RAYMOND CENTRAL PUBLIC SCHOOLS - DISTRICT #55-0161
BOARD OF EDUCATION WORKSHOP, MONDAY, SEPTEMBER 30, 2024 - 6:00 PM
RAYMOND CENTRAL JR-SR HIGH SCHOOL - MUSTANG ROOM
1800 WEST AGNEW ROAD
RAYMOND, NE 68428-9783

AGENDA

1. Call to Order and Pledge of Allegiance

2. Motion to Excuse Board Member's Absence

3. Open Meeting Law

4. Public Forum

5. Discussion Items

    5.1. Superintendent's Report

Board of Education Workshop - Patron Committee Meeting
BVH Architects - Facility Analysis / Educational Planning Suitability
August 31, 2022

Option #1		Option #2		Option #3		Option #4	
PK-3 @ Ceresco / 4-6 @ Val		New PK-6 @ Central Site		HS Additions / Renovation		Existing Central Campus-Elem / New-HS	
Pros	**Cons**	**Pros**	**Cons**	**Pros**	**Cons**	**Pros**	**Cons**
Utilizes space	Splits families more	One facility	Not improving HS	Provide the extra room that is needed	Always need repairs - always have cost	Option kids more	Lots of $$
Numbers solution	Transportation logistics	Everyone can work together	Every kid will travel	Address preschool accessibility	Cost	Better facility for HS	Convert HS to elementary = $$
Collaboration of teaching	Constant school change	Eliminate travel time for teachers/specials/admin	Money spent/Increase Property taxes	Improve current repairs needed - we have no auditorium	Doesn't solve all concerns-travel to 3 sites, faciliy deficiencies	Less bus time	Loss of state aid for two two elementary sites/currently $360K
Co-teaching	Unity (lack of)	Consolidate kitchen & more efficient	Taking away from community presence and involvement/Kids can't walk to business	Address Fine Arts and SpEd needs	Same core structure - ongoing issue - old original building	Brings everyone together	Little kids riding w/older siblings dangerous
More cost effective	Increase bus / travel time - safety	Collaboration of grades	Safety due to kids traveling	Transform temporary classrooms to permanent space	New facility last the length of time to pay for it	All athletics to one site including softball, auditorium, gyms	Kill towns?
Communities keep their schools	Bandaid - temporary solution	Increase security	Travel - Older patrons may not drive to assist in classrooms	Improve safety, security & accessibility (ADA)	Life expectancy of facilities/additions	Gain state aid 2 year new school adjustment	
Earlier integration of towns/kids	Doesn't solve playground or site issues	Better lighting - everything state-of-the-art	Loss of state aid for two two elementary sites/currently $360K	Improved traffic flow			
Small town EMTs closer	Still an old building	Money saved	Kill towns?	Improve teaching efficiency of staff, students, facilities			
	Class sizes - rooms big enough?	Share gym space for activities/ practices					
	3X utilities, support staff	Collaboration of all RC students at one site					
	3X mow, snow, etc	Parents only need to take students to one site					
	No resource officers	Gain state aid 2 year new school adjustment					

Anticipated Elementary School Numbers for the 2025-26 School Year

Based on Current Enrollment

Goals

K-2 Less than 20 per section

3-5 Less than 22 per section

Kindergarten – 50 16-17 per section with 3 sections

1st Grade- 49 – 16-17 per section with 3 sections

2nd Grade- 19-20 per section with 2 sections

3rd Grade- 54- 18 per section with 3 sections- Already have the 3rd staff member with this cohort

4th Grade- 41- 20-21 with 2 sections

5th Grade- 53- 17-18 Per Section with 3 Sections

This would require the addition of 3 teachers at the elementary level.

Title I services are offered primarily at the K-2 level so one of those positions could be transitioned to a teaching position.

AQuESTT

Accountability for a Quality Education System, Today and Tomorrow

AQuESTT leverages three separate but interrelated systems of approval, accreditation, and accountability to ensure equal operation of schools and equitable outcomes for all students.

www.aquestt.com

AQuESTT

Accountability for a Quality Education System, Today and Tomorrow, or AQuESTT, serves as a framework for approval, accreditation, and accountability, and a system for continuous improvement. This cohesive, streamlined system is critical for the benefit of Nebraska students and for the state to have a vibrant and economically-successful future. Through AQuESTT, the NDE can better deliver upon the commitment for educational equity. The AQuESTT framework includes three domains: Leadership; Success, Access, and Support; and Teaching, Learning, and Serving, and six tenets described below.

LEADERSHIP DOMAIN

Strong leaders, committed to achieving educational equity, are critical to the processes of approval, accreditation, accountability, and continuous improvement. Leaders, from school boards to superintendents, principals to teacher leaders, set a vision for achieving educational equity, offering students meaningful access to the educational resources they need at the right moment, at the right level, and with the right intensity to not only reach high expectations for learning, but also to discover and explore their passions and make meaningful connections within the context of their postsecondary interests, careers, and civic lives. Leaders must possess the knowledge, skills, and mindset to systematize equity.

SUCCESS, ACCESS, AND SUPPORT DOMAIN

Educational Opportunities and Access

Each student has access to effective, comprehensive, and continuous learning opportunities that prepare them for ongoing school success, postsecondary education, and career goals.

Transitions

Quality educational opportunities focus on effective supports and high quality collaborations for each student transitioning within, into, and between grade levels, programs, schools, districts, postsecondary education, and careers.

Positive Partnerships, Relationships, and Success

Schools and districts implement best practices in student, family, and community engagement to enhance experiences and opportunities that are culturally inclusive and relevant for each student. Student success and engagement relies on positive partnerships and relationships to fundamentally improve the outcomes for each student, school, district, and community.

TEACHING, LEARNING, AND SERVING DOMAIN

Educator Effectiveness

Each student is engaged by effective educators throughout their learning experiences, such that schools and districts develop effective teachers and school leaders who establish a culture of success.

Student Achievement and Growth

A balanced assessment system that includes results from multiple sources is used to measure student growth and achievement towards Nebraska's content area standards. A balanced assessment system is a necessary component of the instructional process to improve learning and growth for each student.

Postsecondary, Career, and Civic Readiness

Each student, upon high school graduation, is prepared for success in postsecondary education, career, and life pursuits.

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I am…

- An Administrator
- A Client
- The General Public
- A Job Seeker
- A Licensed Professional
- The Media
- A Parent/Guardian/Family Member
- A Student
- A Teacher

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Questions, Comments, or Corrections? Let us know!

Nebraska Continuous Improvement

School Improvement External Team 5-year Visitation Schedule

Overview:

The Nebraska Framework Model was originally released in July 2012 by the Nebraska Department of Education's Accreditation and School Improvement Section. This initial model

focused on four components: “Creating the Profile, Setting the Goals, Planning to Improve, and Implementing the Plan”.

Since the original Nebraska Framework model, there have been multiple state and federal changes that have changed educational practices in Nebraska. In 2019, the Accreditation Section of the Office of Accountability, Accreditation, and Program Approval which oversees compliance with NAC 92 Rule 10 and provides guidance on Continuous Improvement, began studying the connection between regulations for state statutes and agency requirements for operating schools in Nebraska.

Continuous Improvement (CI) is broadly defined as the process of ensuring ongoing improvement “through incremental and breakthrough improvements.” Another framing of CI defines it as “the act of integrating quality improvements into the daily work of individuals in the system.” The term and concept come from the field of quality control and assurance and are commonly used across many sectors and industries and for many goals within an organization. Continuous Improvement: **Review of Literature and Practice, Hanover Research, August 2021**.

Increasingly, state, district, and school-level leaders are using components of a Continuous Improvement (CI) cycle to support student achievement and achieve school improvement goals. While some may view it as a trend driven by directives from Every Student Succeeds Act (ESSA), the core components of CI have been shown to produce meaningful and sustainable positive change in K12 setting.

Legislative Bill 438 was adopted into law in April 2014, changing the accountability system for schools and districts under the Quality Education Accountability Act. The Accountability for a Quality Education System Today and Tomorrow (AQuESTT) was established to integrate components of accountability, assessment, accreditation, career education, and data into a system of school improvement and support. **AQuESTT Timeline Graphic**. In October of 2019, the State Board of Education voted to adopt revised Position Statement S2 which included additional tenets and indicators. **AQuESTT Tenets 2020.**

Since 2019, collaboration between Accreditation and NeMTSS have focused on identifying similarities between the 2012 Nebraska Framework and the NeMTSS problem solving model. For the years of 2020-21 and 2021-22 NeMTSS Regional Leads, Accreditation Staff, and ESU partners have provided Continuous Improvement workdays to empower educators to utilize materials from both models to best serve students.

Specific efforts to combine the 2012 Nebraska Framework model and the NeMTSS problem solving model for Continuous Improvement is known as coherence work. These revised processes, procedures and materials developed for Nebraska Continuous Improvement will become available for implementation for the 2022-23 school year.

Section 009 of NAC 92 Chapter 10

AQuESTT Tenet: All students experience success through a continuous improvement process that builds student, parent/guardian/family and community engagement in order to enhance educational experiences and opportunities for all students.

To maintain Accreditation in the State of Nebraska, school systems comply with all regulations set forth in Rule 10. Specific regulations required for Continuous Improvement are found in Section 009 and are as follows:

009.01A The school system develops and implements a continuous school improvement process to promote quality learning for all students. This process includes procedures and strategies to address quality learning, equity, and accountability. In public schools, the process incorporates multicultural education as described in 004.01F. In all school systems, the continuous improvement process includes the following activities at least once within each five years.

009.01A1 Review and update of the mission and vision statements.

009.01A2 Collection and analysis of data about student performance, demographics, learning climate, and former high school students.

009.01A3 Selection of improvement goals. At least one goal is directed toward improving student academic achievement.

009.01A4 Development and implementation of an improvement plan which includes procedures, strategies, actions to achieve goals, and an aligned professional development plan.

009.01A5 Evaluation of progress toward improvement goals.

009.01B The school improvement process includes a visitation by a team of external representatives to review progress and provide written recommendations. A copy of the school system's improvement plan and the written recommendations of the external representatives are provided to the Department. The external team visits are conducted at least once each five years.

009.01B1 The **AdvancED** External Review may be used by a school system to fulfill the requirement for an on-site visitation if all the requirements of Section 009 are met.

009.01B2 The Progress Plan developed by a public school designated as a priority school as outlined in Subsection 010.02D of this Chapter shall be included within the continuous improvement requirements of Section 009 of this Chapter for the district in which the priority school is located.

Updated September 16, 2022 10:55am

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A Theoretical and Empirical Investigation of Teacher Collaboration for School Improvement and Student Achievement in Public Elem....

Article *in* Teachers College Record · April 2007

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A Theoretical and Empirical Investigation of Teacher Collaboration for School Improvement and Student Achievement in Public Elementary Schools

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Megan Tschannen-Moran

College of William and Mary

Background/Context: *A review of the literature demonstrates that schools are frequently called upon to improve by developing high levels of teacher collaboration. At the same time, there is a paucity of research investigating the extent to which teachers' collaborative school improvement practices are related to student achievement.*
Purpose: *The purpose of this study was to review the literature and empirically test the relationship between a theoretically driven measure of teacher collaboration for school improvement and student achievement.*
Setting: *The data for this study were drawn from students and teachers in a large urban school district located in the midwestern United States.*
Population: *The population for this study came from the elementary schools in one large midwestern school district. Survey data were drawn from a sample of 47 elementary schools with 452 teachers and 2,536 fourth-grade students.*
Research Design: *Hierarchical linear modeling (HLM) was the primary analytic method. Survey data were collected approximately 2 months before students took the mandatory state assessments, which provided the scale scores that served as dependent variables in this research. HLM accounted for the nested nature of the data (students nested in schools).*

This was a naturalistic study that employed secondary data analysis. There was no intervention, treatment, or randomization. Naturally occurring differences in teachers' levels of collaboration were measured, and statistical controls for school social context were employed. At the student level, the study employed controls for children's social and academic backgrounds.

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0161-4681

Data Collection and Analysis: *Data were obtained from teachers and students in the sampled schools. Teacher data were obtained via a survey assessing teacher collaboration. Student data were obtained from the central administrative office of the school district for all students who attended sampled schools during the year in which we surveyed teachers.*
Results: *Results of HLM analyses indicate that fourth-grade students have higher achievement in mathematics and reading when they attend schools characterized by higher levels of teacher collaboration for school improvement.*
Conclusions: *The authors suggest that the results provide preliminary support for efforts to improve student achievement by providing teachers with opportunities to collaborate on issues related to curriculum, instruction, and professional development. The authors also discuss the need for more research on the effects of different types of collaborative practices using more representative samples.*

From the one-room schoolhouses that characterized schooling in the United States over a century ago to modern multiroom school buildings, teachers have traditionally taught students in isolation. Collaboration among teachers has not been the norm historically (e.g., Lortie, 1975; Rosenholtz, 1989b; Sarason, 1996). Typically, collaboration is neither taught nor modeled in university coursework (indeed, few professors teach collaboratively), nor do practicing teachers receive substantial support from colleagues or administrators. Rosenholtz (1989a) argued that isolation was probably the greatest impediment to learning to teach or to improving existing skills because it forced teachers to rely on trial and error and to fall back on their own memories of schooling for models of teaching.

Recent reform efforts in education have included an emphasis on increasing teacher collaboration (Brownell, Yeager, Rennells, & Riley, 1997; Louis, Marks, & Kruse, 1996). In fact, Morse (2000) suggested that collaboration is an educational reform imperative: "Educators will recognize they are not alone in searching for new modes of human exchange. The fact is, this quest for a new way of human exchange is endemic in the social order…Rejecting collaboration is not an option" (p. xi). A focus on the process of collaboration, however, has preempted emphasis on outcome indicators. Indeed, collaboration is often advocated, yet its effects are less frequently investigated. Many studies have reported positive outcomes of collaboration for teachers, including improved efficacy (Shachar & Shmuelevitz, 1997), more positive attitudes toward teaching (Brownell et al.), and higher levels of trust (Tschannen-Moran, 2001). Little has been done, however, to test the prediction that teacher collaboration is associated with increased student achievement. For example, Marks and Louis (1997) stated that there is no clearly established link between teacher empowerment and student performance.

Researchers have, however, argued the possibility that collaboration may improve teaching and learning (Goddard & Heron, 2001; Pounder, 1998). According to Hausman and Goldring (2001), "teachers must be central to any meaningful change in schools" (p. 44). The more teachers collaborate, the more they are able to converse knowledgably about theories, methods, and processes of teaching and learning, and thus improve their instruction. Evans-Stout (1998), however, concluded that "we still do not have much evidence suggesting which collaborative instructional practices lead to improved student learning" (p. 124). Indeed, of the few empirical studies on collaboration conducted in the 1970s, Evans-Stout noted that most suffered from poor designs and that more recent studies have investigated the advantages of collaboration for teachers rather than students. Furthermore, based on a comprehensive review of the literature on school-based problem-solving teams, Welch, Brownell, and Sheridan (1999) cautioned that we lack empirically based studies that directly link collaboration to student outcomes. Thus, there remains a gap in knowledge regarding the effects of teacher collaboration on student-level outcomes.

This study was designed, therefore, to investigate whether there is an empirical link between teacher collaboration for school improvement and student achievement. Our primary research question addresses whether teacher collaboration positively predicts differences among schools in student achievement. In light of the predominance of state systems of testing that emphasize high standards for all, we believe that our outcome variables, fourth-grade students' achievement on high-stakes state-mandated mathematics and reading assessments, are particularly timely. Indeed, our results are of import for those interested in organizing schools so that teachers can meet the challenges brought by student assessment and school accountability.

Because we studied differences in the achievement of students nested in schools, our data were necessarily multilevel. Thus, to account for heterogeneity of regression among schools and to avoid the misestimated standard errors and aggregation bias that sometimes compromise results when ordinary least squares regression is employed to address multilevel research questions, we employed hierarchical linear modeling (HLM). We turn now to a review of the literature on teacher collaboration for school improvement to ground the research questions we tested.

RESEARCH ON TEACHER COLLABORATION

Hausman and Goldring (2001) view schools as potential "communal organizations" characterized by, among other constructs, "enhanced col-

legiality and collaboration" (p. 31). There are a variety of configurations, both formal and informal, within which collaboration may occur. For example, regular and special education teachers may work collaboratively to meet the needs of students with disabilities who spend a portion of the day in regular education settings. Middle school teachers may follow a team model in which they collaborate to improve instruction. School administrators at any level may establish teams of teachers to "problem solve about students experiencing difficulty, to establish and discuss academic standards, and to create positive working relationships with parents" (Friend & Cook, 2000, p. 16). Moreover, collaboration can occur when teachers talk often about their professional work (e.g., during planning periods). These examples clearly demonstrate that schools can present many opportunities for teachers to collaborate for the improvement of instruction, yet not all schools do. Indeed, not all teachers have opportunities to engage in professional discourse about their own learning and instruction. For example, they may work in schools with no formal mechanisms for collaboration and where administrators tightly control educational decisions involving curriculum, assessment, and student placement.

When educators having unique knowledge of a child operate in isolation, the child's educational experience becomes fragmented, and the child's needs may go unmet (Hart, 1998). Conversely, when teachers have opportunities to engage in professional discourse, they can build upon their unique content, pedagogical, and experiential knowledge to improve instruction. Although many scholars suggest that the combined skills and knowledge possessed by a team of educators should be an asset to school processes and hence student achievement, this argument is mainly theoretical. However, to make effective policy recommendations, researchers must move beyond expositions on the rationale for teacher collaboration to studies of its relationship to student learning (Evans-Stout, 1998; Hughes, 1994; Smylie, Lazarus, & Brownlee-Conyers, 1996; Welch et al., 1999).

In a study of teacher autonomy and control, Smylie et al. (1996) found that individual teacher autonomy was negatively associated with student achievement; conversely, team control over resources and accountability for outcomes was positively associated with student success. Although not related directly to collaboration, their results imply that the mutuality and shared responsibility that emerges when teachers collaborate may actually improve instruction and student learning. Other studies show that schools in which teaming occurs report fewer office-level behavioral problems (such as student office referrals and suspensions) than do those schools in which teaming does not occur (Crow & Pounder, 1997;

Pounder, 1998). A lower incidence of student misbehavior, in turn, provides increased opportunities to learn for all students. The less time teachers spend managing classroom conflict, the more time they are able to spend on instruction, thus improving students' academic outcomes.

Other research, although not specifically concerned with student achievement, suggests collaboration has important positive effects for teachers. For example, Erb (1995) found that when teachers work together, they are not only less isolated, but they are also more focused on academic and behavioral outcomes for students than when they work alone. Pounder (1998) examined teacher collaboration by studying teachers who participated formally as middle school team members to coordinate curriculum, interventions, management, and parental communications, as compared with nonteaming teachers. Pounder found that teachers who worked on teams reported more skill variety, knowledge of student performance, contact with parents, and knowledge of other teachers' work. Pounder asserted that when teachers work together on formal teams, there is a "tighter connection between teachers' work and student outcomes" (p. 66). We believe that this is because collaboration provides valuable opportunities for teachers to learn to improve their instruction.

In a review of existing research on educational collaboration, Brownell et al. (1997) concluded that positive outcomes are documented for teachers, including improved affect, heightened efficacy, and improved knowledge base. Shachar and Shmuelevitz (1997) also reported that higher levels of self-efficacy were associated with increases in teacher collaboration. Benefits to students are presumed to result from the positive changes experienced by teachers. For example, teachers' sense of increased efficacy, an outcome supported by research on teacher collaboration, has been linked to improved student achievement (Armor et al., 1976; Ashton & Webb, 1986; Englert, Tarrant, & Rozendal, 1993; Goddard, Hoy, & Woolfolk Hoy, 2000; Moore & Esselman, 1992; Ross, 1992). In sum, researchers believe that there is a link between teacher collaboration and student achievement, but the theory remains in need of testing.

RATIONALE FOR HYPOTHESIS

Our review suggests that when teachers collaborate to address important instructional issues, teaching and learning may be enhanced (e.g., Crow & Pounder, 1997; Erb, 1995; Goddard & Heron, 2001; Pounder, 1998; Putnam & Borko, 1997; Smylie et al., 1996). In light of this, we decided to examine the extent to which teachers work collectively to influence

decisions about school improvement, curriculum, instruction, and professional development. Specifically, we wanted to know whether teacher collaboration around these fundamental issues positively predicted the unequal distribution of student success among schools. Next, we briefly explain the possible benefits that accrue when teachers collaborate to solve problems and make decisions in each of these areas.

School improvement

Hausman and Goldring (2001) stressed the importance of teachers' influence over school decisions. Teachers are, after all, the school personnel most frequently and directly in contact with students. "They are thus a school system's primary reservoir of organizational knowledge about means and ends" (Conley, Schmidle, & Shedd, 1988, pp. 262–263). Other researchers contended that giving teachers responsibility for making key school decisions is important to developing professional communities among teachers (Louis et al., 1996; Marks & Louis, 1997).

Curriculum and instruction

The involvement of teachers in the selection of instructional methods and activities and the evaluation of curriculum and programs is also important. Englert et al. (1993) found that teachers who were given a voice in curricular development claimed ownership of the process and thus were able to sustain changes that were decided in a team context. In a survey of practicing teachers, Melnick and Witmer (1999) found that teachers believed so strongly in the importance of sharing instructional strategies and ideas that they often made time during nonschool hours to meet in teams to discuss these issues. Rosenholtz (1989b) supported these views and further stated that teachers should be involved collectively in instructional decision making.

Professional development

Hausman and Goldring (2001) stated that professional development opportunities, when offered at the level of individual schools, are indicators of school community. Melnick and Witmer (1999) contended that teachers must become actively involved in their own professional development. Such involvement provides opportunities for teachers to learn with colleagues. Further, Melnick and Witmer stated that encouraging active teacher involvement through professional development may allow

teachers to bring about systemic reform. Professional development may be key to improving instruction and fostering a strong sense of professional community (Louis et al., 1996). Moreover, teachers who find challenge and personal accomplishment, often through continued professional development, are more likely to remain in the teaching profession and to work hard to help their students succeed (Rosenholtz, 1989b). Our operational measure of teacher collaboration tapped each of the above areas and was employed to test the following hypothesis:

> H_1: Teacher collaboration is positively and significantly related to differences among schools in fourth-grade achievement on state-mandated assessments of mathematics and reading achievement.

Notably, the state in which the data were collected was engaged in a large-scale accountability effort through which aggregate student achievement scores were publicized in local school "report cards." Results of the fourth-grade assessments employed as dependent variables for this study were publicly reported in this manner. The public reporting of the results underscores the high-stakes nature of the assessment. Hence, we believe that the relationship between teacher collaboration and our dependent variables is highly relevant to those seeking to improve schools, particularly in the context of student assessment and accountability policy.

METHODOLOGY

The data for this study were drawn from students and teachers in a large urban school district located in the midwestern United States. The sample, data collection procedures, student-level variables, teacher collaboration measure, and multilevel analytic methods employed to test our research questions are described below.

SAMPLE

The elementary schools in a midwestern urban school district served as the population for our study. Because this study focused on schools in just one district, there was no possibility for uncontrolled between-district effects. Moreover, this design feature also held constant any differences that might be related to organizational structure (i.e., elementary, middle, secondary) of the schools. To schedule times for the administration of surveys to school faculties, a researcher contacted the principal of each

of 52 randomly selected schools. Principals in three of the selected schools declined to participate. Our decision rule for including schools in the final sample was that each school had at least 4 faculty respondents. The sample includes data from 47 elementary schools, with 452 teachers and 2,536 fourth-grade students.

DATA COLLECTION

Data were obtained from teachers and students in the sampled schools. Teacher data were obtained by a researcher who administered a survey assessing teacher collaboration to faculty groups during a regularly scheduled faculty meeting. At this time, other data beyond the scope of the present study were also collected. For this reason, half of the teachers in the room, selected at random, received a survey with questions assessing teacher collaboration, whereas the other half received a survey with different questions. Teacher surveys were anonymous; hence, we did not attempt to track the grade level that teachers taught or teacher demographics such as age or gender. We obtained student achievement and demographic data from the central administrative office of the school district for all students who attended sampled schools during the year in which we surveyed teachers.

STUDENT-LEVEL VARIABLES

Our student-level control variables included gender, race/ethnicity, free and reduced-price lunch status (a proxy for socioeconomic status [SES]), and prior student achievement. In the sampled schools, approximately 99% of the student population was either Black or White, so race was dummy-coded such that non-White = 1 and White = 0. Gender and SES were coded similarly (female = 1, free/reduced lunch = 1). The dependent variables for this study were fourth-grade students' scaled scores on state-mandated mathematics and reading assessments. The assessments were administered to students in our sampled schools approximately one month after we surveyed teachers in the spring. Reliability and validity evidence for the state-mandated achievement test was obtained from the state department of education. Cronbach's alpha suggested that the dependent measure was acceptably reliable. Further, content validity for scores on the assessment was suggested in two ways: (1) the involvement of expert educators in the development and selection of test items, and (2) the school district from which our sample was drawn followed the state model curriculum for which the mandatory assessment was developed.

As a statistical control for prior student achievement, we employed the Metropolitan Achievement Test (seventh edition) mathematics and reading normal curve equivalent scores obtained by the sampled students one year earlier, as third graders. Finley (1995) reported adequate reliability for scores on the Metropolitan Achievement Test, and Hambleton (1995), Nitko (1994), and Rogers (1994) indicated that adequate concurrent and construct validity evidence exists for scores on the assessment. Because of student mobility, we expected that we would not obtain a prior achievement (third-grade) measure for every fourth-grade student in our sampled schools. However, because we obtained data from the central office of the district, we were able to obtain third-grade mathematics and reading scores for students who, although mobile, made only intradistrict school changes. For this reason, although our research was conducted in an urban district in which mobility is problematic, our missing data rate for prior achievement was just under 14%. We standardized the prior achievement scores to a mean of 0 and a standard deviation of 1 for use in the multilevel hypothesis tests.

SCHOOL-LEVEL VARIABLES

Teacher collaboration was measured by teacher responses to a six-item Likert-type scale. The items are reported in the appendix. The items tap aspects of teacher collaboration recommended in the extant literature as discussed earlier in the rationale for the hypothesis.

School-level SES, constructed as a continuous variable representing the proportion of students in a school receiving a free or reduced-price lunch, was designed as a control for school social context. In addition, we constructed variables representing school size and the proportion of students who were minority.

MULTILEVEL ANALYSIS

Because our research question involved the effects of school practices on students, we employed HLM to account for the nested structure of the data we collected. Our within-school model included dummy variables for student gender, race, and SES, and a continuous variable representing students' prior-year academic achievement. At the school level, teacher collaboration for school improvement was tested as a predictor of differences among schools in students' mathematics and reading achievement. As controls for school context, we also modeled the effects of school SES, proportion of minority students, and size. These variables

were included as controls for aspects of organizational context that might also help to explain differences among schools in student achievement. At Level 2, only the prior achievement slopes were set to vary randomly among schools because variance in these slopes was statistically nonzero. The slopes for the other student-level predictors did not vary significantly among schools, so these effects were fixed. Thus, the equations for our full model are as follows:

1. $Y_{ij} = \beta_{\cdot 0j} + \beta_{\cdot jFEMALE} X_{ijFEMALE} + \beta_{\cdot jAFAM} X_{ijAFAM} + \beta_{\cdot jSES} X_{ijSES} + \beta_{\cdot jMISS\ PRIOR\ ACH.} X_{ijMISS\ PRIOR\ ACH.} + \beta_{\cdot jPRIOR\ ACH.} X_{ijPRIOR\ ACH.} + r_{ij}$

2. $\beta_{\cdot 0j} = \gamma_{00} + \gamma_{0NUMSTD} W_{jNUMSTUD.} + \gamma_{0SES} W_{jSES} + \gamma_{0PCT.BLACK} W_{jPCT.BLACK} + \gamma_{0COLLABORATION} W_{jCOLLABORATION} + U_{0j}$

3. $\beta_{\cdot jPRIOR\ ACH} = \gamma_{50} + U_{jPRIOR\ ACH.}$

RESULTS

Of the 49 participating schools, there were two in which too few faculty members were available to complete the questionnaires. Therefore, these two schools were dropped from the sample, leaving 47 schools, or 90.4% of the 52 schools randomly selected for inclusion. A total of 452 teachers completed the surveys, and over 99% of the forms returned were useable. The final sample included 2,536 students and 452 teachers in the 47 sampled elementary schools from one large urban school district. Descriptive statistics for both the student- and school-level variables appear in Table 1. Nearly 60% of the fourth-grade students in our study

Table 1. Descriptive Statistics

Student Level (n = 2,536)				
	M	*SD*	Minimum	Maximum
Mathematics achievement	0	1	-4.00	5.25
Reading achievement	0	1	-3.92	3.95
Prior math achievement	0	1	-1.94	2.45
Prior reading achievement	0	1	-2.15	2.59
Free or reduced price lunch	.67	.47	0	1
Black	.57	.49	0	1
Female	.48	.50	0	1
School Level (J = 47)				
	M	*SD*	Minimum	Maximum
Teacher collaboration	0	1	-2.08	1.83
Proportion F/R lunch	.62	.20	.10	.89
Proportion Black	.56	.28	.08	1.00
Number of students	401.40	107.26	229.00	710.00

were Black, and about two thirds received a free or reduced-price lunch. Notably, the school-level descriptive statistics indicate considerable variability across schools in the distribution of disadvantaged students.

Note: In the final analysis, all school-level predictors were standardized to have a mean of 0 and a standard deviation of 1.

The mean size of the elementary school faculties surveyed was just over 21. By design, we intended to measure teacher collaboration for school improvement by obtaining responses from approximately half of the faculty. However, because there were uncontrollable events (e.g., teacher absences and schedule conflicts), not every teacher attended the meetings in which surveys were administered. Our research team did not attempt to collect data from teachers who were absent. On average, across the schools in the study, we obtained responses from approximately 45% of the teachers in the sampled schools, with between 4 and 20 responses per school, depending on school size. In no case did teachers present at the faculty meetings we attended refuse to complete the surveys. The elementary schools we sampled were K–5, and teachers from all grades attended the meetings in which we collected our data.

Because we conceptualized the level of teacher collaboration as an important dimension of schools' normative and behavioral environments, we conducted our psychometric analysis of the five collaboration items at the school level. We began by aggregating the five teacher collaboration items to the school level, which resulted in a mean score for each school on each item. Next, we submitted these items to a principal axis factor analysis. Results indicated that all of the items loaded on a single factor with an eigenvalue of 4.25. This single factor explained 85% of the total variance in the items, and item loadings ranged from .79 to .95.

Table 2. Correlations Among Student-Level Variables (n = 2,536)

	Math achievement	Reading achievement	Prior math achievement	Prior reading achievement	Black	Free or reduced-price lunch	Female
Mathematics achievement	-						
Reading achievement	.73**	-					
Prior math achievement	.72*	.67**	-				
Prior reading achievement	.63**	.69**	.72**	-			
Black	-.31**	-.28**	-.29**	-.26**	-		
Free or reduced price lunch	-.31**	-.31**	-.33**	-.34**	.27**	-	
Female	.01	.08**	-.05**	-.07**	.00	.00	-

*$p < .05$. ** $p < .01$.

Internal consistency for the five items was also quite strong (alpha = .96). Based on the high reliability of scores on the scale and the strong single factor that was extracted, teacher collaboration for school improvement was operationalized as the factor score calculated for each school.

Table 3. Correlations Among School-Level Variables (n = 47)

	Teacher collaboration	Proportion Black	Proportion F/R lunch	Number of students
Teacher collaboration	-			
Proportion Black	-.19	-		
Proportion free or reduced-price lunch	-.23~	.52**	-	
Number of students	-.09	.06	.19	-

~$p < .10$. *$p < .05$. **$p < .01$. ** $p < .001$.

Correlations among the student-level variables are reported in Table 2. The results reveal a strong and significant negative association between being a student of color or receiving a subsidized lunch, and mathematics and reading achievement in fourth grade. Conversely, students' prior performance on the Metropolitan Achievement Test (in third grade) was significantly and positively related to their fourth-grade achievement in the same content areas. Table 3 reports correlations among the school-level variables. Among all the school contextual variables, the proportion of students receiving a subsidized lunch ($r = -.23$, $.05 < p < .10$) was the variable most strongly associated with the extent to which teachers reported influencing school improvement decisions. Notably, however, the magnitude of the relationship is not large, and the statistical significance is marginal.

Given that 14% of our student sample was missing prior achievement, we decided to conduct a missing data analysis to determine whether these prior achievement scores were missing randomly. Our analysis revealed that students who were missing prior achievement had significantly lower current achievement scores in both reading and mathematics, which may result from interdistrict mobility. To account for this, we created a student-level dummy variable called *missing prior achievement*, which we employed to adjust our multilevel models for the nonrandom nature of the missing data.

TEACHER COLLABORATION MODELS

We employed HLM to test our main hypothesis: that teacher collaboration for school improvement is related to differences among schools in students' mathematics and reading achievement. We began the multi-

Table 4. HLM Unconditional Model Characteristics: Variation Between Schools in Teacher Collaboration for School Improvement (n = 452 teachers in 47 schools)

	Teacher Collaboration
Intercept (school average)	.011
Between-school parameter variance	.279[a]
Within-school parameter variance	.711
HLM reliability estimate for intercepts	.772
Proportion of variance between schools	.282

[a]Chi-square = 207.11, *df* = 46, *p* <.001.

Table 5. HLM Unconditional Model Characteristics: Variation Between Schools in Students' Mathematics and Reading Achievement (n = 2,536 students in 47 schools)

	Mathematics	Reading
Intercept (school average)	.039	.019
Between-school parameter variance	.265[a]	.195[b]
Within-school parameter variance	.786	.846
HLM reliability estimate for intercepts	.943	.919
Proportion of variance between Schools	.261	.194

[a]Chi-square = 742.04, *df* = 46, *p* <.001.
[b]Chi-square = 509.31, *df* = 46, *p* <.001

level tests with two unconditional models to estimate the extent to which both teacher collaboration and student achievement varied among schools. The results of the unconditional models are shown in Tables 4 and 5. The chi-square tests of significance indicated that, as expected, the proportions of variance among schools in both teacher collaboration (28%) and student achievement (26% mathematics, 19% reading) was statistically nonzero. Hence, we continued our multilevel modeling.

At Level 1 in our multilevel models, we adjusted average levels of school achievement (i.e., the intercepts) for the effects of student demographics (race, gender, and SES) and prior achievement. The within-school findings show that student achievement was significantly and negatively associated with both minority status and disadvantaged socioeconomic status, whereas prior achievement had a significant positive effect. At Level 2, we entered measures of school SES, minority proportion, and size as statistical controls for school social context. In addition, we added our measure of teacher collaboration for school improvement.

Consistent with our main hypotheses, teacher collaboration was a statistically significant predictor of variability among schools in both mathematics and reading achievement. Specifically, a one-standard-deviation increase in the extent to which teachers collaborated on school improve-

ment was associated with a .08 *SD* increase in average school mathematics achievement and a .07 *SD* increase in average school reading achievement. Thus, even with school means adjusted for student characteristics and school social context controlled, teacher collaboration for school improvement was a significant positive predictor of differences among schools in student achievement (see Table 6).

Table 6. HLM Analysis of the Effect of Student and School Characteristics and Teacher Collaboration on Students' Achievement in Mathematics and Reading Assessment (n = 2,536 students in 47 schools)

	Mathematics	*p* value	Reading	*p* value
Intercept (average achievement)	.24***	.00	.23***	.00
	(.04)		(.04)	
Teacher collaboration	.08*	.02	.07*	.02
	(.03)		(.03)	
Proportion of students receiving free or reduced-price lunch	-.08	.13	-.09*	.01
	(.05)		(.03)	
Proportion minority	-.01	.88	.02	.58
	(.05)		(.03)	
School size	-.08*	.04	-.04	.11
	(.04)		(.02)	
Student receives free or reduced-price lunch	-.13**	.00	-.13*	.00
	(.03)		(.03)	
Female	.05*	.03	.08	.00
	(.02)		(.03)	
Black	-.21***	.00	-.23***	.00
	(.03)		(.03)	
Prior math achievement	.64***	.00		-
	(.03)		-	
Prior reading achievement	-	-	.60***	.00
			(.02)	
Missing prior achievement	-.32***	.00	-.29***	.00
	(.05)		(.07)	
HLM variance parameters				
Unconditional between school parameter variance	.26		.19	
Full model between-school parameter variance	.05[a]		.03[b]	
Proportion of between school variability explained by model	81%		84%	

[a]Chi-square = 276.445, *df* = 42, *p* < .001.[b]Chi-square = 132.13, *df* = 40, *p* <.001.

~*p* < .10. *p <.05. ** *p* <.01. *** *p* <.001.

DISCUSSION

When teachers collaborate, they share experiences and knowledge that can promote learning for instructional improvement. From the perspective of organizational theory, collaboration is a form of lateral coordination that can improve organizational performance by fostering "creativity and integration around specific problems" (Bolman & Deal, 2003, p. 55). Such learning can help teachers solve educational problems, which in turn has the potential to benefit students academically. "Of the many resources required by schools, the most vital are the contributions—of effort, commitment, and involvement—from teachers" (Rosenholtz, 1989b, p. 421). It is important to note that the results of this study indicate that teacher collaboration is associated with increased levels of student achievement. After controlling for the effects of student characteristics (race, gender, SES, and prior achievement) and school context, we found that teacher collaboration for school improvement was positively related to differences among schools in both mathematics and reading achievement. These results are important given that most prior research on teacher collaboration has considered results for the teachers involved, rather than student-level outcomes. This study thus offers original evidence of a positive and statistically significant relationship between teacher collaboration and student achievement.

Our results indicate that a one-standard-deviation increase in the extent to which teachers reported collaborating predicted just less than a .1 *SD* increase in differences among schools in student mathematics and reading achievement. Hence, although the main hypothesis of this study was confirmed, it is important to note that the relationship between teacher collaboration and differences among schools in student achievement was moderate. That it is not to say that most schools would not opt for such improvement; however, we believe that further research is needed. For example, one explanation for the magnitude of our findings may pertain to the restricted range of the schools in our sample. Indeed, our findings generalize to the elementary schools of one large urban district. This restriction in range quite likely restricts variability in the social context, collaborative practices, and achievement of the schools we studied. In other words, although our findings are promising, the generality of these results is somewhat limited. Thus, future investigators may wish to employ research designs that draw data from schools that are more broadly representative in terms of social context, urbanicity, and grade levels.

Although the findings are moderate, they are substantively important. In fact, the finding of a positive link between student achievement on

high-stakes assessments and teacher collaboration is timely and significant, particularly in light of the heavy emphasis that accountability policy places on such assessments. Moreover, this was a naturalistic study. We did not examine the effects of a specific program aimed at increasing collaboration for instructional improvement among teachers. Based on our results, however, we suggest that such systematic efforts to enable collaboration among teachers may be rewarded with improved student achievement. The design, costs, and effects of such programs are, however, questions for future researchers and school reformers. Based on the results of this study, we believe that if teachers in urban elementary schools have the potential to raise student achievement on high-stakes mathematics and reading assessments through collaboration, such efforts should be encouraged and supported. The extant literature already indicates that collaboration yields positive outcomes for teachers. Those findings, in conjunction with the important results of this study, further substantiate the need for teachers to be involved in collaborative efforts aimed at improving instruction for their students.

CONCLUSION

This study contributes important new knowledge to the existing research base regarding teacher collaboration. To our knowledge, this is the first study linking teacher collaboration for school improvement to student achievement on high-stakes assessments. Our findings suggest that teacher collaboration may improve schools' ability to foster student achievement.

From our perspective, the relationship between teacher collaboration for instructional improvement and student achievement is likely indirect. That is, the most important outcome of teacher collaboration may be that teachers learn how to improve their instructional practice. On the one hand, low levels of collaboration may indicate teachers' unwillingness to take personal risks, especially those teachers who have worked in isolation for many years. Collaboration, on the other hand, encourages teachers to move beyond reliance on their own memories and experiences with schooling and toward engagement with others around important questions of teaching and learning. The level of achievement envisioned for all students today is unprecedented, and scholars have argued that teacher learning is key to the success of this reform effort (e.g., Cohen & Hill, 2001). Although we did not study teacher learning directly, it is not unreasonable to speculate that the explanation for our results is that teacher collaboration fostered learning that improved instruction. At the very least, our results suggest that schools with greater

levels of teacher collaboration did indeed have significantly higher levels of student achievement. Thus, not only is collaboration good for teachers—quite possibility by fostering teacher learning—but it is also positively related to student achievement.

Appendix

Teacher Collaboration Scale

To what extent do teachers work collectively to influence these types of decisions?

Not at all					Not Very Much
1	2	3	4	5	6

Planning school improvement

Selecting instructional methods and activities

Evaluating curriculum and programs

Determining professional development needs and goals

Planning professional development activities

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The Raymond Central community is committed to providing a positive, challenging learning environment which prepares each individual student to be a responsible citizen in an ever- changing society.

In response to the current climate of racial disparity and injustice, the Raymond Central Board of Education and Superintendent are committed to ACTION and CHANGE. We realize that solutions reside in the hands of the people. As leaders we will:

- ***Work toward ensuring a safe and nurturing environment**
- ***Promote equity and equal opportunity for all**
- ***Call out racism and privilege**
- ***Increase knowledge on social justice**
- ***Support diversity and inclusiveness**
- ***Support culturally responsive training as needed**

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Class Size and School Performance: An Analysis of Elementary and Middle Schools

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Abstract: The class size debate is still ongoing among researchers, even though smaller class sizes are widely supported by parents, teachers, and the public. To contribute to this discussion, data was taken from the North Carolina (NC) School Report Cards (SRC) datasets and used to address two questions: First, is there a relationship between an elementary school's performance score and average class size? Second, is there a relationship between a middle school's performance score and average class size? Using the results from a linear regression and ordered logit, we find that average class size significantly predicts both NC elementary and middle school performance. However, the estimates suggest that higher average class size is negatively related to elementary school performance, but positively related to middle school performance. These results suggest that the impact of class size on student and school performance may depend on the grade levels in question, for example, elementary or middle school. We conclude that policymakers should act carefully when manipulating class sizes, since the effect may depend on the grade levels.

Keywords: Class size, Elementary school, Middle school, School performance, North Carolina

Introduction

The class size debate is still ongoing (Jepsen, 2015; Paola, Ponzo and Scoppa, 2013; Hanushek, 2003; Shen and Konstantopoulos, 2019; Shin and Chung, 2009; Goldstein and Blatchford, 1998). Reductions in class size are widely supported by parents, teachers, and the public (Chingos, 2013). Woods (2015) notes that "teachers unions from Oakland, California to Auckland, New Zealand are advocating for smaller class sizes. A call for smaller class sizes was second only to higher salaries for the LA teachers union at recent protests." Woods (2015) continues by stressing that we need good data and strong analytic methods to find out the level and extent of the effect of class size on student achievement.

There are many factors associated with student learning at the K-12 levels. In their 1994 study, Wang, Haertel and Walberg find that 28 different variables are significantly related to student learning. According to Teodorovic (2011), several classroom-level factors have positive effects on student achievement. Teodorovic (2011) writes that "clear and structured classroom instruction, emphasis on complex (as opposed to basic) skills, whole-class instruction (rather than individual or group work), teacher feedback, orderly climate, moderately frequent reinforcement of student effort…" are all important for achievement (p. 215). Marzano (2003) underscores that there are several school, teacher, and student factors critical to student outcomes. School factors include a guaranteed and viable curriculum, challenging goals and effective feedback, parent and community involvement and safe and orderly environment (Marzano, 2003). Teacher related factors include effective instructional strategies and classroom management, while student related factors include prior achievement, motivation, and home environment (Marzano, 2003). Thus, there are a myriad of factors that affect achievement, making analyses of class size, specifically, especially challenging.

Class size can affect how students learn and even determine the amount of material covered during a class period. For example, a large class with a lot of noise may mean less time for the teacher to cover academic tasks slated for the day. The teacher may also be deterred from assigning group work, which is a best practice in education, because there are simply too many groups to manage. A small class, in contrast, may encourage more teacher pupil interactions, which has been shown to improve student outcomes (Blatchford, Bassett, and Brown,

2011; Leyva, Weiland, Barata, Yoshikawa, Snow, Treviño, and Rolla, 2015). As Paola, Ponzo and Scoppa (2013) emphasize, the effects of "educational inputs, such as class size, teaching quality, school resources, on student achievement have been deeply investigated in the economic literature. However, there is still an ongoing debate and no consensus has been reached about how these factors influence student performance" (p. 135).

Class Size in North Carolina Schools

In 2018, the NC Governor, Roy Cooper, requested greater funds to implement a state mandate for smaller class sizes (Governor Cooper, 2018). There is strong support for the small class measure, but as Mark Barrett (2018) reported, "some school officials in Western North Carolina and elsewhere say it may be difficult to find enough qualified teachers to meet the mandate and some school systems do not have enough classrooms." Nevertheless, class sizes in the stay have been decreasing.

Table 1 below shows that class size has been decreasing for Kindergarten through grades 3 from 2013- 2019. The average Kindergaten class had 21 students in 2013-2014 and decreasing to 18 students in 2018-2019. For Grade 3, the average class size decreased from 21 students in 2013-2014 to 17 students in 2018-2019.

Table 1. History of Student to Teacher Ratio in North Carolina, 2013 - 2019

Year	Kindergarten			1st Grade			2nd Grade			3rd Grade		
	Alott	Avg	Max	Alott	Avg	Max	Alott	Avg	Max	Alott	Avg	Max
13-14	19	21	24	18	21	24	18	21	24	18	21	24
14-15	18	21	24	17	21	24	17	21	24	17	21	24
15-16	18	21	24	17	21	24	17	21	24	17	21	24
16-17	18	21	24	16	21	24	17	21	24	17	21	24
17-18	18	20	23	16	20	23	17	20	23	17	20	23
18-19	18	18	21	16	16	19	17	17	20	17	17	20

Source: NC Senate committee approves revised version of HB13; Class-size changes pushed to 2018. https://abc11.com/1912645/

Table 1 above shows that student-teacher ratios have decreased in Kindergatten, from 19 to 18 students per teacher, and in Grade 3, from 18 to 17 students per teacher between the 2013 and 2019 school years. Accompanying these class size reductions, however, has been a tremendous rise in additional costs (see Table 2). Therefore, considering the strong public support for smaller class sizes, the additional costs need to implement reduction programs, and mixed empirical findings on the matter, more research is critical to continue the debate.

Table 2. Estimated Cost of Small Class Size Mandate in Selected Counties/School Systems

County /School System	Number of Needed Teachers	Amount needed to implement mandate/ other issues
Asheville City Schools	15 or 16 elementary school teachers	Additional classrooms
Chapel Hill-Carrboro City Schools		$3 million for teacher supplements for new hires
Charlotte-Mecklenburg Schools	353 new positions	$23 million
Durham County Schools		$100 million
New Hanover County Schools	48 new positions	$3.2 million and additional classrooms
Surry County Schools	17 new teachers	$1.7 million
Wake County Public Schools	460 new teachers	400 new classrooms; $320 million in capital, operating expenses

Source: Compiled using information from Nordstrom, K (2017). Class Size Chaos: Districts are scrambling to meet new requirements by initiating layoffs and eliminating enhancement teachers. North Carolina Justice Center. https://www.ncjustice.org/wp-content/uploads/2018/11/Ed-Policy-Perspectives-CLASS-SIZE-Kris.pdf

Purpose of the Study

Given the interest by parents, educators and policy makes and with the results from other studies being mixed at best, the purpose of this study are to answer the following research questions:

1. Is there a relationship between a school's performance score and average class size for NC elementary schools?
2. Is there a relationship between a school's performance score and average class size for NC middle schools?

Our data come from the North Carolina (NC) School Report Cards (SRC) datasets. Using the results from a linear regression and ordered logit, we find that average class size significantly predicts both NC elementary and middle school performance. However, the estimates suggest that higher average class size is negatively related to elementary school performance, but positively related to middle school performance.

Literature Review

Class Size

Numerous studies have examined the effects of small classes on student achievement. However, the findings "on the educational effects of class size differences [have] not been clear" (Filges, Sonne-Schmidt and Nielsen, 2018, p. 5). Indeed, the results have been "mixed at best" (Borland, Howsen, and Trawick, 2005, p. 73; Chingos, 2013). According to Chingos (2013), "the evidence on the efficacy of class size is clearly mixed, with one high-quality study finding quite large effects, another finding no effects, and a handful finding effects in between" (p.430). In their meta-analysis of class size research, Filges, Sonne-Scmidt and Nielson (2018) find that "there is some evidence to suggest that there is an effect of reducing class size on reading achievement, although the effect is very small. There is no significant effect on mathematics achievement, though the average is negative meaning a possible adverse impact on some students cannot be ruled out." (p. 6). Finn, Pannozzo and Achilles (2003) conduct a similar meta- analysis and conclude that the "results favored small classes in at least 38 of the 42 measures employed. While some individual changes were small, no measure in any study was statistically significant in favor of larger classes" (p. 334).

In a 2003 paper, Buckingham stresses that "several large scale studies and many smaller ones find a relationship between learning and class size. But a closer examination reveals crucial methodological problems and generalizations that make the findings far less than definitive, even meaningless" (p. 72). In contrast, Glass and Smith (1979), in their meta-analysis of research on class size and academic achievement, came to the conclusion that there is a clear and strong "relationship between class size and achievement…The relationship seems slightly stronger at the secondary grades than the elementary grades; but it does not differ appreciably across different school subjects, levels of pupil IQ, or several other obvious demographic features of classrooms" (p.15). In a large scale study of the California Class Size reduction program, Jepsen and Rivkin (2009) find that reduction in class size raised schools' average mathematics and reading achievement by roughly 0.10 and 0.06 standard deviations, respectively. However, the accompanying rise in the shares of new and not-fully certified teachers offset some of the benefits of class size reductions (Jepsen and Rivkin, 2009, p.224). Complicating the class size debate further, Chingos (2012) concludes that mandated class size reductions in the state of Florida had little, if any, effect on student achievement. In their study of class size during elementary school, Nye, Hedges and Konstantopoulos (2002) draw the following conclusions:

a. Small classes in early grades lead to higher academic achievement.
b. The advantages of smaller classes are larger for lower achieving students for reading, but larger for higher achieving students in mathematics.
c. While there is strong evidence that small classes can benefit all students, evidence for the differential benefit for lower achieving students is both weak and contradictory (p.215).

Baker, Farrie and Sciarra (2016) argue that there is ample research showing that elementary school "children in smaller classes achieve better outcomes, both academic and otherwise, and that class size reduction can be an effective strategy for closing racially or socioeconomically based achievement gap" (p.5). They also emphasize that reductions in class size may positively influence teacher recruitment and retention. Odden (1990) concludes that smaller classes enable opportunities for teachers to engage in research-backed instructional strategies that have been shown to promote higher student performance, like group work and class discussions (p.219). In a review of the relevant research from Australia and New Zealand, Zyngier (2014) concludes that the gains from small classes in early grades are larger when class size is reduced to fewer than 20 students. (p.16).

In a 2012 study, Shin finds that Black students benefit more than others ethnic groups from reduced class sizes regarding first-, second-, and third-grade academic achievement. Indeed, in an analysis of data from the National Education Longitudinal Study, Akerhielm (1995) finds that for 8th graders, students in smaller classes

performed better than students in larger classes. Loveless and Hess (2007) find that smaller class sizes offer teachers more time to address the individual needs of each student, and the smaller settings provide better structure, safety and discipline (p. 2). Finn, Gerber and Boyd-Zaharias (2005) found that students attending small classes over three years increased their likelihood of graduating from high school, especially among economically disadvantaged students.

In an experiment on class size and student outcomes, Mosteller (1995) finds that "minority groups gained more than others in the first two years of the experiment; and although the last two years showed benefits comparable with those of the majority, there was a falling off of benefits" (p.125). Folemer-Anneverlink, Doolard, Mascareno and Bosker (2010) conclude that more "student-teacher interactions occurred in smaller classes than in larger classes. This is true both for interactions related to instruction and classroom management in kindergarten and Grade 1" (p.36). Greater student teacher interactions may facilitate higher quality instructions, especially at the lower grades. Indeed, a 2015 Hanover Research Report notes that several studies find that "enrollment in smaller classes can lead to higher standardized test scores, an increased likelihood of taking college entrance exams, increased earnings, and higher college attendance rates, especially among certain subpopulations" (p.4). In his 1990 paper, Robinson (1990) concludes the following:

a. The most promising effects of small classes on pupil learning occur in grades K-3 (p.82).
b. There is some evidence that smaller classes can have greater positive effects on the achievement of disadvantaged and minority students (p.83).
c. There is more positive student attitudes and behaviors in smaller classes (p.86).

A National Council of Teachers of English Policy Statement (2014) advocates for smaller class size as a means of improving student learning. Nevertheless, they stress that "for many high school students smaller classes do not make a significant difference in academic performance. However, for minority and at-risk students as well as those who struggle with English literacy, smaller classes enhance academic performance." In the statement, educators are advised to note that benefits from reduced class sizes are not uniform across all grades and populations.

Method

Participants

Data are from the North Carolina (NC) School Report Cards (SRC) datasets (NCDPI, 2019). In NC, SRCs are available for each public school. Schools receive report cards with their performance score, in addition to other reporting material, like details on student and teacher characteristics. SRCs are sources of information for government administrators and researchers. The data used for these reports are available at the public school system's website.

The NC General Assembly dictates that student outcome information be used to calculate and ascribe grades to public schools in the state. Two components are used to calculate grades: 1) school achievement scores, which form 80 percent of the grade and 2) school academic growth amongst students, which comprise the final 20 percent. Performance scores fall along a 100-point scale, which then determines letter grades. These letter grades follow a standard 15-point grading scale: A: 85-100 B: 70-84 C: 55-69 D: 40-54 F: Less than 40 (NCDPI, 2019).

We have two separate analysis samples. One sample contains data for NC elementary schools, and the other sample contains data for NC middle schools. The analysis samples contain two years of data, namely for 2018 and 2017. The elementary school dataset includes 2,452 observations for 1,226 elementary schools. Therefore, the set contains two records for each school. Since there are 1,329 elementary schools in NC, our dataset contains over 92 percent of all public elementary schools in the state. The 103 excluded schools were dropped from the final sample because they had missing information for key variables. The middle school dataset has 850 observations for 425 middle schools. Hence, the dataset has two records for each school. There are 465 public middle schools in the state, so the dataset comprises over 91 percent of all public middle schools in NC. Forty schools were excluded because they had missing information for key variables. We only use observations for 2018 and 2017 because a major part of the performance score formula, namely the accountability measures, changed for these years relative to the other years. Hence, performance score comparisons to the years prior to 2017 are problematic.

Measures and Variables

School Performance – Public schools in NC receive a score based on their performance, which varies from 100 to 0. A score corresponds to a letter (A to F) and is composed of two factors. The first (80%) is determined by a school's achievement scores, which come from accountability measures. These accountability metrics include grade level assessments, end-of-grade-tests that evaluate mathematics and reading, and English language assessments for English Learners. The second factor integrates the academic growth of a school's students. Academic growth is measured as the development children experience relative to the mean devolvement experienced by children across NC (for a subject and grade level). Hence, this evaluates the progress students have made since the previous academic year, as a result of the academic instruction they received.

Average Class Size – The average class size at a school, across all subjects and grade levels.

Other Covariates

Years of Teaching Experience – This variable is measured as a set of three mutually exclusive and exhaustive variables.

- *0 to 3 Years of Teaching Experience* - The share of teachers at a school with 0 to 3 years of experience.
- *4 to 10 Years of Teaching Experience* - This share of teachers at a school with 4 to 10 years of experience.
- *Over 10 Years of Teaching Experience* - This share of teachers at a school with over 10 years of experience.

Teachers with Advanced Degrees - The share of teachers with education or licensing levels above bachelor degrees.

Teachers with Full Licenses - The share of teachers who are fully licensed, meaning they meet all examination and certification requirements.

Teacher Turnover - The share of teachers that worked for a school the previous year, but are no longer employed there.

Student Attendance - The average daily share of students that attend school, across grade levels.

Economically Disadvantaged Students - The share of children at a school that are considered economically disadvantaged.

Year 2018 – Dummy variable equal to 1 if the year is 2018 and 0 if the year is 2017.

Results

The analysis and results are as follows - First, the frequencies of performance grades received by NC middle and elementary schools are presented in tables. Second, descriptive statistics and data visuals, followed by our study's hypotheses, are provided. Third, we test our hypotheses with the results from a linear regression and ordered logit.

Middle and Elementary School Performance in North Carolina

Table 3 shows the frequency of middle school performance grades in 2018 and 2017. In 2018, roughly 3 percent of schools earned As, and in 2017, that percentage was roughly 3.5. The percentage of schools that earned Bs in 2018 dropped compared to the previous year. Sixteen percent earned Bs in 2018, while around 20 percent received Bs in 2017. A marginally higher percentage earned Cs in 2018, close to 48 percent, compared to the 43 percent it was in 2017. About 26 percent of middle schools earned Ds in 2018, which is down from 2017. In 2018, 7 percent of schools earned Fs. In 2017, however, the percentage was around 5.7.

Table 3. Frequency of Middle School Performance Grades

	2018		2017	
Letter Grade	Percent	Frequency	Percent	Frequency
A	3.06	13	3.53	15
B	16.00	68	19.76	84
C	47.76	203	43.53	185
D	26.12	111	27.53	117
F	7.06	30	5.65	24

Table 4 displays the frequency of grades received by elementary schools in 2018 and 2017. In 2018, over 3 percent of schools earned As, and in 2017, that percentage was around 4. The percentage of schools that earned Bs in 2018 is approximately the same as it was in 2017, around 28 percent. The same goes for the share of schools that earned Cs. In 2018 and 2017, around 45 percent of schools earned Cs. About 19.6 percent of middle schools earned Ds in 2018, which is up from 2017 (18.4%). In 2018, around 3.2 percent of schools earned Fs. In 2017, however, the percentage was 4.

Table 4. Frequency of Elementary School Performance Grades

	2018		2017	
Letter Grade	Percent	Frequency	Percent	Frequency
A	3.18	39	4.08	50
B	28.71	352	28.38	348
C	45.35	556	45.11	553
D	19.58	240	18.43	226
F	3.18	39	4.00	49

Table 5 displays descriptive statistics for the dependent variable for both middle and elementary schools, in 2018 and 2017. Middle schools performed roughly the same in both years, having average performance scores of approximately 59. Elementary schools performed roughly the same in both years, too, having average performance scores of approximately 63.

Table 5. Middle and Elementary School Performance Scores: Descriptive Statistics

Variables	Mean (SD)	
	2018	2017
Middle School Performance Score	59.46 (12.76)	59.85 (12.79)
Elementary School Performance Score	63.50 (12.10)	63.41 (12.54)

Class Sizes in North Carolina Middle and Elementary Schools

Table 6 shows the descriptive statistics for the average class size variable, for both middle and elementary schools in 2018 and 2017. In 2018, the average middle school class contained around 23 students, and the average elementary school class contained around 19.1 students. In 2017, the average middle school class contained around 23.4 students, and the average elementary school class contained around 19.7 students.

Table 6. Average Class Size and School Performance Score

Variable	Mean (SD)	
	2018	2017
Middle School Average Class Size	22.97 (3.73)	23.40 (3.44)
Elementary School Average Class Size	19.11 (2.26)	19.68 (2.22)

Class Size Hypotheses

Before we present statistics related to the analysis on class size and performance, we formally state the two hypotheses, corresponding to our two research questions.

Hypothesis 1:

$H_{1,N}$: There is not a relationship between average class size and school performance in NC public middle schools.

$H_{1,A}$: There is a relationship between average class size and school performance in NC public middle schools.

Hypothesis 2:

$H_{2,N}$: There is not a relationship between average class size and school performance in NC public elementary schools.

$H_{2,A}$: There is a relationship between average class size and school performance in NC public elementary schools.

Scatterplots and Correlations

Figure 1 presents a 2x2 panel of scatterplots, showing the average class sizes in middle and elementary school plotted against performance scores, in 2018 and 2017 respectively. The first row contains the results for middle schools, and the second row contains the results for elementary schools. The first column contains 2018 data, while the second contains data from 2017. All four plots show an increasing relationship between average class size and school performance. However, the relationship is much stronger for middle schools, compared to elementary schools.

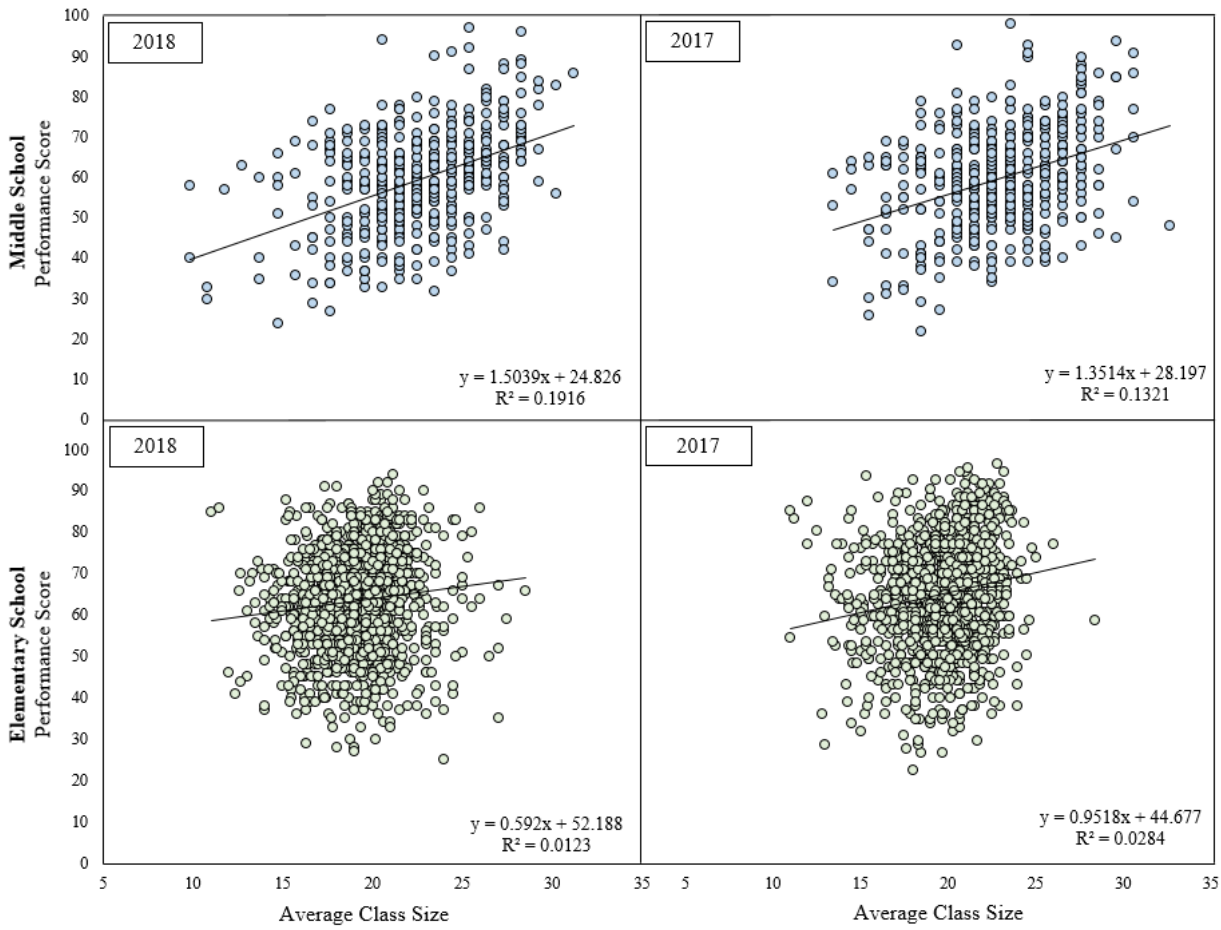

Figure 1. Average Class Size and School Performance Score

Figure 2 presents a 2x2 panel of histograms, showing the average class sizes in middle and elementary school conditional on earned performance grades, in 2018 and 2017 respectively. The first row contains the results for

middle schools, and the second row contains the results for elementary schools. The first column contains 2018 data, and the second contains 2017 data. For NC middle schools, surprisingly, better performing schools average larger class sizes, while lower performing schools average smaller class sizes. For NC elementary schools, a clear pattern does not exist. In 2018, average class sizes are approximately the same, regardless of a school's performance grade. In 2017, however, it appears that better performing schools average slightly higher class sizes compared to lower performing schools.

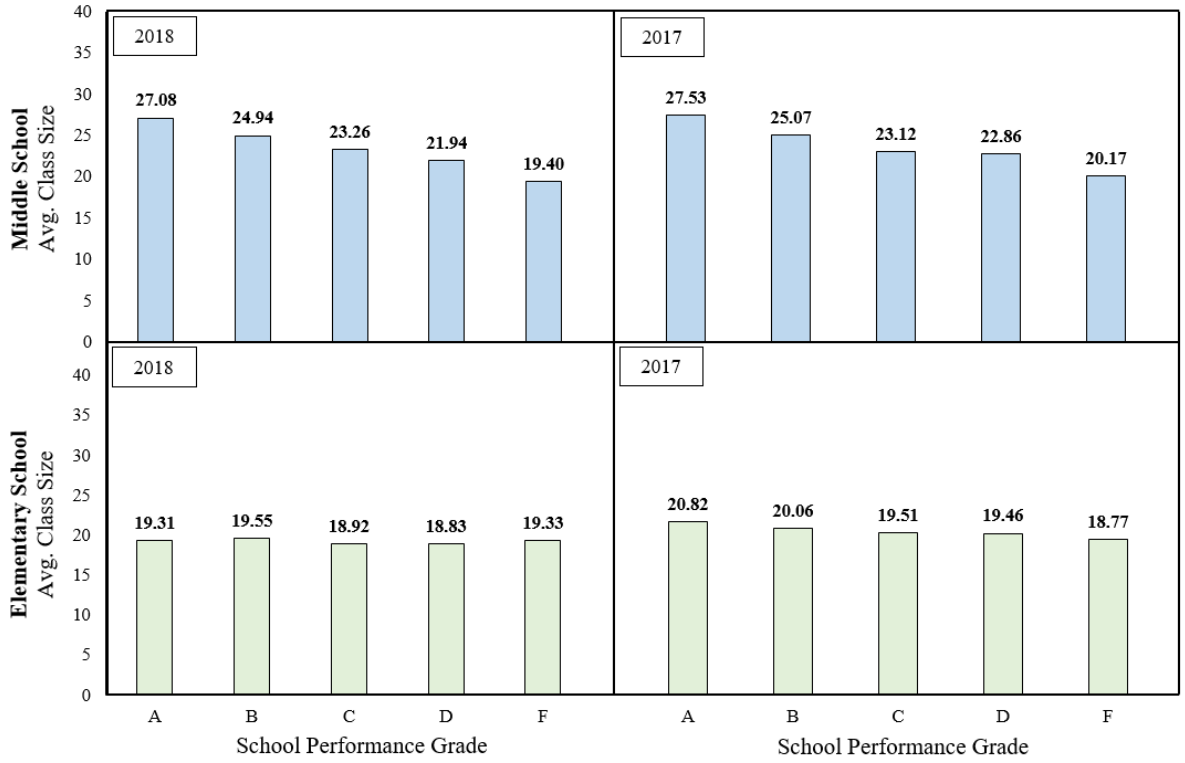

Figure 2. Average Class Size and School Performance Grade

Regression Analysis Plan and Results

To examine the relationship between school performance and class size, we estimate the following model separately for middle and elementary schools. Model (1):

$$SchoolScore_i = \beta_0 + \beta_1 ClassSize_i + \sum \mathbf{\beta X_i} + \varepsilon_i$$

Where [SchoolScore$_i$] is the performance score of the *i*th school. [ClassSize$_i$] is the average class size at the *i*th school. X is an array of other control variables for the *i*th school. These variables include year, share of teachers with 4 to 10 years of experience, share of teachers with over 10 years of experience (the share of teachers with 0 to 3 years of experience is omitted to avoid perfect multi-collinearity), share of teachers with advanced degrees, share of teachers with full licenses, rate of teacher turnover, share of economically disadvantaged students, unique book titles per student, and average daily student attendance. β_0 is the intercept term, $\mathcal{E}_i$ is the error term, and β_1 is the slope coefficient of interest, which corresponds to the primary independent variable of interest for this study.

Model 1 is estimated under two econometric frameworks. First, it is estimated as a multiple linear regression and second, it is estimated as an ordered logit. For the first, the dependent variable of Model 1, SchoolScore, is treated as a continuous variable ranging from 100 to 0. For the second, SchoolScore is treated as an ordinal variable corresponding to the letter grade a school receives, A, B, C, D, and F (A = 5, B = 4, C = 3, D = 2, and F = 1). The results of the ordered logit are used to obtain the marginal effect of the change in a covariate on the probability that a school receives a particular letter grade.

Table 7 presents the key results from the multiple linear regression estimation of Model 1, for middle and elementary schools. We offer interpretations of the key variable of interest. The class size variable is

significantly related to school performance, for both middle and elementary schools in NC. For middle schools, however, the coefficient estimate is positive and significant at the 10% level. While for elementary schools, the coefficient estimate is negative and significant at the 1% level. When the average middle school class size increases by 1 student, school performance score increases by 0.162 points, holding all else constant. When the average elementary school class size increases by 1 student, school performance score decreases by 0.392 points, holding all else constant.

Table 7. Linear Regression Results for Key Variable

Key Independent Variable	Middle Schools					Elementary Schools				
	B	SE B	β	t	p	B	SE B	β	t	p
Average Class Size	0.1621	0.0826	0.0455	1.96	0.0501	-0.3919	0.0806	-0.0719	-4.86	<0.0001
Middle School Model Notes. N = 850. F-Value = 178.60. R-Squared = 0.6804. Adjusted R-Squared = 0.6766.										
Elementary School Model Notes. N = 2,452. F-Value = 288.45. R-Squared = 0.5416. Adjusted R-Squared = 0.5398.										

Table 8 displays selected results from the ordered logit estimation of Model 1, for both middle and elementary schools. The table presents the untransformed logit coefficients. We interpret the results for the key variable. For middle schools, average class size is increasing with earned performance grade. The logit coefficient estimate is statistically significant at the 10% level. For elementary schools, average class size is decreasing with earned performance grade. The logit coefficient estimate is statistically significant at the 1% level. Hence, the ordered logit results support those from the linear regression, for both NC middle and elementary schools.

Table 8. Ordered Logit Regression Results for Key Variable: Logit Coefficients

Key Independent Variable	Middle Schools				Elementary Schools			
	B	SE B	z	p	B	SE B	z	p
Average Class Size	0.0448	0.0236	1.89	0.058	-0.0822	0.0196	-4.20	<0.001
Middle School Model Notes. N = 850. LR Chi-Squared = 797.67 ($p < 0.0001$), Pseudo R-Squared = 0.3592.								
Elementary School Model Notes. N = 2,452. LR Chi-Squared = 1,600.94 ($p < 0.0001$), Pseudo R-Squared = 0.2566.								

Table 9 displays key results from the ordered logit estimation of Model 1, for both middle and elementary schools. The table presents the estimated marginal effects (ME in the tables) associated with earning an A and earning an F (denoted with a subscript A or subscript F). We begin by interpreting the marginal effects associated with earning an A for the key variable. For middle schools, average class size is positively related to the probability that a school earns an A and the estimate is significant at the 10% level. When the average middle school class size increases by 1 student, the probability that a school earns an A increases by 0.00011, holding all other covariates constant at their means. For elementary schools, average class size is negatively related to the probability that a school earns an A and the estimate is significant at the 1% level. When the average elementary school class size increases by 1 student, the probability that a school earns an A decreases by 0.00062, holding all other covariates constant at their means.

We now interpret the marginal effects associated with earning an F for the key variable. For middle schools, average class size is negatively related to the probability that a school earns an F and the estimate is significant at the 10% level. When the average middle school class size increases by 1 student, the probability that a school earns an F decreases by 0.00037, holding all other covariates constant at their means. For elementary schools, average class size is positively related to the probability that a school earns an F and the estimate is significant at the 1% level. When the average elementary school class size increases by 1 student, the probability that a school earns an F increases by 0.00075, holding all other covariates constant at their means.

Table 9. Ordered Logit Regression Results for Key Variables: Marginal Effects

Key Independent Variable	ME_A	SE ME_A	z_A	p_A	ME_F	SE ME_F	z_F	P_F
Middle School Average Class Size	0.00011	0.00006	1.69	0.091	-0.00037	0.00021	-1.79	0.073
Elementary School Average Class Size	-0.00062	0.00017	-3.72	<0.001	0.00075	0.00020	3.78	<0.001
Middle School Model Notes. N = 850.								
Elementary School Model Notes. N = 2,452.								

To summarize the statistical results, the linear regression and ordered logit estimates complement one another.

- We reject $H_{1,N}$. Hence, we find evidence of a relationship between average class size and school performance in NC public middle schools. Average class sizes significantly predict school performance. Larger class sizes are positively related to middle school performance scores.
- We reject $H_{2,N}$. Hence, we find evidence of a relationship between average class size and school performance in NC public elementary schools. Average class sizes significantly predict school performance. Larger class sizes are negatively related to elementary school performance scores.

Discussion

This study based on the 2017 and 2018 data from the NC Schools Report Cards finds that in NC, average class size significantly predicts elementary school performance. As average class sizes increase, elementary school performance scores tend to fall. For middle schools, as average class sizes rise, school performance scores tend to increase. Our elementary school findings mesh well with the many other studies that find that students benefit from smaller classes, especially at the K-3 level (Baker, Farrie and Sciarra, 2016; Bascia, 2010; Zyngier, 2014). Indeed, according to Ehrenberg, Brewer, Gamoron, and Willms (2001), instruction in smaller classes could be more effective since "certain practices may work better in smaller classes. For example, students may pay better attention when there are fewer students in the room" (p.21). Robinson (1990) and Shin (2012) conclude that smaller classes may be very beneficial to minority and disadvantaged students. Mckeachie (1980) concluded that for the "Goals of higher level thinking, application, motivation, and attitudinal change are most likely to be achieved in small classes" (p.26).

Annie Duncan (2011), the Secretary of Education for the Obama Administration, declared that education is the civil rights issue of our generation. He indicated that "if you care about promoting opportunity and reducing inequality, the classroom is the place to start. Great teaching is about so much more than education; it is a daily fight for social justice." Smaller classrooms in elementary school may be one way of improving achievement for lower performing students. Moreover, since many states have adopted policies aimed at reducing class sizes, especially at the K-3 level, our findings suggest that they could be beneficial in NC elementary schools and should continue.

Our finding regarding NC middle schools are a bit more controversial. We find that larger class sizes are positively related to middle school performance. This result does not mesh as well with the literature, like our elementary school findings do. Considering the surprising nature of these results, we feel it unwise to conclude that they offer evidence in favor of larger classes in NC middle school. More research is needed, along with more data, to ensure this finding is not simply a spurious correlation.

Conclusion

Class size reduction is one way to improve student achievement in NC, at least at the elementary school level. This study has shown that at the elementary school level, reduced class size significantly predicts school performance. The costs of implementing class size reduction are often high for many counties and school systems. States should continue the policy of reducing elementary class sizes. Researchers should also continue the investigation into whether class sizes have differential effects depending on the school level in which they occur.

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Student Teacher Stipends

Omaha Public Schools- $9000 Per Semester

Hastings- $3000 Per Semester

Fairbury- $9000 Per Semester

I like Their Wording

Fairbury Public Schools would like to incentivize student teachers to select Fairbury Public Schools for their student teaching experience. We believe we have the best staff to guide, mentor and help develop future educators. We hope that our $9,000.00 student teaching stipend will assist you with your living expenses while you complete your student teaching. In addition, we hope your experience will lead you to make Fairbury your first opportunity for employment as an educator.

The parameters for the upcoming 2024-25 School Year as follows:
• We will award up to 3 Stipends. One (1) for the fall semester and two (2) for the spring semester. If there is not a placement in the fall, then that stipend will be available for the spring semester as well.
• If we have three (3) or fewer student teacher placements, all will receive the stipend, regardless of subject area.
• If we have more than one (1) student teacher in the fall or two (2) in the spring, the stipends will be awarded based on our priority of subject areas below:
• Special Education
• Science
• Early Childhood

Our proximity to Lincoln also provides a unique opportunity to enjoy, both rural life and urban experiences. Our rural community of approximately 4,000 residents and bustling businesses provide great community partners for our district. We look forward to assisting you in your journey to become a Nebraska Educator

Norfolk- $4000 Per Semester

Bellevue- $4000 Per Semester

Fremont- $4500 Per Semester

Brady- $150 Per Day plus they will reimburse for student teaching tuition if they accept a job.

This has been a topic of discussion at the majority of my superintendent meetings.

6. Adjournment