

## Optimal Student Enrollment

### Description of Request:

The requestor is interested in finding out more about the “criteria” school districts are using to determine “optimal student enrollment” in elementary, middle and high schools, as well as, the basis for this determination.

### Question:

1. What criteria are school districts using to determine “optimal student enrollment” in elementary, middle and high schools and what is the basis for this determination?
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### Report:

Following an established REL-NEI Reference Desk research protocol, we conducted a search for research reports as well as descriptive and policy-oriented briefs and articles in this area. The sources included federally funded organizations, additional research institutions, several educational research databases, and a general Internet search using Google and other search engines. We also searched for appropriate organizations that may act as resources on this issue. We have not done an evaluation of these organizations or the resources themselves, but offer this list to you for your information only.

Researchers thought it would be of use to provide a context to the ongoing dialogue around appropriate and optimal school size. Institute for Education Sciences (IES), in their Education Indicators series, articulates the tension between larger and smaller sized schools: “though smaller schools may have a stronger sense of community, larger schools often can provide broader curricular offerings” (IES website. *Education Indicators: An International Perspective*: <http://nces.ed.gov/surveys/international/intlindicators/>)

Our researchers have found no evidence indicating what criteria districts are using to determine “optimal student enrollment” in elementary, middle and high schools or the basis for the determination. However, researchers were able to locate literature that provided research-based ranges of “optimal student enrollment” in elementary and high schools. One study found that “there is some evidence that moderately sized elementary schools (300–500 students) and high schools (600–900 students) may optimally balance economies of size with the potential negative effects of large schools” (Andrews, 2002; see resource below). Another study suggested that while, “Elementary schools [with students of disadvantaged social and economic backgrounds] should be limited in size to not more than about 300 students; those serving economically and socially heterogeneous or relatively advantaged students should be limited in size to about 500 students. Secondary schools serving exclusively or largely diverse and/or disadvantaged students should be limited in size to about 600 students or fewer, while those secondary schools serving economically and socially heterogeneous or relatively advantaged students should be limited in size to about 1,000 students” (Leithwood, 2009; see resource below). Still another study’s results suggested that “the ideal high school, defined in terms of effectiveness (i.e., learning), enrolls between 600 and 900 students. In schools smaller than this, students learn less; those in large high schools (especially over 2,100) learn considerably less” (Lee, 1997; see resource below). In terms of cost effectiveness, “The best of the cost function studies suggest that sizeable potential cost savings in instructional and administrative costs may exist by moving from a very small district (500 or fewer pupils) to a district with approximately 2,000–4,000 pupils. The findings from production function studies of schools are less consistent, but there is some evidence that moderately sized elementary schools (300–500 students) and high schools (600–900 students) may optimally balance economies of size with the potential negative effects of large schools” (Andrews, 2002; see resource below).

We focused on identifying resources that specifically addressed optimal school size for elementary, middle and high schools, but to supplement the research findings that directly address the questions, we have also included a selection of articles reviewing the effect of school size on school performance and the effect a high school's size has on the school's budget.

Question:

**1. What criteria are school districts using to determine “optimal student enrollment” in elementary, middle and high schools?**

**1.1. Revisiting Economies of Size in American Education: Are We Any Closer to a Consensus?**

*Andrews, M., Duncombe, W. & Yinger, J.; June 2002, Economics of Education Review Volume 21, Issue 3, Pages 245-262.*

Source: General internet search using Google.

([http://cpr.maxwell.syr.edu/efap/Publications/Revisiting\\_Economies.pdf](http://cpr.maxwell.syr.edu/efap/Publications/Revisiting_Economies.pdf))

From the abstract: “Consolidation remains a common policy recommendation of state governments looking to improve efficiency, especially in rural school districts. However, state policies encouraging consolidation have increasingly been challenged as fostering learning environments that hurt student performance. Does the empirical research on economies of size support for this policy? The objective of this paper is to define the factors affecting economies of size and update the literature since 1980. The best of the cost function studies suggest that sizeable potential cost savings in instructional and administrative costs may exist by moving from a very small district (500 or fewer pupils) to a district with approximately 2,000–4,000 pupils. The findings from production function studies of schools are less consistent, but there is some evidence that moderately sized elementary schools (300–500 students) and high schools (600–900 students) may optimally balance economies of size with the potential negative effects of large schools. Since program evaluation research on school consolidation is limited, it is time for researchers on both sides of this debate to make good evaluation research on consolidation a high priority.”

**1.2. A Review of Empirical Evidence About School Size Effects: A Policy Perspective.**

*Leithwood K. & Jantzi D.; 2009; Review of Educational Research, Vol. 79, No. 1, pages 464-490.*

Source: General internet search using Google Scholar

(<http://rer.sagepub.com/cgi/reprint/79/1/464>)

From the abstract: “This review examined 57 post-1990 empirical studies of school size effects on a variety of student and organizational outcomes. The weight of evidence provided by this research clearly favors smaller schools. Students who traditionally struggle at school and students from disadvantaged social and economic backgrounds are the major benefactors of smaller schools. Elementary schools with large proportions of such students should be limited in size to not more than about 300 students; those serving economically and socially heterogeneous or relatively advantaged students should be limited in size to about 500 students. Secondary schools serving exclusively or largely diverse and/or disadvantaged students should be limited in size to about 600 students or fewer, while those secondary schools serving economically and socially heterogeneous or relatively advantaged students should be limited in size to about 1,000 students.”

**1.3. High School Size: Which Works Best and for Whom? Lee, V.E. & Smith, J.B.; 1997;**

*Educational Evaluation and Policy Analysis, Vol. 19, No. 3, p. 205-227.*

Source: ERIC (#ED396888)

([http://www.eric.ed.gov/ERICDocs/data/ericdocs2sql/content\\_storage\\_01/0000019b/80/14/96/a2.pdf](http://www.eric.ed.gov/ERICDocs/data/ericdocs2sql/content_storage_01/0000019b/80/14/96/a2.pdf))

From the abstract: “The study described in this article investigates the relationship between high school size and student learning. We used three waves of data from NELS:88 and hierarchical linear modeling (HLM) methods to examine how students’ achievement growth in two subjects (reading and mathematics) over the high school years is influenced by the size of the high school they attend. Three research questions guided the study: (a) Which size high school is most effective for students’ learning?, (b) In which size high school is learning most equitably distributed?, and (c) Are size effects consistent across high schools defined by their social compositions? Results suggest that the ideal high school, defined in terms of effectiveness (i.e., learning), enrolls between 600 and 900 students. In schools smaller than this, students learn less;

those in large high schools (especially over 2,100) learn considerably less. Learning is more equitable in very small schools, with equity defined by the relationship between learning and student socioeconomic status (SES). An important finding from the study is that the influence of school size on learning is different in schools that enroll students of varying SES and in schools with differing proportions of minorities. Enrollment size has a stronger effect on learning in schools with lower-SES students and also in schools with high concentrations of minority students. Implications for educational policy are discussed.”

**1.4. School Reform and the No-Man’s-Land of High School Size.** *Gregory, T.; December, 2000;Indiana University. Portions of this paper are adapted from an unpublished paper, "School Size, School Reform, and the Moral Conversation," delivered at the Journal of Curriculum Theorizing Conference (Bloomington, IN, October 18, 1997).*

Source: ERIC (#ED451981)

([http://www.eric.ed.gov/ERICDocs/data/ericdocs2sql/content\\_storage\\_01/0000019b/80/16/f5/6d.pdf](http://www.eric.ed.gov/ERICDocs/data/ericdocs2sql/content_storage_01/0000019b/80/16/f5/6d.pdf))

From the abstract: “The paper explores the ways in which research and practice have shaped how we think about the proper size of the high school. Since 1970, essentially all research tends to favor the creation of small high schools. Four forces seem to have come into play much more strongly, often in concert with each other, since our conception of the high school was established; the information age, the emergence of an adolescent culture, the students’ rights movement, and our changing views of the proper functioning of organizations all threaten to render the large, comprehensive high school obsolete. Two reform responses to these conditions have emerged: break existing big high schools up into small schools within schools (SWASs) and create new, small high schools. The two alternatives represent very different models of schooling with very different cultures. Successful examples of the SWAS approach are rare, perhaps non-existent. Five types of error are often committed in designing them: errors of size, of continuity, of autonomy, of time, and of control. Creating new, small high schools is an effective approach but their effectiveness begins to diminish when they get much larger than 200 students. SWASs also seem to hit a size barrier when they try to get much smaller than 400 students. This no-man’s-land of high school size is discussed and its implications for reform efforts are considered. The analysis attempts to explain why so little of our widespread effort to reform the high school has been successful and it suggests remedies, uncomfortable as they may be, that hold the promise of rectifying the situation.”

### Resources on “Optimal School Size” in General

- **Research about School Size and School Performance in Impoverished Communities.** *Howley, C., Strange, M., & Bickel, R.; December, 2000, ERIC Clearinghouse on Rural Education and Small Schools.*  
Source: ERIC (#ED448968)  
(<http://eric.ed.gov/ERICWebPortal/contentdelivery/servlet/ERICServlet?accno=ED448968>)  
From the abstract: “Many experts have endorsed small schools as educationally effective, often adding parenthetically that smaller size is especially beneficial for impoverished students. A recent series of studies, the "Matthew Project," bolsters these claims. This digest reviews recent thinking about small school size, describes the Matthew Project studies, and summarizes findings. Summaries of research on school size make various recommendations on optimal size. Researchers and policy analysts most concerned with "community" tend to recommend the smallest schools for everyone; those concerned with student outcomes advise small schools for some communities; and those concerned with inputs recommend larger sizes. From 1966 to 2000, only 22 research reports addressed the interaction of school size and poverty as a major concern, although poverty typically has a strong negative influence on achievement. The Matthew Project is based on the work of N. Friedkin and J. Necochea (1988), who found that school performance benefited from smaller school size in impoverished California communities and from larger school size in affluent communities. A 1996 replication using West Virginia data found similar results. The Matthew Project pursued the issue in Ohio, Texas, Georgia, and Montana and found remarkably strong and consistent equity effects of size. Across states, the relationship between achievement and socioeconomic status was substantially weaker in smaller schools than larger schools. Findings for each state are discussed.”

- **High School Size: Effects on Budgets and Performance in New York City.** Stiefel L., Berne R., Iatarola P., & Fruchter N.; 2000; *Educational Evaluation and Policy Analysis*, Vol. 22, No. 1, p.27-39.  
Source: ERIC (#EJ607454)  
(<http://epa.sagepub.com/cgi/reprint/22/1/27>)  
From the abstract: "Combines budget and performance information to study the effects of high school size. Suggests that since small high schools are more effective for minority and poor students, and the budget per student is found to be similar for small and large schools, policymakers might support the creation of more small high schools."

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**Key words and search strings used in the search:**

Optimal + school size; school size; effect of school size on student achievement; school size + student achievement

**Search databases and websites:**

*Institute for Education Science Sites:* Regional Educational Laboratory Program (REL); What Works Clearinghouse (WWC); Doing What Works (DWW); National Center for Education Statistics (NCES); Institute for Education Sciences (IES); IES Practice Guides

*Additional Data Resources:* The Campbell Collaboration; Data Quality Campaign; Education Development Center; WestEd; The Education Trust; SRI International; ERIC; <http://www.google.com>; <http://www.google.com>; general internet search

**Criteria for inclusion:**

When Reference Desk Researchers review resources, they consider, among other things, four factors:

1. **Date of the publication:** The most current information is included unless in the case of nationally known seminal resources
2. **Source and funder of the report/study/brief/article:** Priority is given to IES, nationally funded, and certain other vetted sources known for strict attention to research protocols;
3. **Methodology:** i.e. Random control trial studies, surveys, self-assessments, literature reviews, policy briefs, etc. Priority for inclusion is given generally to random control trial study findings; however, the reader should note at least the following factors when basing decisions on these resources: Numbers of participants (just a few? Thousands?); Selection (did the participants volunteer in the study, or were they chosen?); Representation (were findings generalized from a homogeneous or a diverse pool of participants? Was the study sample representative of the population as a whole?)
4. **Existing knowledge base:** Although we strive to include vetted resources, there are times when the research base is slim or non-existent. In these cases we have included the best resources we could find, which may include newspaper articles, interviews with content specialists, organization websites, etc.

**REL Northeast and Islands**

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