Contrary to the first question, there was almost no correlation between the number of students in a district and the percent of proficient students. The magnitude of the correlations were overwhelmingly less than .20, which means that the less than 4 percent of the variability in percent of proficient students is accounted for by n-size. This result, along with additional exploratory analyses, supported a conclusion that "there is more to student achievement than district n-size." If student achievement was even somewhat dependent on the number of students in a district, the correlation should have at least been more moderate. However, because of the size of the coefficients, it appears that there is little or no relationship between n-size and achievement. Thus, there has to be more to student achievement than the number of students in a district.

- Using cross-group comparisons, is the achievement of students in some decile groups greater than the achievement of students in other decile groups?
- How big is the difference between decile groups?

  To examine these questions, independent t-tests were run to study the differences among group means for each decile group. To no surprise, even very small differences were statistically significant. The average n-size was close to 3,000 students which makes miniscule differences statistically significant. Thus, I had to revert to an examination of effect size, which demonstrates the extent to which a statistically significant difference is practically significant (the issue of practical significant of an effect size has been called a "meaningfulness criterion" by Bob Forsyth, Iowa Testing Programs, circa early 1980s).

Results of calculating effect sizes yielded small effect sizes (greater than 0.2) between most decile groups and the 9th and 10th decile groupings. Minimal effects (mostly less than 0.2) were found for Grade 5 Math, Grade 7 Reading, Grade 11 Reading, and Grade 11 Science. Somewhat moderate effect sizes (greater than 0.3) were found between several decile groups and the 10th decile group for 8th, 9th, and 10th grade Math. For 3rd through 8th grade Science, these effects were found between the lower decile groups and the 9th and 10th decile groups. Moderate effect sizes (greater than 0.4) were found between lower decile groups and the 10th decile group for 3rd, 4th, 5th, and 6th grade Science.

Conclusions—It is important to keep in mind the program offerings available at schools of all sizes, which gets at “opportunity to learn,” as well as teacher quality, or how well a teacher is prepared to deliver the content for the students. Indeed, these two things may affect student achievement more than n-size.

Final Note—The districts making up the 10th decile were Des Moines and Cedar Rapids. The districts making up the 9th decile were Davenport, Sioux City, Iowa City, and Dubuque.