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Christie Blazer, Supervisor

IMPACT OF SCHOOL SIZE ON STUDENT AND TEACHER OUTCOMES

At a Glance

This Information Capsule reviews the research on the impact of school size on students' academic achievement and other student and teacher outcomes. Studies conducted on the effect of attending a small school on students' academic performance have produced mixed results; however, researchers have consistently found that small schools have the strongest influence on the academic achievement of students from disadvantaged backgrounds. Researchers also agree that students' academic performance cannot be increased by changing only the size of the school. They, therefore, recommend combining small school size with additional school reform efforts.

Although studies have produced inconsistent and in some cases disappointing results on the impact of attending small schools on students' academic achievement, researchers have reported that attending small schools has a positive impact on other student and teacher outcomes, including graduation rates, attendance, and teachers' job satisfaction. Large schools appear to have only two advantages over small schools: the diversity of their student populations and the diversity of their educational programs. Finally, research comparing the costs of small versus large schools suggests that extremely large and extremely small schools are less cost effective than those that enroll a moderate number of students.

For the past two decades, many educators and policymakers have encouraged school districts to create smaller schools, especially at the high school level. Proponents of small schools have characterized large schools as impersonal educational factories, where teachers don't have personal relationships with their students and the learning environment is not customized to students' unique educational needs. They maintain that the many social benefits provided to students in smaller schools – including personal relationships between students and staff, a more collaborative staff, and higher levels of parental involvement - are linked to improved student outcomes (Great Schools, 2016; Institute for Education and Social Policy, 2016; Barrow et al., 2013; National Education Association, 2005).

Optimum School Size

Small elementary schools have generally been classified as those enrolling between 300 and 500 students (Hanover Research, 2015; Leithwood & Jantzi, 2007; Lee & Loeb, 2000). The National Center for Education Statistics (cited in Hanover Research, 2013) classified small middle schools as those enrolling less than 300 students. Small high schools have been defined as those enrolling anywhere from 400 to 1,000 students (Great Schools, 2016; Hanover

Research, 2015; Tanner & West, 2011; Stewart, 2009; Leithwood & Jantzi, 2007).

Researchers have not reached consensus on the ideal school size (Humann et al., 2015; Egalite & Kisida, 2013; Schwartz et al., 2013; Jones & Ezeife, 2011; Gordon, 2010). Estimates range from 275 to 500 students at the elementary level and from 200 to 1,000 students at the secondary level (Hanover Research, 2014; Jones & Ezeife, 2011; Tanner & West, 2011; Zoda et al., 2011; Gordon, 2010; Stewart, 2009; Leithwood & Jantzi, 2007; Hylden, 2005; National Education Association, 2005; Nguyen, 2004). Hanover Research (2015, 2013) reported that, on average, the ideal school sizes proposed by researchers are as follows:

- 300 to 400 students at elementary schools;
- 200 to 400 students at middle schools; and
- 400 to 800 students at high schools.

Great Schools (2016) noted that no school size works for every student. Some students thrive in a small environment where they receive a lot of attention, while others prefer a larger school setting where there is a wider variety of academic offerings and extracurricular activities. Stevenson (2006) stated that “finding the ‘ideal’ school size is at least elusive, and possibly so complex that an ‘absolute ideal’ does not exist.”

Impact of School Size on Academic Achievement

In the early to mid-2000’s, policymakers, philanthropists, and educational organizations, including the U.S. Department of Education, the Annenberg Foundation, and the Carnegie Corporation of New York, provided millions of dollars to help finance the creation of small schools across the U.S. Most notably, it has been reported that the Bill & Melinda Gates Foundation donated \$650 million nationwide to the small school initiative. Beginning around 2008, however, many educational organizations and foundations decided to stop funding small school reforms because studies had not consistently linked small school size to higher levels of student achievement (Schneider, 2016; Hui, 2015; Strauss, 2014; Garland, 2012; Ristow, 2011; Bloomberg Business Week, 2010). Bill Gates explained, “Simply breaking up existing schools into smaller units often did not generate the gains we were hoping for” (Bill & Melinda Gates Foundation, 2008).

Although some studies reported that students attending small schools demonstrated higher levels of academic performance, others found no significant difference in the academic achievement of students attending small versus large schools (Humann et al., 2015; Barrow et al., 2013; Hanover Research, 2013; Schwartz et al., 2013; Cobbold, 2011; Jones & Ezeife, 2011; Zoda et al., 2011; Spote & de la Torre, 2010; Stewart, 2009; Leithwood & Jantzi, 2007; Hager, 2006; Stevenson, 2006; Slate & Jones, 2005).

Several studies investigated the impact of school size on students’ academic performance at different grade levels, but again, no consensus was reached. Some researchers found that school size had the greatest impact on student achievement at the high school level, where schools are typically larger and students are not confined to a self-contained classroom for most of the day (Egalite & Kisida, 2013). However, other studies concluded that school size had a larger effect on elementary and middle school students’ achievement. These researchers hypothesized that small school size is of greater benefit to younger students, when they are in the process of acquiring foundational academic skills and learning to think independently (Cobbold, 2011; Jones & Ezeife, 2011; Slate & Jones, 2005).

Some experts have suggested that the inconsistent research findings may be due more to methodological problems with the research than to a true lack of impact of small schools on students' academic achievement. For example:

- A “small” school in one study might be defined as a “large” school in another study since there are no widely accepted definitions of small and large school sizes.
- Small school reforms are rarely implemented in isolation. Researchers are, therefore, often unable to determine which of several reforms had a positive impact on student performance.
- Because not all studies are able to randomly assign students to small or large schools, findings must be interpreted with caution. When studies do not randomly assign students to schools of different sizes, results may be confounded by other unexplained variables that affect student achievement (Zoda et al., 2011; Slate & Jones, 2005).

Despite these methodological difficulties, two conclusions have consistently emerged from the research concerning the impact of school size on students' academic achievement.

- **The benefits of small schools are most pronounced for students from disadvantaged backgrounds.** Studies have found that small schools have the strongest influence on the academic achievement of disadvantaged students, including students from low-income families and students with lower levels of achievement (Great Schools, 2016; Hanover Research, 2015; Humann et al., 2015; Unterman, 2014; Jones & Ezeife, 2011; Zoda et al., 2011; Stewart, 2009; Slate & Jones, 2005; Howley & Howley, 2004). Cobbold (2011) suggested that the supportive school climate that is often present at small schools disproportionately benefits disadvantaged students. In addition to improved grades and standardized test scores, disadvantaged students attending small schools have also been found to have better attendance, fewer behavior problems, and increased participation in extracurricular activities when compared to disadvantaged students enrolled in large schools (Humann et al., 2015; Zoda et al., 2011).
- **Reduced school size should be part of a larger reform effort.** Most experts agree that school districts should combine small school size with other reforms when they implement initiatives designed to increase students' levels of academic achievement. A number of researchers have concluded that academic achievement cannot be increased by changing only the size of the school (Humann et al., 2015; Meyer, 2015; Hanover Research, 2012; Slate & Jones, 2005). Schneider (2016) referred to small school reforms as “at best, only one piece of a complex puzzle.” According to Hylden (2005), “Nearly all small-school advocates will generally agree that smallness, although important, is likely not in and of itself a ‘magic bullet’ which will cure all the ailments of American education. Rather, smallness simply lays the foundation which makes it possible to create an environment favorable to education.”

Impact of School Size on Other Student and Teacher Outcomes

Although the impact of attending small schools on students' academic achievement remains unclear, researchers have concluded that school size has positive effects on other student and teacher outcomes. Research findings are summarized below.

Graduation rate. Studies have found that students attending small high schools are more likely to graduate on time than students attending large high schools (Schneider, 2016; Abdulkadiroğlu et al., 2013; Barrow et al., 2013; Schwartz et al., 2013; Hanover Research, 2012; Tanner & West, 2011; Spote & de la Torre, 2010; Foley et al., 2008; Hylden, 2005; National Education Association, 2005).

The most robust evidence that small schools have a positive impact on graduation rates comes from a series of studies conducted in New York City by the nonprofit, nonpartisan education and social policy research firm MDRC. MDRC researchers eliminated selection bias from their studies by focusing on small schools that were oversubscribed and had instituted a randomized enrollment lottery (i.e., students who were randomly accepted to a small school were compared to students who applied but were not accepted to a small school). The researchers found that the on-time high school graduation rate of students who attended small schools was 9.4 percentage points higher than the on-time graduation rate of students enrolled in large schools (71.6% for students enrolled in small schools versus 62.2% for students enrolled in large schools). Increased graduation rates were seen in almost every student subgroup, including minority students, low-achieving students, and low-income students (MDRC, 2014; Unterman, 2014; MDRC, 2013; Bloom & Unterman, 2012).

College enrollment. Several studies have reported that students attending small high schools are more likely to attend college than those attending large high schools (Abdulkadiroğlu et al., 2013; Hylden, 2005). MDRC's studies of New York City's small high schools reported that 49% of students who attended a small high school enrolled in a four-year college, community college, or technology school the next year, compared to 40% of similar students who attended large high schools. The finding that students attending small schools enroll in college at higher rates was consistent across the four annual student cohorts studied by MDRC researchers. In addition, Black males and low-income students saw the largest increases in college enrollment (MDRC, 2014; Unterman, 2014).

Although studies suggest that students from small high schools attend college at higher rates, researchers have not found a significant difference between the college acceptance rates of students attending small versus large high schools (Great Schools, 2016; Cobbold, 2011).

Attendance. Researchers have found that students enrolled in small schools have better attendance rates than students enrolled in large schools (Great Schools, 2016; Humann et al., 2015; Abdulkadiroğlu et al., 2013; Grauer, 2012b; Hanover Research, 2012; Cobbold, 2011; Tanner & West, 2011; Spote & de la Torre, 2010; Stewart, 2009; Hylden, 2005; National Education Association, 2005). For example, Foley and colleagues (2008) reported that the average daily attendance of students enrolled in New York City's small New Century High Schools was 84%, compared to 81% for New York City's high school students overall.

Disciplinary infractions. Studies have found that staff at small schools report fewer disciplinary incidents than staff at large schools. Specifically, researchers have found that students in small schools display fewer violent behaviors, are suspended and expelled less frequently, are less likely to join a gang, and are more likely to report feeling safe at their schools (Humann et al.,

2015; Hanover Research, 2014; Abdulkadiroğlu et al., 2013; Bangser et al., 2012; Grauer, 2012b; Cobbold, 2011; Tanner & West, 2011; Zoda et al., 2011; United States Department of Education, 2009; Slate & Jones, 2005; Nguyen, 2004; Public Schools of North Carolina, 2000).

Student-teacher relationships. Studies indicate that students who attend small schools receive more personalized attention from their teachers and other school staff than students who attend large schools. Because teachers have personal connections with their students, they are more easily able to identify their unique strengths and weaknesses and provide them with individualized learning experiences. The personal connections between teachers and students also reduce the likelihood that students will go unnoticed or feel isolated when they are at school. In contrast, it is often impossible for students and teachers in large schools to develop personal relationships because of the sheer volume of students that teachers are required to interact with every day (Great Schools, 2016; Barrow et al., 2013; Hanover Research, 2013; Bangser et al., 2012; Grauer, 2012a; Cobbold, 2011; Tanner & West, 2011; Zoda et al., 2011; Gordon, 2010; United States Department of Education, 2009; National Education Association, 2005; Ready et al., 2004).

Meier (cited in Hylden, 2005) noted that in large high schools, where each teacher interacts with as many as 150 to 200 students every day, “it is simply not possible for teachers to know their students personally. Students who stand out for one reason or another – for high academic ability or athletic talent, as well as for severe academic and disciplinary problems – will receive some form of personalized attention, but the vast majority of ‘average’ students will not” (likely as many as 70-80 percent).

Student attitudes. Researchers have found that students attending small schools have more positive attitudes toward their schools and toward learning in general than students attending large schools. Students attending small schools also report that they are more engaged in the learning process and feel more attached to their schools (Humann et al., 2015; Abdulkadiroğlu et al., 2013; Grauer, 2012b; Hanover Research, 2012; Cobbold, 2011; United States Department of Education, 2009; Hylden, 2005).

Teacher satisfaction. Teachers in small schools report greater job satisfaction than teachers in large schools. They are also more likely to have positive attitudes toward their work and their administrators (Grauer, 2012b; Cobbold, 2011; Hylden, 2005; National Education Association, 2005; Slate & Jones, 2005; Wasley et al., 2000). Tanner and West (2011) stated, “Teacher morale . . . increases as school size decreases.”

Teacher collaboration. Teachers in small schools report stronger professional communities than teachers working in large schools. Studies have reported that teachers in small schools have more opportunities to collaborate to solve problems, share information about their students, and provide each other with professional support. They are also more likely to develop educational programs that are connected across disciplines and grade levels (Humann et al., 2015; Abdulkadiroğlu et al., 2013; Barrow et al., 2013; Hanover Research, 2013; Grauer, 2012a; Tanner & West, 2011; National Education Association, 2005; Wasley et al., 2000). In contrast, Hylden (2005) reported that “in large schools, the sheer size of the faculty, often compounded by an impersonal, bureaucratic environment, makes it difficult for teachers to cohere into a purposeful teaching community.”

Participation in extracurricular activities. Research indicates that students attending small schools are more likely to participate in extracurricular activities than students attending large schools. Although large schools usually have a wider variety of extracurricular activities, there

are often too many students competing for a limited number of available slots. In contrast, there tend to be more open positions on various teams and clubs in small schools because there are fewer students in attendance. Researchers have also pointed out that the small school environment creates a greater sense of obligation to participate in extracurricular activities (Humann et al., 2015; Bangser et al., 2012; Hanover Research, 2012; Cobbold, 2011; Steiner, 2011; Tanner & West, 2011; Stewart, 2009; United States Department of Education, 2009; Hylden, 2005; Slate & Jones, 2005; Public Schools of North Carolina, 2000).

Parent and community involvement. Researchers have found that parents and community members tend to be more involved in small schools than in large schools (Great Schools, 2016; Hanover Research, 2013; Grauer, 2012a; Steiner, 2011; Slate & Jones, 2005). Hylden (2005) reported that “parents respond favorably to smaller-scale and more personalized climate. Several studies have demonstrated a positive correlation between small school size and increased parent and community involvement, which is almost universally acknowledged to be hindered by the sheer size and forbidding formality of large schools.”

Advantages of Large Schools

As can be seen from the research summarized above, small schools appear to have many advantages for students and teachers. Researchers have identified only two advantages of large schools over small schools.

Student diversity. Studies have consistently shown that large schools are more likely to enroll a diverse population of students, thereby exposing students to peers of different races, ethnicities, income levels, and cultural backgrounds (Great Schools, 2016; Abdulkadiroğlu et al., 2013; Egalite & Kisida, 2013; Gordon, 2010). Wells and colleagues (2016) cited a large body of evidence indicating that interaction with classmates from different backgrounds has important educational benefits for all students and has even been associated with smaller test score gaps between students of different racial backgrounds. In addition, the U.S. Commission on Civil Rights (cited in Gordon, 2010) stated, “Recent studies have shown that students of all racial or ethnic groups who attend more diverse schools have a higher comfort level with members of racial and ethnic groups different than their own, an increased sense of civic awareness, and a greater desire to live and work in multiracial settings relative to their segregated peers.”

Curricular Diversity. Studies have found that large schools, especially at the high school level, offer a wider range of classes, including more foreign language options and more opportunities for Gifted, Advanced Placement, and International Baccalaureate coursework, than small schools. Large schools also provide more programs for disadvantaged students and students with special needs (Great Schools, 2016; Abdulkadiroğlu et al., 2013; Grauer, 2012a; Steiner, 2011; Zoda et al., 2011; Gordon, 2010; Hager, 2006).

Some researchers, however, have suggested that this advantage may be overstated. Their studies indicate that schools with enrollments of 400 or more students are able to provide their students with a curriculum that adequately meets their educational needs (Humann et al., 2015; Tanner & West, 2011; Stewart, 2009; Leithwood & Jantzi, 2007; Slate & Jones, 2005). In fact, Cobbold (2011) questioned whether the availability of more courses necessarily translated into a more comprehensive educational program. He noted, “Secondary schools have sometimes been criticised for adopting a ‘shopping mall’ approach to curriculum provision by offering students choice among inconsequential and disconnected elective courses.”

Cost of Small Schools Versus Large Schools

For many years, researchers believed that large schools were more financially efficient than small schools due to economies of scale, or the cost efficiencies associated with sharing personnel, facilities, supplies, and materials among greater numbers of students (Great Schools, 2016; Hanover Research, 2015; Abdulkadiroğlu et al., 2013; Egalite & Kisida, 2013; Zoda et al., 2011).

However, some researchers have begun to rethink their support for the economies of scale assumption. They describe a curvilinear, U-shaped relationship between cost effectiveness and school size, based on studies that have found that schools at either end of the spectrum (either extremely small or extremely large) are less cost effective than those that enroll a moderate number of students, usually between about 450 and 700 students (Hanover Research, 2014; Slate & Jones, 2005).

In addition, some researchers have suggested that large high schools - with their lower graduation and higher retention rates - cost more per student because of the extra year(s) it takes for some students to graduate, if they graduate at all. Therefore, although the cost per student to attend a small school in a given year is usually higher, the total cost to graduate students is actually lower (MDRC, 2014; Tanner & West, 2011; Stewart, 2009; United States Department of Education, 2009; Leithwood & Jantzi, 2007; Stevenson, 2006).

Summary

This Information Capsule reviews studies conducted on the impact of school size on students' academic achievement and other student and teacher outcomes. Although researchers have not reached a consensus on the ideal school size, the optimal sizes proposed by researchers are 300 to 400 students at elementary schools, 200 to 400 students at middle schools, and 400 to 800 students at high schools.

Studies conducted on the effect of attending a small school on students' academic performance have produced mixed results. Some studies have found no significant difference in the academic achievement of students attending small versus large schools, while others have reported that students attending small schools have higher levels of academic performance.

Researchers have consistently found that small schools have the strongest influence on the academic achievement of disadvantaged students, including students from low-income families and students with lower levels of achievement. Researchers also agree that students' academic performance cannot be increased by changing only the size of the school. They therefore recommend combining small school size with additional school reform efforts.

Studies have found that attending a small school has a positive impact on a variety of student and teacher outcomes, including graduation rates, college enrollment, attendance, student-teacher relationships, and teachers' job satisfaction. Researchers have identified only two advantages of large schools: the diversity of their student populations and the diversity of their educational programs.

Some researchers who compared the costs of small versus large schools have found a curvilinear, U-shaped relationship between cost effectiveness and school size. They have concluded that extremely large and extremely small schools are less cost effective than those that enroll a moderate number of students, usually between about 450 and 700 students.

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