



RESEARCH ON BOUNDARY DECISION MAKING

**Office of Research and
Strategic Improvement**

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FAIRFAX COUNTY PUBLIC SCHOOLS

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Introduction

Across the nation, school districts regularly re-evaluate school boundaries to address changes in student populations. Because the redrawing of school boundaries is a challenging process and often highly contested by stakeholders, school officials must be thoughtful and strategic when considering school boundary adjustments.

Preliminary research by FCPS' Department of Facilities and Transportation Services uncovered 16 factors that school districts across the country have used to make boundary decisions. This data was shared with the School Board during a work session in October 2018. The School Board requested a follow-up study to include the examination of educational research around the 16 factors impacting boundary decisions.

Through a review of the literature, this study examines what the research says about the extent to which the 16 factors contribute to student success, caring culture, premier workforce, and resource stewardship. This study operationalizes the four strategic goals in terms of impacts on teaching and learning. In other words, this study aims to answer the question: what does the research say about the impact of the 16 factors on student achievement and the social and emotional well-being of students?

Findings

While there are a variety of common factors that school districts consider when adjusting school boundaries, neither researchers nor practitioners have agreed upon best practices for school boundary decisions. Regarding the 16 factors,¹ there is limited empirical evidence connecting these factors to improved outcomes for students or higher-quality schools. District practices for implementing the 16 factors to address issues of resource stewardship are common, but only some can be tied to research. There is no research connecting any of the 16 factors to developing a premier workforce. Although the research on the most effective strategies and policies for school boundary adjustments is limited, there is evidence to suggest that school boundaries can be used to address issues related to student success and caring culture, which ultimately impact achievement and socio-emotional outcomes for students.

A review of the literature uncovered that there are four ways in which boundary decisions may be linked to student success, caring culture, or resource stewardship: through student diversity, student well-being, social connections that are critical for success, and overcrowding concerns. These four channels through which boundaries impact students can be linked to about half of the 16 factors (transportation, school capacity, demographics, socioeconomics, split feeders; neighborhood stability, health of students, and achievement). Although the remaining factors are important in practice and may have common sense applications for achieving the four strategic goals, there is no research to directly connect these factors to students.

[For more information about the research on each of the 16 factors, Appendix A presents a table of available research by factor. For more information about common practices, Appendix B presents a summarized table of comparison districts currently using the factors for boundary decision based on policy, regulations, or district practice documentation.]

¹ The 16 factors school districts consider when making boundary adjustments are geographic proximity, natural or man-made boundaries, political jurisdictions, neighborhoods, transportation, development, contiguous boundaries, current or projected school capacity, cohorts or split feeders, demographics (race/ethnicity), socioeconomics (FRM/ELP), neighborhood stability or past changes, costs to the school district, health and safety of students, birth-to-kindergarten ratio, and achievement.

Student Success

Student Diversity

Student demographics and socioeconomic status are two factors considered by school districts when examining school boundary policy. Research indicates that both factors may contribute to student success in schools. The boundary adjustment process can be used as a tool to either foster school diversity or hinder racial integration (Siegel-Hawley, 2013). One study, which analyzed a large national sample of over 23,000 school attendance zones, found that school boundaries can significantly alter the racial and ethnic composition of schools (Richards & Stroub, 2015). School diversity is particularly sensitive to school boundary adjustments in school districts that experience rapid changes in racial/ethnic composition (Richards, 2014; Saporito & Van Riper, 2016). Failure to recognize a changing student population can exacerbate issues of equity and diversity (Richards, 2017; Siegel-Hawley, 2013).

Neglecting to address diversity in school membership has a particularly negative impact on disadvantaged groups of students. Black students, for example, show large improvement in test scores when attending integrated schools (Rivkin & Welch, 2006). Similarly, Hastings and Weinstein (2008) found that disadvantaged students performed significantly better as a result of desegregation. Rothwell (2012), who analyzed student performance for over 84,000 schools, found that low-income students, black students, and Hispanic students were more likely to attend lower-performing schools as compared to their middle- and high-income white peers. Furthermore, Rothwell (2012) showed that as proficiency rates of middle- and high-income students increased, proficiency rates of low-income students at the same school also increased.

Similarly, Schwartz (2010) found that low-income students attending lower-poverty schools undeniably outperformed their low-income peers who attended high-poverty schools. The gains in achievement of low-income students at low-poverty schools were large enough to show progress toward closing the achievement gap. The findings of this study are especially compelling because the study utilized random assignment of low-income students to schools as part of a socioeconomic integration policy in Montgomery County, Maryland, thus eliminating questions of self-selection bias or other biases that are common in this type of research.

Although it is not explicitly named as one of the 16 factors, program placement has been noted in the literature as an additional diversity-related factor that should be considered when making boundary adjustments. In fact, school district desegregation efforts have sometimes relied on placement of special programs (such as magnet programs) to increase diversity at schools with high minority membership (Kahlenburg, 2016; Crouch, 1999; Mickelson, 2001). While there is limited literature that directly ties program placement to boundary decisions, literature has examined the extent to which special programs attract a diverse group of students. Unquestionably, low-income and minority students are disproportionately underrepresented in gifted programs and overrepresented in special education programs (Card & Giuliano, 2015; Daniels, 1998; Ford, 1998; Grissom & Redding, 2016). Gifted programs tend to favor white, high-income students, while special education programs disproportionately serve more minority and low-income students. The placement of special programs has the potential to either increase or decrease diversity, depending on the demographics of the school. For example, if a gifted program is placed at a primarily high-minority, low-income school, diversity should increase schoolwide, but adding the same gifted program to a low-minority, high-income school would serve to further minimize diversity.

Caring Culture

Student Well-being

The length of a student's bus ride to and from school, which often depends on geographic proximity of a student's home to the school, is another factor to consider when examining school boundary policy. While there is no research on the impact of long bus rides or geographic proximity on student achievement, a large body of research has documented an inverse relation between student well-being, specifically

students' sleep, and school performance (Carrel, Maghakian, & West, 2011; Millman, 2005; Owens, Belon, & Moss, 2010; Wheaton, Chapman, & Croft, 2016). Geographic proximity and travel times may be proxies for sleep when considering the impact on school performance.

According to the National Sleep Foundation (2019), children ages 6 to 13 need between 9 and 11 hours of sleep and teenagers need between 8 and 10 hours of sleep every night. Children who get insufficient sleep show reductions in motivation, engagement, concentration, and problem-solving skills, all which influence students' achievement and behavior in school (Buckhalt, El-Sheikh, Keller, & Kelley, 2009; Meijer, Habekoth, & Van Den Wittenboer, 2000). If longer commutes cause earlier mornings and later evenings for students, long bus rides could ultimately influence the amount of sleep students are getting.

Social Connections

Students' social connections may be impacted by boundary decisions when a student's social group is disrupted because of a school transition. When a student changes schools, he may lose connections to teachers and friends, which are critical for his future success, including both social-emotional health of students and academic achievement (Pettit & McLanahan, 2003). Although the research on school transition and student mobility is fairly robust, it is also highly complex. Given that there are multiple reasons for a child transitioning to a new school (e.g., a family move, a school closure, a disciplinary action, or moving to the next school level) and that these variations are compounded by individual student-level factors, it is difficult to isolate the impact of a school transition due to boundary changes. Several studies have shown that a school change is associated with lower achievement and, for middle school students, an increase in depressive symptoms and delays in high school graduation (Ou & Reynolds, 2008; Herbers et al., 2013; Anderson, 2017). Other studies have uncovered mixed results that vary based on child characteristics, such as gender or socio-economic status, or whether the transfer occurs within a school year or across school years (National Research Council and Institute of Medicine, 2010). There is some evidence to suggest that low-achieving students and Black students may benefit from the restructuring of social groups caused by split feeders (Langekamp, 2010). In contrast, this same researcher found that higher-achieving students are hindered when transitioning to high school through a split feeder pathway. Overall, school transitions where multiple schools feed into the next school level have less impact on social connections than the positive and negative impacts found for split feeder patterns. Therefore, student achievement is less likely to be impacted by a pyramid feeder structure compared to a split feeder pattern.

Resource Stewardship

Overcrowding

Alleviating overcrowding is another factor that school districts frequently consider when making boundary decisions and is sometimes the concern that prompts boundary revisions. Research supports that overcrowded schools (i.e., schools that exceed their capacity) are not conducive to teaching and learning, which may contribute to issues of student success and caring culture. For example, one study (Batiz & Marti, 1995) determined that school overcrowding had significant negative impacts on teaching and learning. These impacts were more pronounced for low-SES student populations. School overcrowding may also lead to large class sizes when the physical layout of a school impacts the class offerings. A large body of literature concludes that, in general, smaller class sizes result in positive outcomes for students, particularly for the most disadvantaged students (Finn & Achilles, 1999; Mostellar, 1995; Molnar, Smith, Zahorik, Halback, Ehrle, Hoffman, & Cross, 2001). However, skeptics of this conclusion caution that class size reductions are beneficial only in some cases. Some researcher posit that the benefits are observed only for some student groups or only when other factors are similar, such as how effective the teacher is or how much physical space is available (Hanushek, 1999).

Efficiency

Many of the 16 factors considered by districts when making boundary adjustments are tied to issues around efficiency, school capacity, or costs to the school district. Although districts understand these factors as

important and vital to ensuring responsible resource stewardship, there is no empirical research to directly connect the efficient use of resources to improvement in student learning and socio-emotional outcomes. It should be noted that some factors, such as neighborhoods, seen by districts as efficiency considerations may be seen by the community as disruptions to social connections. Therefore, it is possible for a factor to impact both student success and resource stewardship and to do so in competing ways. While there is no educational research that connects some efficiency factors such as geographic proximity, natural or man-made boundaries such as roads, or housing development, common practice and news coverage indicate that districts may need to manage the political aspect of boundary decisions as they relate to these factors.

Conclusion

While the 16 factors identified by FCPS' Department of Facilities and Transportation Services are common considerations for school districts when making boundary adjustments, a review of the literature reveals that some, but not all, factors have implications for student success, caring culture, and resource stewardship. Each of the 16 factors may have important practical implications from an implementation perspective, but there is no research directly connecting all the 16 factors to student outcomes.

Based on the available research, boundary decisions should seek first to address balancing student diversity, consider the impact of school transfers and split feeders on students' social and emotional well-being, minimize travel time, and alleviate overcrowding should it exist, as these factors most directly impact teaching and learning. While resource stewardship is important, the remaining factors should not outweigh the Division's commitment to making boundary decisions that best facilitate student success and a caring culture.

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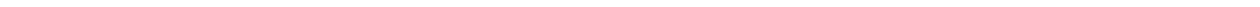
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Appendix A

Boundary Adjustment Factors and Research



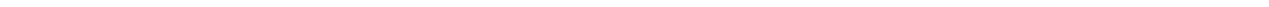
The table below provides a summary of what the research says about the extent to which the 16 factors contribute to equity and excellence in schools. Specifically, the table notes whether there is any empirical evidence connecting the factor to student achievement and social and emotional well-being of students. For each factor that is connected to student outcomes, there is a brief explanation describing how the factor is connected to student achievement or social and emotional outcomes.

Factor	Is there research connecting the factor to student outcomes?	Why does research say about the factor's importance?
Geographic Proximity	Yes	As it relates to the length of a student's travel time to and from school. Longer commute times due to greater geographic distance may impact sleep, which is critical for students' learning.
Natural or Man-Made Boundaries	No	
Political Jurisdictions	No	
Neighborhoods	No	
Transportation	Yes	As it relates to the length of a student's travel time to and from school, transportation may have implications for students' success in school. Longer bus rides may impact sleep, which is critical for students' learning.
Development	No	
Contiguous Boundaries	No	
Current/Projected School Capacity	Yes	Overcrowded schools are more likely to have larger class sizes to accommodate all students. Smaller class sizes are associated with better outcomes for students.
Cohorts/Split Feeders	Yes	There is some evidence to suggest that split feeders may benefit some students by allowing them to establish new social networks. At the same time, for other students, the disruption to their social networks may negatively impact their emotional well-being.
Demographics	Yes	Minority students show improvements in academic achievement from attending more diverse schools.
Socioeconomics	Yes	Low-income students significantly benefit from attending schools with high-income students.

Neighborhood Stability/Past Changes	No	
Costs to School District	No	
Health/Safety of Students	Yes	The mental health of students may be impacted by boundary adjustments in cases where there are disruptions to students' social connections.
Birth-to-Kindergarten Ratio	No	
Achievement	Yes	Many of the other factors considered in making boundary adjustments ultimately impact achievement, including transportation, capacity, split feeders, demographics, socioeconomics, neighborhood stability, and mental health of students.

Appendix B

Boundary Adjustment Factors Considered by Comparison Districts



The table below summarizes which of the 16 factors each of the comparison districts considers when making boundary adjustments. Information is based on publicly available documents or website information for each school division. The comparison districts listed down the left-hand column of the table in alphabetical order represent large school divisions in the U.S., supplemented with a few additional school divisions in Virginia.

Boundary Adjustment Factors Considered																
Comparison Division	Geographic Proximity	Natural or Man-Made Boundaries	Political Jurisdictions	Neighborhoods	Transportation	Development	Contiguous Boundaries	Current/Projected School Capacity	Cohorts/Split Feeders	Demographics (Race/Ethnicity)	Socioeconomics (FRM/ELP)	Neighborhood Stability/Past Changes	Costs to School District	Health/Safety of Students	Birth-to-Kindergarten Ratio	Achievement
Arlington County	X						X	X	X	X	X	X	X			
Broward	X	X		X		X		X	X	X				X		
Charlotte-Mecklenburg	X	X		X	X	X		X	X		X					
Chicago	X	X			X			X		X						
Clark County	X				X			X	X	X	X	X		X		
Dade					X	X	X	X	X	X	X		X			X
Dallas ISD	X	X					X	X	X							
Gwinnett County		X	X		X			X								
Hillsborough		X			X	X		X					X			X
Houston ISD	X				X	X		X	X	X						

Boundary Adjustment Factors Considered

Comparison Division	Geographic Proximity	Natural or Man-Made Boundaries	Political Jurisdictions	Neighborhoods	Transportation	Development	Contiguous Boundaries	Current/Projected School Capacity	Cohorts/Split Feeders	Demographics (Race/Ethnicity)	Socioeconomics (FRM/ELP)	Neighborhood Stability/Past Changes	Costs to School District	Health/Safety of Students	Birth-to-Kindergarten Ratio	Achievement
Los Angeles Unified	X	X		X		X		X		X				X	X	X
Loudon County	X	X		X	X		X	X	X	X	X	X	X			
Montgomery County	X					X		X		X	X	X				
Orange	X			X	X	X		X	X	X						
Palm Beach	X			X	X		X	X	X	X	X			X		
Prince William County					X	X		X		X						
Wake County Schools	X			X	X			X	X		X	X	X			X