WHAT WE KNOW ABOUT MIDDLE SCHOOL SIZE AND STUDENT PERFORMANCE: A REVIEW OF THE LITERATURE

Mark W. Riha¹, John R. Slate*²
and Cynthia Martinez-Garcia²
¹Spring Independent School District
²Sam Houston State University, US

ABSTRACT

Middle school is a critical time in the academic development of adolescents. During this developmental stage indicators of future academic performance surface that allow educators to address academic concerns prior to entry into high school. In this article, literature related to school size and student academic performance with an emphasis on middle level education is reviewed. Numerous researchers have examined the influence of school size on student academic performance at the high school and elementary school level, with the majority of indicating that students enrolled in large-size schools tend to perform at a higher level academically than those students enrolled in small-size schools. Few researchers, however, have conducted studies with a focus exclusively on middle school students. Given the profound impact that middle level education has on future academic success, educational leaders and policy makers must evaluate the effect of middle school size on student performance. As such, they will find information in this literature review helpful.

Texas public school enrollment has increased by 19.8% from 1998 to 2008 (Texas Education Agency [TEA], 2009). Despite this growth, the number of school districts has steadily declined (Robertson, 2007). For over 70 years, school districts have been consolidated with the goal of achieving two primary outcomes: improved academic performance and lower operating costs (Robertson, 2007). In the 40 years following World War II, over 100,000 school districts in the United States were eliminated as a result of consolidation, despite increasing enrollments (Robertson, 2007). The driving force behind this shift toward large districts can be traced to the economies of scale theory, which proposes that anything produced on a large scale is inherently more cost effective than items produced on a small scale (Howley, 2008).

*E-mail: profslate@aol.com
The improvement of middle school education represents a high priority for educators involved with adolescent development (Sink, 2005). Alspaugh (1998) stated that students transitioning from elementary to middle school often experience a decrease in academic achievement. Furthermore, Alspaugh (2004) noted that a decrease in academic achievement has been observed in school districts with growing middle school enrollments. However, the preponderance of research focused on academic achievement has been concentrated on elementary and high schools. Few researchers have conducted studies in which the focus was middle school student achievement (Alspaugh, 2004).

**INTRODUCTION OF MIDDLE LEVEL EDUCATION**

The origins of middle level education can be traced to Columbus, Ohio and Berkeley, California in the late nineteenth century (Clark & Clark, 1993). Manning (2000) stated that the eight-year elementary and four-year high school model utilized prior to 1909 provided students with basic skills and vocational training but did not sufficiently address the educational and developmental needs of young adolescents. The academic deficiencies of the traditional eight-year elementary and four-year high school pattern included the need for a more rigorous and challenging curriculum, content specific instructors, and a reduction in the number of students who dropout or are retained (Briggs, 1920; Koos, 1927).

School boards responded to the demand for reform by introducing junior high schools (Clark & Clark, 1993). Koos (1927) determined that more than 2,000 junior high schools were established between the years of 1910 and 1925. Additionally, Hansen and Hearn (1971) observed that more than 10,000 junior high schools had been created by the year 1947. The junior high school concept became widely accepted by 1950 and considered the developmentally appropriate place to educate young adolescents (Clark & Clark, 1993). However, middle school organizational changes outlined by early educational reformers evolved into a scaled down version of high school and concerns surfaced that the needs of early adolescents were not being met (Hansen & Hearn, 1971).

Advocates for the introduction of junior high schools argued that early adolescents would benefit from exposure to a high school-like setting without the stress of being placed in the same building as older teenagers (Bedard & Do, 2005). The National Middle School Association (NMSA) documented that the needs of younger adolescent students vary from the needs of older adolescents socially, psychologically, and academically (NMSA, 1995). A young adolescent’s social development can be negatively influenced through contact with older high school students (NMSA, 1995). Additionally, early adolescent placement with elementary students can result in slower academic progress (NMSA, 1995). Thus, educational reformers have suggested that middle level campuses include Grades 5 or 6 through 8 and high schools serve students in Grades 9 through 12 (Goldin, 1999).

The desire to provide a more developmentally appropriate environment for early adolescents prompted a national movement to reorganize middle schools (Clark & Clark, 1993). Hansen and Hearn (1971) suggested that increased ability grouping, departmentalization, and high student-to-counselor ratios led to teacher dissatisfaction and the inability to meet the needs of middle level students. Advocates for reform (e.g., Bough, 1969; Hansen & Hearn, 1971) believed that adolescents were maturing earlier than previous generations and that increased exposure to mass communication media had allowed
adolescents to be more informed and sophisticated. In addition to the earlier maturation and increased sophistication, Bough (1969) believed that integrating young, urban students at an earlier age would benefit the students as they progressed through the educational system. Additionally, Bough (1969) asserted that Grade 9 students should be educated with Grades 10-12 students, thereby providing all college preparatory courses at one campus.

**IMPORTANCE OF MIDDLE SCHOOLS**

Brundrett (2004) reported that the majority of researchers who conducted studies with a focus on the middle school level tended to follow a qualitative design. Disseler (2010) commented that extensive research has been conducted concerning student transition from middle school to high school. However, little research has been conducted in which the transition from elementary school to middle school has been examined (Disseler, 2010). Conversely, Benner and Graham (2009) asserted that the transition from elementary school to middle school has been well documented whereas middle school to high school transition was more limited in its documentation. In addition, the effects of middle school transition on student performance have been marginally researched despite the critical turning point middle school represents for young adolescents (Disseler, 2010). Bowen, Bowen, and Richman (2000) observed that given the importance that the early adolescent years play in academic achievement, few researchers have conducted studies with an exclusive focus on middle school students. According to the ACT educational testing company (2008):

> Recent years have seen a heightened awareness of the importance of early childhood education and high school as intervention points in the educational lives of America’s children. Less attention, it seems, has been paid to the importance of the upper elementary grades and middle school and the role they must play in the preparation of students for life after high school. (p. 3)

**IMPACT ON ACADEMIC SUCCESS**

Transitioning to middle school is an experience shared by 88% of all public school children in the United States (NMSA and National Association of Elementary School Principals [NAESP], 2002). The NMSA and the NAESP did not elaborate on the outcome of the 12% of public school children who did not transition to middle school. However, the United States Census Bureau estimated that in 1992, 11% of youth between 16 and 24 years old were dropouts (McMillen, Kaufman, Hausken, & Bradby, 1993). The United States Census Bureau documented that the percent of dropouts in 2008 had decreased to 8% (Chapman, Laird, & KewalRamani, 2010).

Decreased academic success often accompanied middle school students following the transition to middle school (Akos, 2002; Burchinal, Roberts, Zeisel, & Rowley, 2008; Langenkamp, 2010; Simmons et al., 1991). Vars (1998) observed that 88% of all early adolescents experienced academic and social issues following the transition to middle school. Akos (2002) asserted that the transition from elementary to middle school was particularly difficult for many students because it often involved a change in campus and school
personnel. Additionally, students transitioning to middle school were dealing with internal changes in the form of puberty and physical appearance (Akos, 2002; Eccles et al., 1993).

**MIDDLE LEVEL STUDENT MOTIVATION**

The importance of Grade 8 academic success on high school graduation was emphasized by ACT (2008). However, a decrease in academic performance was illustrated by numerous researchers (Alspaugh, 1998; Barber & Olsen, 2004; Eccles et al., 1993; Langenkamp, 2010; Seidman et al., 1994). Clearly, students transitioning to middle level education were at a greater risk of academic difficulties (Eccles et al., 1993) during a critical period in their academic careers (ACT, 2008). Anderman and Midgley (1997) hypothesized that a decrease in student motivation accompanied the transition from elementary to middle school. The researchers suggested that a decrease in perceived academic competence occurred after the transition to middle school was made (Anderman & Midgley, 1997). Anderman and Midgley (1997) claimed that a positive self-perception of academic competence was essential for all students.

Anderman and Maehr (1994) asserted that motivational issues that occurred at the middle school level had a degree of uniqueness and urgency. Moreover, they contended that middle school students experienced a heightened consciousness of emerging adulthood and that career trajectories became a priority. Identified in previous research are environmental factors that were predictive of academic motivation and success among middle school students (Eccles & Midgley, 1989). The predictive environmental factors were: (a) positive teacher-student relationship (Midgley, Feldlaufer, & Eccles, 1989; Wentzel, 1997); (b) supportive peer relationships (Berndt & Keefe, 1995); (c) familiarity with campus goals (Anderman & Maehr, 1994); and (d) a sense of connectedness to the school (Anderman & Anderman, 1999). Murdock, Anderman, and Hodge (2000) reported that students who had friends in middle school who valued education were more likely to be academically successful in high school than students who did not have such friends.

**SCHOOL CONNECTEDNESS**

Cotton (2001) indicated that positive relationships between students and teachers could be utilized to motivate both groups. Blum (2005) defined school connectedness as an academic environment in which students believe that they are cared about as academics and as individuals. School connectedness is the second most important factor in student success behind family. Additionally, a reduction in school violence and dropout rate can be attributed to a strong sense of school connectedness (Cotton, 2001). School connectedness can also help students overcome academic obstacles such as low socioeconomic status (Brookmeyer, Fanti, & Henrich, 2006).

Blum (2005), in an examination of techniques schools could implement to create a feeling of student connectedness, indicated that important factors in student success were high expectations with teacher support, positive and respectful interactions, and a feeling of physical and emotional safety. Smaller schools tend to be safer than larger schools and allow a higher percent of the student population an opportunity to participate in extracurricular
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activities (Cotton, 2001). Blum (2005) stated that the classroom culture has a large impact on fostering a feeling of connectedness and matters more than class size. The National Research Council and Institute of Medicine (2004) identified several factors that increased school connectedness including mentorship programs, providing the same core curriculum to all students, and limiting the size of schools to promote small learning environments.

**College and Career Readiness**

Academic achievement in middle school, specifically eighth grade, had a larger impact on student college and career readiness than any other academic event (ACT, 2008). Furthermore, ACT (2008) emphasized that a critical defining point existed for students on the college and career readiness path. Students who were not on target for college and career readiness when they reached the critical defining point could suffer negative and irreversible consequences (ACT, 2008).

Conley (2007b) defined college readiness as the degree of preparation a student required to matriculate successfully without remediation in a credit-bearing course. Fewer than 20% of Grade 8 students were on track to receive the necessary preparation for college-level work by the time they graduated high school (ACT, 2008). Beneficial study habits that were developed in middle school contributed to academic readiness for college and careers (ACT, 2008). The researchers asserted that increasing college and career readiness required academic interventions prior to high school (ACT, 2008). Further, ACT (2008) argued that despite successful completion of eighth grade exit examinations, many ninth grade students were unprepared for the rigors of high school course work.

Barnes, Slate, and Rojas-LeBouef (2010) determined that despite the addition of academic rigor mandated by the federal government, high school students continued to graduate lacking college readiness skills. Zhao (2006, 2009a) indicated that high stakes testing was producing students who were academically prepared for college but not college ready. The distinction between academically prepared and college ready was articulated by Conley (2007a, 2007b). Conley (2007a, 2007b) defined college readiness as including students’ self-efficacy (Bandura, 1997), self-regulation (Young & Ley, 2002, 2003), and an increased knowledge of academic strategies for reading, writing, and critical thinking. Conversely, standardized examinations evaluated specific content knowledge (Conley, 2007b).

Researchers (e.g., ACT, 2008; Balfanz, 2009; Barnes et al, 2010; Conley, 2005; Cooney & Bottoms, 2002; Rumberger, 1995) have identified multiple factors that would increase the likelihood of middle school and high school students entering college and earning a degree. Those factors included an awareness of postsecondary faculty expectations and academic standards (ACT, 2005; Barefoot, 2008; Bean & Eaton, 2002; Conley, 2005, 2007a, 2007b; Pascarella & Terenzini, 2005; Roderick, Nagaoka, & Coca, 2009; Seidman, 2005; Tinto, 2007; Zhao, 2009b; Zimmerman, 2000). Further, knowledge of the college enrollment process, admission, financial aid, and money management would benefit potential postsecondary students (ACT, 2005; Callan, Finney, Kirst, Usdan, & Venezia, 2006; Roderick et al., 2009; Varcoe et al., 2001; Vienne & Slate, 2009; Zhao, 2009b). In addition, the development of time management and study skills would benefit junior high and high
school students (Conley, 2005, 2007a, 2007b; Lammers, Onwuegbuzie, & Slate, 2001; Slate, Jones, & Dawson, 1993; Slate, Jones, & Harlan, 1998; Slate, Jones, & Rodgers, 1997/98).

High School Completion

Cooney and Bottoms (2002) documented that retention rates of Grade 9 students were three to five times higher than previous grades. The researchers observed that many Grade 8 students performed below the basic national achievement level (Cooney & Bottoms, 2002). In addition, Cooney and Bottoms (2002) recommended that all Grade 8 students and their parents should be made aware of the high school courses that will adequately prepare students for academic success and future career options. Oakes, Gamoran, and Page (1992) reported that course selection in middle school was academically important because high school placement would be based on the courses taken prior to high school enrollment. Cooney and Bottoms (2002) suggested that high school readiness indicators include: (a) successful completion of Algebra I or prealgebra; (b) laboratory and technology experiences with the various sciences; (c) the ability to comprehend and interpret materials by synthesizing and analyzing required texts; (d) competence in completing writing assignments; and (e) development of appropriate study, organizational, and time management skills. Barnes et al. (2010) reinforced the importance of these indicators and stated that effective cognitive and metacognitive strategies were integral parts of a curriculum that allowed students to become critical thinkers.

Balfanz (2009) identified behaviors exhibited by Grade 6 students that often preceded academic difficulty in high school. He contended that Grade 6 students who failed math or reading, were absent for 20% or more of the academic school year, or repeatedly displayed unsatisfactory behavior in a core subject had a 10% to 20% chance of graduating on time (Balfanz, 2009). Balfanz (2009) added that fewer than one out of every four students who demonstrated at least one off-track indicator graduated within one additional year of the scheduled date. The researcher hypothesized that the repeated experience of failing courses resulted in a lack of self-confidence and in the skills necessary to succeed at the next academic level (Balfanz, 2009).

In a study conducted by Barnes (2010), the researcher examined the college readiness rates of secondary students and the degree to which an academic achievement gap existed as a function of ethnicity. Barnes (2010) documented that White students exhibited a higher rate of college readiness than Black and Hispanic students in reading and math. Statistically significant results were present in 27 of the analyses, yielding 19 large-effect sizes, one near-large-effect size, one moderate-effect size, and six small-effect sizes (Barnes, 2010). The researcher observed that Black and Hispanic students increased their college readiness rates as did White students, thus preserving the achievement gap (Barnes, 2010).

Balfanz (2009) noted that lower performing middle schools that served a high poverty community were especially at risk of increasing the achievement gap. Balfanz (2009) analyzed data from 23 middle schools in Philadelphia which were comprised of at least 80% minority students and at least 80% of students who qualified for free and reduced lunch services. He asserted that teachers provided the strongest influence on widening or closing the achievement gap and that improving the quality of instruction resulted in more students who were college ready (Balfanz, 2009). Additionally, closing the achievement gap required that
students attend school regularly, display acceptable behavior, and put forth effort (Balfanz, 2009).

ACHIEVEMENT GAP

The disparity between minority students and White students has become a substantial barrier to racial equality and social justice (Paige & Witty, 2010). Holcomb-McCoy (2007) defined the achievement gap as the academic achievement inequality that existed between one group of students and another. Evidence of an achievement gap between minority students and White students was manifested in grades, dropout rates, standardized examination scores, and enrollment in advanced placement courses (Metz, 2010).

Social and Economic Costs of the Achievement Gap

The National Assessment of Educational Progress (NAEP) concluded that 13-year-old White students obtained higher average scores than did 17-year-old Black students (Perie, Moran, & Lutkus, 2005). Similarly, 13-year-old Black students scored more than 20 points lower than 13-year-old White students (Perie et al., 2005). In addition, the NAEP determined that the science scores of Hispanic 9 year old students lagged more than three grade levels behind their White peers (Perie et al., 2005). According to the NAEP, 90% of White students graduated from high school; whereas only 81% of Black students and 63% of Hispanic students achieved the same accomplishment (Perie et al., 2005).

A comparison of Black and White students’ standardized examination scores revealed that White students outperformed Black students by as much as 75% (Paige & Witty, 2010). Further, Paige and Witty (2010) contended that White students were nearly twice as likely as Black students to earn a postsecondary degree. Darling-Hammond (2010) noted that approximately 40% of U.S. citizens attend college, whereas only 20% of Black and Hispanic students obtain a college degree.

Paige and Witty (2010) reported that Black students were three times more likely to be institutionalized. Furthermore, prisons and other institutional facilities are comprised of people from ethnic minority backgrounds (Darling-Hammond, 2010). Darling-Hammond (2010) documented that U.S. prisons are populated with individuals who are high school dropouts and functionally illiterate. The number of prisoners has quadrupled in the past 30 years, and state legislatures have been forced to allocate a greater portion of their budgets to institutional demands (Darling-Hammond, 2010). To meet the growing demand of a rapidly growing prison population, state budgets have increased funding for correctional operations more than 900% (Darling-Hammond, 2010).

Closing the achievement gap could have a dramatic influence on the economy at a national and local level (McKinsey & Company, 2009). According to McKinsey and Company (2009), the achievement gap can be linked to lower economic earnings, poorer health, and increased incarceration rates. McKinsey and Company (2009) contended that closing the achievement gaps among Black, Hispanic, and White students could result in the addition of $525 billion to the annual national economic output.
Holcomb-McCoy (2007) observed that economic factors including high unemployment rates, low income rates, increased crime rates, and a dependence on public aid were linked to low academic achievement. However, Holcomb-McCoy (2007) pointed out that the achievement gap was a complex phenomenon and involved ethnic and socioeconomic issues. An achievement gap among groups was most notably present on campuses that did not prioritize social justice (Holcomb-McCoy, 2007).

**DROPPING OUT**

Catterall (1987) surmised that tangible losses to society resulted from a lack of basic academic skills. Furthermore, Catterall (1987) maintained that the resulting costs of dropping out of school were substantial and represented a growing societal concern. Clearly, dropping out will impact the future of the individual (Catterall, 1987). However, the consequences of dropping out can have a substantial impact on society (Catterall, 1987).

**Social and Economic Costs of Dropping Out**

Chapman et al. (2010) determined that $23,000 was the expected income of individuals who had not completed high school. The same age bracket of those persons who had completed high school or a General Educational Development certificate was $42,000 (Chapman et al., 2010). Additionally, the lifetime earnings of a person who completed high school compared to a person who did not translated to a difference of roughly $630,000 (Rouse, 2007). Further, Pleis, Lucas, and Ward (2009) documented those dropouts ages 25 and older were in poorer health compared to adults who were not dropouts.

The U.S. Department of Justice (2004) estimated that 34% of federal and state inmates did not receive high school credentials. Additionally, 50% of persons on death row did not receive high school credentials (U.S. Department of Justice, 2009). According to Sum, Khatiwada, and McLaughlin (2009), high school dropouts were 63 times more likely to be incarcerated than were 4-year college graduates. Further, Sum et al. (2009) revealed that institutionalization rates were highest among Black high school dropouts.

The researchers indicated that for every 100 Black males incarcerated, 23 were high school dropouts (Sum et al., 2009). By comparison, six of every 100 Hispanic and White males institutionalized were high school dropouts (Sum et al., 2009). Pettit and Western (2004) documented that male high school dropouts were three to four times more likely to be incarcerated than male high school graduates. In addition, the researchers reported differences in incarceration rates were present among racial lines. For example, Black students who drop out of high school are nearly seven times more likely to be imprisoned in a state or federal facility than White students who drop out of high school (Pettit & Western, 2004). Freeman (1996) argued that although dropping out of high school does not lead to a life of crime, reduced employment opportunities could promote engagement in illegal activities.

High school dropouts were four times more likely than peers with a bachelor’s degree to be living in a family that earned an income 125% below the federal government’s official poverty income threshold (Sum et al., 2009). Lower income families were less able to finance schooling and job training, thus adversely impacting the dropout’s future earning potential.
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(Sum et al., 2009). Furthermore, Sum et al. (2009) reported that high school dropouts were the least likely to be chosen by their employers to receive formal training.

Many low-income families were dependent on federal and state government aid in the form of food stamps, rental subsidies, and health care benefits (Sum et al., 2009). Levin and Belfield (2007) calculated that over the course of a lifetime lower tax contributions, greater reliance on public aid programs, and higher incidence of criminal activity translated to an average cost of $240,000 for the average high school dropout. Catterall (1987) revealed that the children of dropouts repeated a similar pattern of dropping out of school, thereby compounding the societal issues.

Adolescent female dropouts were six times more likely to have given birth than their peers who were currently college students or 4-year college graduates (Sum et al., 2009). In addition, 23% of single mothers age 16 through 24 were high school dropouts, whereas 4% of current college students or 2.6% of 4-year college graduates were single parents (Sum et al., 2009). A substantial number of unwed single mothers who lack high school credentials live at or near the poverty threshold. Many unwed single mothers who dropped out rely on government assistance to support themselves and their children (Sum et al., 2009).

Anderson and Portner (2011) concluded that females who drop out of high school were exposed to substantially higher risks of contracting a sexually transmitted infection. Health and economic consequences have been linked to the contraction of a sexually transmitted infection (Eng & Butler, 1997; Weinstock, Berman, & Willard, Jr., 2004). Researchers (e.g., Black, Devereux, & Salvanes, 2008; Lochner & Moretti, 2004; Oreopoulos, 2007) who have focused on the outcomes of dropping out of high school noted that those individuals who completed high school tended to earn a higher income, maintained better health, were involved in fewer crimes, and had a lower incidence of teenage birth. Simply stated, staying in school allowed for less time and opportunity to engage in activities that resulted in unwanted outcomes (Black et al., 2008; Jacob & Lefgren, 2003; Luallen, 2006).

Contributing Factors to Dropout Rates

Rumberger (1995) contended that school dropouts represented one of the major policy issues in American education. A highly predictive factor in the middle school student dropout rate is family socioeconomic status. Students who came from a low socioeconomic background were twice as likely to drop out as students who came from average socioeconomic families (Rumberger, 1995). In addition, students with a low socioeconomic background were 10 times more likely to drop out than were students from high income socioeconomic families (NCES, 2010).

However, Rumberger (1995) documented that school related factors also contributed to middle school dropout rates. The most powerful predictor of student drop out was being retained for one or more academic years (Rumberger, 1995). Additionally, students who were retained in upper grades were more at risk for dropping out than students who were held back in earlier elementary grades (NCES, 1992). Nevertheless, other factors contributed to the predictive indicators of middle school student dropout rates. Wood, Halfon, Scarla, Newacheck, and Nessim (1993) determined that changing schools increased the risk of a student dropping out. High absenteeism, discipline issues, and poor academic performance were also predictors of potential drop out risks (Rumberger, 1995).
The Office of Policy Planning and Research (1999) hypothesized that school size can directly and indirectly impact student achievement. Lee and Smith (1997) revealed that school size had a minimal effect when comparing math and reading improvements between high minority and high economically disadvantaged schools and low minority and low economically disadvantaged schools with enrollments between 600 to 900 students. However, an increasing achievement gap appeared as school enrollments neared 900 students (Lee & Smith, 1997).

Cotton (1996) examined existing research related to school size and student performance. She indicated that students attending small-size schools performed as well as students attending larger-size schools. Additionally, she stated that minority students and economically disadvantaged students tended to perform better academically in small-size schools than in larger schools (Cotton, 1996).

Leithwood and Jantzi (2009) analyzed the results of 19 studies related to the impact of school size on student achievement. A positive relationship was present in five of the studies, a U shape was indicated in six of the studies, and a negative relationship was present in eight of the studies. Leithwood and Jantzi (2009) maintained that a smaller school may be a benefit to some students but a hindrance to other students. They also indicated that student demographics were important and that socially or economically disadvantaged students would perform better in a smaller school, whereas an advantaged or highly motivated student would perceive the restrictive curriculum as academically stifling. Farber (1998) observed that academic improvement in reading and math was most evident, regardless of socioeconomic status, in high schools with 600 to 900 students.

In an examination of 293 New Jersey schools, Fowler and Walberg (1991) stated that student performance was negatively impacted by school and district size. A subject specific study conducted by Hoagland (1995) in over 700 California high schools indicated that a negative relationship existed between school size and reading performance. However, results were inconclusive for mathematics and writing performance (Hoagland, 1995).

Greenwald, Hedges, and Laine (1996) synthesized 60 studies and reported a negative relationship between school size and student achievement. Lee and Smith (1997) reported that mathematic performance was higher in high schools with enrollments of less than 2,100 students. Conversely, Werblow and Duesbery (2009) indicated that a U shape existed for mathematics as achievement was higher for students enrolled in schools with less than 674 students or more than 2,592 students.

Not all researchers, however, denoted similar results. Lindsey (1982) revealed no statistically significant relationship between school size and student achievement. Jewell (1989), in an analysis of the relationship between school size and college entrance exams after controlling for socioeconomic status, indicated the lack of a statistically significant relationship between entrance exams and school size.

Haller, Monk, and Tien (1993) examined higher order thinking skills of 2,829 Grade 10 students over a three year period from 51 schools across the nation. They hypothesized that the increased number of curricular offerings at a large-size school would promote high order thinking skills and thus improve student achievement. Haller et al. (1993) concluded that
more course offerings had no effect on student performance and that school size had no effect on student achievement.

**SCHOOL CONSOLIDATION**

The consolidation of schools in the late 1800s was part of a more comprehensive movement to professionalize the educational system (Tyack, 1974). Progressive political leaders believed that an educational system administered by professional educators could alleviate the corruption plaguing urban areas and provide a higher quality of education in rural areas (Tyack, 1974). Fueled by the industrial revolution, organizational techniques that had been successful for business and industry were applied to education (Orr, 1992). The prevailing belief of social reformers and policy makers was that an industrialized society should be reflected in the educational system. As a result, a more centralized and urban educational model evolved (Kay, Hargood, & Russell, 1982).

Kennedy (1915) advocated school consolidation in rural areas as a means for expanding the curriculum, improving teacher quality and facilities, and providing a social center for the community. Additional benefits included an improved infrastructure due to student transportation to and from the centrally located school and increased attendance as a result of student transportation (Kennedy, 1915). However, Kennedy (1915) cautioned that consolidation might not be an appropriate strategy for every rural school and should be considered carefully by all parties involved. He stated that consolidation might not be necessary if a school is of sufficient size and has effective instruction. Additionally, construction and transportation costs, sentiments of the community, and the distances students are to be transported should be factors in determining the appropriateness of a proposed consolidation (Kennedy, 1915).

Cubberley (1922) believed school consolidations would benefit students living in rural areas and presented three main arguments in favor of consolidation. First, he stated that larger schools would create a higher teacher to administrator ratio, thereby providing a more efficient organizational structure. Second, he argued that a campus with a larger student population could provide more specialized instruction and a more varied curriculum. Third, a large, centrally located school would provide students’ access to better facilities at a lower cost to the surrounding community. Additionally, Cubberley (1922) contended that a centrally located, consolidated school offered an increase in student attendance, benefits to the local infrastructure, and required a fewer number of teachers, resulting in a cost savings.

Conant (1959) advocated large-size high schools as a means for providing efficient use of district funds and for offering a more comprehensive curriculum than a smaller school. Conant (1959) stated that schools with less than 100 graduating students could offer the same diversified curriculum as a larger school but at a greater financial cost. Additionally, he argued that teacher shortages could be reduced or eliminated as more teachers would be available due to the closure of smaller high schools. Many researchers (e.g., Pittman & Haughwout, 1987; Walberg, 1992) believe that the results of Conant’s (1959) study have provided the foundation for the movement toward school consolidation.

More recently, Dodson and Garrett (2008) examined the advantages and disadvantages of consolidating school districts in Arkansas. They concluded that districts, particularly rural districts, would experience financial savings. However, they cautioned that nonmonetary
costs including the loss of community support and increased concerns for student safety could become areas of concern. Bard, Gardener, and Wieland (2006) suggested that the decision to consolidate should be made at the local level and not the result of a state mandate. They ascertained that districts should consider the fiscal, community, and educational ramifications before the decision to consolidate is made (Bard et al., 2006).

Despite concerns regarding larger schools and school districts, the national trend for more than 70 years has been to consolidate schools and increase campus enrollment (Berry & West, 2010). Between the years of 1938 and 1970, over 120,000 schools and 100,000 districts in the United States were eliminated through consolidation (Berry & West, 2010). As a result, the average school size has increased from 87 to 440 students and the average district size has increased from 170 to 2,300 students (Berry & West, 2010).

**ECONOMIES OF SCALE**

The economy of scale theory is a business model that, when applied to education, results in a reduction in per student expenditures (Andrews, Duncombe, & Yinger, 2002). Advocates for school consolidation often support the economies of scale model because the model holds that larger schools will provide a greater savings in operating costs (Guthrie, 1979). Young and Green (2005) stated that the economies of scale model could be utilized to evaluate the cost efficiency and quality of education in an educational setting.

The West Virginia School Board Authority tied state funding to student enrollment by requiring a minimum enrollment of 600 students for all 5-8 grade campuses (Purdy, 1997). Dodson and Garrett (2008) examined school districts in Arkansas and contended that economies of scale were represented by the savings in personnel costs, supplies, and materials. They indicated that the financial savings were due to the elimination of redundant expenditures. The researchers determined that fewer administrators and specialists were required as smaller schools consolidated into a larger campus (Dodson III & Garrett, 2008). Additionally, Dodson and Garrett (2008) claimed that more competitive salaries could be offered at the consolidated schools as a result of the financial savings, and thus schools could retain more qualified teachers.

Duncombe and Yinger (2007) maintained that a drop in per-student operating cost of 28.8% was present when two small districts (300 students) were consolidated. Further, they demonstrated that a savings of 7% was present when two large districts (1,500 students) were consolidated. Riew (1966) examined 109 Wisconsin schools and indicated that economies of scale were present in high schools with enrollments not exceeding 1,675 students.

A similar study was conducted by Cohn (1968) who focused on Iowa schools. Cohn (1968) observed that a minimum enrollment of 1,277 students, with an optimum size of 1,500 students, was required to benefit from economies of scale. Bowles and Bosworth (2002) conducted a study of 17 Wyoming school districts and compared per-student cost by school size. These researchers indicated that larger school districts tended to educate students at a lower cost than smaller districts.

Overall, the benefits of large-size schools have been questioned by other researchers examining economies of scale. Monk (1987) indicated that schools with more than 400 students experience no financial gains. Fox (1981) conducted a meta-analysis of 30 studies that focused on the economies of scale in education. He concluded that a school operating
above enrollment capacity increased the per pupil cost. According to Fox (1981), an enrollment range between 1,400 and 1,800 students will allow for the economies of scale theory.

**LARGE SCHOOLS**

The movement towards consolidation during the last century has resulted in a decline in the total number of public schools in the United States (NCES, 2010). In 1929, approximately 248,000 public schools were in operation, contrasted with approximately 99,000 public schools in 2007 (NCES, 2010). However, the NCES (2010) reported that between 1997 and 2007, the number of public schools increased by about 9,400 campuses.

**Benefits and Drawbacks**

Student enrollment in public schools has continued to increase despite the reduction in the number of campuses (NCES, 2010). Public school enrollment increased 26% from 39.4 million students to 49.8 million students between 1985 and 2009 (NCES, 2010). Enrollment in elementary schools rose 29%, whereas secondary school enrollment increased 20% (NCES, 2010).

Conant (1959) promoted the idea of larger schools as being more economical and having a more varied and challenging curriculum. However, he argued that the diversity from district to district would make blanket policy statements regarding curriculum or organization difficult and unwise. Monk and Haller (1993) indicated a positive relationship between larger school size and the number of senior course credits offered. Larger schools were able to offer a greater number of specialized courses (Monk & Haller, 1993).

**Impact on Curriculum**

Monk (1987) concluded that an expanded, specialized curriculum was not guaranteed by school size. A school with an enrollment of 400 could offer a curriculum of comparable scope and specialization to a much larger school. Leithwood and Jantzi (2009) indicated that increased curricular offerings did not translate into student success. Smaller schools with a more focused curriculum promoted greater academic achievement (Leithwood & Jantzi, 2009).

Fox (1981) stated that the student demand for specialized classes resulted in a diversified curriculum. Lee, Smerdon, Alfeld-Liro, and Brown (2000) argued that larger high schools had the financial means to offer a broader curriculum than smaller schools. In an examination of 682 high schools, Monk and Haller (1993) examined school and district size as they influenced the number of courses offered. They indicated that as the number of students enrolled increased, the number of specialized classes increased.
Academic Achievement

Howley (1994) contended that offering a wide range of specialized courses diluted the basic curriculum and that a small-size school provided a quality education with a strong core curriculum. Johnson (2006) cautioned that despite the variety of course offerings at a larger school, participation rates tended to be lower than at smaller schools. Johnson (2006) hypothesized that a larger school offered a higher degree of anonymity that allowed less motivated students to avoid academically rigorous courses.

Howley (1995) documented that students from high socioeconomic backgrounds experienced more success at larger high schools than at smaller high schools. Slate and Jones (2006) examined college entrance examination scores for high schools in Texas. They determined that Black students enrolled in large-size high schools performed better on entrance examinations than did Black students in smaller high schools. A similar result was documented with Hispanic students enrolled in large-size high schools (Slate & Jones, 2008).

Smaller schools have been increasingly replaced with larger schools with increased student populations (NCES, 2010). Along with the increased size came a decrease in student connectedness (Blum, 2005), decreased extracurricular participation (Coladarci & Cobb, 1996; Feldman & Matjasko, 2007; Lindsay, 1982), and questionable curricular advantages (Johnson, 2006; Monk, 1987). Furthermore, students who came from diverse or socioeconomically disadvantaged backgrounds were more likely to be academically successful at smaller schools than were similar students enrolled at larger schools (Leithwood & Jantzi, 2009).

Benefits and Drawbacks

Lindsay (1982), in an examination of extracurricular activity participation among 14,668 secondary students in 328 schools, ascertained that the participation rate in schools with 100 or fewer students was higher than in larger schools when the data were controlled for socioeconomic status and student ability level. Coladarci and Cobb (1996) utilized a national data set to examine the relationship between student participation in extracurricular activities and school size. They analyzed 29 extracurricular activities in three categories (i.e., sports, performing arts, and club activities) for schools with 800 students or less and schools with 1,600 students or more. Coladarci and Cobb (1996) documented that in 21 of the 29 activities student participation was greatest in small-size schools.

Feldman and Matjasko (2007) determined that larger schools provided fewer opportunities for students to participate in extracurricular activities. Feldman and Matjasko (2007) hypothesized that as schools increase in size the availability of slots in many activities decreased. Fewer openings translated to more competition and an increase in skill requirements to participate.

Barker and Gump (1964) contended that small-size schools allowed students to develop relationships and provided opportunities for student engagement. They compared student
engagement in large-size schools to student engagement in small-size schools and observed that students enrolled in small-size schools participated in more activities than students enrolled in large-size schools. According to Barker and Gump (1964), the opportunity to participate in extracurricular activities was increased in smaller schools as fewer students were available for athletic and academic teams. The increased enrollment of a large-size school made each student’s participation less critical due to the increased number of potential participants. Additionally, Barker and Gump (1964) argued that school size did not necessitate a comparative curriculum and that much of the advanced curriculum offered at a large-size school was taught in the regular classes at a small-size school.

Impact on Curriculum

Monk (1987) reported that the number of courses offered at a school increased as the student population increased until enrollment reached 400 students. The number of courses offered did not increase in schools with enrollments over 400 students. The relationship between student achievement and course offerings was analyzed by Johnson (2006) who contended that the broader curriculum offered by larger schools did not result in superior student performance. Johnson (2006) hypothesized that the more diverse curriculum only benefited a small-size portion of the student population.

Academic Achievement

In a review of studies conducted by Leithwood and Jantzi (2009), the researchers analyzed 57 studies of school size and student achievement. They documented that students enrolled in small-size schools reported higher achievement than students enrolled in larger schools. According to Leithwood and Jantzi (2009), students who came from diverse or socioeconomically disadvantaged backgrounds demonstrated higher academic achievement at smaller schools than did those students enrolled at larger schools.

Zoda (2009), in an examination of the effect of school size on Grade 4 elementary student math, reading, and writing passing rates on the TAKS examination, analyzed five years of statewide data and collected performance indicator data in math, reading, and writing; school enrollments; gender; and ethnicity. Utilizing Green and Barnes’ (1993) criteria for school size, Zoda (2009) determined that White, Black, and Hispanic students enrolled in large-size elementary schools reported higher examination scores than those students enrolled in small-size or very small-size elementary schools.

Furthermore, Zoda (2009) reported that 72 of the 81 statistically significant outcomes favored large-size schools. Additionally, of the nine outcomes that did not indicate that larger schools had higher passing rates, Zoda (2009) observed a higher passing rate in small-size schools compared to very small-size schools. Similar results were produced when Zoda examined data related to gender. Both boys and girls yielded higher passing rates at large-size schools than small-size or very small-size schools (Zoda, 2009).

More recently, Greeney (2010) documented similar results at the secondary level. Greeney (2010) analyzed multiple years of data and utilized the TAKS examination passing rate indicator data in ELA, math, science, and social studies as a function of ethnicity. White,
Hispanic, and Black students enrolled in large-size high schools consistently yielded higher passing rates than students enrolled in medium or small-size schools (Greeney, 2010).

Additionally, Greeney (2010) noted that 58 of the 60 analyses produced statistically significant results. All 58 of the statistically significant outcomes favored large-size high schools. Follow up post hoc procedures revealed that in 29 instances students enrolled in medium schools produced higher passing rates than students in small-size schools (Greeney, 2010). A summary of the studies in which school size and student achievement were compared is provided in Table 1.

<table>
<thead>
<tr>
<th>Author</th>
<th>Year</th>
<th>Variables analyzed</th>
<th>Outcome</th>
<th>Effect size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coladarci &amp; Cobb</td>
<td>1996</td>
<td>Participation</td>
<td>Favored small schools</td>
<td>Small</td>
</tr>
<tr>
<td>Feldman &amp; Matjasko</td>
<td>2007</td>
<td>Extracurricular activities</td>
<td>Increased participation in small schools</td>
<td>Not provided</td>
</tr>
<tr>
<td>Greeney</td>
<td>2010</td>
<td>TAKS</td>
<td>Favored large schools</td>
<td>Small to large</td>
</tr>
<tr>
<td>Howley</td>
<td>1995</td>
<td>Comprehensive Test of Basic Skills</td>
<td>Not statistically significant</td>
<td></td>
</tr>
<tr>
<td>Johnson</td>
<td>2006</td>
<td>Iowa Tests of Educational Development</td>
<td>Favored small schools</td>
<td>Not provided</td>
</tr>
<tr>
<td>Lindsay</td>
<td>1982</td>
<td>Class size</td>
<td>Favored small schools</td>
<td>Not provided</td>
</tr>
<tr>
<td>Monk &amp; Haller</td>
<td>1993</td>
<td>Course offerings</td>
<td>Size influenced course offerings</td>
<td>Small</td>
</tr>
<tr>
<td>Slate &amp; Jones</td>
<td>2006</td>
<td>TAKS, SAT, ACT</td>
<td>Favored large schools of 1,200 or more</td>
<td>Small to moderate</td>
</tr>
<tr>
<td>Slate &amp; Jones</td>
<td>2008</td>
<td>TAKS, SAT, ACT</td>
<td>Favored large schools</td>
<td>Small to moderate</td>
</tr>
<tr>
<td>Zoda</td>
<td>2009</td>
<td>TAKS</td>
<td>Favored large schools</td>
<td>Trivial to small</td>
</tr>
</tbody>
</table>

**OPTIMAL SCHOOL SIZE**

Optimal school size has been an issue for educational experts advocating both large-size and small-size schools. In a preponderance of the research, the focus has been on the economies of scale and the cost efficiency of schools. However, Leithwood and Jantzi (2009) suggested that an ideal size may not exist for all student outcomes. The researchers documented that smaller schools were beneficial for the majority of student outcomes but pointed out that small was a relative term and was subject to interpretation (Leithwood & Jantzi, 2009). Additionally, the researchers stated that student demographics were an important element in determining optimal school size due to the advantages school size can
provide students from disadvantaged social and economic backgrounds (Leithwood & Jantzi, 2009).

Despite the complex nature of determining an optimal school size, researchers and educational experts have been vocal in their opinions on the subject. Leithwood and Jantzi (2009) have suggested that elementary and secondary schools with large diverse or disadvantaged student populations should be limited to 300 and 600 students, respectively. Elementary and secondary schools with economically and socially heterogeneous student populations should be limited to 500 and 1,000 students, respectively.

Conant (1959) suggested that secondary schools should be of sufficient size to graduate a minimum of 100 students each year. Goodlad (1984) observed he would not want to serve as an administrator for a secondary school of more than 600 students. Cohn (1968), in a study of 377 Iowa high schools, utilized a multiple regression estimation statistical procedure and ascertained that an enrollment between 1,277 and 1,663 was most cost effective with an optimum high school size of 1,500 students. Riew (1966) reported similar results following a study of 430 Wisconsin schools. Riew (1966) indicated that enrollments between 1,101 and 1,600 students resulted in a savings of $26 per pupil.

Fox (1981) evaluated more than 30 studies to determine the most efficient secondary school size. Fox (1981) indicated that an enrollment between 1,400 and 1,800 students would be most efficient. Additionally, Andrews et al. (2002), in a review of 22 studies focused on cost and educational outcome, determined that districts with an enrollment of 500 students or less could benefit financially by consolidating into districts of 2,000 through 4,000 students. However, Andrews et al. (2002) reported that educational benefits were less consistent and recommended an elementary school enrollment of between 300 and 500 students. The researchers stated that secondary enrollments remain between 600 and 900 students. The enrollments suggested by Andrews et al. (2002) optimally balance the benefits of economies of scale with the negative impacts of a larger school.

Slate and Jones (2005) synthesized numerous studies related to school size and student performance. They determined that the current research supported the theory that very small-size and very large-size schools had a negative impact on school quality. Slate and Jones (2005), however, articulated that studies conducted in schools were burdened with methodological issues because correlational data provide, at best, a tentative causal conclusion.

A second methodological concern observed by Slate and Jones (2005) was that many studies were conducted by researchers who utilized an advocacy researcher style. The concern was that intentional and unintentional bias could influence the research design or data analysis to support a desired outcome. A third concern focused on the shifting definition of school size. Slate and Jones (2005) argued that the definition of large-size and small-size schools often varied from one study to the next. Thus, researchers advocating large-size schools or small-size schools could be referring to very different environments.

Slate and Jones (2005) were careful to make the distinction between contrary and contradictory outcomes because of the complexity of the school size issue. Contrary, according to Slate and Jones (2005), meant to be different; whereas, contradictory meant that if one result was true than the other result must be false. The authors contended that differing outcomes did not indicate contradictory results but different facets of a complex issue. It was difficult, according to Slate and Jones (2005), to reduce the relationship between schools size to educational quality to a simple response.
CONCLUSION

Clearly, a complex relationship exists between school size and student achievement. However, few researchers (e.g., ACT, 2008; Benner & Graham, 2009; Bowen et al., 2000; Brundrett, 2004) have exclusively focused on middle level education. The contradictory and inconsistent results included within this literature review warrant the further investigation of the effects of middle school size on student achievement. With the critical role that middle level education plays in preparing students for success in high school and postsecondary education (ACT, 2008; Balfanz, 2009; Oakes et al., 1992; Rumberger, 1995), educational leaders and policy makers must examine the effects of middle school size on student achievement.

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What We Know About Middle School Size and Student Performance


