

School District Size, Student Achievement and High School Course Offerings in Connecticut¹

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This study compared Connecticut's small schools with their larger, non-city counterparts on the basis of standardized student achievement scores and high school course offerings. In this study, a "small" district included any Connecticut public school district with fewer than 2,500 students. A "small" high school was defined as having fewer than 150 students per grade. No significant differences were found between large and small school districts with respect to student achievement scores. Some significant differences were found among large, medium, and small high schools with respect to high school course offerings.

INTRODUCTION

From 1981 to 1986, student enrollments in Connecticut declined by 10%. Recent State Department of Education enrollment projections indicate that the decline can be expected to continue through 1988 and become more evident in the high schools through 1991. Continuing declines in enrollment and related available resources raise questions about the quality of education which can be offered by those systems already small in size and about the efficacy of consolidating small school systems. Very little substantive research has been conducted on the advantages and inherent qualities of either large or small schools. Results of past research efforts have been reported as confusing and sometimes misleading.

The supporting evidence is incomplete—many critical questions and potential liabilities are simply ignored. . . The conclusions are, at best, inconclusive, and, at worst, simply incorrect. In short, there is no strong empirical base to support the assumptions and assertions of school and district reorganization advocates [10].

Recently the State of Illinois came under fire because of State Board of Education recommendations for consolidation based on its claim that larger schools result in increases in student achievement, more comprehensive course offerings, and cost economies [7]. The Illinois Association of School Boards has voted to oppose any efforts toward consolidation unless they are specifically designed to improve instruction [6]. In the absence of overwhelming evidence linking school size and achievement, it appears that such controversies will persist. Because approximately 67% of Connecticut's school systems can be described as small or rural there is a need for a study which begins to systematically build an em-

pirical base focusing on the quality of education which its small school systems can offer in comparison to the larger school systems.

The purpose of this study was to compare Connecticut's small schools with their larger, non-city, counterparts on the basis of student achievement and high school course offerings. A "small" school district was defined as one with fewer than 2,500 students. A "small" high school was defined as one having fewer than 150 students per grade.

Review of Literature

Based on previous research about consolidation [2], proponents of larger consolidated districts have claimed that students benefit from larger schools through a more varied curriculum, better facilities, and more varied course offerings. On the other hand, proponents of small districts have claimed that students of small schools benefit from fewer breaks in their education by attending different school buildings at various stages of their education, and closer contact with teachers who know the community and families well. It becomes apparent that a wide diversity of opinion concerning the effect of school district size on the quality of education exists.

Achievement. In any determination of the effectiveness of schooling, student achievement is one of the most frequently used indicators of the extent to which a school fulfills its function. Measures of student achievement, when properly aligned with planned objectives and instruction, are considered to be a type of "report card" that indicates how well a school is doing. The relationship of school size to achievement has been investigated often with mixed results.

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In reviewing studies of the impact of school size on the quality of education, James and Levin [8] found either no significant relationships or negative ones between student enrollments and level of achievement. However, they pointed out that there were questionable aspects of every study and that the results were not conclusive. More recently, a study by the Illinois State Board of Education [7] reported that schools with enrollments of fewer than 215 students and more than 1,280 students had lower achievement levels than schools with enrollments between 215–493 and 494–1279. While they reported a significant difference in achievement with respect to enrollment, it was not made clear if these differences were statistically significant. The achievement means as presented “looked” different, but no evidence was provided to indicate levels of statistical significance. In addition, the methods of analysis were not clearly defined. In the absence of such information, their results must be viewed cautiously.

The Small Schools Task Force in Montgomery County, Maryland [9] concluded from its study of elementary school size and achievement “that school size is not the determining factor in the quality of a child’s elementary school education. Other factors such as leadership of the principal, abilities and dedication of the staff, and community support and involvement may be more important factors.” In further support of factors other than school size, Cusick [5] in his report to the National Commission on Excellence in Education stated that “the critical factor which differentiates a good school from one not so good is the orientation of the majority of the students toward superior academic education.” Clearly, factors other than mere size have a tremendous influence on “superior academic achievement.”

Findings such as these emphasize that one must consider that although achievement may be used as an *indicator* of quality education, many factors in addition to enrollment must be considered before attempting to make causal statements about student achievement.

Course Offerings. Proponents of large consolidated schools have claimed that large schools are capable of offering a greater range of courses. By providing more varied course offerings, students have greater flexibility in choosing courses to fulfill their graduation requirements and future career objectives. It would seem that large schools do have an edge.

A study of high school course offerings in Illinois [7] found that large schools more frequently (1) had longer foreign language sequences, (2) offered calculus, (3) offered selected non-required courses such as geography, and (4) offered more opportunities for remedial math and English.

Students in large schools may have more flexibility in selecting courses than students in small schools. Even where small schools offer approximately the same course, scheduling difficulties with “singleton” courses may arise. For instance, even though a small school may offer calculus, there could be so few students who take it that it is scheduled for only one time slot (a “singleton”) or in alternate years. Consequently, students of small schools

may be in the dilemma of having to choose another course over calculus in order to get all the courses they need or want for graduation. Large schools, on the other hand, may offer calculus in more than one time slot diminishing the probability of schedule conflicts.

Small schools, however, tend to be more stringent in their graduation requirements [1]. For example, 70% of the smallest schools (total school enrollment < 100 students) required students to take general science or biology, but only 8% of those with enrollments over 1,000 required biology and only 23% required general science.

Few can argue that larger schools, due to larger enrollments and resources, may offer more varied course offerings. The more important question may be how many students actually complete them. A 1980 survey of high school diploma requirements [11] showed that while only eight states required high schools to *offer* a foreign language, *none* required students to take it. Furthermore, courses such as algebra, French I, and geography are frequently offered in secondary schools. However, only 31% of the students complete algebra, 13% complete French I, and 16% complete geography. Calculus is offered in schools enrolling about 60% of all students, but only 6% of all students complete it.

While comparisons of course offerings are important, it is clearly also important to examine percentages of students who actually complete those courses and then weigh the relative importance of course offerings and course completions.

METHODOLOGY

Sample Selection

All public school districts in the state of Connecticut were included in this study with the exception of the five major metropolitan districts: Bridgeport, Hartford, New Haven, Stamford, and Waterbury. Because of their unique urban circumstances, these districts were considered not typical of the other districts in the state.

Districts were classified as follows for analysis purposes.

1. *Small District*—total enrollment, fewer than 2,500 students.
2. *Large, Non-city District*—total enrollment, greater than 2,500 students.
3. *Small High School*—total enrollment, fewer than 600 students, or fewer than 150 students per grade.
4. *Medium High School*—total enrollment between 601 and 900 students or 150–225 students per grade.
5. *Large High School*—total enrollment greater than 900 students or greater than 225 students per grade.

While these definitions are acknowledged to be somewhat arbitrary, the literature does not provide any consistent distinctions with respect to ideal high school enrollment. Enrollments ranging from 450 to over 1,200 students have been reported as optimal for a comprehensive high school [3; 4]. Classifications for this study were influenced by the distribution of high school enrollments

TABLE 1

Mean Percentage of Students Needing Further Help in the Areas of Math, Reading, and Writing as indicated by the 1985 Grade 4 State of Connecticut Mastery Test

Area	Mean Percentage		<i>t</i>
	Small Schools (<i>n</i> = 94)	Large, Non-City Schools (<i>n</i> = 59)	
Math	12.8%	14.1%	1.06
Reading	22.7%	25.0%	1.22
Writing	14.0%	14.4%	.29

Note: None of the values for *t* are significant ($p < .05$).

in Connecticut, the experience of the researchers, and a very general trend in the literature.

Due to the nature of the variables, it was necessary to utilize different groupings depending upon the data used in the respective analyses. The small district definition was used for the Mastery Test comparisons because this variable is common to all districts in Connecticut. The high school size definitions were used in comparisons of course offerings relating only to high schools. Readers should note that some districts appear in the small *district* group for comparisons of Mastery Test data due to their overall district enrollment, but appear in the medium *high school* group for comparisons of course offerings because of the size of their high schools.

Research Questions

Based on the review of literature and the availability of data from the Connecticut State Department of Education, this study was designed to answer the following specific research questions:

1. Is there a significant difference between small and large districts with respect to the percentage of students in need of additional help in math, reading, or writing

as indicated by the 1985 Connecticut Fourth Grade Mastery Test?

2. Are there significant differences among districts with small, medium, or large high schools with respect to the percentage of students at or above SLOEP (State Level of Expected Proficiency) on Connecticut's Ninth Grade Proficiency Examination?

3. Are there significant differences among districts with small, medium or large high schools with respect to high school course offerings?

Data Collection

All data used in this study were the most recent data available from the Connecticut State Department of Education.

RESULTS

No significant differences between small and large school districts were found in terms of the mean percentage of students in need of further help in the areas of math, reading, and writing as indicated by the 1985 Connecticut Fourth Grade Mastery Test (see Table 1). Small schools tended to have slightly lower mean percentages of students in need of further help in each area.

No significant differences among small, medium, or large high schools were found in mean scores and percentages of students above SLOEP (State Level of Expectancy Proficiency) on Connecticut's Ninth Grade Proficiency Examination (see Table 2). Medium high schools tended to have slightly higher percentages of students above SLOEP in language arts, reading, and writing.

The Fourth Grade Mastery Test and the Ninth Grade Proficiency Examination results indicated that small and large districts may do equally well educating their children in kindergarten through ninth grade. It would be reasonable to assume that if the districts are able to maintain equivalent levels of achievement in kindergarten through ninth grade, the years in which a student's study and work

TABLE 2

Comparison of Means and the Percentage of Students above SLOEP by Subject on the Ninth Grade Proficiency Examination, 1984

Subject	Means			Percentage of Students Above SLOEP		
	Small Schools (<i>n</i> = 36)	Medium Schools (<i>n</i> = 25)	Large, Non-city Schools (<i>n</i> = 55)	Small Schools (<i>n</i> = 36)	Medium Schools (<i>n</i> = 25)	Large, Non-City Schools (<i>n</i> = 55)
Mathematics	<u>84.43</u>	<u>84.72</u>	<u>84.38</u>	<u>95.17</u>	<u>94.71</u>	<u>93.92</u>
Language Arts	<u>90.89</u>	<u>91.45</u>	<u>91.01</u>	<u>97.89</u>	<u>98.17</u>	<u>97.80</u>
Reading	<u>80.49</u>	<u>80.83</u>	<u>80.47</u>	<u>98.20</u>	<u>98.74</u>	<u>98.31</u>
Writing	<u>5.81</u>	<u>5.84</u>	<u>5.81</u>	<u>96.46</u>	<u>97.10</u>	<u>96.25</u>

Note: Underlined means for each subject are not significantly different from each other. Thus, means for the same subject that are not underlined by the same line are significantly different from each other ($p < .05$).

TABLE 3
Comparison of the Number of 1983 Program Offerings in Selected Areas
in Small, Medium and Large, Non-City High Schools

	Small (<i>n</i> = 36)		Medium (<i>n</i> = 25)		Large, Non-City (<i>n</i> = 55)	
	Mean	SD	Mean	SD	Mean	SD
Arts	<u>6.89</u>	1.88	<u>8.36</u>	1.68	<u>9.00</u>	1.71
Vocational	<u>5.06</u>	1.43	<u>5.76</u>	1.81	<u>7.65</u>	2.44
Foreign Language	11.56	3.45	<u>14.92</u>	4.39	<u>17.51</u>	5.94
Percentage of Schools That Offer Vocational Clubs	61%		64%		80%	
Average Length in Years of Longest Foreign Language Sequence	<u>4.83</u>	1.32	<u>5.16</u>	.80	<u>5.25</u>	1.46

Note: Underlined means for each area are not significantly different from each other. Thus, means for the same area that are not underlined by the same line are significantly different from each other ($p < .05$).

habits are formulated, they will be able to maintain that consistency in grades ten, eleven, and twelve. No evidence to support that contention is currently available.

Course Offerings

As noted in the review of literature, course offerings provide only a part of the overall curriculum picture. The percentages of students who actually complete the courses is an equally important issue. These two factors should be studied concurrently so that the relative importance of each can be weighed. Because this study used only available State Department of Education data, the focus was on course offerings.

Table 3 describes the results of comparisons of small, medium, and large high schools with respect to course offerings in the areas of the arts, vocational education,

and foreign languages. Small high schools offered significantly fewer arts and foreign language courses than did medium and large high schools. There were no significant differences with respect to the average percentages of schools that offered vocational clubs or to the average length in years of the longest foreign language sequence.

Small and medium high schools were not significantly different from each other with respect to the number of program offerings in vocational education. They did however, offer significantly fewer vocational courses than did large high schools. Opportunities in the arts, vocational education, and foreign languages did favor medium and large high schools.

Table 4 describes the results of comparisons of small, medium, and large high schools with respect to advanced course offerings. Small, medium, and large high schools did not differ significantly with respect to course offer-

TABLE 4
Percentage of Schools Offering Advanced Courses - 1983

Course	Mean Percentage		
	Small (<i>n</i> = 36)	Medium (<i>n</i> = 25)	Large, Non-City (<i>n</i> = 55)
Calculus	<u>86%</u>	<u>92%</u>	<u>98%</u>
Computer Programming	<u>92%</u>	<u>88%</u>	<u>98%</u>
Advanced Placement Social Studies	<u>28%</u>	<u>32%</u>	<u>62%</u>
Advanced Placement Science	<u>31%</u>	<u>48%</u>	<u>67%</u>
College Board, Honors, or UCONN English	<u>39%</u>	<u>72%</u>	<u>84%</u>

Note: Underlined means for each course are not significantly different from each other. Thus, means for the same course that are not underlined by the same line are significantly different from each other ($p < .05$).

ings in calculus or computer programming. Large high schools offered advanced placement social studies significantly more often than small and medium high schools. Large high schools offered advanced placement science significantly more often than small high schools. Medium and large high schools also offered advanced English significantly more often than small high schools.

Readers should note that there is a tendency for the number of course offerings to increase as the size of the high school increases (see Tables 3 and 4).

CONCLUSIONS AND RECOMMENDATIONS

This report was meant to survey each area, examining the general relationships of school size to each area. In addition to answering some relevant questions, it also directed our attention to some specific areas for further investigation.

There were significant differences between small, medium, and large high schools with respect to the percentage of schools offering courses in the arts, foreign languages, advanced placement science and social sciences, and College Board, Honors, or UCONN English. Small high schools tended to offer fewer courses. Because some of the advanced courses offered in larger high schools may have very limited enrollments, it is necessary to weigh the relative importance of this finding in relation to the number of students who actually took these courses.

Based upon the Fourth Grade Mastery Test and the Ninth Grade Proficiency Test, no significant differences were found between small and large schools with respect to student achievement although there was a tendency for small or medium high schools to show higher test scores than large high schools. Further examination of this trend may be warranted.

SUMMARY OF MAJOR FINDINGS

In summary, the major findings related to the specific research questions guiding this research were:

1. There was no significant difference between small and large districts with respect to the percentages of students in need of additional help in math, reading, or writing as indicated by the 1985 Fourth Grade Mastery Test.

2. There were no significant differences among small, medium, or large high schools with respect to mean scores or percentages of students above SLOEP on the Ninth Grade Proficiency Examination.

3. Large high schools consistently offered more advanced courses than small or medium high schools.

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