

A Study of the Relationship Between Building Conditions, Selected Teacher Qualifications, and Student Attendance in High and Low Performing Elementary Schools

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ABSTRACT

The No Child Left Behind legislation has served to make educators throughout the country more aware of the need to increase student academic performance on an annual basis. As part of the effort to report on satisfactory performance, the Virginia Department of Education evaluates school organizations based upon the annual student percent pass rate on the Standards of Learning assessment. This evaluation may result in schools being categorized as either low or high performing. The major difference between the two categories is obviously student academic performance, but there may be other differences in the school organizations that would also account for the categorization of schools. This leads to the possibility of other variables that may play a part in the difference between low and high performing schools. Five possible variables that may have such an influence would be the condition of the school building, teacher quality, school enrollment, student attendance and participation in the free and reduced-priced lunch program. These were the five variables that were investigated in this study which sought to ascertain if there is a significant difference in the teacher quality measure when the school is rated

as either high or low performing. If a significant difference exists, the data may indicate that the quality of the teacher influences the rating of the school.

Likewise, data regarding the condition of the building, school enrollment and student attendance rates and participation in the free and reduced-price lunch program may indicate an influence that these variables may have upon the rating of the school performance. All of this could be of importance to local school authorities in making decisions relative to improving student learning.

This study found there to be no significant difference between the building conditions, teacher quality, and school enrollment in the high and low performing schools; however, a significant difference did exist between the student attendance rates and in the population of students participating in the free and reduced-price lunch program in the high and low performing schools.

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Dedication

I dedicate my doctoral dissertation to my parents who instilled in me at a very young age the value of lifelong learning. I want to especially thank my mother for her prophecy when I was at the age of four that I would become a doctor some day.

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CHAPTER I: THE PROBLEM

Introduction

Considerable research has been conducted in the last 16 years dealing with the relationship between school building conditions and student achievement. This body of research reported that the physical environment influences the learning setting and how students and teachers feel about the space in which a major portion of instructional time is spent. This research confirmed that in public schools there are good and poor classroom physical environments and that student achievement is influenced by the condition of the building. For teachers, the highly stressful work regimen of working with children would mandate that the physical environment of the classroom support and assist them in helping students learn (Earthman & Lemasters, 2009).

Cash (1993), Hines (1996), Earthman, Cash, & Van Berkum, (1996), Lanham (1999), Crook (2006), and Bullock (2007) are recent studies that focused exclusively on the relationship that exists between building conditions and student achievement. These researchers investigated the possible relationship between student achievement and condition of the school building. Crook used a larger population than previous researchers to investigate the relationship between student performance and building conditions. Bullock replicated the Cash study in middle schools.

The range of differences of scores between students in standard and substandard buildings in the studies cited above was quite pronounced. The significant differences between the scores of students in substandard buildings and those students in standard buildings were found to range from two to 17 percentile points. These differences may be attributed to many reasons one of which is the fact that it is difficult

to study the relationship between school building quality and student achievement. Other possibilities might be in the methodology used in the study and the instrument utilized to assess the building condition.

John Bailey's (personal communication, February 18, 2009) and Lemasters' (1997) research synthesis were further evidence of the association between building condition and student achievement. Lemasters synthesized the results of 57 different studies for the period of time from 1982 to 1997. Lemasters' concluded that the condition of the school buildings is in fact associated with student achievement. Bailey's synthesis included an analysis of 54 of 130 studies conducted from 1998 through 2008 to determine their relevance to the subject of the relationship between student achievement, behavior, attitudes and attendance with school building condition. Bailey concluded the following: (1) in those studies that used a building assessment instrument based upon research findings, the building does have a significant influence upon the health and productivity of students and teachers, (2) in those studies that used a school building assessment instrument based upon the maintenance needs, the researchers could not always find significant differences in student measures of health and productivity, (3) in those studies that used student mean scaled scores of standardized achievement tests rather than the percent of student passing an assessment measure, significant differences in student scores were found indicating the building did have an influence upon students and (4) in those studies where student attitudes was the dependent variable, the researchers could not find a significant line of influence between school building condition and student attitudes.

Researchers continue to examine and expand the boundaries of the theoretical model used to explain human phenomena related to how the physical environment can influence humans. The model developed by Cash (1993) describes the condition of buildings and suggest that student behavior is also related to building condition. In addition, the influence of the building condition on student attitudes is included in the theoretical model.

Sometimes these differences were very significant such as in the Hines (1996) study, who found differences in student scores to be as high as 17 percentile points. But in other studies, the differences were smaller, but just as important considering the array of variances that influenced student learning. When researchers attempt to assess the factors they believe influence student achievement, they may run into difficulties controlling for the other factors and understanding how they relate to one another.

Some studies have not found any differences in scores of students in satisfactory and unsatisfactory buildings. The Picus, Marion, Calvo, & Glenn, (2005) study, for instance, conducted in the Wyoming public schools concluded that there is essentially no relationship between the quality of school facilities and student performance when other factors known to impact student performance are accounted for. These researchers, however, failed to control several variables, one of which was the SES of the students on the high school level.

The studies cited above such as Cash (1993), Earthman, Cash and Van Berkum (1996), Hines, (1996); Lanham, (1999), Crook, (2006) and Bullock, (2007) found significant differences in the scores of students in satisfactory and unsatisfactory school

buildings that range from two percentile points to 10 percentile points. These differences represented what was found for one year only. It has not yet been possible to measure the influence unsatisfactory school buildings have upon students year after year, but it could well be cumulative during the life of the student in school. Nevertheless, such differences in the scores are very important and statistically significant (Earthman & Lemasters, 2007).

All of these studies were well-crafted and based upon a theoretical model that explained relationships between school leadership, building condition, student attitudes, and student achievement. The relationship these studies investigated was between the condition of the school building and student academic achievement.

All of the researchers who completed these studies tried to control confounding variables by assuming a uniformity of application such as the school curriculum, teaching methodology, teacher qualifications, and attendance rates. Cash (1993), Earthman, Cash and Van Berkum (1996) and Hines (1996) assumed that because the state licensed teachers based upon a state prescribed teacher training program that all teachers were of equal quality and that years of experience did not necessarily increase the quality of a teacher. The same applied to the curriculum where the state mandates certain subjects be taught and students are then tested on these courses. The same could be said for teaching methodology, because the state prescribed course of study for teachers is normally the same in all institutions of higher education preparing teachers.

Because of the use of these assumptions regarding certain variables, there has been some criticism of the existing body of research relating to the lack of control over

teacher quality, curriculum, teaching methodology, attendance rates and even socio-economic status of students. Although the criticism may be justified on certain grounds, the assumptions regarding uniformity of variables in this research are sound methodology. Moreover, when data regarding certain variables are either unavailable or non-existent, assumptions have to be made in order to conduct a research study. Because of this concern for the integrity of previous research, it would seem prudent to investigate the influence these variables have on research studies.

Statement of the Problem

Because of this criticism it would seem that investigation of the importance of at least one variable on the results of the research would be prudent. There seems to be a question as to the amount of differences in the qualities of teachers found in standard and substandard buildings. In this study the researcher sought to ascertain if a relationship exists between teacher quality standards, building conditions, school enrollment, student attendance rates and participation in the free and reduced-price lunch program.

Research Questions

The main research question for this study was: Is there a significant difference between school building conditions, teacher quality standards, and student attendance in high and low performing elementary schools in Virginia? The sub-research questions for this study were:

1. Is there a significant difference between the school building conditions of elementary school buildings rated as high and low performing schools by the Virginia Department of Education (VADOE)?

2. Is there a significant difference between teacher quality standards in high and low performing elementary schools?
3. Is there a significant difference between student attendance rates in high and low performing elementary school buildings?
4. Is there a significant difference between school enrollments in high and low performing elementary school buildings?
5. Is there a significant difference between the student participation rate in the free and reduced-price lunch program in high and low performing elementary school buildings?

Significance of the Study

This study sought to ascertain if there was a significant difference in three variables when the school is rated as either high or low performing. These variables are school building condition, teacher quality, and student attendance. If no significant exists, the data may indicate that previous researchers who assumed there was no significant in these variables between standard and substandard rated buildings were correct in this assumption. Likewise, data regarding the condition of the building and attendance rates may indicate an influence that this variable may have upon the rating of student performance. All of this could be of importance to local school authorities in making decisions relative to improving student learning.

There were three important reasons to research further the possible relationship between teacher qualifications, building conditions and school attendance rates in high and low performing schools. The first reason was that the findings of this study may

further determine the level of influence that teacher qualifications, building conditions and school attendance rates have in schools rated high or low performing.

The second reason was that it may determine the level of influence the building conditions may have upon student performance in buildings rated by the Virginia Department of Education as high or low performing schools. The third reason was that it may provide important research based results which may influence policy for the improvement of student achievement, teacher selection, building construction and renovation.

Conceptual Model

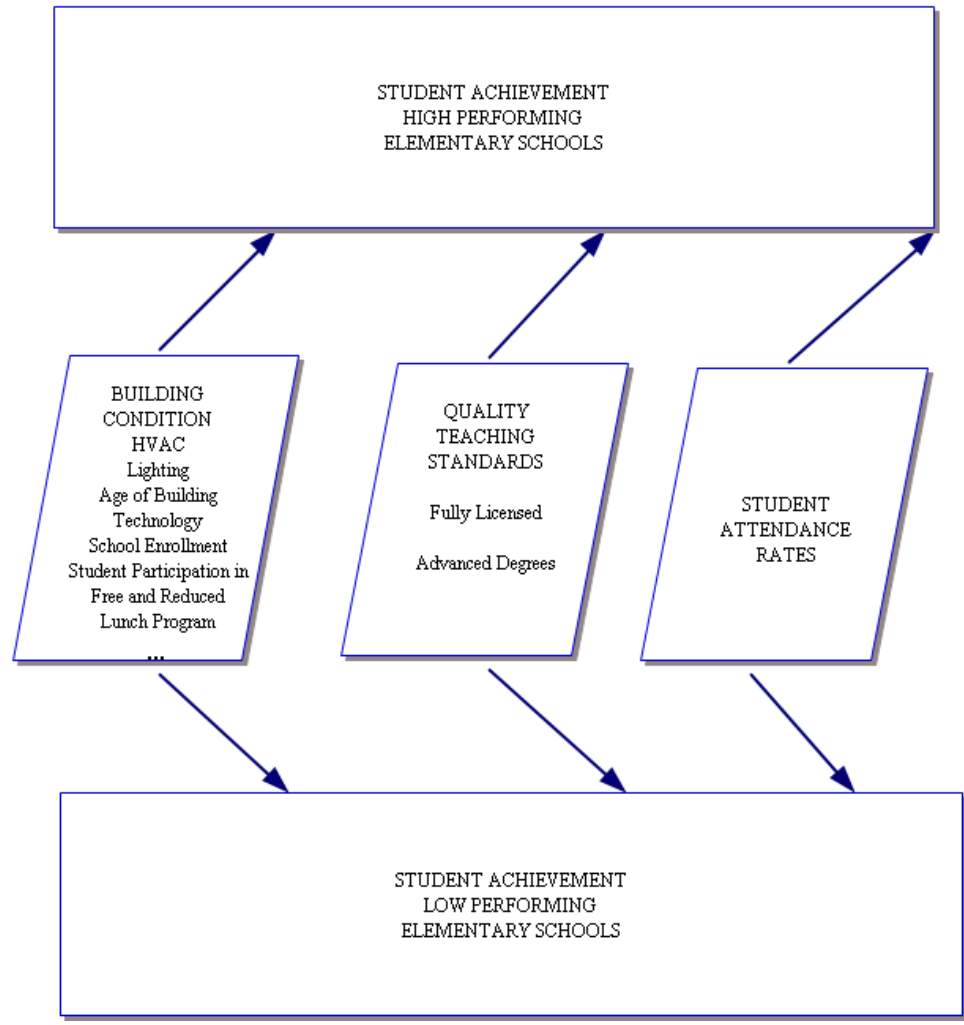
The idea that the physical environment of schools influences student learning resonates with policymakers, parents, and the general public (Crampton, Thompson, & Vesely, 2004). Researchers continue to examine and expand the boundaries of the theoretical model used to explain human phenomena related to how the physical environment can influence humans. The model developed by Cash (1993) explains how buildings are in the condition they are in and suggest that student behavior is also related to building condition. Several national and state studies have shown that relationships exist between building condition and student achievement.

The conceptual model for this study, shown in Figure 1.1 below, incorporates the study of the relationship between the building conditions, school enrollment, student attendance and participation in the free and reduced-price lunch program rate, and teacher quality standards of high performing and low performing elementary schools. The scope of this study transcends existing research in that it will focus on the

relationship between building conditions, teacher quality standards, school enrollment and student attendance and participation in the free and reduced-price lunch program rate in high and low performing elementary schools in Virginia. The relationship symbols of the arrows in the middle of the conceptual model reflect the essential characteristics that both high and low performing schools have in common. In this conceptual model the building condition, teacher quality standards, school enrollment, student attendance and participation in free and reduced-price lunch program rates may influence the performance of students and in turn influence whether the school is rated as either high and low performing.

Figure 1.1

CONCEPTUAL MODEL



Definitions

Low Performing/Struggling School

A Low Performing School is defined for the purposes of this study as a school that is rated: (1) accreditation denied, (2) accredited with warning in one or more content areas or (3) a school that is conditionally accredited. The data used was derived from the VADOE School Accreditations Ratings (Virginia Department of Education, 2009a).

High Performing School

A High Performing School is defined for the purposes of this study as an elementary school where the student achievement on the SOL test in English and mathematics rank in the top 10% of all fully accredited schools. The data used were derived from the VADOE School Accreditations Ratings (Virginia Department of Education, 2009a).

Building Conditions

Building conditions for the purposes of this study are rated as standard (good) and substandard (poor). A standard building condition rating was given to a school building with a total score ranging from 49-73 on the Assessment of Building and Classroom Conditions in Elementary Schools (ABCCES). A substandard building condition rating was given to school buildings with a total score ranging from 48-23 on the ABCCES.

Teacher Quality

In this study the quality of the teaching staff within a school is the means of the number of teachers possessing an advanced degree and the percent of teachers in a school that are fully certified. The means of these two factors is used to designate the level of teacher quality in every school building included in the study.

Attendance

For the purposes of this study attendance is used as an academic indicator of student achievement. The objective standard for attendance during the 2009-10 school year is 94 percent (Virginia Department of Education, 2009b).

Assessment of Building and Classroom Conditions in Elementary Schools (ABCCES)

The ABCCES is the survey instrument used by building administrators to determine the overall condition of their building and classrooms.

Limitations

The first limitation of this study is in the self-administration of the Assessment of Building and Classroom Conditions in Elementary Schools (ABCCES) by the principals in the schools. The survey instrument was self administered by the principals who may have lent themselves to bias in their responses.

The second limitation is in achieving the desired response rate from the administrators using an electronic format. Achieving an adequate sample size insures the validity and reliability of the results.

The third limitation of this study is the inaccessibility of mean scaled scores of the Virginia Standards of Learning (SOL) Assessment results. The assessment scores available from the Virginia Department of Education were percent passing scores.

The final limitation is the time of year the survey was conducted. The survey and invitation letters were sent in August to all of the randomly selected high and low performing school principals. August, as the researcher discovered, was that time of the 12 month school calendar when a lot of the changes in the school principals took place. These unexpected changes in the school principals resulted in a reduced number of responses from the study population.

Organization of the Study

The focus of this study was the relationship between building condition, teacher qualifications and student attendance and how they influenced student achievement in a selected number of Virginia elementary schools.

Chapter 1 includes an introduction, statement of the problem, research questions, significance, conceptual model, definitions, limitations and organization of the study.

Chapter 2 includes a review of the literature related to the conditions of school buildings, teacher quality standards and their relationship to student achievement. The building conditions included both structural and cosmetic conditions. Teacher quality

standards included years of teaching experience, verbal aptitude, certifications, content knowledge and teacher preparation program completed.

Chapter 3 includes the methodology of the study, background and development of the Assessment of Building and Classroom Conditions in Elementary Schools (ABCCES), teacher quality standards and structural/academic performance rating assessment instruments. Additionally how the data were collected, analyzed and results determined.

Chapter 4 includes the results of the study along with an explanation of the data collection and data analysis.

Chapter 5 includes the summary of findings, discussion, conclusion, and implications for further research.

CHAPTER 2: REVIEW OF THE LITERATURE

Introduction

Chapter two gives a review of the research literature that is focused on the relationship between student achievement, building conditions and teacher quality. Many studies have been conducted over the past 25 years that addressed separately the relationship between building conditions, teacher quality and student achievement.

In Virginia, Cash (1993), Hines (1996), Lanham (1999), Crook (2006) and Bullock, (2007) researched the relationship of building conditions and student achievement. Additionally, Lemasters (1997) researched and published a synthesis that looked at the research concerning the relationships that existed between student achievement and, building condition.

Darling-Hammond & Youngs (2002), Clotfelter, Ladd & Vigdor (2007), Boyd, Goldhaber Lankford & Wycoff (2007), Rice (2003b), Stronge (2002) and Ferguson (1998) conducted much of the recent research that focused on the relationship of teacher qualifications and student achievement. Rice (2003b) and Stronge (2002) conducted in-depth study reviews of the existing research that pertained to the relationship of quality teaching and student achievement. Because the studies of the relationships between building conditions and student achievement and teacher quality and student achievement were not researched together the literature review will be presented in the same manner.

Building Condition and Student Achievement

The initial research in Virginia relative to the relationship of building conditions to student achievement was conducted by (Cash, 1993). Cash investigated the relationship between the condition of a school building and student achievement and behavior. The study found a significant difference between the scores of students in standard and substandard buildings. Significant differences of four percentile points were found in reading comprehension, math applications and the composite score between students in poorly rated buildings and those students in buildings rated as being in good condition. Differences of five percentile points were found in Science and the Total Composite Score. Other differences ranged around 2-3 percentile points in other sub-tests. Results compared favorably to previous research on the same subject.

Earthman, Cash, & Van Berkum (1996) replicated Cash's study in North Dakota. The study found differences in scores between students in poor buildings and students in buildings rated as being good as high as nine percentile points in spelling and seven percentile points in reading vocabulary and science. These differences reflected those found by Edwards, (1991) and Cash, (1993). The consistent differences found were in the sub-tests of reading, math applications, science and total composite scores.

Hines (1996) replicated the Cash, (1993) study using large urban high schools in Virginia. The study found that the differences in achievement scores exceeded the top number found by Edwards (1991), Cash (1993), and Earthman, et al. (1996). On some sub-tests, he found the differences to be as high as 17 percentile points. This far exceeds the 9 percentile point difference found by previous researchers. Other differences that were high were 17 percentile points in math applications and 15

percentile points in reading comprehension and 14 percentile points in total composite scores.

Lanham (1999) investigated the relationship between student achievement and the condition of the school building attended on the elementary level. Lanham developed and used a modified version of the CAPE, the Assessment of Building and Classroom Conditions in Elementary Schools (ABCCES). Lanham found that free and reduced price lunch participation was the first significant variable, followed by air-conditioning which was significant in three of the five analyses. This study found, also, other building factors to be significant, such as ceiling type, room structure, floor type, and site size. These study findings were consistent with the findings of previous researchers, even though Lanham used different statistical methods in this analysis.

Brannon (2000) investigated the relationship between the precursors of the building condition and the building condition itself. The first part of the theoretical model explains the possible relationship between the leadership and the financial ability of the school system in eventually determining the condition of the school buildings for which school leadership is responsible. Brannon found that the principals had a better knowledge of the condition of the school buildings than any of the other groups. This research demonstrated the use of the CAPE by principals in properly assessing the condition of the school buildings. The CAPE was used in previous research and was effective.

Crook (2006) investigated the relationship between student performance and building conditions. Crook used the entire population of 231 high school buildings in Virginia. Passing scores on SOL were used as a measure of student achievement to

compare student bodies in standard and substandard buildings. The research found that the correlations that were significant were in the sub-tests of Math Concepts and Math Application. Crook reasoned that although his findings were not as extensive as previous researchers, they did corroborate the findings of previous research studies.

Thornton (2006) investigated the relationship between the school building condition and minority and economically disadvantaged students. Thornton used the same population of high schools that was identified by Crook (2006) as buildings in standard and substandard condition. Thornton used the mean scaled score of students on the SOL in a building as his measure of comparison between the two groups of students. Thornton found that the building condition had minimal, five out of 10 subtests significantly different, influence on economically disadvantaged students. The findings did not coincide with standard belief that economic status of the family of the student influences learning. Thornton found; however, significant differences in student achievement scores on seven out of 10 subtest between minority students in substandard and standard buildings. Again, this is unusual because there is no research basis for indicating that racial background has anything to do with student learning. Although the study found significant differences in achievement test scores of students in standard and substandard buildings, which support previous research, Thornton's findings were unusual in that they did not correspond with common knowledge about demographic influences on student learning. Yet, Thornton's findings might well indicate that buildings in substandard condition have a greater influence on minority students than they do on the general population.

Bullock (2007) investigated the relationship between school building condition and student achievement as measured by their performance on the Standards of Learning (SOL) examinations at the middle school level in the Commonwealth of Virginia. This study found that building condition is related to student achievement. Students performed better in newer or recently renovated buildings than they did in older buildings. The percentage of students passing the Commonwealth of Virginia Standards of Learning Examination at the middle school level was higher in English, mathematics and science in standard buildings than it was for students in substandard buildings. One of the largest differences in percentage of students passing was in English at 6.10 percentage points. This difference was significant at the .05 level of significance. This is noteworthy because student's ability to read affects all other academic areas. Building age, windows in the instructional area, and overall building condition were positively related to student achievement. The data from this study were compared to the results of earlier studies that examined high schools in the Commonwealth of Virginia, demonstrating that these findings were consistent with the findings of other studies.

Teacher Quality and Student Achievement

The qualifications of a teacher and their relationship to student achievement are of importance now in public education. Rice (2003a) stated that "First, teacher quality matters. In fact, it is the most important school-related factor influencing student achievement. This is largely due to the fact that teacher compensation represents a

significant public investment. In 2002 alone, the United States invested \$192 billion in teacher pay and benefits” (Rice, 2003a). A number of other researchers have argued that teacher quality measures are a powerful predictor of student performance.

Although the existing research suggests agreement among the researchers of the indicators of a quality teacher there were many differences relative to defining, measuring and determining the level of influence each quality teacher indicator had on student achievement.

The existing research that focused on the relationship between teacher quality and student achievement identified five indicators of teacher quality: (a) a teacher’s verbal ability, (b) content knowledge, (c) teacher preparation, (d) certifications and (e) teaching experience. The review of the literature that pertains to the five quality teacher indicators will follow on an individual basis.

Teacher’s Verbal Ability

Rice (2003b) defined verbal ability as the result of an assessment that measures the impact of literacy levels or verbal abilities of a teacher. Stronge (2002) defined verbal ability as a teacher’s score on an aptitude test such as the SAT (Scholastic Assessment Test) or GRE (Graduate Record Exam). Darling-Hammond & Youngs (2002) defined verbal ability as a minimum score on tests of basic skills, general academic ability, or general knowledge or both. The assessment instrument and or method to determine the verbal ability of a teacher appears to differ amongst researchers; such as, Rice, Stronge and Darling-Hammond et al. Darling-Hammond et

al. (2002) does not specify the name of a specific assessment instrument and provided flexibility relative to what the instrument measures; such as, basic skills, general academic ability or general knowledge. A minimum score on either of these instruments appeared acceptable by Darling-Hammond et al. (2002). Rice (2003b) placed an emphasis on the use of any assessment tool that would measure the literacy or verbal abilities of a teacher. Rice did not specify a preferred or minimum performance level for a teacher to be viewed as a quality teacher. Stronge (2002), on the other hand, suggested the use of norm referenced aptitude tests such as the SAT or the GRE which tend to measure verbal, non-verbal and written skills. Stronge like Rice did not specify a preferred or minimum performance level for a teacher to be considered a quality teacher.

These studies suggest that some test scores seem to predict levels of teacher performance and desired educational outcomes. More specifically, tests that assess the impact of literacy levels or verbal abilities of teachers tend to show positive effects. Two analyses conducted by Ferguson (1998) provided evidence of a positive relationship between teacher performance on tests of verbal ability and teacher effectiveness, as measured by student achievement. Ferguson and Ladd (1998) estimated the effect of teachers' performance on the ACT on student reading and mathematics achievement gains from third to fourth grade and from eighth to ninth grade. The analysis controlled for a variety of student and teacher variables. At the school level, Ferguson and Ladd found a positive relationship between teacher test scores and student achievement gains for the younger sample in reading, but not mathematics. The district level analysis revealed a positive relationship between the average

teacher's ACT score in the district and average mathematics achievement gain in the district for both younger and older students.

In contrast, studies of the influence of the National Teacher Examination (NTE) and other state-mandated tests of basic skills and/or teacher abilities report mixed findings. Piper and O'Sullivan (1981) demonstrated that NTE scores are not highly correlated with supervisor ratings of teachers during the student-teaching period or during the first year of teaching. Andrews, Blackmon, and Mackey (1980) examined correlations among undergraduate grade point averages, student teacher performance, and NTE scores for 269 student teachers. Andrews et al. found a positive relationship between teacher performance on the NTE and student grade point averages. The study concluded that the "NTE is valid for what is taught in the classroom but not necessarily for predicting teacher performance, a conclusion in keeping with the NTE literature" (p. 359). Finally, all of the studies reviewed also reinforce the complexity of the education production process in that the effects of what teachers know and can do as indicated by test scores depend on factors like the student and teacher attributes. In particular, evidence suggests that teacher test scores matter most for educationally at-risk students.

Teacher's Content Knowledge

Content knowledge as reflected in Clotfelter, Ladd, & Vigdor (2007) findings indicated that teacher test scores relative to their content knowledge are predictive of student achievement and that teacher test scores in math are particularly important for student achievement in algebra and geometry. This finding was consistent with studies

by Monk et al. (1994) who found, using national survey data, that teacher preparation programs in math have positive influence on student test scores in math, but that preparation in other subjects does not translate into higher student achievement in those subjects. Rice (2003b) views content knowledge in terms of the level and type of courses taken by teachers which represent proxies for what teachers know and can do in the sense of that coursework. Darling-Hammond & Youngs (2002) concurred with the July 2002 report of the U.S. Secretary of Education which stated that verbal ability and content knowledge are the most important indicators of highly qualified teachers. Stronge (2002) stated that content knowledge is a teacher's knowledge of the content that is to be taught. Clearly, subject matter knowledge positively influences teaching performance; however, it is not sufficient in and of itself. Teacher training programs that emphasize content knowledge acquisition and neglect pedagogical coursework are less effective in preparing prospective teachers to teach students in programs that offer both content and pedagogical knowledge (Stronge, 2002). According to Boyd, Goldhaber, Lankford & Wyckoff. (2007) the No Child Left Behind legislation aims to change the landscape by requiring states to ensure that all teachers are "highly qualified." The legislation considers new teachers highly qualified if they receive state certification and demonstrate content knowledge of the material they teach, either by passing a subject-area examination or by having an undergraduate major in that subject, or both.

Studies of middle and high school teachers, primarily mathematics and science, reveal that coursework in both pedagogy and content areas have a positive impact on student achievement. With respect to grade level, the evidence indicates that, while

pedagogical coursework seems to contribute to teacher effectiveness at all grade levels, the importance of coursework in content areas are most apparent at the secondary level. Further, evidence suggests that the impact of content coursework on effectiveness of high school teachers may taper off after a certain amount of coursework is taken such as, after five courses for high school math teachers; however, the effect of pedagogical coursework persist and may even outweigh that associated with content coursework (Monk, 1994).

Ferguson and Womack (1993) assessed the extent to which education and subject-matter coursework predict the teaching performance of student teachers completing a university teacher education program. In this study, teaching performance was measured by 107 survey items that assessed 13 categories of teacher expertise. Ferguson et al. found that the proportion of variance in teacher performance explained by the amount of education coursework taken was 16.5%. In contrast, measures of content explained less than 4%. These results suggested that education coursework is a more powerful predictor of teaching effectiveness and student achievement than measures of content expertise as indicated by grade point average and NTE specialty scores (Ferguson & Womack, 1993).

Monk (1994), in a later study, drew on more refined measures of teacher coursework to examine the impact of various types of teacher preparation on student achievement in mathematics and science. Data for this study came from the Longitudinal Study of American Youth. This study found that the amount of content preparation that teachers have is positively associated with student achievement in high

school mathematics and science that this effect depends on the subject being taught, the characteristics of the students being taught and additional teacher attributes. Stronge (2002) stated that “Teachers with little or no coursework in education consistently have difficulties in the areas of classroom management, curriculum development, student motivation, and specific teaching strategies” (p. 5). A set of interpretive studies by Griffin, (1989) and Grossman & Richert, (1988) concluded that field experiences tend to be disconnected from the other components of teacher education programs. Despite this, studies suggest positive effects in terms of opportunity to learn the profession and reduced anxiety among new teachers (Rice, 2003b). No studies were found that focused on the correlation between the coursework taken in elementary education preparation programs and their influence on elementary student achievement.

Teacher’s Preparation Program

Adams and Krockover (1997) found teacher preparation programs as the source identified by teachers as their source for knowledge of student-centered instruction, general pedagogical knowledge including classroom routines and discipline, and pedagogical content knowledge including instructional strategies. Adams and Krockover also found teacher preparation programs to provide novice teachers with a framework by which to organize, understand, and reflect on their experiences in the classroom.

Clodfelter, Ladd & Vigor (2007) defined teacher preparation programs also referred to as knowledge of teaching as the knowledge of instructional methods,

learning theories, measurement and testing, and classroom management. Teacher preparation programs as defined by Stronge, (2002) include a series of courses focusing on child development, instructional and assessment techniques, and methods and materials related to specific content areas. Knowledge of teaching as referred to by Darling-Hammond & Youngs, (2002) is the experiences in teacher education courses or preparation experiences.

In the course of teacher education and student teaching, candidates are typically judged on their teaching skill, professional conduct, and the appropriateness of their interactions with children. Teacher preparation programs, the study of pedagogy, as referred to by Boyd, Goldhaber, Lankford, & Wyckoff (2007) includes knowledge of instructional methods, learning theories, measurement and testing, and classroom management. Such material can be offered in free-standing courses or, when it is specific to a particular subject area, woven into a subject-matter course.

Primarily qualitative in nature, the studies of teacher education programs reveal mixed evidence regarding the degree to which these programs contribute to teachers' knowledge. Several studies identify the specific components of teacher education programs that are most important such as subject-specific pedagogy and classroom management. These studies offer limited evidence regarding the contribution of teacher education programs to teacher competencies or more importantly, student achievement (Rice, 2003a). Pigge (1978), based upon questionnaire responses from 1,851 principals and 770 teachers across grade levels, found that teachers perceive that the competencies most necessary to do their work were those learned on the job. Clark, Smith, Newby, & Cook, (1985) used observational interview and survey data from

44 first year teachers and 27 student teachers from a number of different teacher education programs to study the impact of teacher education programs. Clark et al. found that the most frequently perceived origin of ideas for teaching practices were teachers' own ideas. The second most common sources of teaching innovations were student teacher experiences and content from teacher education courses. Taken together, the teacher education program accounted for about one-third of the practices used by the teachers.

As far as selectivity or prestige of the higher education institutions attended by teachers, the evidence suggests a modest positive effect on student performance at the elementary level, and a more significant positive effect at the high school level. Ehrenberg & Brewer, (1994) coded the selectivity of institutions attended by teachers using Barron's six-category rating system of the admissions selectivity of the school in that year. The study found that, holding other factors constant, the average selectivity of the undergraduate institutions attend by teachers has a positive effect on student gain scores.

At the elementary level the positive effect of teacher quality may be more pronounced for low-income students. Studies of extended teacher education programs suggest positive effects on the number of teachers entering the profession and teacher retention rates, but no clear effect on teacher performance, at least as indicated by principal evaluations. Andrew and Schwab (1995) compared graduates from four (144) and five (163) year teacher education programs at the same institution. Comparisons of the two groups revealed that more graduates of the five-year program entered and remained in the teaching profession than graduates of the four-year program. A

number of quasi-experimental studies have been conducted on the impact of a teacher's advanced degree on teacher effectiveness.

Advanced degrees have a history of showing no positive effect on student achievement, and sometimes even have negative effects for elementary student achievement. A recent wave of studies that take into consideration the subject area of the degree and teaching assignment have found a positive effect of subject-specific advanced degrees on student achievement (Rowan, Correnti, and Miller, 2002). Rowan, Correnti, and Miller (2002) used survey data from Prospects: The Congressionally Mandated Study of Educational Opportunity to study the effect of teachers on elementary student achievement in mathematics and reading. Rowan et al. used hierarchical growth models that controlled for a variety of home and social background factors to test the effect of teacher attributes on math and reading achievement for two cohorts of student: students in grades one through three and students in grades three through six. Rowan et al. found that students assigned to teachers holding a bachelor's or a master's degree in English performed no differently than those students assigned to teachers without the subject-specific degree. These studies are limited to high school mathematics and, to a lesser extent, science.

Teacher's Certification

Teacher certification as defined by Clotfelter, Ladd, & Vigdor, (2007) includes credentials such as a teacher's years of experience, type of license, and licensure test score. Rice (2003b) defined teacher certification as the traditional primary gatekeeper mechanism for the teaching profession. Rice stated that the specific requirements for

certification vary from state to state, but typically include the completion of an accredited and approved teacher education program, practice teaching, and a formal recommendation from an institution of higher education. Teacher certification as related to effective teaching is defined by Stronge, (2002) as relating to the educational background and to scores on some test of pedagogical, content knowledge, or both. Teacher certification was viewed by Darling-Hammond & Berry, (2006) as a combined set of qualifications such as general academic and verbal ability, subject matter knowledge and teacher education that are measured as part of a teacher certification program. Teacher certification as viewed by Boyd, Goldhaber, Lankford & Wyckoff. (2007) always involved examinations, often in both general knowledge and teaching skills, and it nearly always involved coursework and practice teaching. Ideally certification keeps poor teachers out of the classroom, while giving people with the potential to be good teachers the authorization to enter the classroom. But certification may also have an unintended consequence.

Existing empirical studies have demonstrated a positive effect of certified teachers on high school mathematics achievement when the certification is in mathematics. This subject-specific teacher certification effect is less obvious in other high school subject areas, and the effect is zero or even negative in elementary-level math and reading (Rice, 2003b). Hawk, Coble, & Swanson, (1985) studied the effect on student achievement in mathematics of secondary teachers certified in mathematics versus those certified in other subjects. The study used a paired-comparison design, including a sample of 36 secondary school teachers certified in mathematics; 18 in-field and 18 out-of-field, and 826 students. Hawk et al. found that student achievement

scores in both general math and algebra were higher for students whose teachers were certified in math. In addition, teachers certified in math demonstrated greater knowledge of the subject and scored significantly higher on the instructional presentation component of the instrument measuring professional skills. Based on this study, it appears that teacher certification in math has a positive influence on secondary school teacher performance and student achievement in math.

Studies of emergency or alternative route teacher certification have shown little clear influence on student performance in high school mathematics and science relative to teacher certification acquired through standard channels. Darling-Hammond (1990) distinguished between alternative routes to certification, which do not change the standards but introduce other options for attaining them, and alternative certification which changes the standard under which certification is granted. Darling-Hammond argued that fully prepared and certified teachers are generally more highly rated than teachers without full preparation. Goldhaber and Brewer (2000) extended an analysis of the NELS: 88 data to study the influence of different types of teacher certification on student achievement in high school math and science. They found that math students whose teachers earned the standard certification do significantly better than students whose teachers hold private school certification or who are not certified in their subject area. In contrast, they found no evidence that math and science students of teachers with emergency credentials do any worse than students whose teachers' have standard teaching credentials. But in a critique of the Goldhaber and Brewer (2001) study, Darling-Hammond & Youngs, (2002) argued that the emergency certified teachers included in the study are most likely veteran teachers who hold some sort of licensure,

for instance, those who have moved and are not fully certified in the state where they are teaching. Boyd, Goldhaber, Lankford and Wyckoff (2007) examined extensively how preparation and certification requirements influence student achievement. Boyd et al. found that teachers who score well on certification exams can improve student outcomes significantly. In addition, the study found limited evidence that certification requirements diminish the pool of applicants, but there is not enough evidence on how they influence student outcomes.

In a related study Croninger, Rice, Rathbun and Nishio (2007) drew on data from the Early Childhood Longitudinal Study (ECLS) to analyze the relationship between elementary school teacher qualifications and first-grade achievement in reading and mathematics. Croninger et al. found that certain teacher qualifications matter. The study reaffirmed findings from other studies that have concluded that more refined measures of teacher preparation are better predictors of student achievement than are more conventional measures. Two teacher qualifications associated with significant positive effects on reading achievement next to experience are those that capture the emphasis of the coursework taken in preparation for the profession, at the school level, and the specific type of degree earned, elementary education, at the teacher level. However, broader measures like certification status and possession of advanced degrees were not found to be related positively to elementary student achievement in reading; the case of student achievement in mathematics, the relationship with possession of advanced degrees was actually negative. The results of this study are also comparable to those at the high school level that have demonstrated the importance of teachers' subject-specific degrees in mathematics and science. Second,

the results of this study found that teacher qualifications appear to have the strongest influence on reading achievement, arguably the focus of early elementary education. Teachers who hold elementary education degrees and have more than two years of experience teaching first grade are associated with higher student achievement in reading. Third, the results of this study revealed the importance of considering not only the individual effects of teacher qualifications but also contextual effects of teacher qualifications. Many studies have considered the importance of individual teacher qualifications on achievement; far fewer have considered the possible collective effects of hiring highly qualified teachers and their effect on student achievement overall. One possible explanation is that teachers with greater collective expertise in specific subject areas may be able to develop stronger curricular programs and provide pedagogical support to less qualified colleagues, boosting subject-specific cognitive gains school wide (Croninger, Rice, Rathbun, & Nishio, 2007).

Teacher's Years of Experience

Rice (2003b) stated that while research indicates there is a relationship between student achievement and teacher experience, at the elementary level of education, it appears that the relationship is most evident in the first several years of teaching, with some evidence of vintage effects for very experienced teachers. Rice also stated that estimates of the effect of teacher experience on high school students achievement suggest that experience has a more sustained effect that continues later into teachers' careers. Stronge (2002) views teacher experience as the period of time that it takes teachers to develop from novices to masters at different intervals over time, taking from

five to eight years to master the art, science and craft of teaching. Teacher experience as viewed by Clotfelter, Ladd, & Vigdor. (2007) is the number of years used by a state to determine a teacher's salary. They noted that most of the gain in achievement associated with teacher experience occurs in the first two years of teaching.

A set of quasi-experimental studies designed to test the causal relationship between teacher experience and student achievement reveals a positive relationship between these two variables. Hanushek, (1997) found that 29% of the estimates of the impact of experience on teacher quality were statistically significant and positive. This point was supported, also, by Greenwald, Hedges, & Laine, (1996) who conducted a meta-analysis of education production function literature from which they concluded that teacher experience is, in fact, related to student achievement. Murnane & Phillips, (1981) examined a sample of Black elementary school students from predominantly low-income families in one inner-city. Murnane et al. (1981) found that among teachers in their first seven years of teaching a significant positive effect on elementary school student achievement. The study also found a weak negative relationship between experience and student achievement among teachers with eight to 14 years of experience and a positive effect of experience on student achievement for teachers with 15 or more years of teaching experience. At the elementary level, this relationship is most evident during the first several years of teaching, and there is some evidence that positive effects re-emerge among very experienced teachers with more than 14 years of experience. Estimates of the effect of teacher experience on high school student achievement suggest that experience has a more sustained effect, continuing later into teacher's careers. Ferguson (1991) found that high school teachers with nine or more

years of experience were associated with higher student scores than teachers with only five to nine years of experience. Stronge (2002) found that teachers develop from novices to masters at different intervals over time, taking from five to eight years to master the art, science, and craft of teaching. His findings support the conclusions of Rice (2003b).

The main focus of this literature review was to answer the overarching research question, is there a relationship between building conditions, teacher quality measures and student attendance of high and low performing elementary schools in selected Virginia schools? The evidence from the existing research of the relationship between building condition, quality teaching and student achievement is very compelling from the standpoint that the condition of a school building such as structural, cosmetic and technology items combined with the level of quality teaching such as a teacher's verbal ability, years of experience, certification, content knowledge and knowledge of pedagogy do influence student achievement. The majority of the existing research of the relationship between building condition, quality teaching and student achievement was conducted over a 25 year period prior to the No Child Left Behind (NCLB) federal legislation of 2002. Early into the implementation of the NCLB legislation, Virginia in compliance with the NCLB legislation set student academic performance measures for passing at the minimum in 2002 of 60.7% in reading and 58.4% in mathematics on a gradient scale with four point annual increments culminating in 2014 with a passing rate for reading and mathematics of 100% for all students including the sub-categories of Black, Students with Disabilities, English Language Learners (ELL) and Economically Disadvantaged (U. S. Department of Education, 2003). The 2009-10 passing rate for all

students was 85% for reading and 83% in mathematics (Virginia Department of Education, 2009a).

The existing research of the relationship between building conditions, teacher qualifications and student achievement is fairly conclusive that building conditions and teacher qualifications do impact student achievement; however, much of the existing research concerning the relationship between building condition and student achievement has been criticized for failure to control for other important variables that influence student achievement.

CHAPTER 3: METHODOLOGY

Introduction

Chapter three presents the methodology of this research study. Included in this chapter is a description of the population and the rationale used by the researcher in selecting that population. This chapter also contains a discussion of the data needed for this study. A detailed description of the instrument used to collect the data and why this particular instrument was chosen is also discussed. Finally, the procedures used by the researcher for gathering and analyzing the data are discussed.

Population

The targeted population for this study was the elementary schools that had 3rd, 4th and 5th grade students in high and low performing elementary schools in the Commonwealth of Virginia. According to the 2009-2010 VADOE Local and Regional Schools and Centers Report, there were 1,190 elementary schools in Virginia (Virginia Department of Education, 2009c).

The school population was selected by using the Virginia Department of Education Accreditation Ratings. The rating consists of measures of percent of students passing mandated subject tests, such as English, Mathematics, Science, and History. The level of achievement of students in every elementary school was used to determine the rating.

The first criterion in the selection process was based upon those high performing elementary schools that were rated as fully accredited having met the VADOE 2009-10

accreditation benchmarks of a 75% passing rate in grades 3-5 English, 70% passing rate in grades 3-5 Mathematics, 50% passing rate in 3rd grade Science and History and 70% passing rate in grades 4-5 History. The second criterion in the selection process was those low performing elementary schools that were not fully accredited with an accreditation designation of either: (1) accreditation denied, (2) accredited with warning in one or more content areas or (3) a school that is conditionally accredited.

The final criterion in the selection process was the use of the random method to select the high and low performing elementary schools. Survey Random.org was used to randomly select a sample of each of the high and low performing schools.

Random.org offers true random numbers to anyone on the Internet. The randomness comes from atmospheric noise, which for many purposes is better than the pseudo-random number algorithms typically used in computer programs. People use random.org for holding drawings, lotteries and sweepstakes, to drive games and gambling sites, for scientific applications and for art and music. Randomness has three aspects: random sampling, random assignment, and random processes. Random processes such as: rolling dice or flipping a coin or consulting a table of random numbers are also used to determine how random sampling and random assignment are implemented (Vogt, 2007).

The total number of elementary schools in the Commonwealth in 2009-10 reported by the VADOE was 1,190. Of this number, 1,175 were classified as high performing schools and 15 were classified as low performing schools. A random sample of 20 high performing schools was drawn using the random method described above. The entire number of 15 low performing schools formed the sample of low

performing schools. Even though there is a difference of five schools between the sample of high performing schools and the low performing schools, the two samples were be treated as equal.

The 2009-10 VADOE Accreditation Ratings were chosen instead of the Federal No Child Left Behind (NCLB) Adequate Yearly Progress (AYP) Ratings. The Virginia Department of Education ratings are equal to the NCLB ratings in standards and accountability measures and less complex for determining school ratings (Virginia Department of Education, 2009a).

Instrumentation

The Assessment of Building and Classroom Conditions in Elementary Schools (ABCCES) was used to evaluate the conditions of the high and low performing elementary schools. The ABCCES is the elementary school version of the Commonwealth Assessment of Physical Environment (CAPE). The ABCCES was selected for this study because its track record of yielding reliable and valid results when used by Lanham (1999). The standard version of the questionnaire includes 34 questions probing a wide number of aspects of school facilities. Two aspects of the ABCCES were considered. First, the aspects of school facilities probed in the survey were those which the research literature has demonstrated to have relevance to teaching and learning. Included in this roster were issues such as lighting, thermal comfort, building maintenance, indoor air quality, acoustics, programmatic supports, and aesthetics. Second, in probing these aspects of school facilities the survey asked descriptive rather than evaluative questions. In other words, rather than ask about the

adequacy of lighting and indoor air quality, which is evaluative, the ABCCES survey asked descriptive questions such as what proportion of instructional spaces have windows relative to lighting, or how frequently are the walls painted relative to aesthetics. The scoring protocol for the ABCCES survey provided a method for creating school building index scores from the principal's survey responses.

The recent work of Uline & Tschannen-Moran, (2008), Hawkins, (1999) and McGuffey, (1974) used an alternate approach by gathering the views of teachers, rather than those of principals. The information gathered using this approach was more evaluative than descriptive. Both approaches do yield meaningful connections between facility conditions and educational outcomes (Roberts, 2009). For the purposes of this study the ABCCES was preferred because the information gathered was more objective in nature compared to the information gathered from the instruments developed and used by Uline and Tschannen-Moran, (2008), the Appraisal Guide for School Facilities, Hawkins, (1999), and Model for the Evaluation of Educational Buildings (McGuffey, 1974).

Facilities management next to student achievement is a key responsibility of the building principal. Because of this, the principal had a more in-depth working knowledge of the architectural footprint, heating-ventilation-air conditioning requirements, overall condition of the building and related safety requirements. Therefore, the principals were asked to complete the building evaluation.

Data Needed

The data needed for this study was the building condition evaluations of the high and low performing elementary schools as assessed by the ABCCES. The ABCCES was developed to determine whether school buildings had certain qualities or factors that represented favorable conditions for learning. The ABCCES can adequately discriminate between buildings in substandard condition and standard condition. The results of the ABCCES assessment were used to determine the overall condition of the school buildings.

School attendance rates were used to compare the two groups of students and serve as a measure of student performance. The existing research has established a definite relationship between the building condition, student attendance and achievement. Duran-Narucki's (2008) study of school building condition, attendance, and academic achievement in New York City, found student attendance to be an accurate predictor of student achievement on standardized tests. These results were reported after controlling for other possible factors, including socioeconomic status, ethnicity, and teacher quality. That poorer building conditions negatively impacts student attendance and that attending school is necessary to learning are both logical arguments that continue to be supported by research. Attendance data were obtained from the VADOE School, School Division, and State Report Cards.

The VADOE School, Division and State Report Card provided data reflecting the measurable qualifications required to attain highly qualified teacher licensure status for all the 3rd, 4th, and 5th grade teachers in the high and low performing selected elementary schools. The types of data needed for the study from the VADOE School

Report Card reports were the percentage of fully licensed teachers, and the percentage of teachers with advanced degrees.

Data Gathering

Prior to disseminating the Assessment of Building and Classroom Conditions in Elementary School in Virginia (ABCCES), permission was granted from Dr. James Lanham to use the ABCCES in this research study. In addition, the ABCCES was submitted to the researcher's dissertation committee and the Institutional Research Board (IRB) for approval. Appendix D is a copy of the IRB approval letter received. Following approval for the use of the ABCCES in this study by the dissertation committee, it was submitted to the IRB for exemption of review. The ABCCES had been used in previous IRB approved research studies and exemption was expected.

The ABCCES was loaded into the 'Survey Monkey'; a professional web based program that allowed surveys to be sent electronically, via email addresses, to the randomly selected elementary school principals in the high performing and low performing schools based upon the availability of schools in each category on the 2009-2010 School Accreditation Ratings Report.

The email addresses of elementary school principals were obtained from the VADOE, Department of Elementary Education. When the principals opened their email an introductory letter as well as a link to the ABCCES was available. The body of the email provided an explanation regarding the purpose of the survey; the importance of their participation and responses; that participation in the study survey was voluntary and assurances that their responses would be confidential. Instructions for completing the survey and for submitting it were enclosed. The letters were addressed to each

individual principal. See Appendix A and Appendix B for a copy of the letters sent to the principals. Appendix C contains a copy of the Assessment of Building and Classroom Conditions in Elementary Schools (ABCCES) in Virginia. Participation in the study survey was voluntary; therefore, principal consent was assumed based upon the receipt of a completed building evaluative instrument.

A follow up email letter was sent one week following the initial letter and survey thanking those who completed the survey and reminding those who had not responded to kindly complete and return the survey. After determining the principals who had not responded after the third week an additional email and link to the ABCCES was sent encouraging their cooperation.

The teacher quality index data for the high and low performing elementary schools was obtained from the Virginia School Division, and State Report Cards. Virginia's Standards of Learning accountability program includes a commitment to informing the public of the progress of schools in raising student achievement and enhancing the learning environment. Online report cards for schools, school divisions and the commonwealth include data on student achievement by grade, subject and student subgroup and information on other indicators of school quality. The data that were obtained from the online school report cards was the percent of fully licensed teachers and the teacher education attainment of the instructional staff of the high and low performing elementary schools.

School attendance rates were used as a variable that substituted for student performance. The school attendance rates data for the high and low performing

elementary schools was obtained from the Virginia School Division, and State Report Cards.

All research data gathered were downloaded and stored on a thumb drive and a separate computer for safe keeping until needed for analysis. The study participant roster containing the link code was stored separately from the electronic surveys received on a CDR Compact Disk and stored in a locked file drawer.

Data Analysis

The data analysis process used in this study employed multiple facets and applications to select, compile, inspect, clean, transform, and model the data with the goal of highlighting useful information to answer the study research questions (Figure 3.2) The data analysis process was comprised of 7 steps: (1) Identify elementary schools rated as high or low performing, (2) Administer the ABCCES via Survey Monkey to principals of selected elementary schools, (3) Develop teacher quality index for each school using two quality teaching standards, (4) Develop mean attendance rates for the high and low performing schools, (5) Compile the attendance rates of economically disadvantaged students, (6) Conduct the data analysis using the independent samples t-test and (7) Compile data analysis results into APA style tables and charts.

Figure 3.2

Data Gathering and Analysis Process



All of the data gathered were loaded into the Statistical Package for Social Science (SPSS) and organized so that any trends or patterns could be easily seen. One of the common procedures for organizing a set of data is to show it in a frequency distribution: an organized tabulation of the number of items located in each category on the scale of measurement (Gravetter & Wallnau, 2000).

A data file was created in SPSS to compile the data from the ABCCES survey, teacher quality standard, and student attendance rates. All of these data were examined for trends, patterns and empty cells, accordingly. The exercise is conducted to insure the accuracy and reliability of the data analysis results when using Excel or SPSS as the data analysis software program of choice.

The first application was to compare the results of the ABCCES assessment of the high and low performing schools. This application addressed research question #1. Is there a relationship between the school building conditions of elementary school buildings rated as high and low performing schools by the Virginia Department of Education?

Scoring for the Assessment of Building and Classroom Conditions in Elementary Schools in Virginia (ABCCES) followed the method used by Lanham (1999) in the study of elementary schools in Virginia.

Survey items are constructed to obtain either a specific numerical answer generated by the respondent or a selection from a list of responses. Where specific numerical responses were given no coding was used. For some items, a rating scale was employed with clear explanations of the ratings provided. In all cases the

responses are structured to offer the most positive response first, followed by less positive responses in descending order. The most positive response was coded as a “5”, the next response a “4”, and so on. For questions requiring a yes or no answer, yes was coded as a “2” and no was coded as “1”. For all survey questions “0” was used if there is no response (Lanham, 1999, p. 72).

The ABCCES also contained two open-ended questions regarding school facilities and the study. Lanham used these questions in his analysis of the responses of the principals. However, the purpose of using the ABCCES in this study was to determine the overall condition of the building. Therefore, these questions were removed from the instrument sent to principals.

The summary of response types, survey questions, and coding is presented in Table 3.1. Data in this figure indicate the specific items of the ABCCES and the value of the coding. The exact numbers of choices available to the respondent are also indicated. The respondent choices from the ABCCES were compiled and analyzed.

Table 3.1

Summary of ABCCES Response Types, Survey Questions, and Coding

<u>Response Type</u>	<u>Coding</u>	<u>Survey Questions of This Type</u>
Specific numerical response	N/A	1, 3,5,6,12,13,30,31,32
Two-choice scale	A-2 B-1	16
Three-choice scale	A-3 B-2 C-1	4, 7,8,9,14,15,17,19,20, 21, 26, 27
Four-choice scale	A-4 B-3 C-2 D-1	2, 18
Five-choice scale	A-5 B-4 C-3 D-2 E-1	10,11,28,29
Yes/No Response	Yes-2 No-1	22,23,24,25

Note: From: Lanham, James (1999). Relating Building and Classroom Conditions in Elementary Schools in Virginia, Blacksburg, VA: Unpublished doctoral dissertation, Virginia Polytechnic Institute & State University.

In as much as Research Sub-question number one asks if there is a difference between the building condition in high and low performing elementary schools, the rating of the buildings required a single numerical factor. The responses to all of the chosen items for each school building were summed according to the weighting of the item. If the respondent of a school chose all positive responses, the total score for the school building would be 75. If, however, the respondent scored the school building on

the lowest response on each item the building would have a score of 23. Such extreme scores are very unlikely and almost all scores for schools in this study fell well within the range.

The scores of the school buildings in each of the two groups of buildings were summed and a mean score drawn. The mean score of the two groups of buildings was used to analyze for a significant difference in scores. A *t*-test of independent samples was used to determine if there was a significant difference between the scores of the two groups.

The second application was to analyze the teacher quality indices of the high and low performing elementary schools. The analysis was done by using an independent samples *t*-test. This analysis addressed research question #2: Is there a difference between teacher quality measures in high and low performing elementary school buildings rated by the Virginia Department of Education?

The third application was the analysis of the school attendance patterns and rates employing an independent samples *t*-test, using the means of the of student attendance in the high and low performing schools. This analysis also addressed research question #3 Is there a significant difference between student attendance rates in high and low performing elementary school buildings?

The fourth and final application was to control for the variance related to socio-economic status (SES), data detailing the attendance rates of economically disadvantaged compared to the other students enrolled in each elementary school. The

socio-economic status of each school was used as a covariant to adjust for the attendance means. The results of this analysis were used to compare the influence of SES of this study to others conducted in a similar manner. This analysis was used to answer research question #3.

The combined data from the ABCCES, Quality Teaching Indices, school attendance rates, school enrollment and student participation in the free and reduced-price lunch program from the high and low performing schools was analyzed using the SPSS independent samples *t*-test method to answer the five research sub-questions:

1. Is there a significant difference between the school building conditions of elementary school buildings rated as high and low performing schools by the Virginia Department of Education (VADOE)?
2. Is there a significant difference between teacher quality standards in high and low performing elementary school buildings rated by the Virginia Department of Education?
3. Is there a significant difference between student attendance rates in high and low performing elementary school buildings rated by the Virginia Department of Education?
4. Is there a significant difference between school enrollments in high and low performing elementary school buildings?
5. Is there a significant difference between the student participation rate in the free and reduced-price lunch program in high and low performing elementary school buildings?

CHAPTER 4: FINDINGS

Introduction

In Chapter 4, the results from the Assessment of Building and Classroom Conditions in Elementary Schools (ABCCES) survey completed by elementary building principals, teacher quality index and student attendance rates are reported. Survey responses, specific demographic information, teacher qualifications, and student attendance rates about the schools in the sample were summarized and analyzed using the independent samples t-test.

The purpose of this study was to evaluate the hypothesis is there no significant difference in selected variables such as, school building condition, the teacher quality measure, and student attendance rates when the school is rated as either high or low performing. If a significant difference exists, the data may indicate that these variables may influence the performance rating of the school assigned the VDOE. The performance ratings that a school may receive are: fully accredited or (1) accreditation denied, (2) accredited with warning in one or more content areas or (3) a school that is conditionally accredited. For the purposes of this research study a high performing school is a school assigned a performance rating of fully accredited. Low performing schools were the schools not receiving the rating of fully accredited but one of the three aforementioned accreditation ratings from the VDOE.

Research Method Employed

The research method used for this study was the quantitative methodology with all of the data collected associated with quantity and measure. Quantitative research methods fall under the category of empirical or statistical studies. Quantitative research methods are the dominant method of research used in social science. Quantitative research may include experimental studies, quasi-experimental studies, pretest-posttest designs, and others where control of variables, randomization, and valid and reliable measures are required and where generalizability from the sample to the population is the aim. Data in quantitative studies are coded according to a priori operational and standardized definitions.

Description of High and Low Performing Schools and Why Chosen

The school population for this study was the high and low performing elementary schools for the school year 2009-2010 located on the Virginia Department of Education Statistics and Reports web page entitled State Summary, a subsection of the Accreditation and AYP Summary-School Accreditation Ratings (Virginia Department of Education, 2009). This report provided a breakdown of all accreditation ratings; such as, fully accredited, accredited with warning, accreditation denied. The elementary schools for this study were identified individually from the 2009-2010 School Accreditation Ratings Report which is a sub-section of the Accreditation and AYP Summary Reports. There were a total of 1,175 fully accredited and 15 elementary schools that were not fully accredited listed on the summary report of 1,190 elementary schools.

The first criteria in the selection process was based upon those high performing elementary schools that were rated as fully accredited having met the Virginia Department of Education 2009-10 accreditation benchmarks of a 75% passing rate in grades 3-5 English, 70% passing rate in grades 3-5 Mathematics, 50% passing rate in 3rd grade Science and History and 70% passing rate in grades 4-5 History. There were a total of 1,175 fully accredited elementary schools listed on this summary report.

The second criteria in the selection process were those low performing elementary schools that were not fully accredited with an accreditation designation of either: (1) accreditation denied, (2) accredited with warning in one or more content areas or (3) a school that is conditionally accredited. There were a total of 15 low performing schools listed on this summary report.

The method used to identify the 20 high performing schools was to first compile and randomly enter the 1,175 of fully accredited elementary schools onto an Excel spreadsheet. Second, the Random.org randomization software program was programmed to accept a range of numbers with a minimum value from 1 to a maximum value of 1,175 which represented all 1,175 fully accredited, high performing schools. Once the range of numbers had been entered into the True Random Number Generator the researcher clicked the Generate button to obtain a random number. Third, the twenty entries were made for the 20 high performing schools. The random numbers were matched to the Excel master list of 1,175 schools to determine the school that would receive an invitation letter to participate in the study survey.

The total population of possible low performing schools was 15. It was not necessary to draw a sample of low performing schools because of the limited number

listed on the Virginia Department of Education's School Accreditation Ratings-State Summary report. Two schools were classified as accreditation denied, seven schools were classified as accredited with warning and the final six schools were classified as conditionally accredited.

The 20 high performing and 15 low performing schools selected for this study were a combination of rural and urban schools. The majority of the schools selected were located in the Tidewater area of Virginia comprised of the counties of Gloucester and York, and the cities of Williamsburg, Newport News, Norfolk and Virginia Beach. Some of the elementary schools selected were designated as Title I schools. The majority of the Title I designated schools were located in the urban school districts.

Description of the Assessment of Building and Classroom Conditions in Elementary Schools (ABCCES) and Why Chosen

Invitations to participate in the study and copies of the ABCESS were sent to the 20 high performing schools in the sample and to all 15 low performing schools. The invitations were sent electronically to principals in the 35 elected schools comprised of high and low performing schools. Principals in 11 high performing and five low performing schools returned completed survey instruments. The 16 responses; 11 high performing and 5 low performing, were received after obtaining permission from the affected school divisions to conduct a study survey, sending three follow-up emails and offering monetary incentives. The low response rate was affected by sending the letters of invitation during August of the 12 month school calendar. Several of the principals of the selected schools had been reassigned during this time. The response rate for the high performing schools was 55% and for the low performing schools 33%. For the total

school population the rate of return was 45.7%. The ideal response rate for surveys instruments is 80%.

The Assessment of Building and Classroom Conditions in Elementary Schools (ABCCES) was used to evaluate the building conditions of the eleven high and five low performing elementary schools. The ABCCES is the elementary school version of the Commonwealth Assessment of Physical Environment (CAPE).

The ABCCES was selected for this study because its track record of yielding reliable and valid results when used by Lanham, (1999). The standard version of the questionnaire included 34 questions probing a wide number of aspects of school facilities. Two aspects of the ABCCES should be highlighted. First, the aspects of school facilities probed in the survey are those which the corpus of research literature has demonstrated have relevance to teaching and learning. Included in this roster are issues such as lighting, thermal comfort, building maintenance, indoor air quality, acoustics, programmatic supports, and aesthetics. Second, in probing these aspects of school facilities the survey asks descriptive rather than evaluative questions. The scoring protocol for the ABCCES survey provides a method for creating school building index scores from the principal's survey responses. For the purposes of this study the ABCCES was preferred because the information gathered was more objective in nature compared to other evaluative information gathered from the instruments developed and used by Uline, Tschannen-Moran, M. & Perez, L. (2003), the Appraisal Guide for School Facilities (Hawkins, 1999), and Model for the Evaluation of Educational Buildings (McGuffey, 1974).

The ABCCES original contained three open-ended questions regarding school enrollment, attendance rates and the percent of the student population received free and reduced-price lunch. Data from these questions were cross-referenced with the Virginia Department of Education School Report Card data for accuracy and found to be the same. The purpose of using the ABCCES in this study was to determine the condition of the High and Low Performing School Buildings.

Research Sub-question number one asks if there is a difference between the building conditions in high and low performing elementary schools. Because of this a single numerical factor was needed for the statistical analysis. The responses to all of the choice items for each school building were summed according to the weighting of the item. If the respondent of a school chose all positive responses, the total score for the school building would be 74. If, however, the respondent scored the school building on the lowest response on each item the building would have a score of 23.

The scores of the school buildings in each of the two groups of buildings were summed and a mean score drawn in the descriptive statistics format. The mean score of the two groups of buildings was used to analyze for the difference in scores. A t-test of independent samples was used to determine if there is a significant difference between the scores of the two groups.

Principals were asked to respond to the 32 items of the ABCCES to establish an evaluation of the school building condition. The questions were broken down into three parts. Part 1 of the survey included general questions (1-11) regarding the school building. Part 2 of the survey included questions (12-28) relating to the school's classrooms. Part 3 included questions (29-32) aimed at obtaining general information

regarding the schools. Principals were asked to answer the questions using their best judgment and experience as building principals to respond.

Questions Pertaining to Building Condition and Data Analysis

The ABCCES responses received from 11 high performing and five low performing schools were summed and analyzed using descriptive statistics and an independent samples *t*-test. An analysis of all the coded responses resulted with a mean for all responses of $M = 59.88$ and a standard deviation of $SD = 5.277$. The range of the items was 18 questions with a minimum response of 50 and a maximum response of 68. The lowest possible score for the ABCCES is 23 and the highest possible score is 74. With a possible range of 51 the median school score would be 48.5. A mean score of $M = 59.88$ which was achieved for all schools in the study suggests that all of the principals believed that their buildings were in above average condition.

The SPSS output data for an independent samples *t*-test is provided in a two part table. The first part is group statistics such as, the related number in samples, means, standard deviation, and standard error. The second part provides the independent samples test with *t*-test for equality of means. Table 4.1 displays data on the independent samples *t*-test that was conducted to evaluate the hypothesis is there no significant difference between the building conditions in high and low performing elementary schools. An alpha value of $<.05^*$ one-tailed and critical value $<.01^{**}$ two-tailed was used as the p-value for this independent samples *t*-test. A p-value of .119 was the result of the independent samples *t*-test between the scores of the high and low

performing schools which is greater than the p-value of $<.05$ and $<.01$, statistically insignificantly different and not enough to reject the null hypothesis of no significant difference between high and low performing schools.

Table 4.1

Independent Samples t-test for Building Condition

School	N	M	SD
High Performing	11	61.27	5.676
Low Performing	5	56.80	2.588

t-test for Equality of Means

	t	df	Sig. (2-tailed)	Mean Difference
Building Condition	-1.661	14	.119	-4.473

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

Table 4.2 displays data on the independent samples *t*-test that was conducted to evaluate the hypothesis is there no significant difference between the internet access to a Local Area Network (LAN) in high and low performing elementary schools.

An alpha value of $<.05$ * one-tailed and critical value $<.01$ ** two-tailed was used as the p-value for this independent samples *t*-test. A p-value of .002 was the result of the independent samples *t*-test between the scores of the high and low performing schools which is less than the p-value of $<.05$ and $<.01$, and statistically significant enough to reject the null hypothesis of no significant difference between internet access to a LAN in high and low performing schools.

Table 4.2

Local Area Network

School	N	M	SD
High Performing	11	1.91	.302
Low Performing	5	1.20	.447
Total	16	-	-

<i>t</i> -test for Equality of Means				
	t	df	Sig. (2-tailed)	Mean Difference
Local Area Network	-3.763	14	.002**	-.709

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

General Questions Relating to the School and Data Analysis

School Enrollment

The principals were asked in question 30 to provide the school enrollment from the March 30, 2010 enrollment report to the Virginia Department of Education. These enrollment figures were cross-referenced with the VDOE School Report Data for accuracy. Data contained in Table 4.3 provide a summary analysis of the responses of the independent samples *t*-test. This independent samples *t*-test had a threshold *p*-value of <.05 or <.01 and a resultant *p*-value of .497 which was greater than <.05 resulting in the enrollment data between the high and low performing schools not being enough to reject the null hypothesis of no significant difference between the student enrollment of the high and low performing schools. This data analysis addressed sub-research question number four.

Table 4.3

Independent Samples t-test for School Enrollment

School	N	M	SD
High Performing	11	427.64	147.918
Low Performing	5	477.00	73.959

t-test for Equality of Means

School	t	df	Sig. (2-tailed)	Mean Difference
School Enrollment	.698	14	.497	49.364

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

Free and Reduced-Price Lunch

Question 31 of the ABCCES asked the building principals to specify the percentage of the student enrollment that qualified for free and reduced-price lunches on or about March 30, 2010. The free and reduced-price lunch student enrollment data were cross-referenced with the VADOE School Report Data for accuracy. All the data were reported in an ordinal format of percentages and converted into an interval format figure for the purposes of the means and independent samples *t*-test performed.

Data contained in Table 4.4 provide a summary analysis of the responses of the independent samples *t*-test. An independent samples *t*-test that was conducted to evaluate the hypothesis is there no significant difference between the number of student receiving free and reduced-price lunch in high and low performing schools. A *p*-value of $< .05$ and $< .01$ was necessary for there to a significant difference between the high and low performing schools. The mean number of students participating in the free and

reduced-price program at the high performing schools was 145.13 and 378.85 at the low performing schools. A p-value of .002 was the result of the independent samples *t*-test which was statistically significant and less than the critical p-value $<.01$ and the p-value $<.05$. As a result, the null hypothesis of no significant difference between high and low performing schools was rejected meaning that there is a significant difference between the percentage of students receiving Free and Reduced Lunches in high and low performing schools. This data analysis addressed sub-research question number five.

.Table 4.4

Independent Samples t-test for Free and Reduced-price Lunch as a Percentage of Total School Enrollment

School	N	M	SD
High Performing	11	145.13	128.020
Low Performing	5	378.85	77.079

t-test for Equality of Means

School	t	df	Sig. (2-tailed)	Mean Difference
Free and Reduced Lunch	3.743	14	.002*	233.727

Note. Sig. .002*. * $p <.05$. ** $p <.01$.

Teacher Quality Index Comparison and Data Analysis

The information and data used to develop the Teacher Quality Index were gathered from the Virginia Department of Education Standards of Learning

Accountability Program. Virginia's Standards of Learning accountability program includes a commitment to informing the public of the progress of schools in raising student achievement and enhancing the learning environment. Online report cards for schools, school divisions and the Commonwealth include data on student achievement by grade, subject and student subgroup and information on other indicators of school quality. Report cards also provide data on other key indicators of school quality; such as, student attendance, licensure status and advanced degrees earned by teachers.

The teacher quality data were nonparametric ordinal in format and were converted to the interval format after estimating the number of teachers in each school by using the average of 20 per class and dividing it into the total K-5 enrollment total. The VDOE does not provide the number of teachers by school; therefore, an estimation was computed and used. The average of 20 students per class was determined by using the K-2 ideal average number of 15. The average student per class of 25 on grade 3-5 level was used. Summing of these average numbers and dividing by two equals 20 students per class. The total student enrollment was divided by 20 to get the total number of teachers.

An analysis was conducted to determine; if there was a significant difference in teacher quality indices between the high and low performing schools. The analysis used a means *t*-test and an independent samples *t*-test to find out if a significant difference exists between the means of the teacher quality indices in the 11 high and five low performing schools. The index measures were the number of teachers fully licensed and the number of advanced degrees. Existing research of teacher licensure

and advanced degrees suggest that these variables may have a positive influence on student achievement on the elementary level.

Teachers Fully Licensed

Data contained in Table 4.5 provides a summary analysis of the independent samples *t*-test. This independent samples *t*-test used the *p*-values of $<.05$ and $<.01$ to establish statistical significance. The mean number of teachers fully licensed for the high performing schools was 19.400 and 20.527 for the low performing schools. The *p*-value of .742 was the resulting *p*-value which is more than the *p*-values $<.05$ and $<.01$ and thus not enough to reject the null hypothesis of no significant difference between high and low performing schools relative to fully licensed teachers.

Table 4.5

Independent Samples t-test for Teachers Fully Licensed

School	N	M	SD
High Performing	11	19.400	7.049
Low Performing	5	20.527	3.349

<i>t</i> -test for Equality of Means				
School	t	df	Sig. (2-tailed)	Mean Difference
	.336	14	.742	1.127

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

Teachers with Advanced Degrees

Data contained in Table 4.6 provide a summary analysis of the independent samples *t*-test. The independent samples *t*-test used the *p*-values of $<.05$ and $<.01$ to establish statistical significance. The mean number of teachers with advanced degrees at the high performing schools was 12.150 and 13.121 at the low performing schools. The *p*-value of .734 was the resulting *p*-value which is more than the *p*-values $<.05$ and $<.01$ and thus not enough to reject the null hypothesis of no significant difference between high and low performing schools relative to teachers with advanced degrees. The analysis of fully licensed teachers and teachers with advanced degrees resulted in no significant difference between the indices used to determine teacher quality. This answers the second sub-research question.

Table 4.6

Independent Samples t-test for Teachers with Advanced Degrees

School	N	M	SD
High Performing	11	12.150	5.683
Low Performing	5	13.121	3.669

t-test for Equality of Means

School	t	df	Sig. (2-tailed)	Mean Difference
	.347	14	.734	.9717

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

School Attendance Rates and Data Analysis

The third sub-research question asked if there is a significant difference in student attendance rates between low and high performing schools. In some research studies the rate of attendance or absence has been used as a surrogate for student achievement because of the difficulty in obtaining accurate student achievement test results. The attendance rates were reported in an ordinal nonparametric format on the VADOE State Report Card. The attendance rates were converted to an interval format by multiplying the attendance rate by the required VADOE minimum 180 school days for attendance.

Data contained in Table 4.7 provides a summary analysis of the responses of the independent samples *t*-test. This independent samples *t*-test used the p-values of $<.05$ and $<.01$ to establish statistical significance. The p-value of .041 was the resulting p-value which is less than the p-value $<.05$ and more than the p-value $<.01$, statistically significant and thus enough to reject the null hypothesis of no significant difference between high and low performing schools relative to the attendance rates. This analysis established that there is a significant difference between the attendance rates between the high and low performing schools and addressed research question #3: Is there a significant difference between student attendance rates in high and low performing elementary school buildings?

Table 4.7

Independent Samples t-test for School Attendance Rates/Days

School	N	M	SD
High Performing	11	172.636	1.699
Low Performing	5	170.640	1.506

t-test for Equality of Means

School	t	df	Sig. (2-tailed)	Mean Difference
	-2.248	14	.041*	-1.996

Note. Sig. .041* . * $p < .05$. ** $p < .01$.

Attendance Rates of Economically Disadvantaged and Data Analysis

Economically disadvantaged is sub-group reporting category for the No Child Left Behind (NCLB) federal guideline. This sub-group is the number of students receiving free and reduced-price lunch in each school. Schools are required to report the daily attendance for the sub-group economically disadvantaged. These data are-reported as a percentage, an ordinal non-parametric format, which was converted to an interval format by multiplying the% rate by 180 school days.

Data contained in Table 4.8 provides a summary analysis of the responses of the independent samples *t*-test. P-values of $<.05$ and $<.01$ were used in this independent samples *t*-test to establish statistical significance. The p-value of .108 was the resulting p-value which is more than the p-values $<.05$ and $<.01$ and thus not enough to reject the null hypothesis of no significant difference between high and low performing schools relative to the attendance rates of economically disadvantaged. This analysis, also, addressed research question #3: Is there a significant difference between student attendance rates in high and low performing elementary school buildings?

Table 4.8

Independent Samples t-test for Attendance Rates of Economically Disadvantaged

School	N	M	SD
High Performing	11	171.491	1.415
Low Performing	5	170.280	.985

t-test for the Equality of Means

School	t	df	Sig. (2-tailed)	Mean Difference
	-1.718	14	.108	-1.2109

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

CHAPTER 5: SUMMARY OF FINDINGS, CONCLUSION, DISCUSSION, IMPLICATIONS FOR PRACTICE, AND RECOMMENDATIONS FOR FURTHER RESEARCH

Introduction

In Chapter Five the results and findings from Chapter 4 will be analyzed and an appropriate discussion, conclusion and recommendations for further study will be provided based upon those findings. The sub-research questions for this study were addressed: (1) Is there a significant difference between the school building conditions of elementary school buildings rated as high and low performing schools by the Virginia Department of Education? (2) Is there a significant difference between teacher quality measures in high and low performing elementary schools rated by the Virginia Department of Education? (3) Is there a significant difference between student attendance rates in high and low performing elementary schools rated by the Virginia Department of Education?

This research study was contrasted to the research findings of other researchers in the field to ascertain any similarities and differences in research findings. The research conducted by others in the field focused primarily on the relationship between building conditions and student achievement where the building conditions were rated

standard and substandard. The studies of the other building facility researchers received criticism for not controlling for confounding variables such as teacher quality, considering structural factors alone, not conducting data analysis of the findings and examining only the top and bottom 25% of the schools (Picus, et al., 2005). This study on the other hand attempted to address most of the criticism that the prior research received. Therefore, this study researched the differences in building conditions in elementary schools rated as high and low performing while controlling for teacher qualifications and student attendance rates. In addition, an independent samples t-test was conducted on all of the study variables.

Summary of Findings

The summary of findings for this study addressed the research questions relative to the differences of building conditions, teacher quality indices and student achievement in high and low performing schools. These findings were based upon statistical analysis of the study variables in Chapter 4 which were in some instances statistically significant but not in all.

Research Question #1 - Is there a significant difference between the school building conditions of elementary school buildings rated as high and low performing by the Virginia Department of Education?

An independent samples *t*-test was performed; to establish, if possible, that a significant difference exists between the building conditions of the high and low performing schools. The results of the Assessment of Building and Classroom Conditions in Elementary Schools were the source of the data for this finding. The

resultant p-value .119 and mean difference of -4.473 were not statistically significant and not enough to reject the null hypothesis no significant difference between the building conditions of high and low performing elementary schools. In summation, based upon the findings there is no significant difference between the school building conditions of elementary school buildings rated as high and low performing by the Virginia Department of Education.

Research Question #2 – Is there a significant difference between teacher quality measures in high and low performing elementary school buildings rated by the Virginia Department of Education?

An independent samples *t*-test was conducted to establish if there was a relationship between teacher quality measures in high and low performing schools. The teacher quality indices were the number of teachers fully licensed by the Virginia Department of Education and the number of teachers with advanced degrees.

There was a mean difference of 1.127 between teachers fully licensed in the high and low performing schools. A *t*-value of .336 and p-value of .742 was greater than the threshold p-values and was not statistically significant.

The mean difference between teachers with advanced degrees in the high and low performing schools was .9717. A *t*-value of .347 and p-value of .734 was greater than the threshold p-value and was not statistically significant.

In summation, the quality of teacher indices which was the number of teachers fully licensed and the number with advanced degrees between high and low performing schools was not enough to be considered statistically significant and to reject the null hypothesis of no significant difference between teacher quality measures in high and

low performing schools. Therefore, based upon the summary of findings there was no significant difference between teacher quality measures in high and low performing elementary school buildings rated by the Virginia Department of Education.

Research Question #3 – Is there a significant difference between student attendance rates in high and low performing elementary school buildings rated by the Virginia Department of Education.

An independent samples *t*-test yielded the following results. The mean difference between the days of attendance for the high performing and low performing schools was -1.996. In addition, a *t*-value of -2.248 and a *p*-value of .041 were generated. The *p*-value .041 was less than the threshold *p*-value of <.05 but greater the *p*-value of <.01 enough to reject the null hypothesis no significant difference between the attendance rates of low and high performing schools. In summation, based upon the findings, there was a statistically significant difference between the attendance rates of high and low performing schools. Therefore, there is a significant difference between the student attendances rates in high and low performing schools.

Research Question #4.-. Is there a significant difference between school enrollments in high and low performing elementary school buildings?

An independent samples *t*-test was conducted to determine if there was a significant difference between the school enrollment of high and low performing schools. A mean difference of 49.364 along with a *t*-value of .698 and a *p*-value of .497 were not enough to be statistically significant. Therefore, these findings were not enough to

reject the null hypothesis of no significant difference between the school enrollment of high and low performing schools. In summation, there was no significant difference established between the school enrollment of high and low performing schools.

Research Question #5. - Is there a significant difference between the student participation rate in the free and reduced-price lunch program in high and low performing elementary school buildings?

An independent samples *t*-test was conducted to determine if a significant difference may exist between the student participation rate in free and reduced-price lunch in high and low performing schools. The mean difference of 233.727 along with a *t*-value of 3.743 and *p*-value of .002 were statistically significant and enough to reject the null hypothesis of no significant difference between the student participation rate in free and reduced-price lunch in high and low performing schools. The highest student participation rate in free and reduced-price lunch was observed in the low performing schools. In summation, there was a significant difference established between the student participation rate in free and reduced-price lunch in high and low performing schools.

Other Findings

In addition to the findings of the main and five sub-research questions this study examined other variables that were a part of the Assessment of Building and Classroom Conditions in Elementary Schools (ABCCES). The findings for the variables; access to a local area network and attendance rates of economically disadvantaged students controlled for in this study, are provided.

Attendance Rate of Economically Disadvantaged Students

The results the independent samples *t*-test conducted to determine if a significant difference existed between the attendance rate of the economically disadvantaged student population in high and low performing schools resulted in a mean difference of -1.2109 and a *t*-value of -1.718 and a *p*-value of .108. These results were not statistically significant nor enough to reject the null hypothesis of no significant difference between the attendance rates of economically disadvantaged students in high and low performing schools. Therefore, no significant difference exists between the attendance rate of economically disadvantaged students in high and low performing schools.

Access to a Local Area Network (LAN)

The results the independent samples *t*-test conducted to determine if a significant difference existed between the access to a local area network (LAN) in high and low performing schools resulted in a mean difference of -.709 and a *t*-value of -3.763 and a *p*-value of .002. These results were statistically significant enough to reject the null hypothesis of no significant difference between the access to a local area network in high and low performing schools. Therefore, a significant difference exists between the access to a local area network in high and low performing schools.

Conclusion

The main research question for this study was: Is there a relationship between school building conditions, teacher quality standards and student attendance in high and low performing elementary schools in Virginia? The analyses of the data for this

study lead to the conclusion that no significant difference in the condition of the buildings or quality of the teaching faculty was observed between low and high performing schools in Virginia. The data further indicates no significant difference between the school enrollment in high and low performing schools; however, that there was a significant difference in the attendance rate of students, the student participation rate in the free and reduced lunch program and access to a local area network in the low and high performing schools

Discussion

The data analysis in this study lead to the conclusion that: (1) there was no significant difference between the overall building conditions of high and low performing schools, (2) there was no significant difference between the teacher qualifications in high and low performing schools, (3) there was a significant difference between the student attendance in high and low performing school, (4) there was no significant difference between the school enrollment in high and low performing schools and (5) there was a significant difference in the student participation rate in the free and reduced-price lunch program in high and low performing schools.

First it should be noted that there was no significant difference between the overall building conditions in high and low performing schools. There were, prior to this study, numerous studies that established that students in good or standard buildings perform better academically than students in poor or substandard buildings. Some of the studies were Cash, (1993) that found a significant difference between the scores of students in standard and substandard buildings in several sub-tests of the TAP.

Significant differences of four percentile points were found in reading comprehension, math applications and the composite score between students in substandard rated buildings and those students in buildings rated as being in standard condition.

Earthman, Cash, & Van Berkum, (1996) replicated Cash's study in North Dakota and found differences in scores between students in substandard buildings and students in buildings rated as being standard as high as nine percentile points in spelling and seven percentile points in reading vocabulary and science. The major difference between these studies is that the previous studies included all schools in a category, such as all small high schools, and then found their condition based upon a principal evaluation, whereas this study identified school organizations based upon their academic performance.

Additionally, this study used only one section of the ABCCES, Overall Building Conditions, to assess the condition of the buildings. Further the student attendance rates of the high and low performing schools were used as a measure of performance due to the inaccessibility of mean scaled student scores provided by the Virginia Department of Education (VADOE) and the methodological issues associated with interpreting a percentage passing rate. The other studies used the SOL percent passing rates as a measure of performance or other norm-referenced or criterion referenced assessment results, this study used other variables to determine the differences in the high and low performing schools. Although no significant difference between the variable building conditions in high and low performing schools were found, the explanation for the differences in performance must be found in the other study variables discussed, such as attendance rates. It is clear that even though this study

found no significant difference between the building conditions of high and low performing schools that this finding is not a contradiction of the other building facilities researchers.

The second variable used to compare the school organizations was in the teacher quality indices. Teacher quality is one of the confounding variable in which the other researchers received criticism because it was not controlled for. There are numerous studies that suggest that teacher quality is one of the most important variables that contribute to student achievement. Boyd, Goldhaber, Lankford and Wyckoff (2007) examined extensively how preparation and certification requirements influence student achievement. Boyd et al. found that teachers who score well on certification exams can improve student outcomes significantly. Hawk, Coble, & Swanson, (1985) study found that student achievement scores in math were higher for students whose teachers were certified in math. Croninger, Rich, Rathbun and Nishio, (2007) study found when analyzing the relationship between elementary school teacher qualifications and first-grade achievement in reading and mathematics that certain teacher qualifications matter. Teacher qualifications were chosen to see if a significant difference between teacher qualifications may have a relationship with the high and low performance ratings received by the schools from the VADOE. The Elementary and Secondary Education Act (also known as No Child Left Behind) requires all teachers of core academic subjects to be “highly qualified.” The federal law defines a highly qualified teacher as a teacher who is fully licensed by the state, has at least a bachelor’s degree and has demonstrated competency in each subject taught. Virginia’s licensure regulations, with their emphasis on content knowledge, require new teachers

to far exceed the federal highly qualified standard. The conclusion in this study of there being no significant difference between the teacher qualifications, as defined in this study, in high and low performing schools may well serve to counter the criticism of the other building facilities researchers from Picus and others, (2005). The conclusion in this study contradicts the Picus et al., (2005) study by not finding a significant difference between the teacher quality in high and low performing schools and clearly validates the assumption made by; Cash, (1993), Hines, (1996), Earthman, Cash & Van Berkum, (1996) that every teacher regardless of the state is licensed by the state government based upon a state approved program of preparation and that the quality of the teachers in the two groups of school buildings was comparatively equal. Clearly the conclusion that there was no significant difference between teacher qualifications in high and low performing schools in effect contradicts the Picus et al., (2005) study and may suggest that other confounding variables not controlled for may be influencing student achievement more directly.

The third variable, student attendance rates, established a significant difference between the attendance rates of students in high and low performing schools existed. The attendance rate was used in this study as a surrogate for student performance because of the inaccessibility of mean scaled student scores provided by the Virginia Department of Education and the methodological issues associated with interpreting a percent passing rate when used as a measure of student performance. The Duran-Narucki (2008) study found when comparing the attendance rates between standard and substandard building conditions that students attended school less regularly in substandard school buildings. The higher attendance rate of the high performing

schools may be attributed to the overall condition of the school buildings. Additionally it may suggest that the high performing schools had more effective K-5 attendance policies. Above average building conditions combined with effective attendance policies usually create a school climate and affective domain that is conducive for increased student achievement and overall school performance.

An analysis of data regarding a possible difference between the student population receiving free and reduced-price lunch in high and low performing schools was completed. Students receiving free and reduced-price lunch are also categorized as economically disadvantaged. The difference found in the percent of students receiving free and reduced-price lunch between high and low performing schools may suggest in effect that another confounding variable beyond teacher qualifications has a more direct relationship to the differences between high and low performing schools. There are considerable research findings to indicate that students from economically disadvantaged families do not perform academically as well as students who come from homes that are not economically disadvantaged. These students most often come from homes where the parent efficacy for helping their children with homework and other academic requirements are weak to non-existent.

Implication for Practice

One area of concern deals with the difference in the attendance rate between high and low performing schools. The findings of this study may suggest that school district policy makers and building administrators evaluate their attendance policies and individual school attendance rates for patterns, trends, effectiveness and consistency in application across the division. The findings of this study established that the

attendance rate in the low performing schools was less than that of the high performing schools. The research in the field of education is very clear that if students are not in school it is difficult or impossible for the average learner much less the below or at-risk learner to maintain and excel academically. The slightest weakness in a district's attendance policy or a school's execution of these policies, such as number of parent notes that are considered excused absences, can result patterns of critical and excessive absences. District policy makers and building administrators should take the results of this study into account when looking for weaknesses in their attendance policies that can ultimately result in a school's attendance to adversely impact that schools overall academic achievement and school performance rating. Additionally, the attendance rate of teachers can also influence student achievement and ultimately the performance rating of the schools. The attendance policy for teachers should be equally strict and executed by building principals consistently within the school division.

Recommendations for Further Research

The following recommendations for future research emerged from this study:

1. A replication of this study should be conducted again at the elementary level with an emphasis on increasing the sample to improve upon the effect size and robustness of the findings, examine the teacher qualifications more in-depth by considering other qualification data collected by the VADOE such as endorsements and if available the type of content specific advanced degrees; such as, reading and math specialist. School attendance rates would remain as the measure for student performance.

2. Conduct a replication of this study on high school level to determine if there are differences between the building conditions, teacher qualifications and student attendance rates in high and low performing middle schools. One area of particular interest might be the differences in teacher qualifications in high and low performing schools based upon research that claims a positive relationship between student achievement and content specific advanced degrees; such as mathematics.
3. Replicate this study again on the elementary level seeking to determine if there are differences between building conditions, teacher qualifications and student attendance rates in high and low performing school's whose performance rating is based upon the school attaining full accreditation and Annual Yearly Progress (AYP) for one to two consecutive years. This comparison should be made on a school by school basis versus a means basis. By making this modification to the school performance rating criteria it should result an increase the number of low performing schools for a more balanced sample population of schools.
4. Conduct a similar study on the elementary, middle or high school level with the variables building condition, teacher qualifications, and student attendance controlling for technology integration in classroom instruction to determine the difference between the fore mentioned variables in high and low performing schools. This research study found a significant difference in the access to a Local Area Network (internet) in high and low performing schools. The Virginia Department of Education along with school divisions across the state has invested a considered amount of funds to provide Instructional Technology

Resource Teachers (ITRT) to increase the level of integration of technology into the instructional process. These positions now exist in all 132 Virginia school divisions, and more than \$500 million has been spent to support educational technology infrastructure. All Virginia school divisions have moved toward meeting the requirement of employing one ITRT and one technology support staff member per 1,000 students. More schools are now using Smart Boards, Kindles, IPADS, Netbooks and other interactive technology devices to enhance classroom instruction. Very little if any research has been conducted to measure the impact that this technology integration initiative has impacted student achievement in high and low performing schools.

5. Replicate this study again on the elementary level seeking to determine if there are differences between building conditions, teacher qualifications and student attendance rates in high and low performing schools. The methodology data analysis process would use actual student scores instead of means to compare schools. Conducting the data analysis using actual student scores should help address the impact of the study that is often blunted when using means to make comparisons.
6. Replicate this study again on the elementary level seeking to determine if there are differences between building conditions, teacher qualifications and student attendance rates of Title I and non-Title I schools instead of the performance rating of high and low performing.

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Appendix A

Dear

My name is Paul McLean. I am the Coordinator of Student Services for Gloucester County Public Schools, Gloucester, VA.

I am conducting a research project in cooperation with the Division of Educational Leadership and Policy Studies at Virginia Polytechnic and State University (Virginia Tech). My research involves the study of the relationship between building condition, teacher quality measures and student attendance rates in 20 randomly selected elementary schools in Virginia.

The purpose of this study is to determine if there is a relationship among these variables. With the role that the Standards of Learning Assessments play in school accreditation, it is important that we identify any variables that may be preventing students from performing at their highest level. As the average age of schools hover around 40 years old, it is imperative that we conduct this research to determine if there is a relationship between the condition of educational facilities, teacher qualifications and student attendance rates in selected elementary schools.

In order to complete this research, data on the building condition will be needed. The current condition of school facilities will be determined by the information provided by you through your completion of the Assessment of Building and Classroom Conditions in Elementary Schools (ABCCES) facilities assessment instrument. Participation in this study survey is voluntary. **The survey consists of 32 questions and should take approximately 15 minutes to complete.**

The names of the participating schools will not be identified in this study.

I have attached a copy of the ABCCES assessment for your school. Please take a few minutes to complete it and return the online assessment instrument. To access the assessment instrument, click on the following web link:

<http://www.surveymonkey.com/s/7XGPKC7>. Upon completion, simply click submit and the results will be automatically tallied. Thank you in advance.

Thank you very much for your time and cooperation.

Sincerely,

Paul McLean
Candidate for Doctoral Degree
Virginia Tech.

Glen I. Earthman
Professor Emeritus
Virginia Tech.

Appendix B

Dear

My name is Paul McLean. I am currently doing research in cooperation with the Division of Educational Leadership and Policy Studies at Virginia Polytechnic and State University. My research involves the study of the relationship between building condition, teacher quality measures and student attendance rates in 20 randomly selected elementary schools in Virginia.

The purpose of this study is to determine if there is a relationship among these variables. With the role that the Standards of Learning Examinations play in school accreditation at the state level and the Adequately Yearly Progress component of No Child Left Behind, it is important that we identify any barrier that may be preventing students from performing at their highest level. As the average age of schools hover around 40 years old, it is imperative that we conduct this research to determine if there is a relationship between the building condition, teacher quality measures and student attendance rates in 20 randomly selected elementary schools in Virginia.

In order to complete this research, data on the building condition will be needed. The current condition of school facilities will be determined by the information provided by you through your completion of the Commonwealth Assessment of Physical Environment facilities assessment instrument. Participation in this study survey is voluntary.

The survey consists of 32 questions and should take approximately 15 – 20 minutes to complete.

The names of the participating schools will not be identified in this study.

To access the assessment instrument, click on the following web link: <http://www.surveymonkey.com/s/7XGPKC7> Upon completion, simply click submit and the results will be automatically tallied. Thank you in advance.

If you have any questions or require clarification, please call me at the Office of Student Services 804-693-7910 or my cell phone 757-879-1337.

Sincerely,

Paul McLean
Candidate for Doctoral Degree
Virginia Polytechnic and State University

Glen I. Earthman Professor
Emeritus Virginia Tech.

Appendix C

AN ASSESSMENT OF
BUILDING AND CLASSROOM CONDITIONS IN
ELEMENTARY SCHOOLS IN VIRGINIA

INSTRUCTIONS: You are asked to rate specific features of your school building and classrooms as well as provide certain demographic information regarding your school. Please use your best judgment and experience as a building administrator to answer these questions. Circle the best response for each question or fill in the appropriate blank.

Part 1 -Questions relating to the school building in general:

1. What is the age of the school building in years? (Please base your answer on your best estimate of the time period during which most of the space used by students was built.)

_____ years old.

2. What description best fits the school building?

- A. The building was originally designed and built as an elementary school.
- B. The building was originally designed and built as a secondary school, but underwent major renovations before conversion to an elementary school.
- C. The building was originally designed and built as a secondary school, but underwent some renovations before conversion to an elementary school.
- D. The building was originally designed and built as a secondary school and was not renovated before conversion to an elementary school.

3. What year was the last major renovation to the school building completed? _____ (if no renovations have ever been done, write none).

4. Are there visible indications of roof leaks in the building?

- A. No visible signs, or only a few old water spots in ceiling.
- B. Ceiling is currently developing a few new stains due to minor leaks.
- C. Ceiling is deteriorating due to water damage, or water falls in some area of facility requiring buckets for water collection.

5. When was the last time interior walls, including classrooms, were painted? _____ years ago.

6. When was the last time the exterior painting was completed? _____ years ago.

7. How would you rate the electrical service in the school building?
 - A. There is sufficient electrical service to meet all current building needs with room for expansion.
 - B. There is sufficient electrical service to meet all current building needs with little room for expansion.
 - C. Electrical service is not sufficient to meet current building needs.

8. What kind of flooring is found in the majority of the instructional spaces?
 - A. Carpet
 - B. Tile or Terrazzo
 - C. Wood Floor

9. Is the facility located near a busy, major highway, a frequently used rail line, an area where aircraft frequently pass overhead, or any other loud noise producing environment?
 - A. No
 - B. Yes, but measures have been taken to reduce the level of noise within the facility.
 - C. Yes, and no measures have been taken to reduce the level of noise within the facility.

10. How would you rate the overall maintenance of the school building? When answering this question, consider such maintenance items as general repairs, light bulb replacement, the maintenance of plumbing, electrical and similar systems, etc.
 - A. Outstanding
 - B. Very good
 - C. Satisfactory
 - D. Needs improvement
 - E. Poor

11. How would you rate the structural condition of the school building?
 - A. Outstanding
 - B. Very good
 - C. Satisfactory
 - E. Poor
 - D. Needs improvement

Part 2 -Questions relating to the school's classrooms:

12. Please provide the following information regarding your classrooms:

Total number of classrooms in your school: _____

Total number of classrooms located in permanent structures: _____

Total number of mobile classrooms or trailers _____

Questions 13-28 apply only to the classrooms in your permanent structure. Do not consider trailers when answering these questions.

13. How many classrooms do not have windows? _____

14. Which of the following best describes the heating system in the school?

- A. Even heat/able to control in each room.
- B. Even heat/unable to control in each room.
- C. Uneven heat/unable to control in each room.

15. Which of the following best describes the air conditioning system in the school's instructional areas?

- A. Air conditioning in all instructional spaces which can be well-regulated
- B. Air conditioning in some instructional spaces, or air conditioning in all instructional spaces, but not well regulated.
- C. No air conditioning in instructional spaces.

16. What is the type of lighting in the majority of classrooms?

- A. Incandescent Lighting
- B. Fluorescent Lighting

17. What color are the walls in the majority of classrooms?

- A. Pastel colors
- B. White or off-white
- C. Dark colors

18. What type of material is used for the majority of interior classroom ceilings?
 - A. Acoustical tiles
 - B. Plaster
 - C. Wood
 - D. Metal
19. How often are classroom floors swept (if wood, tile or terrazzo) or vacuumed (if carpeted)?
 - A. Daily or more frequently
 - B. Weekly
 - C. Monthly
20. How often are classroom floors mopped (if wood, tile or terrazzo) or cleaned (if carpeted)?
 - A. Daily or weekly
 - B. Monthly
 - C. Annually
21. Which of the following best describes electrical service in classrooms?
 - A. There is at least one outlet per wall in each classroom, or four or more outlets.
 - B. There are two or three outlets in each classroom.
 - C. There is one outlet in each classroom.
22. Do classrooms have connections to a school-wide local area computer network?
 - A. Yes
 - B. No
23. Do classrooms have connections to a district-wide or other wide area computer network?
 - A. Yes
 - B. No

24. Do classrooms have Internet access?
- A. Yes
 - B. No
25. Do classrooms have cable connections to a central television antenna or other cable television system?
- A. Yes
 - B. No
26. Which of the following best describes classroom furniture?
- A. All classrooms have furniture that is functionally sound and facially attractive.
 - B. Though at least half the rooms may have some minor facial scars on student desks, all of the furniture is functionally sound and looks satisfactory.
 - C. Most classrooms have furniture that is either facially scarred or functionally damaged.
27. Which of the following best describes the structural characteristics of the school's classrooms?
- A. Classrooms are self-contained spaces with a door that can be closed.
 - B. Classrooms are in modified open spaces using movable partitions or furniture to identify classroom boundaries.
 - C. Classes are held in open space areas shared with other classes.
28. How would you rate the overall cosmetic conditions in the classrooms?
- A. Outstanding
 - B. Very good
 - C. Satisfactory
 - D. Needs improvement
 - E. Poor

Part 3 -General Questions relating to the school:

29. How would you rate the overall condition of the school, taking into consideration all building, classroom, and technology characteristics?
- A. Outstanding
 - B. Very good
 - C. Satisfactory
 - D. Needs improvement
 - E. Poor
30. What was the school's enrollment on March 30, 2010?
31. What percentage of the school enrollment qualified for free or reduced-price lunches on or about March 30, 2010? _
32. What is the approximate acreage of the school site? _____acres

Your contribution to this effort is greatly appreciated. If you would like to receive a summary of the results, please email your request to pmclean@vt.edu and one will be mailed to you.

This survey is derived from the Commonwealth Assessment of Physical Environment developed by Dr. Carol Cash (1993) and from the State Assessment of Facilities in Education © by Dr. Carol Cash and Dr. Glen Earthman (1995). Their assistance and support in this endeavor is acknowledged and greatly appreciated.

MEMORANDUM

DATE: July 30, 2010

TO: Glen Earthman, Paul McLean

FROM: Virginia Tech Institutional Review Board (FWA00000572, expires June 13, 2011)

PROTOCOL TITLE: A Study of the Relationship Between Building Conditions, Selected Teacher Qualifications, and Student Attendance in High and Low Performing Schools

IRB NUMBER: 10-579

Effective July 30, 2010, the Virginia Tech IRB Administrator, Carmen T. Green, approved the new protocol for the above-mentioned research protocol.

This approval provides permission to begin the human subject activities outlined in the IRB-approved protocol and supporting documents.

Plans to deviate from the approved protocol and/or supporting documents must be submitted to the IRS as an amendment request and approved by the IRS prior to the implementation of any changes, regardless of how minor, except where necessary to eliminate apparent immediate hazards to the Subjects. Report promptly to the IRS any injuries or other unanticipated or adverse events involving risks or harms to human research subjects or others.

All investigators (listed above) are required to comply with the researcher requirements outlined at <http://www.irb.vt.edu/pages/responsibilities.htm> (please review before the commencement of your research).

PROTOCOL INFORMATION: Approved as: Exempt, under 45 CFR 46.101(b) category(ies) 2 Protocol Approval Date: 7/30/2010 Protocol Expiration Date: NA Continuing Review Due Date*: NA *Date a Continuing Review application is due to the IRS office if human subject activities covered under this protocol, including data analysis, are to continue beyond the Protocol Expiration Date.

FEDERALLY FUNDED RESEARCH REQUIREMENTS: Per federal regulations, 45 CFR 46.103(1), the IRS is required to compare all federally funded grant proposals / work statements to the IRS protocol(s) which cover the human research activities included in the proposal / work statement before funds are released. Note that this requirement does not apply to Exempt and Interim IRS protocols, or grants for which VT is not the primary awardee.

The table on the following page indicates whether grant proposals are related to this IRB protocol, and which of the listed proposals, if any, have been compared to this IRS protocol, if required.

Invent the Future

VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY

An equal opportunity. affirmative action institution

Date*	OSP Number	Sponsor	Grant Comparison Conducted?

*Date this proposal number was compared, assessed as not requiring comparison, or comparison information was revised.

If this IRB protocol is to cover any other grant proposals, please contact the IRB office (irbadmin@vt.edu) immediately.

cc: File

VITA

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Defense of Doctoral Dissertation, Spring 2011
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Assistant Principal
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Planning Coordinator
Walker Academy
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Technical Education Instructor
Grant Administrator
Gloucester High School
Gloucester, Virginia