

ADEQUACY POST-ROSE V. COUNCIL FOR BETTER EDUCATION IN KENTUCKY
PUBLIC SCHOOL FACILITIES: A CASE STUDY

by

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ABSTRACT

CAROLINE FORD WILSON. Adequacy post-*Rose v. Council for Better Education* in Kentucky public school facilities: A case study (Under the direction of DR. LISA G. DRISCOLL)

The decision in the 1989 landmark Kentucky case, *Rose v. Council for Better Education*, initiated many reforms to ensure that children have access to an adequate education, including funding new construction and renovations for school facilities. The purpose of this instrumental, qualitative case study is to describe how the additional state and local funding for a selected Kentucky public school facility affected the provision of an adequate education. The term *adequacy* is used in the study to mean the fiscal sufficiency to meet a qualitative set of achievement standards required by the state as indicated in the *Rose* decision. One recently renovated middle school was purposefully selected based on its relatively lower score on the *Kentucky School Report*. Selected features: (1) security, (2) technological readiness, (3) lighting, (4) thermal comfort and (5) air quality were examined. Interviews, facility observations including photographic images, archival and contemporaneous documents, and reflexive field notes comprised the data collection. District and school administrators, teachers, and other individuals deemed knowledgeable were selected purposefully and by the snowball method for interviews. Observations focused on the five features and their relationship to teaching and learning. Classrooms were observed without students present. Document analysis was used for contextual information about the school district and the school case. Triangulated data were analyzed in an iterative and holistic process to identify common themes. Trustworthiness of the findings was established through triangulation of data,

peer debriefing, disconfirming analyses, the rich description, and field notes. The findings suggest that the additional facilities funding since the *Rose* decision created a teaching and learning environment that supported the tenets of an adequate education that previously had not been realized. Improvements that support an adequate education were found in three of the five features. Evidence of three additional building features emerged (the facility's auditorium renovations, added disability accessibility, and classroom renovations according to content area). Enhancements made to these three additional features added to the educational opportunities afforded to the students. The study adds to the knowledge base on outcomes of Kentucky reforms and the relationship between facilities and opportunities for an adequate education.

Keywords: school facilities, Kentucky, public school finance, fiscal adequacy

DEDICATION

For Henry

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CHAPTER 1: INTRODUCTION

Litigation involving public school funding is a concern in many states. The issue of whether public school students are receiving an adequate education has been an issue in the Commonwealth of Kentucky since the 1980s. Kentucky's State Supreme Court resolved this issue with the case, *Rose v. Council for Better Education* in 1989.¹ The court's decision in the case was based on Kentucky constitution's mandate that every child receive an efficient and adequate education.² The Kentucky Supreme Court decision that students in its public schools were not receiving an adequate education at that time was due to insufficient school funding. In response to the ruling the legislature increased the funding for students through the Kentucky Education Reform Act (KERA).³ Part of the increase in funding was earmarked for facility renovations of

¹ *Rose v. Council for Better Education*, 790 S.W.2d. 186 (Ky. 1989).

² Originally, the case was filed in 1988 as *The Council for Better Education v. Wilkinson*, 85 Ky. 1759, Cir. Ct. (1988). The plaintiffs, the Council for Better Education were several local boards of education and twenty-two public school districts. Wallace Wilkinson, governor of Kentucky, the State Board of Education, and the president *pro tempore* of the Senate were named as defendants. Upon appeal by State Senate President, Rose, to the Kentucky Supreme Court, the case became *Rose v. Council for Better Education*, 790 S.W.2d. 186 (Ky. 1989). For the purposes of this study, adequacy is the focus. Section 183 stated, "The General Assembly shall, by appropriate legislation, provide for an efficient system of common schools throughout the state." Kentucky Legislative Research Commission, "Ky Const § 183 General Assembly to Provide for School System," *Baldwin's Kentucky Revised Statutes Annotated*, September 23, 2012, Westlaw.

³ *The Council for Better Education v. Wilkinson*, 85 Ky. 1759, Cir. Ct. (1988), 17.; For the purposes of this dissertation, adequacy, not efficiency was examined. The KERA was passed as House Bill no. 940, General Assembly, Commonwealth of Kentucky, Regular Sess. (1990). The act is codified in KY. REV. STAT. ANN. § 156.000 The University of Kentucky, "KERA Information," *Education.uky.edu*, last modified February 18, 2010, <http://education.uky.edu/site/KERAinformation>.

regular public elementary and middle and schools.⁴ Therefore, outcomes of adequacy found in public school facilities are a direct result of the *Rose v. Council for Better Education* and the finance reforms. A prudent question exists in the aftermath of the funding of these renovations. Has receiving additional school facility funding improved the likelihood that students will receive an adequate education when compared to prior funding levels?

Statement of the Problem

How is the additional funding for public school facilities resulting from the *Rose v. Council for Better Education* case contributing to, maintaining the status quo, or diminishing the opportunity for Kentucky public school students to receive an adequate education in a selected school? To this researcher's knowledge, a physical examination of a public school facility in a selected Kentucky elementary or middle school along with the collection of observations, interviews, and contemporaneous and archival documents has not been conducted in order to decide this unresolved question. What is needed is an in-depth, qualitative investigation of *how* five purposefully selected public school facility features including security, thermal comfort, lighting, technological readiness, and air quality are related to the current provision of an adequate education when compared to the school's facilities prior to the renovation.

⁴ Most K-12 public school facilities were renovated, thus these renovations were not limited to regular elementary and middle. This study focused on regular elementary and middle schools.

What is Being Examined

In this research study five features found in the public school facilities of a purposefully selected school in one Kentucky public school district were examined to describe how the additional school facility funding post-*Rose* affected the provision of an adequate education when compared to these features in the facility prior to the renovations.

The physical assessment process of the public school facilities in Kentucky are a direct result of the case, *Rose v. Council for Better Education*, which upheld the state constitution's mandate that every child receive an efficient and adequate education. Legislation enacted as a result of the verdict in the case led to the amendment of Kentucky State Statute 157.⁵ In efforts to uphold adequacy as prescribed by the case opinion, this amendment outlined the process for evaluating and the three areas to access in the public school facilities. These areas include the physical state, educational appropriateness, and technological preparedness of the schools as they relate to state standards and guidelines.⁶ These three categories were employed in a mathematical formula to determine the weighted-score of each public regular elementary or middle school. Within these categories are features of security, thermal comfort, lighting, technological infrastructure, and air quality. Studying the current renovated status of these features in the regular public school facilities determines how the additional funding for Kentucky public school facilities scoring relatively low on the *Kentucky School Score Report* has contributed to the improvement and provision of an adequate

⁵ Kentucky Legislative Research Commission, "Kentucky Legislature: KRS 157.420," accessed January 20, 2013, <http://www.lrc.ky.gov/KRS/157-00/420.PDF>.

⁶ Kentucky Department of Education, "Facilities Assessment Project," last modified October 10, 2012, <http://education.ky.gov/districts/fac/Pages/Facilities-Assessment-Project.aspx>.

education. When examined together, these five features may be considered to be indicators of adequacy from the educators' point of view.

Research Question

As a result of the *Rose v. Council for Better Education* case, the Kentucky legislature changed the state public school finance formula in order to create an equitable and adequate educational system. After 1989, public school districts received more state funding than previously allocated for facilities renovation or new construction in order to meet the adequacy standard. The 2010 Amended Kentucky State Statute 157 mandating the evaluations of public school facilities statewide resulted in the scoring of the schools in the Commonwealth. As a result of the scoring process, low-scoring schools were renovated or rebuilt new. An unresolved question is how has the additional funding for Kentucky public school facilities scoring relatively low on the *Kentucky School Score Report* affected the provision of an adequate education?

This qualitative case study has one overall research question and three sub-questions: How did the additional facilities funding since the *Rose* decision for a Kentucky public school affect the provision of an adequate education?

1. What is the history of the school facility and its community?
2. How did the security, technological readiness, lighting, thermal comfort and air quality change from prior to the *Rose* decision and after in this school?
3. How has the opportunity for an adequate education been diminished, stayed the same, or improved on the basis of facilities renovation prior to and since the *Rose* decision?

The Support Education Excellence in Kentucky (SEEK) was formed in the process and guaranteed an amount of per pupil in all school districts in the state by raising the state's base grant, altered balancing grants, and property valuations.⁷ SEEK is the Kentucky Public School's finance formula, which is a minimum foundation formula with tiers.⁸ The Facilities Support Program of Kentucky (FSPK) was also created and ensured part of the finance formula revision allotted for schools to receive money for facility renovations and construction.⁹ The proposition that students need an improved learning environment to receive an adequate education is the reasoning behind including school facilities in the finance structure.¹⁰ In addition to funding, the legislature in 2010 mandated under the Kentucky Facilities and Inventory Classification System (KFICS) an assessment of school facilities based on the three criteria of technology, suitability, and physical condition (Figure 1).¹¹ Scored evaluations of public school facilities in

⁷ Deborah A. Verstegen, "Kentucky," In *A Quick Glance at School Finance: A 50 State Survey of School Finance Policies and Programs Vol. I: State by State Descriptions*, Center for Research and Educational Planning, University of Nevada, Reno, accessed July 16, 2013. <http://schoolfinancesdav.wordpress.com/>.

⁸ Ibid. "The revised funding formula, Support Education Excellence Kentucky (SEEK), raised the state's foundation grant, adjusted equalizing grants and property assessments so that poorer districts received a larger share of state aid, and changed the aid formula so that state funding is calculated on a per-pupil basis." (p.1)

⁹ Ibid. In order to fund building construction, renovations, and monthly mortgage responsibility, the Support Education Excellence in Kentucky (SEEK) program included a means to support facility funding known as the Facilities Support Program of Kentucky (FSPK).

¹⁰ Ibid.

¹¹ Kentucky Legislative Research Commission, "Kentucky Legislature: KRS 157.420." states, "(9) Beginning in fiscal year 2011-2012, the Kentucky Department of Education shall standardize the process for evaluating the overall quality and condition of all school buildings across the state. The evaluation process shall: (a) Result in consistent categorization of buildings for local planning purposes and for the distribution of state general fund moneys designated for capital construction; (b) Be based on measurable, objective criteria; (c) Include numerical scoring with weights to recognize building components and characteristics that address: 1. Life safety issues; 2. Compliance with state and federal codes; 3. Compliance with requirements under the Americans with Disabilities Act; 4. Community spaces; 5. Instructional areas; 6. Mechanical, electrical, plumbing, and other technology systems; 7. Site and exterior

Kentucky based on these measurements resulted in a number of schools receiving relatively low scores, leading to renovations and the rebuilding of public schools facilities.¹² How fiscal adequacy is expressed in the public school facilities was determined by physical examination of five features found in the public school facilities of regular elementary or middle schools in one representative Kentucky school district. To date, these findings are largely quantitative, focused on an economic model of decision-making, and therefore, narrowly focused on architectural features. Often the information is gathered in checklist format. A more in-depth qualitatively-focused investigation that addresses *how* the facility renovation based on five features (security, technological readiness, lighting, thermal comfort, and air quality) affected the educators' and others' perceptions of the provision of an adequate education is necessary. This study offers a specific and detailed examination of the perceptions of educational professionals. The data gathered through this process provides an account of the experiences and impressions of educators working in the school.

building conditions; 8. Age of the buildings; 9. Feasibility of building additions or major renovations; 10. The districts' facility capacities; 11. Current use of temporary facilities; and 12. Projected enrollment growth; and (d) Use of a third-party evaluator that utilizes an already established software-based system to perform the first, base-line evaluation.

¹² Kentucky Department of Education, "Facilities Inventory & Classification System Kentucky School Score Report," accessed October 22, 2012, <http://education.ky.gov/districts/fac/Documents/KFICS%20State%20Report%20School%20List%20by%20District%20School%202.pdf>.

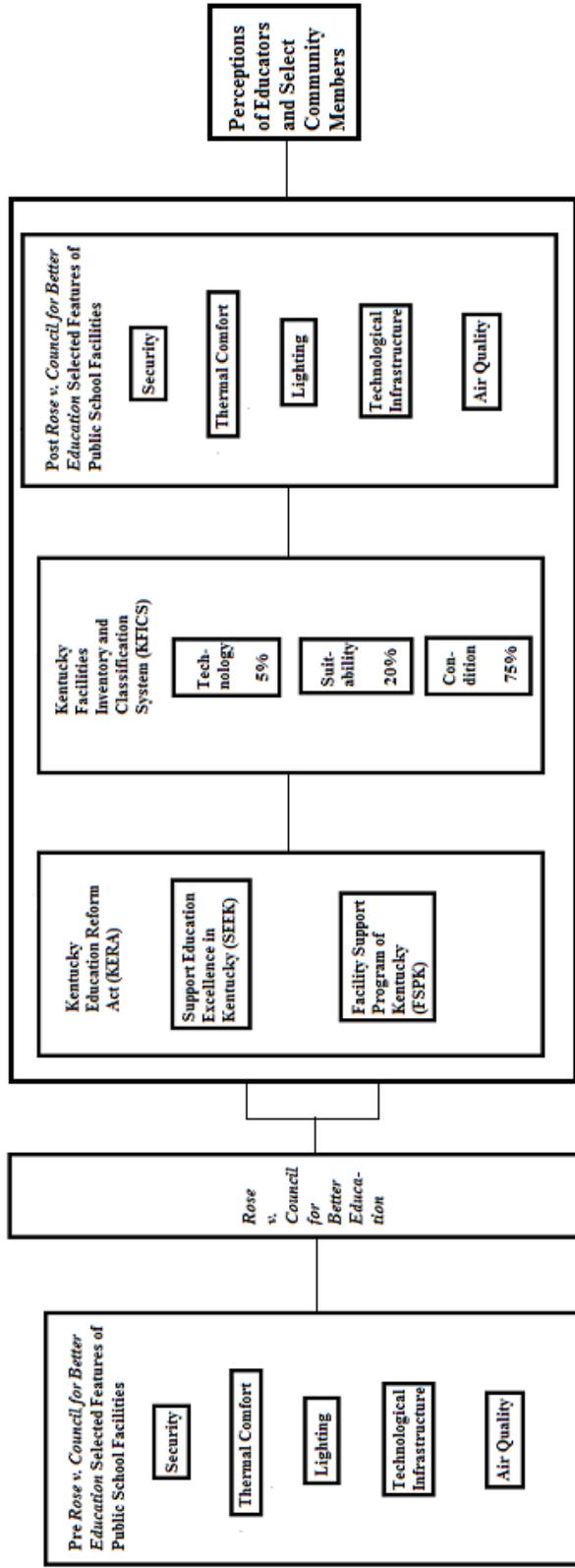


Figure 1. Conceptual framework for the study plan

Historical Background

This section discusses historical circumstances in the Commonwealth of Kentucky before and after *Rose v. Council for Better Education*.¹³ In addition to explaining aspects of state funding, national funding practices are reviewed.

Prior to *Rose v. Council for Better Education* in Kentucky, education funding levels were perceived to be lower than needed by certain public interest groups and professional associations in the Commonwealth.¹⁴ These entities argued the Commonwealth was not proportionately and equitably funding both the affluent and poor school districts of the state.¹⁵ The group held that the legislature was not upholding their constitutional duty to provide the means to achieve an adequate education.

The Kentucky Supreme Court in *Rose v. Council for Better Education* declared the entire state educational finance system unconstitutional due to the legislature's failure to sanction laws that would according to the court, "provide for an efficient system of common schools throughout the state."¹⁶ As a result of the case, the legislature restructured the public education funding formula and provided more revenue for public school facilities.¹⁷ The court's ruling led to the creation of the Kentucky Education

¹³ U.S. Government Printing Office, "Frequently Asked Questions," accessed December 12, 2012, <http://bensguide.gpo.gov/support/faqs.html>. The word Commonwealth is derived from the Anglo-Saxon word "wela" meaning "sound and prosperous state." There are no economic or legal differences between a state and a Commonwealth. Kentucky is a state and a Commonwealth.

¹⁴ A group of business and civic leaders, known as the Prichard Committee, set out to demonstrate the association between great schools and great employment. Meanwhile, a group of county and city school districts, the Council for Better Education (CBE), focused on the need for fiscal equity in the system, filing a 1985 lawsuit against the executive branch.

¹⁵ Deborah A. Verstegen and Terry Whitney, "From Courthouses to Schoolhouses: Emerging Judicial Theories of Adequacy and Equity," *Educational Policy* 11, no. 3 (1997): 339.

¹⁶ *Rose v. Council for Better Education*, 790 S.W.2d. 186 (Ky. 1989).

¹⁷ Kentucky Revised State Statute 157.310, "Declaration of Legislative Intent" stated, "It is the

Reform Act (KERA). The statute called for reform of the Kentucky educational system. The law, which aimed at creating financial adequacy and an efficient educational system, became effective June 1990.¹⁸ Six main areas of public education were the focus of the law: Governance, curriculum, technology, support services, assessment, and finance.¹⁹ Provisions put in place under KERA called for additional facility space and funding.

Since *Rose v. Council for Better Education*, the significance of adequate public school facilities has been recognized nationally and additional federal funding has been allocated, however, this development is beyond the scope of this study. Congressional leaders passed the American Recovery and Reinvestment Act of 2009 (ARRA) as a way to stimulate the economy, protect jobs, and invest in education and the economic stability of the country.²⁰ Under the ARRA, the State Fiscal Stabilization Fund (SFSF) was created in order to distribute \$48.6 billion from the United States Department of Education to state governors for local educational agency (LEA) distribution.²¹ LEAs

intention of the General Assembly to assure substantially equal public school educational opportunities for those in attendance in the public schools of the Commonwealth, but not to limit nor to prevent any school district from providing educational services and facilities beyond those assured by the state supported program. The program shall provide for an efficient system of public schools throughout the Commonwealth, as prescribed by Section 183 of the Constitution of Kentucky, and for the manner of distribution of the public school fund among the districts and its use for public school purposes, as prescribed by Section 186 of the Constitution.” Kentucky Legislative Research Commission, “Kentucky Revised State Statute, 157.310,” *Declaration of Legislative Intent*, accessed January 10, 2013, <http://www.lrc.ky.gov/KRS/157-00/310.PDF>.

¹⁸ Ibid.

¹⁹ Ibid.

²⁰ 111th U.S. Congress, “American Recovery and Reinvestment Act of 2009,” 123 STAT. 115, accessed on November 30, 2012, <http://www.gpo.gov/fdsys/pkg/BILLS-111hr1enr/pdf/BILLS-111hr1enr.pdf>.

²¹ U.S. Department of Education, “General: State Fiscal Stabilization Fund,” *Ed.gov*, last modified March 15, 2010, <http://www2.ed.gov/policy/gen/leg/recovery/factsheet/stabilization-fund.html>.; According to the U.S. Department of Education, a local educational agency (LEA) is “a public board of education or other public authority legally constituted within a State for either administrative control or direction of, or to perform a service function for, public elementary schools or secondary schools in a city, county,

(also called school districts) could use the funds to assist in modernizing, renovating, and repairing public school facilities.²²

Significance of the Study

This study was necessary for various reasons. Prior to this study, research had not been conducted in Kentucky regarding the money the state spent on facility renovations as a result of the *Rose* case. A question remained how the facility renovations in the state affected a student's right to an adequate education as prescribed by the Kentucky Supreme Court. It had not been determined if the facility renovations in the state had made a student's education more adequate. The question of whether there has been an improvement in adequacy based on facility renovations had not been answered. This study resulted in findings that led to conclusions that contribute to the field of education. Information gathered assisted in the researcher's determination if the school renovations had provided a more adequate education for the students than prior to the renovations.

township, school district, or other political subdivision of a State, or for a combination of school districts or counties that is recognized in a State as an administrative agency for its public elementary schools or secondary schools." U.S. Department of Education, "Definitions," accessed January 15, 2013, <http://www.ed.gov/race-top/district-competition/definitions>.

²² Ibid.; Nationwide, public school facilities are in need of repair. The U.S. Government Accounting Office released a report in 1995 explaining one-third of all school buildings in the country were in poor condition. "U.S. General Accounting Office," "School Facilities: Conditions of America's Schools," accessed November 30, 2012, <http://www.gao.gov/assets/230/220864.pdf>.

By 2004 more than 12,000 public school facilities were built and 130,000 were renovated. Conversely, the wealthiest public school districts spent the most on public school facilities at an average rate of \$9,361 per student in relation to the least wealthy public school districts which spent an average of \$4,800 per student. Mary W. Filardo, et. al., "Growth and Disparity: A Decade of U.S. Public School Construction," accessed July 19, 2013, <http://www.eric.ed.gov/PDFS/ED498100.pdf>.

In 2000, to determine the need for public school building structures, the National Education Association found that \$322 billion was necessary to repair existing schools and build new schools in efforts to make them suit student's educational needs. National Education Association, "Modernizing Our Schools: What Will It Cost?" accessed November 30, 2012, http://www.educationworld.com/a_issues/issues078.shtml.

Therefore, public school facility renovation has national interest. This case study is narrowly-focused and explored the public school facility funding influence on a school district in Kentucky as a result of the *Rose v. Council for Better Education* case.

I chose this topic to research based on my interest in education law and public school facilities. The courts are where our laws are made and upheld, and the decisions made in the courtroom affect the lives of many. The case referred to in the present study, *Rose v. Council for Better Education* was particularly interesting since it provided money to schools across the state of Kentucky.²³ I found it notable that less affluent districts, which had facilities in very poor condition prior to the case, now had completely renovated or even new school facilities. Students no longer were educated in sub optimal public school facilities, effectively penalized due to the demographics of their community.

It was vital to go to the school site in the case study instead of simply requesting documents and district facility assessment reports for review; there were stories to be told by the educators that used the space and interacted with the students daily. Their voices shed light on the results of the facility renovations as they pertain to students receiving an adequate education. Facility assessment sheets do not provide the entire picture. In addition, it was important for me to be able to validate what participants told me during the interview process and what the documents stated. By being present in the facility during the case study, making observations, and taking field notes, I was able to corroborate these two methods of data gathering. I arrived to the case study site without preconceived notions or anything to gain or lose based on the findings. The outcome of the study would not benefit me in any manner; therefore, I was able to honestly report my conclusions.

²³ The financial restructuring of the funding formula for schools was only one part of the results of the case.

Definition of Terms

Public School Facility

A public school facility is a structure where students are physically present in an environment housing instructional and correlated activities related to the education of students.²⁴ Construction of such buildings involves the planning and implementation process overseen by architects, local school boards, school superintendents, and county commissioners or other officials.

Fiscal Equity

Fiscal equity is a concept that encompasses many definitions across the states. Broadly speaking, fiscal equity rests on the premise that equal opportunity for access to public education regardless of a person's geographical location within a state is necessary and fair.²⁵

The measurement of fiscal equity among school districts or pupils in a state relies on statistical measures of combined state and local funding. These statistics include measures of central tendency, measures of dispersion, and measures of wealth neutrality with regard to per pupil revenue and/or expenditures. These statistics were applied at either the district level or the pupil level utilizing tenets of horizontal equity (equal funding of similarly situated students) and vertical equity (differential funding treatment of students whose needs are greater).²⁶ Since equity analyses are based on differences

²⁴ National Center for Education Statistics, "Facilities Information Management: A Guide for State and Local Education Agencies", 2003, http://nces.ed.gov/forum/pub_2003400.asp.

²⁵ Robert Berne and Leanna Stiefel, *The Measurement of Equity in School Finance: Conceptual, Methodological, and Empirical Dimensions* (Baltimore: Johns Hopkins University Press, 1984), 11.

²⁶ *Ibid.*, 13.

among districts with regard to per pupil revenue on expenditures, there is an implicit assumption that per pupil amounts should not be widely disparate.²⁷

Beginning with the successful challenge of *Serrano v. Priest*, 18 Cal.3d. 728 (1976) (*Serrano I*) against the state of California, the constitutionality of public school funding has been litigated at least once by plaintiff school districts and children claiming that the state violated their constitutional rights by creating or sustaining inequitable disparities in per pupil funding. To date, this litigation has been decided for the plaintiffs in twenty-eight states.²⁸

Fiscal Adequacy

Closely related to fiscal equity, the concept of fiscal adequacy of public school funding addresses the equity assumption that per pupil revenue or expenditures not be disparate. Rather, fiscal adequacy as related to per pupil funding suggests that the amount of funding needed for the student to reach some qualitative standard of achievement be provided. Thus, the amount of funding needed to reach a standard is the salient threshold rather than equitable amounts of funding.

For the conduct of this study, the term *adequacy* is used to mean the fiscal sufficiency to meet a qualitative achievement standard required by the state, either by policy promulgated by its state board of education, or in state statute. Although these are instances in which “adequacy” is applied to a physical, suitable or technological standard in a public school facility—that was not the context applied in this study.

²⁷ *Ibid.*, 14.

²⁸ National Education Access Network, “Equity and Adequacy School Funding Liability Court Decisions,” accessed on September 25, 2012, <http://schoolfunding.info/wp-content/uploads/2011/07/‘Equity’-and-‘Adequacy’-School-Funding-Decisions-by-Outcome1.pdf>.

In 1989, the Kentucky Supreme Court upheld the District Court's decision in *Rose v. Council for Better Education*, by stating that an efficient system of education must have as its goal to provide each and every child with minimum levels of knowledge and skill in order for that child to receive an adequate education in the state.²⁹

Public school funding litigation in Kentucky, California, and Colorado filed on the basis of violation of the equal protection clauses in the respective state constitutions incorporated the fiscal adequacy concept. The adequacy litigation linked the achievement of educational outcomes to the condition of school facility, which allowed for facility renovation and new construction in the remedy phase.

Opportunity for An Adequate Education

As previously mentioned, the term *adequacy* in this study pertains to the fiscal sufficiency to meet predetermined standards. Educational opportunities for meeting these standards refers to the prospects and avenues students have to achieve these guidelines.

Limitations of the Study

This research study has the following limitations which may be threats to external validity³⁰:

1. The generalization of the study conclusions is determined by the reader.

Information regarding the study procedures, methods, and outcomes has been provided in order for the reader to determine how representative the case is of other school facilities.

²⁹ *Rose v. Council for Better Education*, 790 S.W.2d. 186 (Ky. 1989).

³⁰ External validity are threats to the extent the case study is generalizable to other situations. The researcher cannot control for these threats.

2. The information and perceptions obtained from interviews with selected individuals may be limited in their accuracy and reliability. While efforts were made to determine the accuracy and reliability of responses, potential problems: (1) the length of time passed since prior to and after the incidents queried may affect respondent recollections; (2) the respondents may have not possessed direct knowledge pertaining to the question(s); and (3) respondents may have wished to present the school district and their own actions in the most positive context. While I had no control over interviewees' perceptions, steps were taken to control external threats to validity. I triangulated the data collected through various methods in order to verify the validity of respondent's perceptions. Methods utilized included participant interviews, documents collected for evidence, on-site observations, and field notes taken.

Delimitations of the Study

This research study has the following delimitations which may be threats to internal validity³¹:

1. Evidence gathered from participants does not include contemporaneous accounts from 1937 when the school facility was originally built. Individuals during from this time period were unavailable to participate in the study.
2. The study does not address or employ a fiscal equity analysis among the public school districts. This type of analysis was beyond the scope of the study.

³¹ Internal validity is the extent to which a causal conclusion is reasonable. The researcher can control for these threats.

3. The study does not directly focus on the link between student achievement and public school facilities, class size, or students who had “Head Start”³² and those who did not. This study was focused on public school facilities and indicators of adequacy.
4. The study does not focus on the funds contributed by the American Recovery and Reinvestment Act of 2009 (ARRA) as a way to modernize, renovate, and repair public school facilities. This study focused on funding specifically provided by the state of Kentucky.

Organization of the Study

This study is organized into five chapters. Chapter 1 includes the overview, historical background, statement of the problem, what is being examined, research questions, definition of terms, limitations, and organization of the study.

Chapter 2 encompasses a review of relevant literature to include an overview of public school funding in the United States, including Kentucky, the concepts of fiscal equity and adequacy with application to facilities, and the policy and procedures developed in Kentucky to distribute state funding to the most needy situations. Following this section, a discussion of the recent research literature pertaining to each of the five school facility features (security, technological infrastructure, lighting, thermal comfort, and air quality) is presented. Although this study does not directly investigate the relationship between the quality of school facilities and students’ academic achievement, because adequate educational outcomes encompasses academic achievement among other outcomes, a short

³² Head Start is a federal program run by the U.S. Department of Health and Human Services. It provides education, health, and nutrition to low-income children and their families.

discussion of the former is provided. In Chapter 2 the resources utilized include research studies, historical accounts, case law, key concepts, state and federal statutes, state constitutions, policies and government documents.

Chapter 3 explains the methodology used in the study. As with many qualitative case studies an inductive approach is assumed. The case recruitment and selection process, the methods of interviewing, observations, contemporaneous and archived document search and use are described. The data analysis and trustworthiness strategies employed are described.

Chapter 4 presents the findings from the data with attention to trustworthiness strategies including data triangulation, of the interviews, observations, document analysis and reflexive field notes. Where appropriate, selected photographic images of the school facility have been included. Specific elements of the data analysis including themes derived from the coded interviews with the district and school administrators, teachers and others, the retrospective and contemporary analysis, and the methods used to ensure trustworthiness, including disconfirming findings, are discussed.

Chapter 5 presents the conclusions based on the analysis of the research data. Implications for policy and recommendations for future studies are introduced.

CHAPTER 2: LITERATURE REVIEW

This chapter demonstrates the relationship between current policies, laws, research and how the additional money for public school facilities resulting from the *Rose v. Council for Better Education* decision contributes to what Kentucky determined to be necessary for public school students to receive an adequate education.³³

A physical examination of a public school facility in a selected Kentucky public school along with the collection of visual evidence, interviews, and archival documents has yet to be conducted in order to decide this unresolved question. Security, technological readiness, lighting, thermal comfort and air quality features prior to and after the renovation were examined by collecting the perceptions and experiences of school administrators, teachers, and selected community members. The data gathered assisted in determining how the additional funding for Kentucky public school facilities improved the likelihood that students will receive an adequate education when compared to prior funding levels.

³³ *Rose v. Council for Better Education*, 790 S.W.2d. 186 (Ky. 1989).

Public School Funding in the United States

School Funding History Overview

System-wide school funding did not begin in the United States until 1890.³⁴ At this time, approximately \$34 million dollars in funding was being provided to public schools.³⁵ However, it would take the publication of Ellwood P. Cubberley's book for great interest in state aid for public education to take hold nationally. In 1906 Cubberley published *School Funds and Their Apportionment*.³⁶ Cubberley studied funding distribution structures and concluded public school financial reform was necessary in two-thirds of the states.³⁷ He noted inadequate funding was being allocated to smaller schools in these states while schools in the larger cities were receiving adequate funding.³⁸ He favored a revision of the apportionment plan which would lead to *equality and equalization* in these states so that those needing funding could receive a larger proportion.³⁹

Other scholars would follow Cubberley's lead and extend his approach to *equality and equalization* to include local county contributions. In 1922 Harlan Updegraff introduced

³⁴ David C. Thompson, R. Craig Wood, and Faith E. Crampton, *Money and Schools*, (New York: Larchmont, 2008), 83.

³⁵ Ibid.

³⁶ Ellwood P. Cubberley, *School Funds and Their Apportionment: A Consideration of the Subject With Reference to a More General Equalization of Both the Burdens and the Advantages of Education*, (New York: Columbia University, 1905).

³⁷ Ibid.

³⁸ Ibid.

³⁹ Ibid.

the concepts of *equalization* and *reward for tax effort*.⁴⁰ In this plan, local public school districts were able to collect additional state assistance by taxing themselves at greater rates.⁴¹ A year later, George D. Strayer and Robert Haig advanced Cubberley's notion of *equality and equalization* to include *minimum educational opportunity*.⁴² Strayer and Haig maintained the state funding should also include a degree of program fairness and be accessible under *uniform tax effort*.⁴³ The outcome was the creation of foundation programs where the state guaranteed a financial and educational foundation on which local public school districts could build.⁴⁴ In 1924 Paul R. Mort added the concept of the *weighted pupil* to Strayer and Haig's *minimum educational opportunity* idea.⁴⁵ He reasoned educational programs should differ in costs in order to be equal. In order to fund public school districts more equally, the criteria should vary in efforts to determine the exact educational costs, rather than fund without thought.⁴⁶ These models and ideas were widely accepted in the initial planning phase of state public school funding.⁴⁷ However, the views of Henry Morrison in 1930 were not popular back then and continue to remain unpopular. He favored the elimination of public school districts in place of a

⁴⁰ Harlan Updegraff, *Rural School Survey of New York State: Financial Support*, (New York: Forgotten Books, 2012).

⁴¹ Ibid.; Thompson, Wood, and Crampton, *Money and Schools*, 84.

⁴² George D. Strayer and Robert M. Haig, *The Financing of Education in the State of New York*, vol. 1 (New York: Macmillan, 1923).

⁴³ Ibid.; Thompson, Wood, and Crampton, *Money and Schools*, 84.

⁴⁴ Ibid.

⁴⁵ Paul R. Mort, *The Measurement of Educational Need*, (New York: Columbia Teachers College, 1924).

⁴⁶ Ibid.; Thompson, Wood, and Crampton, *Money and Schools*, 84.

⁴⁷ Thompson, Wood, and Crampton, *Money and Schools*, 84.

state takeover.⁴⁸ Morrison argued the fact that public education ultimately was controlled by the state, fiscal inequality would not be solved until tax base rates and educational programs were completely state run.⁴⁹

In modern times, localities contribute a percentage of the money spent for public education in their district. Each state's department of education with the exception of Hawaii sends additional money to the districts based on state-tailored finance formulas. The federal government provides the least out of the three in allocating money from federal programs and the U.S. Department of Education initiatives. Currently, public schools rely on operating and capital funding to function.⁵⁰ Operating funds pay for recurring aspects of the educational system. Teachers, administrators, materials, books, and utilities are included in this category.⁵¹ Funds are generated by taxes and other sources of public revenue.

Capital funds are utilized to pay for physical assets of public education with multi-year use.⁵² Facilities, land, equipment, and furniture are included.⁵³ Historically, these funds are borrowed and paid back over time with annual revenues.⁵⁴

⁴⁸ Henry C. Morrison, *School Revenue*, (Chicago: University of Chicago Press, 1930).

⁴⁹ *Ibid.*; Thompson, Wood, and Crampton, *Money and Schools*, 84.

⁵⁰ National Clearing House for Educational Facilities, "State Capital Spending on PK-12 School Facilities," accessed September 25, 2012, http://www.ncef.org/pubs/state_capital_spending_on_school_facilities.pdf.

⁵¹ *Ibid.*

⁵² *Ibid.*

⁵³ *Ibid.*

⁵⁴ *Ibid.*

Fiscal Equity and Adequacy

In public education fiscal equity pertains to the principle that equal opportunity for access to public education irrespective of a student's geographical location within a state is essential and fair.⁵⁵ In other words the treatment of students is not based on variances of wealth, income, or power. Lord John Emerich Edward Dalberg-Acton, the politician and writer noted fiscal equity as a hallmark of the United States' absence of class separation. Acton wrote, "a child is not born to the station of its parents, but with an indefinite claim to all the prizes that can be won by thought and labor. It is in conformity with the theory of equality...to give as near as possible to every youth an equal state in life."⁵⁶ Many states rely on property taxes to fund school facilities. This reliance is vulnerable to funding insufficiencies in localities where the property rates are higher when compared to wealthier areas. States have sought solutions through finance formulas to offset these inequalities. Despite these measures, the speed of finance restructuring has not kept up with current expenses, leading to imbalances, and therefore inequity.⁵⁷

Fiscal equity can be measured in relation to horizontal and vertical equity.⁵⁸

Horizontal equity is the equal treatment of equals, meaning that those who have the same

⁵⁵ Robert Berne and Leanna Stiefel, *The Measurement of Equity in School Finance: Conceptual, Methodological, and Empirical Dimensions*, 11.

⁵⁶ Lord John Emerich Edward Dalberg-Acton, quoted in Hickrod, George Alan Karnes Wallis Hickrod, "A Reply to the "Forbes" Cover Story or The Political Theory of School Finance Revisited: A Victorian Essay," *J. Educ. Fin.* 12 (1987): 451.

⁵⁷ Ben Levin, "Approaches to Equity in Policy for Lifelong Learning," *The Organisation for Economic Co-operation and Development*, (2003): 5.

⁵⁸ Berne and Stiefel, *The Measurement of Equity in School Finance: Conceptual, Methodological, and Empirical Dimensions*, 13.

needs get the same treatment.⁵⁹ Students in districts across a state would receive equal funding per pupil if the students were of equal skill level, preparation, and level of need.⁶⁰ This type of equity has two limitations. First, needs and the cost to fill the needs of students vary across the districts and among educational facilities.⁶¹ Second, funding that is equalized across districts but is considered deficient is not satisfactory.

Vertical equity is the acknowledgment that equal treatment is not consistently fair for students who are in poverty or are disabled physically or mentally.⁶² Therefore, this position on equity supports unequal treatment of unequals.⁶³ A district following this philosophy provides supplementary funding to those students who need it instead of providing all students the same amount.⁶⁴

Fiscal adequacy pursues the extent of resources necessary to meet set standards or accomplish certain outcomes for students.⁶⁵ Additional funding to bring the low socioeconomic community schools equal resources and support as the high-SES schools would convey adequacy.

⁵⁹ Richard A. King, Austin D. Swanson, and Scott R. Sweetland, "Designing Finance Structures to Satisfy Equity and Adequacy Goals," *Education Policy Analysis Archives* 13, no. 15 (2005): 2.

⁶⁰ William J. Glenn, et al., "The Equity of School Facilities Funding: Examples from Kentucky," *Education Policy Analysis Archives* 17, no. 14 (2009): 3.

⁶¹ Ibid.

⁶² King, et al., *Education Policy Analysis Archives*, 2.

⁶³ Ibid.

⁶⁴ Glenn, et al., *Education Policy Analysis Archives*, 4.

⁶⁵ Gregory C. Malhoit and Derek W. Black, "The Power of Small Schools: Achieving Equal Educational Opportunity through Academic Success and Democratic Citizenship," *Nebraska Law Review* 82 (2003): 2.; King, et al., *Education Policy Analysis Archives*, 2.

Waves of Adequacy and Fiscal Equity Legal Challenges Regarding School Funding

Historically, the United States public schools finance litigation has been divided into waves.⁶⁶ The first wave, occurring between 1971 and 1973 involved litigation based on fiscal equity and the equal protection clause of the federal constitution.⁶⁷ The California Supreme Court in the 1971 *Serrano v. Priest* case provided the central fiscal equity argument utilized in succeeding victorious cases. At the time of the suit, public education funding in California was funded from property taxes from local school districts. Lower wealth districts had to levy a tax rate higher than wealthier districts, yet brought in less money. The disproportionate financial allocation per pupil was inequitable and therefore unconstitutional.⁶⁸ The California Supreme Court held California's public school funding system was in violation of the United States Constitution's Fourteenth Amendment guarantee of equal protection.⁶⁹

The second wave of school finance litigation taking place from 1973 until 1989 remained centered around fiscal equity; however, the legal reasoning shifted to equal protection clauses and education articles present in the individual state's constitution.⁷⁰

⁶⁶ William E. Thro, "The Third Wave: The Impact of the Montana, Kentucky, and Texas Decisions on the Future of Public School Finance Reform Litigation," *Journal of Law and Education* 19, (1990): 222.

⁶⁷ *Ibid.*

⁶⁸ *Serrano v. Priest*, 18 Cal.3d. 728 (1976) "Substantial disparities in expenditures per pupil among school districts cause and perpetuate substantial disparities in the quality and extent of availability of educational opportunities. For this reason the school financing system before the court fails to provide equality of treatment to all the pupils in the state. Although an equal expenditure level per pupil in every district is not educationally sound or desirable because of differing educational needs, equality of educational opportunity requires that all school districts possess an equal ability in terms of revenue to provide students with substantially equal opportunities for learning."

⁶⁹ *Ibid.*

⁷⁰ Verstegen and Whitney, "From Courthouses to Schoolhouses: Emerging Judicial Theories of Adequacy and Equity," 333.

San Antonio Independent School District v. Rodriguez (1973) was an unsuccessful legal attempt at fiscal equity in Texas that ended in the United States Supreme Court.⁷¹ The United States Supreme Court held although education is of utmost importance, it is a state responsibility and not guaranteed in the Constitution of the United States under the equal protection clause.⁷² State taxation funding public schools and education reforms are for the state to oversee, thus it is not a federal matter.⁷³ Since this opinion, funding challenges have been advanced in the state courts and centered around the establishment of the state's constitutional guarantee of an education.⁷⁴

The 1973 New Jersey case, *Robinson v. Cahill* was the first to render the state's educational finance system unconstitutional under these provisions as it failed to be "thorough and efficient."⁷⁵ The New Jersey Supreme Court found that the state finance system created a disproportionate situation among school districts with public education revenue relying on property values. Wealthier districts were collecting a disproportionate amount of money to use towards education when compared to the less affluent districts; therefore the state was not "efficient" as required in the state constitution.⁷⁶

The third wave of finance litigation began in 1989, focusing on adequacy and the state constitutions.⁷⁷ In light of court rulings favoring plaintiffs, states nationwide overhauled

⁷¹ *San Antonio Independent School District v. Rodriguez*, 411 U.S. 1 (1973).

⁷² *Ibid.*; Thro, *Journal of Law and Education*, 225.

⁷³ *San Antonio Independent School District v. Rodriguez*, 411 U.S. 1 (1973).

⁷⁴ *Ibid.*

⁷⁵ *Robinson v. Cahill*, 303 A.2d. 273 (N. J. 1973).; Versteegen and Whitney, *Educational Policy*, 334.

⁷⁶ *Ibid.*

⁷⁷ Versteegen and Whitney, *Educational Policy*, 338.

their financial systems to ensure greater fiscal equity.⁷⁸ Funding in many situations was equal across districts; however, it was not adequate.⁷⁹ Plaintiffs sought legal challenges against states based on violations of the state constitution by not providing a “sufficient” education as indicated.⁸⁰

In 1989 finance and educational law expert witnesses were brought in to discuss national rankings, school facility conditions, and funding discrepancies in Kentucky in *Rose v. Council for Better Education*. Justice Ray Corns, the presiding judge in the case recalls that many schools did not have indoor plumbing or libraries, nor did they offer advanced math, foreign language, and biology classes.⁸¹ The Kentucky Supreme Court declared the then, state educational finance system unconstitutional due to the legislature’s failure to sanction laws that would according to the court, “provide for an efficient system of common schools throughout the state.”⁸²

The 1989 Texas case, *Edgewood v. Kirby* noted the educational programs in poverty-stricken districts were not equal to those offered in affluent districts.⁸³ Unequal funding was also recognized in the New Jersey 1994 case, *Abbott v. Burke*, where the court ordered parity expenditures between the poor districts and affluent districts.⁸⁴ In 1997 the

⁷⁸ Michael A. Rebell and Jessica R. Wolff, “Litigation and Education Reform: The History and Promise of the Education and Adequacy Movement,” *The Campaign for Educational Equity* (2006): 12.

⁷⁹ William E. Thro, “Judicial Analysis During the Third Wave of School Finance Litigation: The Massachusetts Decision as a Model,” *Boston College Law Review* 35 (1994): 603.

⁸⁰ Verstegen and Whitney, *Educational Policy*, 338.

⁸¹ *The Council for Better Education v. Wilkinson*, 85 Ky. 1759, Cir. Ct. (1988).

⁸² *Rose v. Council for Better Education*, 790 S.W.2d. 186 (Ky. 1989).

⁸³ *Edgewood v. Kirby*, 777 S.W. 2d. 391 (Tex. 1989).

⁸⁴ *Abbott v. Burke*, 100 N.J. 269 (1985).

Ohio Supreme Court ruled the financial system unconstitutional, citing its failure to offer statewide educational system in *DeRolph v. State*.⁸⁵ The court also indicated that many of the school buildings were unsafe and found that a mere 20% of the facilities were disability accessible.⁸⁶

Across the country since the third wave of litigation began, there have been numerous funding lawsuits. Specifically, 44 states have had financial suits based on fiscal equity and/or adequacy arbitrated in state courts.⁸⁷ In 28 of these states, the plaintiffs won which meant that their current state public school finance system was found to be unconstitutional.⁸⁸ In the 11 states in which the defendant won, the state finance system was deemed constitutional. It is also important to note out of the 44 states mentioned, several have had multiple legal challenges.

These legal challenges illustrate the importance of public education funding nationally. Kentucky is among many other states that has dealt with the legality surrounding the issue of fiscal equity and/or fiscal adequacy of state education finance systems. Beyond the legal challenges the question remains how has the reallocation of money influenced student education? Specifically, how the additional funding for Kentucky public school facilities scoring relatively low on the *Kentucky School Score Report* has contributed to the improvement and provision of an adequate education?

⁸⁵ *DeRolph v. State*, 78 Ohio St.3d. 193 (1997).

⁸⁶ *Ibid.*

⁸⁷ National Education Access Network, "Litigations Challenging Constitutionality of K-12 Funding in the 50 States," accessed on September 25, 2012, <http://schoolfunding.info/wp-content/uploads/2011/07/Litigations-Challenging-Constitutionality-of-K-12-Funding7.pdf>.

⁸⁸ *Ibid.*

School Funding History in Kentucky

A historical review of what transpired in public school funding in the state of Kentucky prior to the case, *Rose v. Council for Better Education*, is necessary to fully appreciate the problem at hand. The condition of the state finance formula for public education and the wording of the state constitution are integral factors of the lawsuit. The reforms made to the finance formula as a result of the litigation led to the current conditions of the public schools. The study examined these conditions to determine how the additional funding received contributed to the provision of an adequate education.

Constitutional History

Kentucky has had four constitutions. The first Constitution was adopted by the U.S. Congress in 1792 when Kentucky moved from being a county of Virginia to statehood. The constitution underwent three revisions, the second Constitution was completed in 1799, the third Constitution was written in 1850 and the fourth Constitution was finalized in 1891.⁸⁹ It is important to discuss the constitutions, because in the public finance of education, what the constitutions say, specifically, is vital to the provision of public education in the state.

The first constitution (1792) of the state of Kentucky as with many other state constitutions at the time did not include language referencing public education. During this period in southern history, there was no compulsory education, although common schools were prevalent. Moreover, it covered the basic structure of the government in the

⁸⁹ Kentucky Legislative Research Committee, "Planning for School Facilities Can Be Improved To Better Serve the Needs of All Students," no. 341, (2006): 1.

state.⁹⁰ The document divided the government into three branches, the legislative, executive, and judicial.⁹¹ The second constitution of the state of Kentucky written in 1799 also did not contain language referencing public education.⁹²

The 1850 Kentucky constitution contained an Article on education. Article XI §1 provided that the state may raise funds for education by tax collection.⁹³ The section also instructed the General Assembly to invest money for education.⁹⁴ Article XI §2 declared a Superintendent of Public Instruction be elected at the same time the Governor is elected and serve a four year term.⁹⁵

The fourth constitution of Kentucky is the most current version and was completed in 1891. Ratification of this constitution followed the American Civil War and the additions

⁹⁰ Kentucky Legislative Research Commission, “First Constitution of Kentucky (1792),” *Baldwin’s Kentucky Revised Statutes Annotated*, September 23, 2012, Westlaw.

⁹¹ *Ibid.*

⁹² Kentucky Legislative Research Commission, “Second Constitution of Kentucky (1799),” *Baldwin’s Kentucky Revised Statutes Annotated*, September 23, 2012, Westlaw.

⁹³ Kentucky Legislative Research Commission, “Third Constitution of Kentucky (1850),” *Baldwin’s Kentucky Revised Statutes Annotated*, September 23, 2012, Westlaw. Article XI § 1 of the constitution stated, “The capital of the fund called and known as the “Common School Fund,” consisting of one million two hundred and twenty-five thousand seven hundred and sixty-eight dollars and forty-two cents, for which bonds have been executed by the State to the Board of Education, and seventy-three thousand five hundred dollars of stock in the Bank of Kentucky; also the sum of fifty-one thousand two hundred and twenty-three dollars and twenty-nine cents, balance of interest on the school fund for the year 1848, unexpended, together with any sum which may be hereafter raised in the State by taxation or otherwise for purposes of education, shall be held inviolate, for the purpose of sustaining a system of common schools. The interest and dividends of said funds, together with any sum which may be produced for that purpose by taxation or otherwise, may be appropriated in aid of common schools, but for no other purpose.”

⁹⁴ *Ibid.* Article XI § 1 of the constitution stated, “The General Assembly shall invest said fifty-one thousand two hundred and twenty-three dollars and twenty-nine cents in some safe and profitable manner; and any portion of the interest and dividends of said school fund, or other money or property raised for school purposes, which may not be needed in sustaining common schools, shall be invested in like manner. The General Assembly shall make provision, by law, for the payment of the interest of said school fund: provided, that each county shall be entitled to its proportion of the income of said fund, and if not called for, for common school purposes, it shall be reinvested from time to time for the benefit of such county.”

⁹⁵ *Ibid.*

of the Fourteenth Amendment to the United States Constitution.⁹⁶ Sections 1 and 3 of the Kentucky state constitution reflect this change. Section 1 states,

All men are, by nature, free and equal, and have certain inherent and inalienable rights, among which may be reckoned: First: The right of enjoying and defending their lives and liberties. Second: The right of worshipping Almighty God according to the dictates of their consciences. Third: The right of seeking and pursuing their safety and happiness. Fourth: The right of freely communicating their thoughts and opinions. Fifth: The right of acquiring and protecting property. Sixth: The right of assembling together in a peaceable manner for their common good, and of applying to those invested with the power of government for redress of grievances or other proper purposes, by petition, address or remonstrance. Seventh: The right to bear arms in defense of themselves and of the State, subject to the power of the General Assembly to enact laws to prevent persons from carrying concealed weapons.⁹⁷

Section 3 of the constitution states,

All men, when they form a social compact, are equal; and no grant of exclusive, separate public emoluments or privileges shall be made to any man or set of men, except in consideration of public services; but no property shall be exempt from taxation except as provided in this Constitution, and every grant of a franchise, privilege or exemption, shall remain subject to revocation, alteration or amendment.⁹⁸

Education clauses are detailed in sections 183 through 189 of the constitution.⁹⁹

Section 183 stated, "The General Assembly shall, by appropriate legislation, provide for an efficient system of common schools throughout the state."¹⁰⁰

⁹⁶ National Archives, "Charters of Freedom; Constitution of the United States," *Archives.gov* accessed October 12, 2012, http://www.archives.gov/exhibits/charters/constitution_amendments_11-27.html.

⁹⁷ Kentucky Legislative Research Commission, "Kentucky Legislature: Kentucky Constitution," accessed January 15, 2013, <http://www.lrc.ky.gov/Legresou/Constitu/list1.htm#Bill of Rights>.

⁹⁸ *Ibid.*

⁹⁹ *Ibid.*

¹⁰⁰ Kentucky Legislative Research Commission, "Ky Const § 183 General Assembly to Provide for School System."

These sections are vital to the Kentucky Supreme Court's decision in *Rose v. Council for Better Education*. The Kentucky Supreme Court found students in low wealth public school districts were deprived of equal protection of the laws as assured by Sections 1 and 3 of the Kentucky Constitution.¹⁰¹ The Court also found the then public education finance method violated Section 183 of the Kentucky Constitution.¹⁰²

Legislative History

In 1930 the Kentucky legislature passed a mandate directing school funding money placement in an equalized fund for expanding per-pupil disbursements in low standard school districts as discussed in Table 1.¹⁰³

¹⁰¹ *Rose v. Council for Better Education*, 790 S.W.2d. 186 (Ky. 1989).

¹⁰² *Ibid.*

¹⁰³ *Ibid.*

Table 1. History of Kentucky school funding timeline

Year	Action
1930	KS 4364, KS 4399a-8, KS 4434a-14a law that directed school funding money placement in an equalized fund to expand per-pupil disbursements in low standard school districts.
1932	<i>Talbott v. Kentucky State Board of Education</i> invalidated KS 4364, KS 4399a-8, KS 4434a-14a.
1941	Section 186 amended and allowed 10% of state money to be used for equalizing intentions.
1944	State money to be used for equalizing intentions was increased to 25%.
1952	The per capita requirement was removed from Section 186 of the Constitution.
1954	The Kentucky legislature created the Minimum Foundation Program (MFP).
1965	The court found in <i>Russman v. Lockett</i> the state constitution required property assessment at 100% of its fair market value, no greater.
1966	House Bill 1 passed in legislature that reduced property tax rates respectively to balance the court mandated rise in assessment rates. The legislature permitted school systems to charge one of the following taxes: 1) work-related tax on earnings and revenues; 2) a tax on total utility receipts; or 3) a tax on income.
1976	The legislature transferred the tax collection process to the state. The legislature also passed the Power Equalization Program (PEP).
1979	House Bill 44 passed in the legislature that mandated school districts decrease tax rates on real property annually so proceeds would not surpass the prior year's proceeds by more than 4%.
1981	Financial records outlined a statewide tax rate decline at 33% from the time the bill of 1979 was sanctioned until 1981, the year the <i>Rose v. Council for Better Education</i> case was filed in Kentucky.

Sources: *Talbott v. Kentucky State Board of Education*, 244 Ky. 826, 52 S.W.2d. 727 (1932).; Kentucky Legislative Research Commission, Kentucky Legislature: Kentucky Constitution, Section 186," accessed January 15, 2013, <http://www.lrc.ky.gov/Legresou/Constitu/186.htm>.; *Rose v. Council for Better Education*, 790 S.W.2d. 186 (Ky. 1989).; Kentucky Legislative Research Commission, "KRS 157.330: Fund to Support Education Excellence in Kentucky," *Kentucky Revised Statutes*, Accessed on January 15, 2013. <http://www.lrc.state.ky.us/KRS/157-00/330.PDF>; *Rose v. Council for Better Education*, 790 S.W.2d. 186 (Ky. 1989).; *The Council for Better Education v. Wilkinson*, 85 Ky. 1759, Cir. Ct. (1988), 4.; *Russman v. Lockett*, 391 Ky. S.W.2d. 694 (1965).

In 1932 the mandate was invalidated by the court case, *Talbott v. Kentucky State Board of Education*.¹⁰⁴ The court's decision was based on the premise that Section 186 of the constitution mandates per capita allocation, not equalization of funding.¹⁰⁵ Section 186 was amended in 1941 and allowed 10% of state money to be used for equalizing intentions. This funding amount was increased to 25% in 1944.¹⁰⁶ The per capita requirement was removed from Section 186 of the constitution in 1952 which allowed the legislature more freedom to ensure "efficient" public schools across the state.¹⁰⁷ In 1954 the Kentucky legislature created the Minimum Foundation Program (MFP). The purpose of the program was to balance inequities across school systems and gain more funding from local school districts.¹⁰⁸ In order to qualify for the program a school district was obligated to charge a minimum real property tax of \$1.10 per \$100.00 of assessed value in the locality.¹⁰⁹ The maximum tax the district could charge was \$1.50 per \$100.00 of assessed value in the locality.¹¹⁰ Assessments in the localities fluctuated as high as

¹⁰⁴ *Talbott v. Kentucky State Board of Education*, 244 Ky. 826, 52 S.W.2d. 727 (1932).

¹⁰⁵ Section 186 of the Kentucky Constitution states, All funds accruing to the school fund shall be used for the maintenance of the public schools of the Commonwealth, and for no other purpose, and the General Assembly shall by general law prescribe the manner of the distribution of the public school fund among the school districts and its use for public school purposes. Kentucky Legislative Research Commission, "Ky Const § 186 General Assembly to Provide for School System," *Baldwin's Kentucky Revised Statutes Annotated*, September 23, 2012, Westlaw.; *The Council for Better Education v. Wilkinson*, 85 Ky. 1759, Cir. Ct. (1988), 3.

¹⁰⁶ Kentucky Legislative Research Commission, "Kentucky Legislature: Kentucky Constitution, Section 186," accessed January 15, 2013, <http://www.lrc.ky.gov/Legresou/Constitu/186.htm>.; *Rose v. Council for Better Education*, 790 S.W.2d. 186 (Ky. 1989).

¹⁰⁷ *Ibid.*

¹⁰⁸ Kentucky Legislative Research Commission, "KRS 157.330: Fund to Support Education Excellence in Kentucky," *Kentucky Revised Statutes*, Accessed on January 15, 2013. <http://www.lrc.state.ky.us/KRS/157-00/330.PDF>; *Rose v. Council for Better Education*, 790 S.W.2d. 186 (Ky. 1989).

¹⁰⁹ *The Council for Better Education v. Wilkinson*, 85 Ky. 1759, Cir. Ct. (1988), 4.

¹¹⁰ *Ibid.*, 3.

33 $\frac{1}{3}$ % of the fair market value of the property to as low as 12 $\frac{1}{2}$ % of the value.¹¹¹ The range of these assessment values sparked a 1965 lawsuit, *Russman v. Luckett*.¹¹²

Plaintiffs in this case claimed their property was not being assessed at a fair market value.

The Kentucky Court of Appeals declared the state constitution required property assessment at 100% of its fair market value, no greater.¹¹³

The legislature made many changes in 1966 as a result verdict in the *Russman* case which led to the 100% fair market rate assessment of property.¹¹⁴ First, House Bill 1, also known as “The Rollback Law” was enacted to reduce the tax rates in order to balance any rise in assessments on property.¹¹⁵ As a result of the bill, school, county, and city property tax revenues were lowered to the 1965 level.¹¹⁶ Second, the legislature permitted school systems to charge one of the following taxes: 1) work-related tax on earnings and revenues; 2) a tax on total utility receipts; or 3) a tax on income.¹¹⁷ These taxes were advantageous to the wealthy districts with higher population density, businesses, and large payrolls.¹¹⁸

The legislature in 1976 transferred the tax collection process to the state. That same year the legislature also passed the Power Equalization Program (PEP). This program

¹¹¹ *Ibid.*, 4.

¹¹² *Russman v. Luckett*, 391 Ky. S.W.2d. 694 (1965).

¹¹³ *Ibid.*

¹¹⁴ *Rose v. Council for Better Education*, 790 S.W.2d. 186 (Ky. 1989).

¹¹⁵ *The Council for Better Education v. Wilkinson*, 85 Ky. 1759, Cir. Ct. (1988), 4.

¹¹⁶ *Rose v. Council for Better Education*, 790 S.W.2d. 186 (Ky. 1989).

¹¹⁷ *Ibid.*

¹¹⁸ *The Council for Better Education v. Wilkinson*, 85 Ky. 1759, Cir. Ct. (1988), 4.

allocates money to school districts based on a maximum tax rate to be equalized as determined by the Superintendent of Public Instruction.¹¹⁹ The local districts must charge at least a tax rate of 25 cents per \$100 of the property value or the maximum rate sustained by the PEP, the greater amount of the two.¹²⁰ In the *Rose* case, the court noted the assigned primary tax rate is low leaving merely a portion of the 25 cents local tax being equalized through the PEP.¹²¹ House Bill 44 passed in 1979 mandated that school districts decrease tax rates on real property annually so that proceeds would not surpass the prior year's proceeds by more than 4%.¹²² Following the legislation tax rates swiftly decreased as the value of real property rose.¹²³ Financial records outlined a statewide tax rate decline at 33% in two short years from the time the bill was sanctioned in 1979 until 1981.¹²⁴ Therefore, school districts were securing less revenue to educate students as they had prior to the legislation. The initial 1930 legislation to expand per-pupil expenditures to low wealth school districts had eroded over time.

¹¹⁹ *Rose v. Council for Better Education*, 790 S.W.2d. 186 (Ky. 1989).

¹²⁰ *Ibid.*

¹²¹ *The Council for Better Education v. Wilkinson*, 85 Ky. 1759, Cir. Ct. (1988), 6.

¹²² *Ibid.*

¹²³ *Rose v. Council for Better Education*, 790 S.W.2d. 186 (Ky. 1989).

¹²⁴ *Ibid.*

Fiscal Equity for Taxpayers and Students

Taxpayer Fiscal Equity

Whereas fiscal equity for students has to do with assistance to “bring up” or make equitable funding between low and higher capacity districts based on the fiscal capacity of the district, fiscal equity for taxpayers advances that all school districts (taxpayers) should make essentially the same amount of tax *effort* per pupil. The important point here is that the “taxpayer” is not an individual, but rather is a school “district.”¹²⁵ This concept would mean that all districts would make some minimum tax effort (say, for example \$2.75 per \$100 dollars of property value) which in accordance with varying levels of the property base across district would produce different amounts of tax revenue for schools. Then the state would equalize the revenue on a per pupil basis.

Taxpayer Fiscal Equity: The First Challenge for Equal Educational Opportunity

Funding concerns related to taxpayer equity and equal opportunity under the Fourteenth Amendment of the U.S. Constitution have been present in Kentucky as far back as 1884 when the equitable distribution of school funding was called into question, when a new tax scheme was implemented that organized the collection and expenditure of local property taxes along racial lines. American taxpayers in Owensboro, Kentucky sought to alter the state’s school finance system.¹²⁶ It was proposed that the tax revenue collected at that time from Caucasians would go to fund schools for “whites only” and tax money collected from African Americans would go to fund “blacks only.”¹²⁷ This

¹²⁵ This concept of the taxpayer as not an individual and rather a governmental entity is different from that used in public finance.

¹²⁶ *Claybrook v. City of Owensboro*, 23 F. 634, 635 (C.C.D. Ky. 1884).

¹²⁷ *Ibid.*

statute was found in violation of the Kentucky Constitution by a Kentucky Circuit Court on the grounds it deprived African Americans equal protection of the laws.¹²⁸ The Circuit Court concluded it did not have the power to issue guidelines for how the tax funds be distributed, however, ruled the then current process as unfair and noted the only remedy was in fiscal equity.¹²⁹ In efforts to move toward a more equitable system, seven years later the state added Section 183 to the constitution ensuring an “efficient” system of schools across the state.¹³⁰

Fiscal Equity and Adequacy for Kentucky Public School Students

Two measures of public school funding are fiscal equity and adequacy. As previously mentioned, fiscal equity is funding students according to their district’s ability to pay rather than funding students in exactly equal amounts. For example, consider two similarly situated children (requiring similar level of resources and conditions for an education) except that one child is from a low fiscal capacity district and the other is from a high capacity school district. It is highly likely that if the tax effort¹³¹ for both districts remains equal, the lower fiscal capacity district will NOT be able to raise the same amount of local revenue for schools as the high fiscal capacity district, simply because the high capacity district has more high value property to tax. The result is that children through no fault of their own attending school in a low fiscal capacity district will not

¹²⁸ Ibid.

¹²⁹ Judge Barr stated, “If I am correct in my conclusion, all that colored children in Owensboro are entitled to is the equal protection of the laws, in that a fair share of this fund be applied toward the maintenance of the common schools especially provided for colored children. In this view the only remedy is in equity.” *Claybrook v. City of Owensboro*, 23 F. 634, 635 (C.C.D. Ky. 1884).

¹³⁰ Kentucky Legislative Research Commission, “Kentucky Legislature: Kentucky Constitution,” accessed October 12, 2012, <http://www.lrc.ky.gov/legresou/constitu/list1.htm>.

¹³¹ The term *tax effort* means the rate of the levy applied taken with the property assessment scheme.

enjoy the fruits that having additional resources that money can buy as a child attending school in a high capacity or wealthier district would. This principle as it applies to similarly situated (in educational need and in dollars needed to fund education) individuals is termed *horizontal equity*. For horizontal equity to be satisfied, then the lower capacity district(s) will require additional funding (usually from the state) to “make up the difference” that exists between itself and a higher capacity district. Thus, districts pay and receive funding according to their need to bring all the similarly situated students throughout a state up to a substantially equitable amount of total state and local funding.

In contrast to horizontal (fiscal) equity is *vertical equity*. This concept applies to children who ARE NOT similarly situated in so far as resources needed to learn go, they are *vertically* situated to each other. The contrast in this case is that between a regular education student and a student that requires additional, specialized services (such as services for special education, economically disadvantaged, and so on) that also cost additional funding. To satisfy vertical equity, dissimilarly situated children should be allotted the funds according to the need of their group which means that some children require more funding to educate and that is equitable.

Of course, school districts in a state have a mix of both similarly situated students and of dissimilarly situated students such that both horizontal and vertical equity principles need to be taken into account to produce fiscal equity on the whole throughout a state.

Fiscal adequacy is sufficiently funding public education to meet some qualitative standard of student achievement of goals. It is different from fiscal equity in that equity applies to funding among students and adequacy asks how much funding does a student require to meet some standard to a specified degree of proficiency. Unlike fiscal equity,

there is no comparison made among differing student needs and the resources required to address those different needs by school districts that vary in capacity, but rather fiscal adequacy focuses on a quality (qualitative standard) and estimates the cost of resources and conditions needed to have all the children reach that standard.

Over a period of years, state legislation and current tax rates in Kentucky were not sufficient in providing differentially greater funding for low-wealth school districts. Financial programs such as the Minimum Foundation Program (MFP) and the Power Equalization Program (PEP) were not beneficial to underfunded districts in the state. These programs were based on the principles of taxpayer equity whereby the district was required to tax themselves at a specified rate in order to raise a base revenue amount. However, because of the low property tax base in most low wealth (poor fiscal capacity) an insufficient amount of revenue was raised. In order to qualify for additional funds from the state, the school district would have to apply another “tier” of tax effort. However, in a property poor district, the extra revenue brought in would still be insufficient. It became obvious that poor districts could tax themselves at greater and greater cumulative tax rates and still not bring in enough money to sufficiently fund their schools. Thus, the 1954 Minimum Foundation Program and the Power Equalization Program that appeared to be implemented with an eye toward instilling a greater tax effort from poor districts had failed to provide an “incentive” for low wealth school districts to levy local property tax increases or the devaluing of property assessment process.¹³² The MFP program was unable to rectify the disparity between school systems.¹³³ Similarly the PEP of 1976 was found to be underfunded and not helpful.¹³⁴

¹³² Molly A. Hunter, “All Eyes Forward: Public Engagement and Educational Reform in

Kentucky's property tax rates continued to be comparatively low and varied across the school districts in the 1980s. When state and local tax effort controlling for tax capacity was compared with the national average of the same, Kentucky was at 89% of the national average.¹³⁵ Property tax revenues brought in by the districts varied from \$78 to \$3,867 per student.¹³⁶ The amount spent on instruction also varied from \$1,499 to \$3,709 per student.¹³⁷ The overall amount the state spent per student ranked 40th nationally.¹³⁸

Kentucky educational statistics reflected the historical position of student success. Prior to the Kentucky Education Reform Act (KERA) achievement scores were less than the majority of other states in many categories. Performance scores were especially low in the poorer districts.¹³⁹ In the 1980s Appalachian counties experienced a 48% functional illiteracy rate and only 68% of Kentucky's ninth graders graduated from high school in four years.¹⁴⁰

Kentucky," *Journal of Law & Education*, 28 (1999): 488 (citing "Cheating Our Children," *Lexington Herald-Leader*, Series August 1989 through November 1989.).

¹³³ *Rose v. Council for Better Education*, 790 S.W.2d. 186 (Ky. 1989).

¹³⁴ *Ibid.*

¹³⁵ Hunter, *Journal of Law & Education*, 488 (citing The Prichard Committee for Academic Excellence, *The Path to a Larger Life: Creating Kentucky's Education Future*, xvii.)

¹³⁶ Hunter, *Journal of Law & Education*, 488 (citing the Office of Education Accountability (OEA), Kentucky General Assembly, Annual Report, Tables 20, 26, and 28 (December 1996) and Jacob E. Adams, Jr., "School Finance Reform and Systemic School Change: Reconstituting Kentucky's Public Schools," 18 *J. Educ. Fin.* 318, 331 (Spring 1993)).

¹³⁷ *Ibid.*

¹³⁸ *Rose v. Council for Better Education*, 790 S.W.2d. 186 (Ky. 1989).

¹³⁹ *The Council for Better Education v. Wilkinson*, 85 Ky. 1759, Cir. Ct. (1988), 11.

¹⁴⁰ Hunter, *Journal of Law & Education*, 486 (citing C. Scott Trimble and Andrew C. Forsaith, "Achieving Equity and Excellence in Kentucky Education," 28 *J. Law Reform* 599, 601 (1995) (citing Anne F. Keating, *You Get What You Pay For: Financing Public Schools in Kentucky*, *Ky Bench & Bar* (Winter 1993))).

Poor districts could not offer as many educational opportunities and course offerings to their students as wealthier districts in the state.¹⁴¹ There were limited foreign language, science, mathematics, and advanced courses offerings.¹⁴² These counties had limited funding for the arts.¹⁴³

In addition to offering less course offerings than other schools nationally, school facilities were in disrepair in the poor districts and well-equipped in their wealthier counterpart.¹⁴⁴ In the Elliot County schools in the Appalachian region, elementary students and special education student classes were housed in trailers reclaimed from a flood in the area.¹⁴⁵ According to the case documents leakages, under-heated gymnasiums, deteriorating plaster, and multiple repairs were common in school facilities located in poor districts.¹⁴⁶ These inadequate situations in the poor counties had an impact on the entire state through their sustenance of an insufficiently educated workforce which in turn produced an inability to attract potential companies.¹⁴⁷ The workers were not receiving a viable education in many cases if they attended schools in the poor district. Businesses seeking to relocate passed over Kentucky due to its

¹⁴¹ *Rose v. Council for Better Education*, 790 S.W.2d. 186 (Ky. 1989).

¹⁴² *Ibid.*

¹⁴³ *Ibid.*

¹⁴⁴ *Ibid.*

¹⁴⁵ *Ibid.*

¹⁴⁶ *Ibid.*

¹⁴⁷ Hunter, *Journal of Law & Education*, 486 (citing Judge Ray Corns, Remarks at the National Organization on Legal Problems in Education Conference (Nov. 19, 1994) in referring to a *Report of the Kentucky Chamber of Commerce Task Force on Education* (1983)).

educational system.¹⁴⁸ Job seekers found it difficult to secure employment in the state with a 7th highest in unemployment national ranking.¹⁴⁹ Many citizens left Kentucky in search of a better-paying community.¹⁵⁰

When Kentucky policymakers and citizens became aware of public education contrasts between their state and the nation, many were not satisfied and wanted more opportunity for the students of their Commonwealth. Faced with below national averages on nearly every category, citizens embarked on improving their standings. Specifically, a group of business and civic leaders, known as the Prichard Committee, set out to demonstrate the association between good schools and high employment.¹⁵¹ Meanwhile, a group of county and city school districts, the Council for Better Education (CBE), focused on the need for fiscal equity in the system, filing a 1985 lawsuit against the executive branch. In the suit they claimed that equitable resources were not provided among school districts; there was too much dependency on local unstable funding, which resulted in fiscal and program inequalities among the districts statewide.¹⁵² Initially, the CBE sought fiscal equity in their state funding for education. Fiscal equity, being financing for every child according to the district's capacity to pay. Later, the plaintiffs altered this approach into a case for adequacy. The shift away from equity was due to

¹⁴⁸ Ibid.

¹⁴⁹ Ibid.

¹⁵⁰ Ibid.

¹⁵¹ The Prichard Committee set out to gain political support for the lawsuit. Made up of influential business and community leaders, the group strove to communicate the poor condition of the public schools in Kentucky and the relationship between improved schools and better jobs. The committee was named after Richard Prichard now deceased, a former lawyer and Kentucky native. See, also Peter Schrag, *Final Test: The Battle for Adequacy in America's Schools* (New York: New Press, 2003), 64.

¹⁵² *The Council for Better Education v. Wilkinson*, 85 Ky. 1759, Cir. Ct. (1988), 8.

CBE's realization the state was proportionately not funding both the affluent and poor school districts of the state such that all students could achieve 21st century requirements.¹⁵³ Most of the state's students were equally not securing the tools, teachers, textbooks, facilities, equipment and classes necessary to be prepared for modern society.¹⁵⁴ Therefore, they were not receiving an adequate education that prepared them for their future.

The plaintiffs also did not seek the same outcome as a similar case in Texas, *Edgewood v. Kirby* (1989), which relied on the fiscal equity argument and used the Robin Hood resolution.¹⁵⁵ Robin Hood is a colloquial term that defines when state government uses tax revenue from the wealthier districts and re-appropriates it to the poorer districts.¹⁵⁶ The plaintiffs realized in order to garnish wide-spread support for the case they would need for everyone to gain, which would occur in reform based on adequacy.¹⁵⁷

According to Schrag, in CBE's changing the basis for their suit to adequacy, they were taking a legal risk. Up until this time period, the definition of an adequate education had not been determined and the degree of resources had not been assessed. States have varying educational goals, thus there is not a uniform set of standards from which to

¹⁵³ Versteegen and Whitney, *Educational Policy*, 339.

¹⁵⁴ Schrag, *Final Test: The Battle for Adequacy in America's Schools*, 65.

¹⁵⁵ *Ibid.*; *Edgewood v. Kirby*, 777 S.W.2d. 391 (Tex. 1989).

¹⁵⁶ Texas Education Agency, "Chapter 41 Wealth Equalization," *Tea.state.tx.us*, last modified September 7, 2012, http://www.tea.state.tx.us/index2.aspx?id=6796&menu_id=645.

¹⁵⁷ Schrag, *Final Test: The Battle for Adequacy in America's Schools*, 65.

measure.¹⁵⁸ The burden would be upon the plaintiffs to define the components of an adequate education in the state of Kentucky and prove the legislature was not upholding their constitutional duty to provide the means to achieve such an education.

Council for Better Education v. Wilkinson

For years, veteran Kentucky teacher, principal, district superintendent and Kentucky Department of Education employee Arnold Guess, having served as the 1982-83 co-chair of the Kentucky Superintendent's Commission for State School Finance, was intimately aware of the inadequacies of the education students in the less affluent counties across the state.¹⁵⁹ He gathered district superintendents of poor counties and two education finance experts together in Frankfort, Kentucky on May 4, 1984 to discuss his ideas.¹⁶⁰ They talked about the possibility the Kentucky state constitution was being violated by the legislature's failure to provide all students in the state an "efficient" education as it stated they should.¹⁶¹ Together they decided to recruit more people interested in their cause and hired legal experts to determine if they had a case of merit.¹⁶² A well-known politician in the state of Kentucky and former governor, Bert Combs, was selected as the group's counsel.¹⁶³ Combs agreed to the position under one condition: The CBE gained the

¹⁵⁸ William S. Koski and Rob Reich, "When 'Adequate' Isn't: The Retreat from Equity in Educational Law and Policy and Why It Matters," *Emory Law Journal* 56, (2006): 561.

¹⁵⁹ Ronald G. Dove, "Acorns in a Mountain Pool: The Role of Litigation, Law and Lawyers in Kentucky Education Reform," *J. Educ. Fin.*, 17, (1991): 88.

¹⁶⁰ *Ibid.*

¹⁶¹ *Ibid.*

¹⁶² *Ibid.*

¹⁶³ Bert T. Combs (1911-1991) was an attorney, judge and governor of Kentucky. In 1951 he was appointed to the Kentucky Court of Appeals. He served as governor from 1959 until 1963 and he was nominated to serve on the Federal Court of Appeals in 1967. Combs served as the lead attorney in the *Council for Better Education v. Wilkinson* (1988) case, better known as the appeal *Rose v. Council for*

support of 40% of the school districts in Kentucky.¹⁶⁴ A substantial majority of public school districts supported the cause (61 out of 177), and Combs took the case *pro bono*.¹⁶⁵

Timing and political power structures were a major aspect in the decision to proceed with litigation. At the time of the case, Judge Corns was a district court judge in Franklin, Kentucky.¹⁶⁶ He had previously held the role of chief legal counsel in the governor's office under Governor Combs for four years and served as Director of the Division of Legal Services in the Education Department for 16 years.¹⁶⁷ He offered to step aside; however, both sides agreed Judge Corns was the appropriate judge for the case.¹⁶⁸ Judge Corns sought to conduct a fair trial in his courtroom.¹⁶⁹ Needless to say, his expert knowledge of education law and background in education reform made him compassionate to the fiscal equity and adequacy cause in Kentucky public education.

In 1985 plaintiffs filed a complaint against the legislature in the Franklin, Kentucky Circuit Court, asserting that the method of financing schools by the legislature was in violation of the 14th Amendment of the Constitution of the United States and Kentucky

Better Education (1989). Appalachian Heritage Alliance, "Governor Bert T. Combs Statue Project," accessed October 10, 2012, <http://www.appalachianheritagealliance.org/bertcombs.html>.

¹⁶⁴ Dove, *J. Educ. Fin.*, 91.

¹⁶⁵ *Ibid.*, 91(citing a personal interview with Bert Combs, lead counsel for the plaintiffs, in Lexington, Kentucky on 8 Nov. 1990).

¹⁶⁶ Retired Judges Mediation & Arbitration Services, "Ray Corns," accessed January 10, 2013, <http://www.retiredjudgesmediation.com/retiredjudges%20site%20files/RAY%20CORN.S.pdf>; University of Kentucky, "KERA Information," *Education.uky.edu*.

¹⁶⁷ *Ibid.*

¹⁶⁸ The University of Kentucky, "KERA Information."

¹⁶⁹ *Ibid.*

Constitution.¹⁷⁰ Wallace Wilkinson (governor of Kentucky), the State Board of Education and its Superintendent, the State Treasurer, and the President *pro tempore* of the Senate were named as defendants in the case. The lawsuit stated that school districts in the state varied widely in the amount of assessable property wealth available which caused a great discrepancy among the districts' financial capabilities.¹⁷¹ The complaint goes on to allege that the then current school funding formula resulted in insufficiencies, injustices, and disparities in Kentucky, which led to an overall inefficient public educational system in the state.¹⁷² The plaintiffs prepared evidence supporting their argument that Kentucky's statutory system for funding its public schools is in violation of Sections 1,¹⁷³ 3,¹⁷⁴ and 183¹⁷⁵ of the Kentucky Constitution and the 14th Amendment¹⁷⁶ of the United States Constitution.¹⁷⁷

¹⁷⁰ *The Council for Better Education v. Wilkinson*, 85 Ky. 1759, Cir. Ct. (1988), 2.

¹⁷¹ *Ibid.*, 7.

¹⁷² *Ibid.*, 11.

¹⁷³ Section 1 of the Kentucky Constitution: "All men are, by nature, free and equal, and have certain inherent and inalienable rights, among which may be reckoned: First: The right of enjoying and defending their lives and liberties. Second: The right of worshipping Almighty God according to the dictates of their consciences. Third: The right of seeking and pursuing their safety and happiness. Fourth: The right of freely communicating their thoughts and opinions. Fifth: The right of acquiring and protecting property. Sixth: The right of assembling together in a peaceable manner for their common good, and of applying to those invested with the power of government for redress of grievances or other proper purposes, by petition, address or remonstrance. Seventh: The right to bear arms in defense of themselves and of the State, subject to the power of the General Assembly to enact laws to prevent persons from carrying concealed weapons." Kentucky Legislative Research Commission, "Kentucky Legislature: Kentucky Constitution," accessed October 12, 2012, <http://www.lrc.ky.gov/legresou/constitu/list1.htm>.

¹⁷⁴ Section 3 of the Kentucky Constitution: "All men, when they form a social compact, are equal; and no grant of exclusive, separate public emoluments or privileges shall be made to any man or set of men, except in consideration of public services; but no property shall be exempt from taxation except as provided in this Constitution, and every grant of a franchise, privilege or exemption, shall remain subject to revocation, alteration or amendment." *Ibid.*

¹⁷⁵ Section 183 of the Kentucky Constitution: "The General Assembly shall, by appropriate legislation, provide for an efficient system of common schools throughout the State." *Ibid.*

¹⁷⁶ 14th Amendment of the United States Constitution: Section 1. "All persons born or naturalized

The defense argument advanced that the Governor and the General Assembly had met the directive of Section 183, that the Plaintiff's State or Federal Constitutional Rights were not violated, that the majority of the Plaintiff's fiscal difficulties were a consequence of mishandling, waste, and inept tax collection practices, and that the concern involving a mandate outlining the appropriation and distribution of public monies was a question for the legislature and not a matter for judicial review.¹⁷⁸

Judge Corns made a ruling on May 31, 1988 that stated there were four issues before him that were necessary to define. First, the definition of the phrase "an efficient system of common schools" as stated in Section 183 of the state constitution; Second, whether education is a fundamental right under the state condition; Third, whether Kentucky's finance system violated Section 183 of the state constitution; and Fourth, whether the students in the poor districts were being denied equal protection under the law.¹⁷⁹ Corns ruled that "efficient" as pertaining to the Kentucky constitution is defined as considerable consistency, considerable fairness of economic resources and considerable equivalent educational prospects for every student.¹⁸⁰

in the United States, and subject to the jurisdiction thereof, are citizens of the United States and of the State wherein they reside. No State shall make or enforce any law which shall abridge the privileges or immunities of citizens of the United States; nor shall any State deprive any person of life, liberty, or property, without due process of law; nor deny to any person within its jurisdiction the equal protection of the laws." National Archives, "Charters of Freedom; Constitution of the United States."

¹⁷⁷ *The Council for Better Education v. Wilkinson*, 85 Ky. 1759, Cir. Ct. (1988), 2.

¹⁷⁸ *Ibid.*, 3.

¹⁷⁹ *Ibid.*, 2.

¹⁸⁰ *Ibid.*, 13.

On the matter of a right to an education, the court declared the language in the state constitution provided education as a fundamental right in the state of Kentucky.¹⁸¹ The court decided the state's finance system was unconstitutional by providing an inferior education to the poorer school districts.¹⁸² The court ruled students were being denied equal protection under the federal and state constitutions.¹⁸³

In preparation for his final judgment, Corns selected an advisory commission to determine reform strategies.¹⁸⁴ He also expanded the definition of "efficient" to include seven capacities all students be provided. These abilities are as follows:

- 1) sufficient oral and written communication skills to enable students to function in a complex and rapidly changing civilization;
- 2) sufficient knowledge of economic, social, and political systems to enable the student to make informed choices;
- 3) sufficient understanding of governmental processes to enable the student to understand the issues that affect his or her community, state, and nation;
- 4) sufficient self-knowledge and knowledge of his or her mental and physical wellness;
- 5) sufficient grounding in the arts to enable each student to appreciate his or her cultural and historical heritage;
- 6) sufficient training or preparation for advanced training in either academic or vocational fields so as to enable each child to choose and pursue life work intelligently;
- 7) Sufficient levels of academic or vocational skills to enable public school students to compete favorably with their counterparts in surrounding states, in academics or in the job market.¹⁸⁵

¹⁸¹ Ibid., 15.

¹⁸² Ibid., 14.

¹⁸³ Ibid., 17.

¹⁸⁴ Ibid.

¹⁸⁵ *Rose v. Council for Better Education*, 790 S.W.2d. 186 (Ky. 1989).

The committee developed a report outlining nine principles for providing an “efficient” system of schools in the state.¹⁸⁶ Corns used these 21st century standards in his final decree. The court listed the nine principles:

- 1) The establishment, maintenance and funding of common schools in Kentucky is the sole responsibility of the General Assembly.
- 2) Common schools shall be free to all.
- 3) Common schools shall be available to all Kentucky children.
- 4) Common schools shall be substantially uniform throughout the state.
- 5) Common schools shall provide equal educational opportunities to all Kentucky children, regardless of place of residence or economic circumstances.
- 6) Common schools shall be monitored by the General Assembly to assure that they are operated with no waste, no duplication, no mismanagement, and with no political influence.
- 7) The premise for the existence of common schools is that all children in Kentucky have a constitutional right to an adequate education.
- 8) The General Assembly shall provide funding which is sufficient to provide each child in Kentucky an adequate education.
- 9) An adequate education is one which has as its goal the development of the seven capacities recited previously.¹⁸⁷

Rose v. Council for Better Education

John Rose, the President *pro tempore* of the Senate appealed the case to the Kentucky Supreme Court, therefore, it became *Rose v. Council for Better Education*. Upon appeal, the Court upheld Corns’ ruling.¹⁸⁸ On June 8, 1989, the court directed the legislature to restructure the entire school finance system in compliance with Section 183 of the state constitution. Further, the Kentucky Supreme Court decision mandated that if a new law

¹⁸⁶ Ibid.

¹⁸⁷ Ibid.

¹⁸⁸ Ibid.

was not passed by the next General Session of the legislature, the entire system of schools would cease to exist. The legislature complied by creating the Task Force on Education Reform and organized three committees, Curriculum, Governance, and Finance to oversee the changes.¹⁸⁹ The governor and the legislature signed the Kentucky Education Reform Act of 1990 (KERA) within one year of the decision.¹⁹⁰ This act dramatically restructured education in Kentucky in terms of funding for educational resources and facilities.

School Facility Fiscal Equity and Adequacy Cases in the United States

The *Rose* case was not an isolated instance of litigation. Several states have had similar adequacy litigation, resulting in judgments for the plaintiffs such as New Jersey, Colorado, and California. The focus in these cases has been on adequacy. Major components linking many cases with the *Rose* case is the insufficient nature of the public school funding and facilities in the states. In these cases, the plaintiffs have asserted students were not receiving the education they are entitled to under the laws of the respective state.

Abbott v. Burke, (1985)

In 1981 the Education Law Center (ELC) in New Jersey, representing 20 poor school children brought a suit against the State of New Jersey, known as *Abbott v. Burke*.¹⁹¹ The plaintiffs sued the defendant on the grounds it was not providing an adequate education to

¹⁸⁹ Adams, *J. Educ. Fin.*, 321.

¹⁹⁰ Hunter, *Journal of Law & Education*, 498.

¹⁹¹ *Abbott v. Burke*, 100 N.J. 269 (1985).

all children as required by the state constitution.¹⁹² The ELC's argument was the state funding process was unconstitutional in that it allowed for spending inequalities among poor urban and more affluent suburban school districts.¹⁹³ The Supreme Court of New Jersey ruled on the case in 1985 to remand the case back to the Office of Administrative Law for review of the plaintiff's claims.¹⁹⁴ The New Jersey Supreme Court ruled in 1990 that the current state education funding system was unconstitutional.¹⁹⁵ The court ordered the legislature to modify or create new law ensuring equal financial support of urban districts to that of suburban districts and "adequate" funding to offer additional programs to lessen the detriments of the urban students.¹⁹⁶ The case has also resulted in new finance formula requirements.¹⁹⁷ Following the New Jersey Supreme Court judgment, the case has been ruled on nineteen more times.¹⁹⁸ Similarly to Kentucky, the ruling in the Abbott case has led to legislative reforms. In 1998 after *Abbott V*, mandates were put into place calling for new curriculum standards, mandated preschool programs, all-day kindergarten, and additional facilities for services, after-school programs, and summer school.¹⁹⁹ In 2000 *Abbott V* and *Abbott VII* case prompted the legislature to fund

¹⁹² N.J. Const. (1947) Art. VIII, § 4, para. 1.

¹⁹³ *Abbott v. Burke*, 100 N.J. 269 (1985).

¹⁹⁴ *Ibid.*

¹⁹⁵ Education Law Center, "The History of *Abbott v. Burke*," accessed on October 12, 2012, <http://www.edlawcenter.org/cases/abbott-v-burke/abbott-history.html>.

¹⁹⁶ *Ibid.*

¹⁹⁷ National Education Access Network, "School Funding Cases in Kentucky," last modified November 2011, <http://schoolfunding.info/2012/05/school-funding-cases-in-kentucky/>.

¹⁹⁸ Education Law Center, "Abbott Decisions," accessed on October 12, 2012, <http://www.edlawcenter.org/cases/abbott-v-burke/abbott-decisions.html>.

¹⁹⁹ National Education Access Network, "School Funding Cases in New Jersey," last modified

facilities in particular. July 18, 2000, the New Jersey legislature sanctioned the Educational Facilities Construction and Financing Act (EFCFA).²⁰⁰ Across the state districts received \$12 billion for the planning, building, and refurbishment of schools.²⁰¹

Since 2000 there has been additional litigation, funding, and laws put in place. In 2002, the State of New Jersey, through the Schools Development Authority broadcasted a \$10 – \$12 billion school construction program.²⁰² The goal of the initiative was to construct and renovate school facilities in the *Abbott* school districts.²⁰³ Later in 2008, a new school finance plan was accepted by the General Assembly.²⁰⁴ The formula entails the state providing \$7.8 billion to K-12 public schools for the fiscal year 2009.²⁰⁵ In 2011 the New Jersey Supreme Court nullified public education budget cuts made by the state in the *Abbott* school districts.²⁰⁶

Giardino v. Colorado State Board of Education, (1998)

Plaintiffs in 1998, represented by the Colorado Lawyers Committee brought a lawsuit against the Colorado State Board of Education.²⁰⁷ The suit claimed the condition of the

November 2011, <http://schoolfunding.info/2011/11/school-funding-cases-in-new-jersey/>.

²⁰⁰ Bari A. Erlichson, “New Schools for a New Millennium: Court-Mandated School Facilities Construction in New Jersey,” *J. Educ. Fin.* 27, no. 2 (2001): 664.

²⁰¹ *Ibid.*

²⁰² “Schools Development Authority,” *State of New Jersey Schools Development Authority*, accessed September 10, 2012, <http://www.njsda.gov/Archive/2002/>.

²⁰³ National Education Access Network, “School Funding Cases in Kentucky.”

²⁰⁴ State of New Jersey 212th Legislature, “The School Funding Reform Act of 2008,” accessed September 20, 2012, http://www.njleg.state.nj.us/2006/Bills/A0500/500_I2.PDF.

²⁰⁵ *Ibid.*

²⁰⁶ Education Law Center, “*Abbott v. Burke*,” accessed on October 1, 2012, <http://www.edlawcenter.org/assets/files/pdfs/abott-v-burke/Abbott%20I.pdf>.

²⁰⁷ *Giardino v. Colorado State Board of Education*, 98CV0246, Denver District Court, (Colo.

public schools in the state were restricting students from receiving the opportunity for an equal education due to the deteriorating buildings and overcrowded classrooms. According to the plaintiffs the buildings were declining and the classrooms were overcrowded.²⁰⁸ Therefore, the state was not fulfilling its constitutional obligation to create and preserve a systematic and consistent public school system.²⁰⁹ Upon the approval of a trial court judge, the parties settled the case in June of 2000.²¹⁰ The legislature, as part of the settlement, enacted Senate Bill 00-181.²¹¹ Under this law, the state allocated \$190 million over a period of eleven years for building and repairing schools in the most deficient school districts in the state.²¹² The same year as the settlement, Amendment 23 was approved by voters and called for an increase in public school expenditures proportional to inflation, plus one percent annually for ten years and thereafter proportional to inflation.²¹³

In 2009 the Colorado Supreme Court in *Lobato v. State* held the plaintiffs in the case may challenge the public school funding system as encroaching upon Colorado's mandate in the constitution that guarantees a "through and uniform" public education

1998).; National Education Access Network, "School Funding Cases in Colorado," last modified November 2011, <http://schoolfunding.info/2011/09/school-funding-cases-in-colorado/>.

²⁰⁸ *Giardino v. Colorado State Board of Education*, 98CV0246, Denver District Court, (Colo, 1998).

²⁰⁹ *Ibid.*

²¹⁰ National Education Access Network, "School Funding Cases in Colorado."

²¹¹ Senate Bill 00-18. Colorado General Assembly, "An Act," 2000, accessed on January 17, 2013, [http://www.leg.state.co.us/2000/inetcbill.nsf/billcontainers/817CA03BC575CA638725683A004DEBA7/\\$FILE/181_enr.pdf](http://www.leg.state.co.us/2000/inetcbill.nsf/billcontainers/817CA03BC575CA638725683A004DEBA7/$FILE/181_enr.pdf).

²¹² *Ibid.*

²¹³ National Education Access Network, "School Funding Cases in Colorado."

system.²¹⁴ In 2011 the case was sent back to district court where the judge nullified the state's public school finance formula.²¹⁵ Since the ruling, in January of 2012, the state has filed an appeal.

Eliezer Williams, et al., v. State of California, (2004)

In 2000 California school districts and approximately one-hundred students filed a lawsuit against the state of California and its state education agencies.²¹⁶ The plaintiffs brought the suit on the grounds the state public educational organizations were not providing students with equivalent access to learning resources, safe and suitable school facilities, and competent teachers.²¹⁷ The case was settled among the parties in 2004 and provided various funding amounts in the state education system. Money was earmarked for facilities, management oversight costs, and materials for schools whose ranking was in the lower three deciles of the statewide Academic Performance Index.²¹⁸ Schools meeting this criterion would receive a share of \$800 million over four years for repair of facilities. \$138 million would go to students for instructional materials at these schools. An additional \$50 million was given to implement the changes and costs related to

²¹⁴ *Lobato v. Colorado*, 218 P.3d. 358 (Colo. 2009).

²¹⁵ Ibid. District Court, Denver, Colorado, "*Lobato v. Colorado*," Colorado, accessed October 18, 2012, <http://schoolfunding.info/wp-content/uploads/2011/12/183-page-decision-issued-on-December-9-2011.pdf>.

²¹⁶ California Department of Education "Notice of Settlement in *Eliezer Williams, et al. v. State of California, et al.*" last modified on December 20, 2004, <http://www.cde.ca.gov/eo/ce/wc/yr04ltr1220.asp>.

²¹⁷ California Department of Education, "The *Williams* Case: An Explanation," last modified September 4, 2012, <http://www.cde.ca.gov/eo/ce/wc/wmslawsuit.asp>.

²¹⁸ Education Law Center, "Safe and Adequate: Using Litigation to Address Inadequate K-12 School Facilities," accessed October 25, 2012, http://www.edlawcenter.org/assets/files/pdfs/publications/Safe_and_Adequate.pdf.

overseeing the process.²¹⁹ The settlement money was paid for by legislation implemented in August 2004 as Senate Bill 6, Senate Bill 550, Assembly Bill 1550, Assembly Bill 2727, and Assembly Bill 3001.²²⁰

Kentucky Education Reform Act (KERA)

Kentucky Education Reform Act (KERA) was approved as House Bill 940 on April 11, 1990 and signed into law by Governor Wallace Wilkinson.²²¹ This statute was a result of the court's ruling in the *Rose* case which called for reform of the Kentucky educational system. The law, which aimed at creating financial adequacy and an efficient educational system, became effective June 1990.²²² Six main areas of public education were the focus of the law: Governance, curriculum, technology, support services, assessment, and finance.²²³

Governance

The legislation altered state agencies and the powers of local governing bodies for public schools. State level changes consisted of the Commissioner of Education becoming the principal state school officer and taking on the responsibilities of the Superintendent of Public Instruction,²²⁴ the selection of a new State Board of Elementary and Secondary Education,²²⁵ and the reorganizing of the Department of Education.²²⁶

²¹⁹ California Department of Education, "The *Williams* Case: An Explanation."

²²⁰ Ibid.

²²¹ The KERA was passed as House Bill no. 940, General Assembly, Commonwealth of Kentucky, Regular Session, (1990). The act is codified in KY. REV. STAT. ANN. § 156.000; The University of Kentucky, "KERA Information," *Education.uky.edu*.

²²² Ibid.

²²³ Deborah A. Verstegen, "A Framework for Determining the Cost of an Adequate Education: A Tale of Two States," *J. Educ. Fin* 32, no. 3 (2006): 203.

²²⁴ Kentucky Legislative Research Commission, Statute 156.010 "Commissioner's Authority to

Modifications at the local level were made in the area of school board member qualifications,²²⁷ election policies,²²⁸ superintendent's selection process,²²⁹ superintendent's job responsibilities,²³⁰ and district and school system employee qualifications.²³¹ The statute directed a larger decision-making role to the local schools. The legislature mandated that by 1996 each school in the state would be overseen by a school council consisting of the school principal, three peer-selected teachers, and two parents chosen by a parent group.²³²

The aim of this restructuring was for parents and teachers, the primary stakeholders, to have an open dialogue regarding facets of the school system.²³³ These council groups

Organize Department of Education: Composition-Function," "Kentucky Legislature: Revised Kentucky Statutes," accessed October 12, 2012, <http://www.lrc.ky.gov/krs/titles.htm>.

²²⁵ Kentucky Legislative Research Commission, Statute 156.016 "Abolition of Employment Positions: Reorganization," "Kentucky Legislature: Revised Kentucky Statutes."

²²⁶ Kentucky Legislative Research Commission, Statute 156.029 "Kentucky Board of Education: Membership-Functions," "Kentucky Legislature: Revised Kentucky Statutes."

²²⁷ Kentucky Legislative Research Commission, Statute 160.180 "Eligibility Requirements," "Kentucky Legislature: Revised Kentucky Statutes."

²²⁸ Kentucky Legislative Research Commission, Statute 160.042 "Election of Members: Present Terms to Continue, Exception," "Kentucky Legislature: Revised Kentucky Statutes."

²²⁹ Kentucky Legislative Research Commission, Statute 160.350 "Superintendent of Schools: Appointment-Term-Vacancy-Qualifications-Removal- Contract Extension," Statute 160.352 "Screening Committee: Minority Representation-Recommendations for Superintendent," "Kentucky Legislature: Revised Kentucky Statutes."

²³⁰ Kentucky Legislative Research Commission, Statute 160.390 "General Duties as to Condition of Schools: Responsibilities-Reports," Statute 160.395 "Duty of Superintendents to Distribute Information to School Board and School Council Members," "Kentucky Legislature: Revised Kentucky Statutes."

²³¹ Kentucky Legislative Research Commission, Statute 161.020 "Certificates Required of School Employees: Filing Requirements-Validity and Terms for Renewal," "Kentucky Legislature: Revised Kentucky Statutes. "; Adams, *J. Educ. Fin.*, 329.

²³² Kentucky Legislative Research Commission, Statute 160.345 "Required the Adoption of School Councils for School-based Decision Making," "Kentucky Legislature: Revised Kentucky Statutes."

²³³ Hunter, *Journal of Law & Education*, 500.

were given eight areas to manage. These areas include establishing policy on curriculum, textbook, teaching practices, staff assignments, discipline, school budget, professional development, and filling principal vacancies.²³⁴

One area they also governed was the school facility. Facility assignment and use of the school facility during the instructional day was to be determined by the school council.²³⁵ Underlying the curriculum portion of the KERA transformation were learning goals.²³⁶ These goals were academic standards for every child in the public schools.²³⁷ To elucidate the goals, the Kentucky Board of Education implemented learning expectations to assist in defining each goal.²³⁸

Curriculum

Under the revised curriculum model KERA adopted a new primary program, extended the required age of students attending school, textbooks, extensive professional development for teachers, advance use of technology in the schools, and support services.

²³⁴ Kentucky Legislative Research Commission, Statute 160.345 “Required the Adoption of School Councils for School-based Decision Making,” “Kentucky Legislature: Revised Kentucky Statutes.”

²³⁵ U.S. Department of Education, “Office of Educational Research and Improvement,” “Notes From the Field: KERA in the Classroom,” *Office of Educational Research and Improvement*, (2000): 3.

²³⁶ The six learning goals are the following: Goal 1: Students use basic communication and mathematics skills for purposes and situations they will encounter throughout their lives. Goal 2: Students apply concepts and principles from mathematics, the sciences, the arts, the humanities, social studies, practical living studies, and vocational studies to what they will encounter throughout their lives. Goal 3: Students develop their abilities to become self-sufficient individuals. Goal 4: Students become responsible members of a family, work group, or community, including demonstrating effectiveness in community service. Goal 5: Students think and solve problems in school situations and in a variety of situations they will encounter in life. Goal 6: Students connect and integrate experiences and new knowledge from all subject matter fields with what they have previously learned, and build on past learning experiences to acquire new information through various media sources. Kentucky Department of Education, “Kentucky Learning Goals and Academic Expectations,” Accessed July 16, 2013, <http://education.ky.gov/curriculum/docs/Documents/Kentuckys%20Learning%20Goals%20and%20Academic%20Expectations.pdf>.

²³⁷ Western Kentucky University, “Kentucky Education Reform Act (KERA),” *Libguides.wku*. Ed, last modified March 23, 2012, http://libguides.wku.edu/print_content.php?pid=242174&sid=1999460.

²³⁸ U.S. Department of Education, Office of Educational Research and Improvement, 3.

The primary school program replaced grades Kindergarten through third with grades one through fourth.²³⁹ The purpose behind the restructuring was to introduce the KERA initiatives early on in order to foster student success in the lower grades.²⁴⁰

A statewide textbook implementation took place in light of the curriculum changes. The process was overseen by the State Textbook Commission.²⁴¹ Professional development sessions were provided to teachers for assistance in acclimating them to the guidelines and practices under KERA.²⁴² The mandate introduced more instruction on problem solving, writing, and the demonstration of knowledge.²⁴³

Technology

Increasing the use of technology in the public schools was a part of the KERA act. Provisions were put into place to provide the funding for the equipment as well as the staff training.²⁴⁴ The plan included the addition of computers and a telephone in every classroom.²⁴⁵

Support Services

KERA added the following support services to the state: pre-school for educationally at-risk and disabled children, family and youth centers, and an extension of school services. These programs were created in hopes of removing learning obstacles for

²³⁹ Hunter, *Journal of Law & Education*, 500.

²⁴⁰ U.S. Department of Education. Office of Educational Research and Improvement, 3.

²⁴¹ Adams, *J. Educ. Fin.*, 328.

²⁴² The University of Kentucky, "KERA Information," *Education.uky.edu*.

²⁴³ Hunter, *Journal of Law & Education*, 501.

²⁴⁴ U.S. Department of Education, Office of Educational Research and Improvement, 8.

²⁴⁵ *Ibid.*

children in the state.²⁴⁶ Academically at-risk and disabled children four years old were provided preschool as a way to ensure their success.²⁴⁷ The law mandated that by 1992 school districts were to have added family resource and youth centers to qualifying school in or beside the school facility.²⁴⁸ These resource centers were to deliver health and community services to students in need.²⁴⁹ Social services offered included after-school tutoring, before and after school activities, summer school instruction for students needing more academic assistance, and programs helping students progress beyond societal, emotional, and physical obstacles to receiving an education.²⁵⁰

Assessment

Methods to assess the previously mentioned learning goals were a major component of the KERA act. From 1991 until 1998 the assessment initiative was known as the Kentucky Instructional Result Information System (KIRIS).²⁵¹ The test measured student achievement towards the learning goals. Student scores were not analyzed on an individual basis; however, they were used to examine the individual school's academic progress.²⁵² Principals and teachers were held accountable for student growth on the basis of the test.²⁵³ Schools were expected to show student academic improvement

²⁴⁶ Ibid., 3.

²⁴⁷ Ibid., 7.

²⁴⁸ Ibid.

²⁴⁹ U.S. Department of Education, Office of Educational Research and Improvement, 7.

²⁵⁰ Ibid.

²⁵¹ Ibid., 3.

²⁵² Ibid.

²⁵³ Hunter, *Journal of Law & Education*, 501 citing Partnership on Kentucky School Reform, (1996), 5-6.

biennium and would receive financial rewards or sanctions depending on student performance.²⁵⁴ After the questioning of the validity of the test, it was replaced with a corrected version, Commonwealth Accountability Testing System (CATS).²⁵⁵

Changes in the Kentucky Public School Finance Formula

Revised education finance formulas and funding regulations were part of the KERA Act.²⁵⁶ Various methods of tax collection were required in the state to raise revenue for education.²⁵⁷ The Support Education Excellence in Kentucky (SEEK) fund was established under the law.²⁵⁸ SEEK assured a set sum of money per pupil as a minimum amount in every district in the state of Kentucky by elevating the state's base grant, altered balancing grants and property valuations.²⁵⁹ The reason for the adjustment was so that less wealthy public school districts receive a greater portion of state assistance.²⁶⁰ The funding formula was transformed and state funding became calculated on a per-pupil basis.²⁶¹

Provisions put in place under KERA called for additional facility space and funding. However, when developing the legislation, it was unclear what these additions would cost. Therefore, finance formulas generated by the new law would be tailored to include

²⁵⁴ U.S. Department of Education, Office of Educational Research and Improvement, 3.

²⁵⁵ *Ibid.*, 4.

²⁵⁶ Verstegen, "Kentucky," In *A Quick Glance at School Finance: A 50 State Survey of School Finance Policies and Programs Vol. I: State by State Descriptions*.

²⁵⁷ *Ibid.*

²⁵⁸ *Ibid.*

²⁵⁹ *Ibid.*

²⁶⁰ *Ibid.*

²⁶¹ *Ibid.*

funding for future facility projects as required by KERA. Specifically, the new funding formula for facilities is Facilities Support Program of Kentucky (FSPK).²⁶²

School Facility Funding Process in Kentucky

District Facility Plan, Local Planning Committee

As a result House Bill 940 generated under the KERA Act facility construction requirements were altered.²⁶³ As part of the law, the Kentucky Revised Statute 157.420 (4) (KRS) directed money used out of the state and local public school fund for facility construction be placed in a separate funding account.²⁶⁴ This account was only to be used for capital outlay projects approved by the chief state school officer and those grounded in the survey conducted in agreement with regulations of the State Board for Elementary Education and Secondary Education.²⁶⁵

KRS 157.622 designates criteria for developing school facility plans.²⁶⁶ The statute denotes the school district's responsibility to develop a local facility plan every four years. This plan shall be approved by the State Board for Elementary and Secondary

²⁶² Ibid.

²⁶³ Thomas C. Boysen, and Kentucky State Board for Elementary and Secondary Education, "Kentucky School Facilities Planning Manual," (1992): 2.

²⁶⁴ Kentucky State Statute 157.420(4) stated, "The per pupil capital outlay allotment for each district from the public school fund and from local sources shall be kept in a separate account and may be used by the district only for capital outlay projects approved by the chief state school officer in accordance with requirements of law, and based on survey made in accordance with administrative regulations of the State Board for Elementary and Secondary Education." Ibid.

²⁶⁵ Ibid.

²⁶⁶ Statute 157.622(1) stated, "School districts shall develop a local facility plan once each four years in accordance with the schedule set by the chief state school officer. The State Board of for Elementary and Secondary Education shall approve the facility plan submitted by the district upon the recommendation of the chief state school officer. Nothing in this regulation shall prohibit a school district from requesting an amendment to its facility plan at other times during the four year cycle." Ibid.

Education if recommended by the chief state school officer.²⁶⁷ Each district's plan shall be generated by following the required standards and process, known as District Facility Planning Process (DFPP) and noted in "A Review of the School Facilities Construction Commission."²⁶⁸ As noted in Figure 2, facility plans were overseen by administrators and outlined the status of present facilities and future construction needs.²⁶⁹ Local district superintendents were charged with initiating the procedure in which the Local Planning Committee (LPC) was selected and serve as interim chairperson until the official chairperson was chosen.²⁷⁰ Upon nomination of the LPC, the Kentucky Department of Education was responsible for conducting training and informational support.²⁷¹ The LPC collected information, developed a master plan, drafted the plan, and submitted the draft to the Kentucky Department of Education (KDE).²⁷² The KDE reviews and revises the plan draft before sending it back to the LPC. If the draft is not approved at any of the incremental stages, it is revised by the LPC.²⁷³ Once approved by the LPC, the Local Board of Education (LBE) reviews the draft plan. Figure 2 demonstrates upon endorsement by the LBE and the LPC, local public hearings are held.²⁷⁴ After the hearing, the LBE prepares the final draft of the plan and submits it to KDE for

²⁶⁷ Ibid., 3.

²⁶⁸ Ibid. See also, "A Review of the School Facilities Construction Commission," *Legislative Research Commission*, no. 332 (2006): 18.

²⁶⁹ Ibid., 10.

²⁷⁰ Ibid., 72.

²⁷¹ Ibid., 11.

²⁷² "A Review of the School Facilities Construction Commission," p. 19.

²⁷³ Ibid.

²⁷⁴ Ibid., 20.

authorization.²⁷⁵ If validated, LBE has a local hearing regarding the plan and prepares a report.²⁷⁶ The report is sent by the LBE to the KDE for review.²⁷⁷ The final draft of the plan is sent to the LBE for review.²⁷⁸ The LBE may request modifications to the plan.²⁷⁹ When the final plan is completed, it is sent to the KDE for agreement.²⁸⁰ The KDE sends the final plan to the state board of education.²⁸¹ The state board of education will notify the LBE of the decision on the consent of the final plan.²⁸²

²⁷⁵ Ibid.

²⁷⁶ Ibid.

²⁷⁷ Ibid.

²⁷⁸ Ibid.

²⁷⁹ Ibid.

²⁸⁰ Ibid.

²⁸¹ Ibid.

²⁸² Ibid.

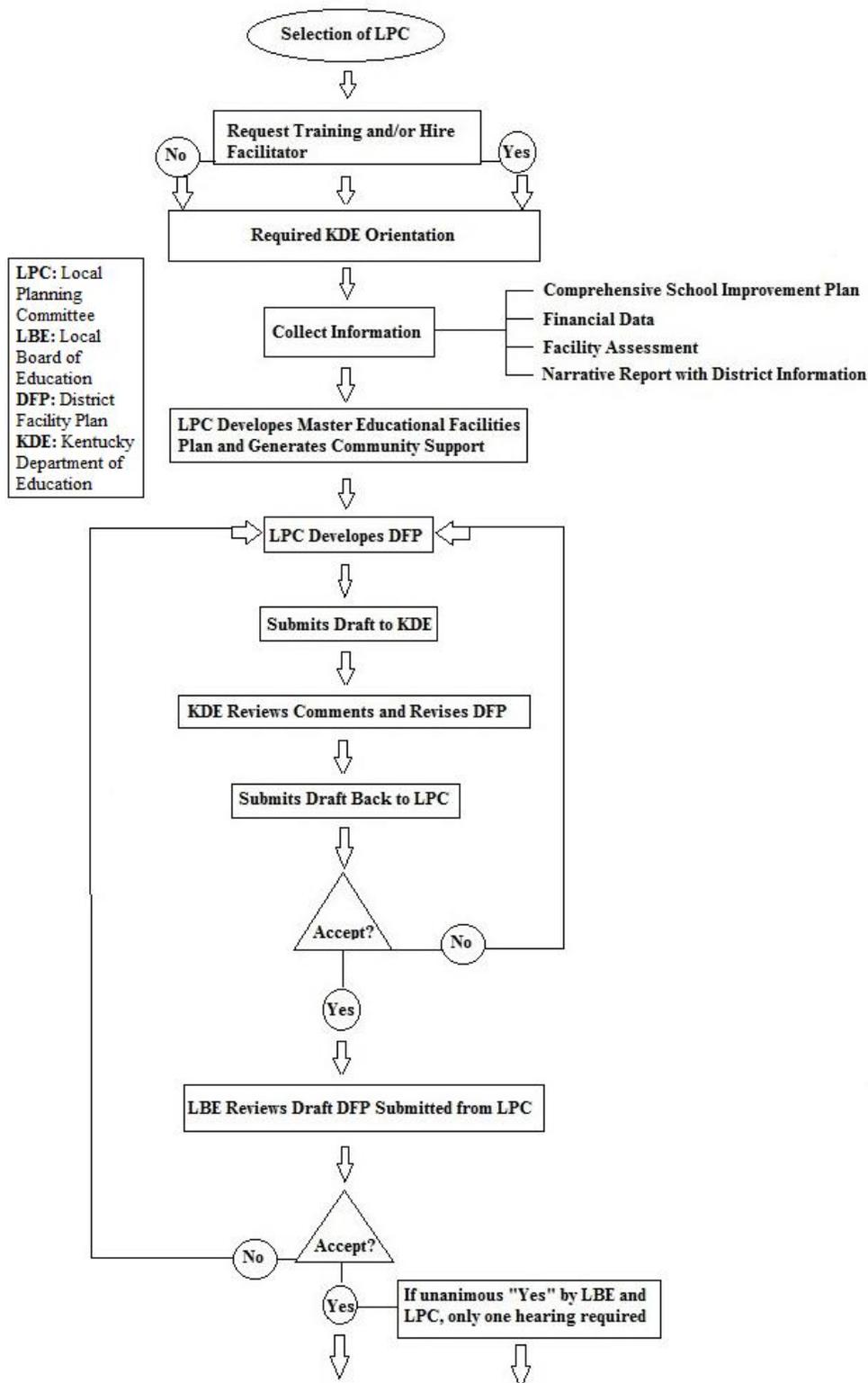


Figure 2. District facility planning in Kentucky

Source: As adapted from Ibid. See also, Kentucky Legislative Research Commission, “A Review of the School Facilities Construction Commission,” no. 332 (2006): 19. Permission to use granted by owner.

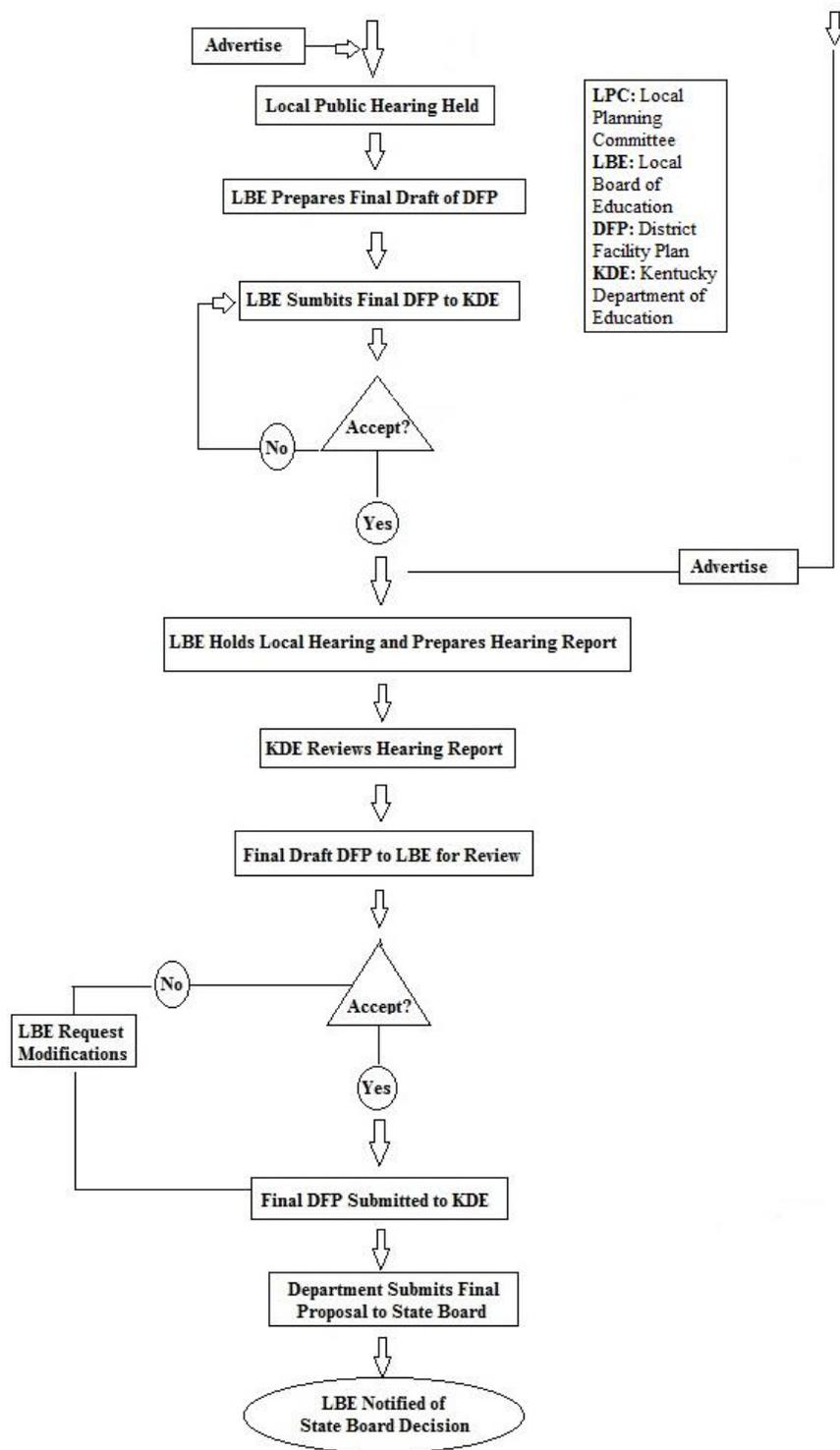


Figure 2. District facility planning process in Kentucky (continued)

Source: As adapted from Ibid. See also, Kentucky Legislative Research Commission, "A Review of the School Facilities Construction Commission," no. 332 (2006): 19. Permission to use granted by owner.

Federal Funding for Kentucky Public School Facilities

The Works Project Administration (WPA) was a federal program that was part of the New Deal under President Franklin D. Roosevelt. This agency employed approximately 8 million people in the United States from 1935 to 1943 to construct public works projects.²⁸³ Construction included public schools, public buildings, and roads as noted in Table 2.²⁸⁴ In Kentucky, from the years 1930 to 1939, a total of 1758 WPA school building projects were constructed.²⁸⁵ These structures were also meant to function as community centers.²⁸⁶ The cost of the projects was \$24,780,627 with the federal government paying \$9,708,921 of the total.²⁸⁷

²⁸³ Mary Meehan, "University of Kentucky Celebrates Historic WPA Collection," *Lexington Herald-Leader* (Lexington, KY), Sept. 3, 2012.

²⁸⁴ The Kentucky Heritage Council, "Kentucky Historic Schools Survey: An Examination of the History and Condition of Kentucky's Older School Buildings," accessed June 14, 2013, <http://www.heritage.ky.gov/NR/rdonlyres/186485D6-1783-488E-ACBC-F6E18166F284/0/KYHistoricSchoolsSurvey.pdf>.

²⁸⁵ Ibid.

²⁸⁶ Ibid.

²⁸⁷ Ibid.

Table 2. Works Progress Administration in Kentucky

Area of Focus	Quantity or Money Spent in the State for WPA projects
Roads, Highways, and Streets	\$117,656,194
Buildings	\$25,817,417
Water, Sewer, and other Utilities	\$12,337,072
Garments Made	8,165,400
Miles of Highways, Roads, and Streets	14,026

Source: Mary McLaren, Jennifer Bartlett, and Angelia Pulley, "WPA: An Important Chapter in U.S. and Kentucky History," *Library Presentations*, accessed, July 10, 2013, http://uknowledge.uky.edu/libraries_present/32.

Since *Rose v. Council for Better Education*, the significance of adequate public school facilities has been recognized nationally and additional federal funding has been allocated, however, this development is beyond the scope of this study. Congressional leaders passed the American Recovery and Reinvestment Act of 2009 (ARRA) as a way to stimulate the economy, protect jobs, and invest in education and the economic stability of the country.²⁸⁸ Under the ARRA, the State Fiscal Stabilization Fund (SFSF) was created in order to distribute \$48.6 billion from the United States Department of Education to state governors for local educational agency (LEA) distribution.²⁸⁹ LEAs

²⁸⁸ 111th U.S. Congress, "American Recovery and Reinvestment Act of 2009," 123 STAT. 115.

²⁸⁹ U.S. Department of Education, "General: State Fiscal Stabilization Fund," *Ed.gov*; According to the U.S. Department of Education, a local educational agency (LEA) is "a public board of education or other public authority legally constituted within a State for either administrative control or direction of, or to perform a service function for, public elementary schools or secondary schools in a city, county, township, school district, or other political subdivision of a State, or for a combination of school districts or counties that is recognized in a State as an administrative agency for its public elementary schools or secondary schools." U.S. Department of Education, "Definitions."

could use the funds to assist in modernizing, renovating, and repairing public school facilities.²⁹⁰

Support Education Excellence in Kentucky (SEEK) Funding

The *Rose* case exploited the discrepancies between school district funding in Kentucky. The KERA Act was put in place to balance these inequities through a program that revamped the school funding formulas, known as Support Education Excellence in Kentucky (SEEK). The initiative, largely unrevised, is still in use today by the state and localities.²⁹¹ SEEK is the Kentucky Public School's finance formula, which is a minimum foundation formula.²⁹² SEEK is a three-tiered finance system made up of a state base guarantee and two levels that provide localities with options for collecting in excess of the state promised per pupil allocation.²⁹³ The adjusted base guarantee per pupil is provided by the state and is constructed upon the prior school year's student

²⁹⁰ Ibid.; Nationwide, public school facilities are in need of repair. The U.S. Government Accounting Office released a report in 1995 explaining one-third of all school buildings in the country were in poor condition. "U.S. General Accounting Office," *School Facilities: Conditions of America's Schools*.

By 2004 more than 12,000 public school facilities were built and 130,000 were renovated. Conversely, the wealthiest public school districts spent the most on public school facilities at an average rate of \$9,361 per student in relation to the least wealthy public school districts which spent an average of \$4,800 per student. Filardo, et al., "Growth and Disparity: A Decade of U.S. Public School Construction."

In 2000, to determine the need for public school building structures, the National Education Association found that \$322 billion was necessary to repair existing schools and build new schools in efforts to make them suit student's educational needs. National Education Association, "Modernizing Our Schools: What Will It Cost?"

Therefore, the topic of public school facility renovation has national interest. This instrumental case study is bounded by a single school and its school district and community and will describe how the public school facility funding influence (from the *Rose* case) on renovations in a purposefully selected Kentucky middle school affect the provision of educational adequacy.

²⁹¹ Lawrence O. Picus, Allan Odden, and Mark Fermanich, "Assessing the Equity of Kentucky's SEEK Formula: A 10-Year Analysis," *J. Educ. Fin.* 29 (2004): 317.

²⁹² Verstegen, "Kentucky," In *A Quick Glance at School Finance: A 50 State Survey of School Finance Policies and Programs Vol. I: State by State Descriptions*. "The revised funding formula, Support Education Excellence Kentucky (SEEK), raised the state's foundation grant, adjusted equalizing grants and property assessments so that poorer districts received a larger share of state aid, and changed the aid formula so that state funding is calculated on a per-pupil basis." (p.1)

²⁹³ Ibid.

average daily attendance.²⁹⁴ School districts gaining student membership in the first two months of the school year are given supplementary money to recompense for the growth.²⁹⁵ In the 1990-91 school year following the *Rose v. Council for Better Education* case, the state base guaranteed amount was \$2,305.²⁹⁶

In addition to the base, the legislature adjusted the amount giving more to counties according to at-risk students, transportation, and exceptional children (Figure 3).²⁹⁷ At-risk students are recognized as those who qualify for the federally sponsored free lunch program.²⁹⁸ The additional weighted amount given for these students was 0.15.²⁹⁹ The transportation adjustment was made factored on those students living greater than a mile away from school and the population density of the school district.³⁰⁰ The exceptional children calculation was based on the number of children and their learning needs. Specific weight categories were created by the KDE for KERA. Severely handicapped students were assigned the weight of 2.35, mildly handicapped students were assigned 1.17, and students with speech difficulties were assigned 0.24.³⁰¹

²⁹⁴ Adams, *J. Educ. Fin.*, 332.

²⁹⁵ Ibid.

²⁹⁶ Picus, Odden, and Fermanich, *J. Educ. Fin.*, 318.

²⁹⁷ Ibid., 316-317.

²⁹⁸ Adams, *J. Educ. Fin.*, 332.

²⁹⁹ Picus, Odden, and Fermanich, *J. Educ. Fin.*, 317.

³⁰⁰ Adams, *J. Educ. Fin.*, 332.

³⁰¹ Picus, Odden, and Fermanich, *J. Educ. Fin.*, 317.

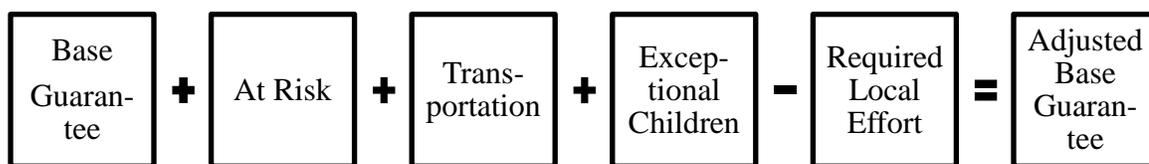


Figure 3. An overview of the adjusted base guarantee calculation

A local monetary effort from the counties was also a condition of the legislature. Tax collection was at a minimum rate of \$0.30 per \$100 of the fair market property value.³⁰² Taxable property included real property, motor vehicles, utilities, income surcharges, and professional licenses.³⁰³

Under SEEK, counties have the option to raise more money than is guaranteed by the state base. These non-compulsory tax collection designs are Tier I and Tier II of the reformed finance formula. In the first Tier, districts are limited to raising no more revenue than 15% of their adjusted base guarantee.³⁰⁴ Equalization financing was offered under Tier I. Districts with per pupil property wealth less than 150% of the state average were given aid to subsidize the difference.³⁰⁵ Tier II is also a non-compulsory option for localities. However, districts are limited to raising no more revenue than 30% of their adjusted base guarantee, the state does not equalize Tier II tax escalations, and tax increments require an electoral vote.³⁰⁶

³⁰² Ibid.

³⁰³ Ibid.

³⁰⁴ Ibid.

³⁰⁵ Hunter, *Journal of Law & Education*, 503.

³⁰⁶ Adams, *J. Educ. Fin.*, 334.

The implementation of SEEK has increased pupil funding in the state of Kentucky. Funding grew 44.5% from 1990 to 2001.³⁰⁷ The poorest districts have experienced the greatest increase of 65.9% and the wealthier districts have gained 24.8%.³⁰⁸ Overall, Kentucky's per pupil spending moved up from 40th in the nation to 21st.³⁰⁹

Facility Support Program of Kentucky (FSPK)

At the time of the KERA Act legislators anticipated a need for additional school facility funding, however, the exact cost of future facility construction was not known. In order to fund building construction, renovations, and monthly mortgage responsibility, the SEEK program included a method to support facility funding known as the Facilities Support Program of Kentucky (FSPK).³¹⁰ Under this program, the school district contributes at least \$0.05 equivalent tax per \$100 in assessed property value to cover the facility-related costs.³¹¹ An equivalency tax is in addition to the minimum rate of \$0.30 per \$100 of the fair market property value required by SEEK.³¹² If school districts use the tax revenue for reasons unrelated to debt service, the funds are not equalized.³¹³

³⁰⁷ Susan Weston Perkins and Robert F. Sexton, "Substantial and yet Not Sufficient: Kentucky's Effort to Build Proficiency for Each and Every Child," *Campaign For Educational Equity*, no. 2 (2009): 12.

³⁰⁸ *Ibid.*

³⁰⁹ Hunter, *Journal of Law & Education*, 502.

³¹⁰ Kentucky Department of Education, Office for State Budget Director, "Department of Education: Support Education Excellence in Kentucky (SEEK)," accessed September 20, 2012, http://osbd.ky.gov/NR/rdonlyres/BDD61E11-A1E0-4B08-8247-C79ED6A48319/0/SupportEducationExcellence_in_Kentucky.pdf.

³¹¹ "A Review of the School Facilities Construction Commission," 1.

³¹² Rodney L. Bennett, "Advisory: Funding for Capital Construction Summary," *Kentucky Department of Education Division Facilities Management*, (2010), 3.

³¹³ Adams, *J. Educ. Fin.*, 335.

SEEK Capital Outlay Fund

Included in SEEK is a provision for capital outlay funds. The program is a flat-grant of \$100 per pupil for capital expenditures.³¹⁴ The districts are required to place the money in its Capital Outlay Fund.³¹⁵ The number of pupils is determined by the school district's adjusted average daily attendance.³¹⁶ The funds may be used for direct construction costs and to pay for debt bonds issued for school districts.³¹⁷ The funded projects require approval from the Commissioner of Education through the Division of Facilities Management.³¹⁸

Building Growth Fund

The Kentucky General Assembly passed legislation in 1994 to assist in funding facilities for public school districts expecting student population growth. Local districts were permitted to levy a \$0.05 tax known as the first growth nickel.³¹⁹ The tax was used to pay for debt service and new facilities.³²⁰ Under the law in order to qualify, districts were required to meet the following criteria: 1) Growth of at least 150 students in average daily attendance and 3% overall growth for the previous five years; 2) Possess mortgage responsibility equal to 80% of SEEK capital outlay, FSPK district \$0.05

³¹⁴ William J. Glenn, et al., *Education Policy Analysis Archives*, 6.

³¹⁵ Ibid.

³¹⁶ Legislative Research Commission, "A Review of the School Facilities Construction Commission," 3.

³¹⁷ *Kentucky Department of Education*, "Construction," last modified October 18, 2012, <http://education.ky.gov/districts/fac/Pages/Construction.aspx>.

³¹⁸ Bennett, *Kentucky Department of Education Division Facilities Management*, 3.

³¹⁹ Legislative Research Commission, "A Review of the School Facilities Construction Commission," 4.

³²⁰ Ibid., 3.

equivalent tax and FSPK state equalization; and 3) Student enrollment in excess of classroom space; and 4) Possess an accepted and qualified local school facility plan.³²¹

Qualified Zone Academy Bonds (QZABs)

Qualified Zone Academy Bonds (QZABs) are a way bonds taken to benefit a school district's funding project whose interest is paid by the federal government.³²² QZABs benefit eligible school districts by providing a funding source that is effectively an interest free loan for the district.³²³ Public school districts nationwide are eligible and have 25 years to repay the principal.³²⁴ The program, created in 1998 is found under Section 54E(c)(2) of the United States Internal Revenue Code.³²⁵ The federal government pays for the interests on the bonds, which saves up to 50% of the costs of the project.³²⁶ These funds cannot be used for new construction, however, may be used for public school facility renovations, repairs, equipment and technology, curricula development, and teacher training.³²⁷ Low socio-economic populations are eligible for the program.³²⁸

³²¹ Ibid., 3-4.

³²² "U.S. Department of Education, "Apply for QZAB Grant," *Ed.gov*, accessed February 23, 2013. http://www.qzab.org/?page_id=407.

³²³ Ibid.

³²⁴ Ibid.

³²⁵ U.S. Department of Education, "Apply for QZAB Grant: IRS," *Ed.gov*, accessed February 23, 2013. http://www.qzab.org/?page_id=178.

³²⁶ Ibid.

³²⁷ U.S. Department of Education, "Qualified Zone Academy Bonds: A Tool That Works for Schools," *QZAB.com*, accessed February 23, 2013, http://qzabs.com/tools_doe_qzab.html#examples.

³²⁸ "U.S. Department of Education, "Apply for QZAB Grant," *Ed.gov*. According to the department of education, in order for a school to be eligible to apply for the QZAB the following criteria must be met: a) "The school is a public school that provides education and training below the college level; b) The school is willing to operate a special academic program in cooperation with businesses to enhance

The Commonwealth of Kentucky has taken advantage of the program, however, in not a substantial way when compared to the billions the state has put into construction and renovation cost since *Rose v. Council for Better Education*.³²⁹ In 2008, 2009, 2010, 2011, 2012, and 2013 the state received respectively, \$7,145,000, \$25,009,000, \$24,481,000, \$0, \$6,444,000 and \$6,444,000 from the QZABs.³³⁰ An overwhelming majority of the money used for new and renovated schools in Kentucky originated from the state and local funds. The state has spent more than \$2 billion in state revenue on the replacement and remodeling of school facilities since *Rose v. Council for Better Education*.³³¹

Kentucky School Facility Construction Commission (KSFCC)

In order to assist school districts to meet their capital construction needs, legislatures set up the Kentucky School Facility Construction Commission (KSFCC) in 1985.³³² The commission was designed for various purposes including delivering additional support for facility construction, a more balanced distribution of school buildings between districts, and supplying a share of debt service.³³³ The criteria for a district to participate

the academic curriculum and increase graduation and employment rates; and c) either (i) the school is located in an empowerment zone or enterprise community (including empowerment zones designated or authorized to be designated under the Act), or (ii) it is reasonably expected that at least 35% of the students at the school will be eligible for free or reduced-cost lunches under the school lunch program established under the National School Lunch Act.”

³²⁹ Prichard Committee, “Ten Steps Forward, Sources, Details, and Trends to Support Kentucky Schools: Achieving the Top 20 by 2020,” accessed October 20, 2012, <http://www.prichardcommittee.org/about-us/top-20-by-2020>.

³³⁰ U.S. Department of Education, “Maximus Face Amount,” *QZAB.com*, accessed February 23, 2013, <http://qzabs.com/qzab%20allocations.html>; U.S. Department of Education, “Apply for QZAB Grant,” *Ed.gov*, accessed February 23, 2013, http://www.qzab.org/?page_id=416.

³³¹ Prichard Committee, “Ten Steps Forward, Sources, Details, and Trends to Support Kentucky Schools: Achieving the Top 20 by 2020.”

³³² *Ibid.*, 5.

³³³ *Ibid.*, 1.

in the program include having unmet needs based on an approved facility plan minus available local revenue.³³⁴ The mandate also holds a provision requiring the FSPK local \$0.05 equivalent tax revenue be budgeted for facility mortgage responsibility, new construction, facility additions, and renovations.³³⁵

KSFCC became a pathway for districts to generate the needed amount for building funding. The commission's existence provided for an increase in the yearly average of construction or renovation projects from \$50 million to more than \$300 million during the 1990-91 fiscal year.³³⁶ Since the legislation, the state has spent more than \$2 billion in state revenue on the replacement and remodeling of school facilities as noted in Figure 4.³³⁷

³³⁴ Ibid.

³³⁵ Ibid.

³³⁶ Adams, *J. Educ. Fin.*, 335.

³³⁷ Prichard Committee, "Ten Steps Forward, Sources, Details, and Trends to Support Kentucky Schools: Achieving the Top 20 by 2020."

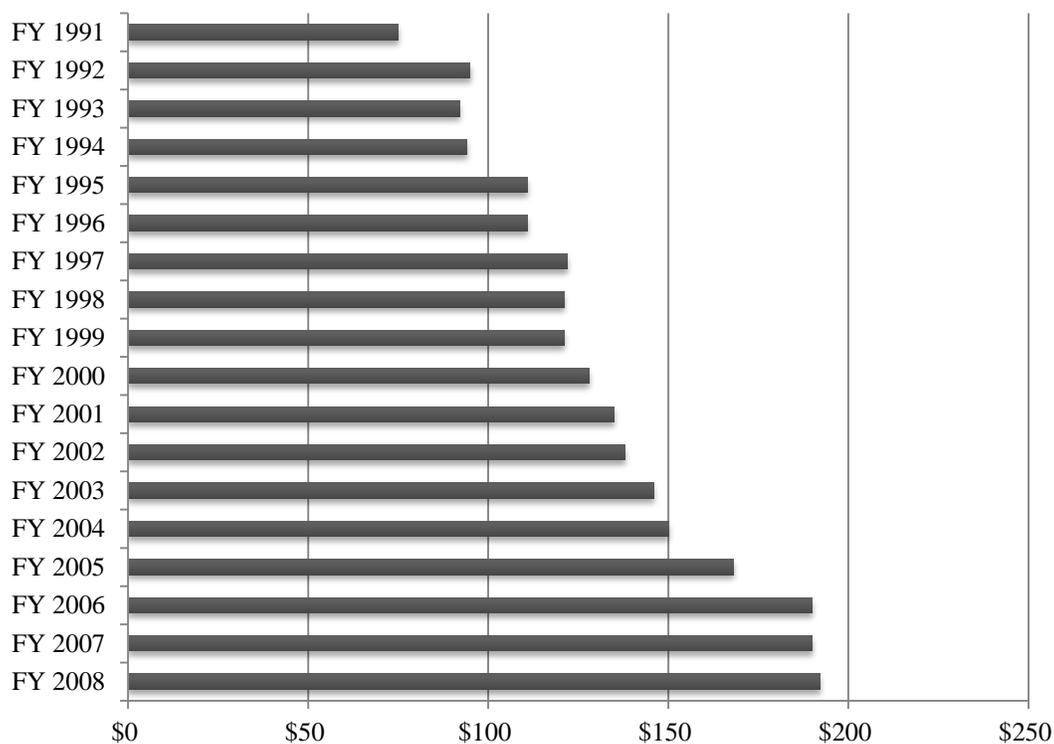


Figure 4. State spending on new and remodeled buildings

(in Millions of 2005 Constant Dollars)

Source: As adapted from Prichard Committee, “Ten Steps Forward, Sources, Details, and Trends to Support Kentucky Schools: Achieving the Top 20 by 2020,” accessed October 20, 2012, <http://www.prichardcommittee.org/about-us/top-20-by-2020>.

Urgent Need School Trust Fund

In order to address specific needs of local school districts, the General Assembly of Kentucky created a non-KSFCC funding resource.³³⁸ Districts that met quantified criteria were allowed to raise local tax rates.³³⁹ The General Assembly in some situations matched the locally generated revenue.³⁴⁰ In 2003 and 2005 through budget bills, the General Assembly referred funding to designated districts with category 5 (poorest

³³⁸ Legislative Research Commission, Kentucky Facilities Planning Manual, 702 KAR 1:00.; “A Review of the School Facilities Construction Commission,” viii.

³³⁹ Ibid.

³⁴⁰ Ibid.

condition) schools as noted in Table 3.³⁴¹ This type of school funding was recognized as *Urgent Need School Trust Fund* and Category 5 funding.³⁴² The method provided districts meeting certain criteria as mentioned below the funding to replace or renovate Category 5 schools.³⁴³ In addition to meeting Category 5 standards, the those schools meeting the urgent needs requirement must meet the Kentucky Department of Education's best practice minimums of 300, 400, and 500 students for elementary, middle, and high schools, respectively.³⁴⁴

³⁴¹ Ibid. According to Mr. Tim Lucas (Kentucky Department of Education), Category 5 school facilities were in "very poor condition, had not had significant renovation in the building's life, had a student population that exceeded KSFCC minimum requirements and were in districts that could not reasonably afford to replace the schools." Tim Lucas, *Urgent-Needs Grant*, e-mail message to author, April 29, 2013.

³⁴² Ibid.

³⁴³ Ibid.

³⁴⁴ Ibid., 7.

Table 3. Kentucky Public School facility condition ranking /category

Category	Label	Criteria
1	Excellent	Functional Age of 1-10 years. No apparent deterioration; basically new.
2	Good	Functional age of 10-20 years. Minor deterioration; no improvements needed.
3	Average	Functional age of 20-30 years. Some deterioration; no improvements needed within 5 years.
4	Fair	Functional age of 30-40 years. Deterioration; Needs improvement or possible replacement.
5	Poor	Functional age older than 40 years. Deteriorated to the point of replacement; needs immediate attention. Required systems are non-existent and need to be provided.

Source: Kentucky Legislative Research Commission, *Kentucky Facilities Planning Manual*, 702 KAR 1:00.; “A Review of the School Facilities Construction Commission,” 3. Functional age is defined as either actual age or years since last renovation.

Assessment of Buildings

In 2010 the Kentucky Facilities Inventory and Classification System (KFICS) commenced as part of the Kentucky Revised Statute 157. The statute declared there are criteria the state must meet to support the construction and renovation of public school facilities.³⁴⁵ In accordance with the law, the Kentucky Department of Education was

³⁴⁵ Kentucky Legislative Research Commission, “Kentucky Legislature: KRS 157.420.” states, “(9) Beginning in fiscal year 2011-2012, the Kentucky Department of Education shall standardize the process for evaluating the overall quality and condition of all school buildings across the state. The evaluation process shall: (a) Result in consistent categorization of buildings for local planning purposes and for the distribution of state general fund moneys designated for capital construction; (b) Be based on measurable, objective criteria; (c) Include numerical scoring with weights to recognize building

required to evaluate the (1) physical condition, (2) educational suitability, and (3) technological preparedness of the state's public schools as they related to state standards and guidelines.³⁴⁶ Kentucky's public schools are classified on a scale of 1 to 5 indicating excellent to poor school facilities condition, respectively as shown in Table 3. In 2005 there were 276 schools in Category 1, 336 schools in Category 2, 368 schools in Category 3, 190 schools in Category 4, and 33 schools in Category 5.³⁴⁷ Only schools that were Category 3 or Category 4 were subject to the assessments in 2011.

The building condition was evaluated based on functional systems and elements of a building and used the UNIFORMAT II Elemental Classification system.³⁴⁸ The assessments for each school were performed by a third-party consultants hired by the state.³⁴⁹ Results of the valuation were reported in a weighted-score format based on

components and characteristics that address: 1. Life safety issues; 2. Compliance with state and federal codes; 3. Compliance with requirements under the Americans with Disabilities Act; 4. Community spaces; 5. Instructional areas; 6. Mechanical, electrical, plumbing, and other technology systems; 7. Site and exterior building conditions; 8. Age of the buildings; 9. Feasibility of building additions or major renovations; 10. The districts' facility capacities; 11. Current use of temporary facilities; and 12. Projected enrollment growth; and (d) Use of a third-party evaluator that utilizes an already established software-based system to perform the first, base-line evaluation.

³⁴⁶ Kentucky Department of Education, "Facilities Assessment Project."

³⁴⁷ Kentucky Legislative Research Commission, "Kentucky Department of Education Division of Facilities Management.," "Review of the School Facilities Construction Commission," 10.

³⁴⁸ The UNIFORMAT II Elemental classification system was developed to provide a consistent reference for the description, economic analysis, and management of buildings. The U.S. General Services Administration originally developed this format and later the American Institute of Architects accepted it with some changes. This model for preparing costs estimates comparisons has since been accepted by architects and the construction industry in the U.S. For more information see, Bowen, Charette, and Marshall, UNIFORMAT II, NIST Special Publication 841.

³⁴⁹ Ibid.; Parsons Commercial Technology Group partnered with MGT of America to perform the public school facility evaluations.

physical condition (75%), suitability (20%), and technological preparedness (5%) and used to generate the *Kentucky School Score Report*.³⁵⁰

For the first round of these assessments and reports only schools classified as Category 3 and 4 were done in the first year of the law's implementation. Thus, a total of 146 districts (with 485 instructional programs) and 477 buildings were completed. There were 28 school districts that did not have any schools in Category 3 and 4, thus had no assessments completed. In 2009 Kentucky had 176 public school districts with approximately 1,200 buildings. Those reports were released to the public in November, 2011. Information in these reports was used by the Kentucky General Assembly to make public school building funding decisions.

As noted earlier an assessment report of approximately 48-50 pages was done for each school. The cover page of each report contained a picture of the front of each school, the name of the district, and the dates of the Condition Assessment and the Suitability/Technology Assessment which were as much as six months earlier. The report contained an executive summary of the assessment containing essential findings of the assessment and specific characteristics of the building structure. Also, included was the Building Condition Budget Summary, the Building Condition Budget Detail, and the Building Condition Deficiencies Narrative that included photographic documentation.

³⁵⁰ Kentucky Department of Education, "Facilities Inventory & Classification System Kentucky School Score Report." Links to the score report for each school organized by district are found at <http://education.ky.gov/districts/fac/Pages/Facilities-Assessment-Project.aspx>.

Defining the Five Public School Facility Features

To produce the three sub-scores for the *Kentucky School Score Report* specific categories of the school building were assessed to evaluate the three categories of physical condition, suitability, and technological preparedness. This study does not seek to replicate these facilities assessments, but rather the intent was to examine five composite features that derive from the three categories. The five features are (1) security, (2) technological infrastructure, (3) lighting, (4) thermal comfort, and (5) air quality.

When examined together, I made the assumption that these five features are indicators of adequacy as is shown in Figure 5. Each of these features is found in contemporary public school facilities and have been identified by architects, builders and educators as contributing to a sound educational environment that promotes learning in the 21st century; i.e. promotes an adequate education. The features are those that are open to perception by students and their teachers as they engage in the teaching and learning process in school buildings. This study assumed that physical features of the school affects the learning climate for the students. Yet, in the design of school facilities teachers and students are rarely asked to provide input based on their experiences. One consequence of this oversight is that data pertaining to facility characteristics are almost never linked to data on student achievement, health and experiential barriers to teaching and learning in the spaces. For example, the feature of lighting could be expressed by foot-candles³⁵¹ of electric lighting, solar lighting, natural light emitted from windows, and/or to an extent, the color of and reflection from walls and ceilings. However, these indicators are of limited value if we do not know that during science activities students

³⁵¹ The light shed on a surface by a light source twelve inches in distance.

may accidentally drop small gray pins on the floor and be unable to retrieve them, that students have difficulty getting their solar powered calculators to work through the entire class period, that once the overhead lighting is turned off, it is almost pitch black in the classroom, and that when plugging technological equipment or microscopes, electrical breaker switches trip. The actual experiences and perceptions of the students provide an important and unique picture of the facilities in real educational process.

The assessment of physical condition encompasses each of these influences in its elements. Thus, each of these five features is part of several elements identified in the UNIFORMAT II classification system. In the sections that follow, each of the five features is discussed relative to the evidence that they can influence student achievement.

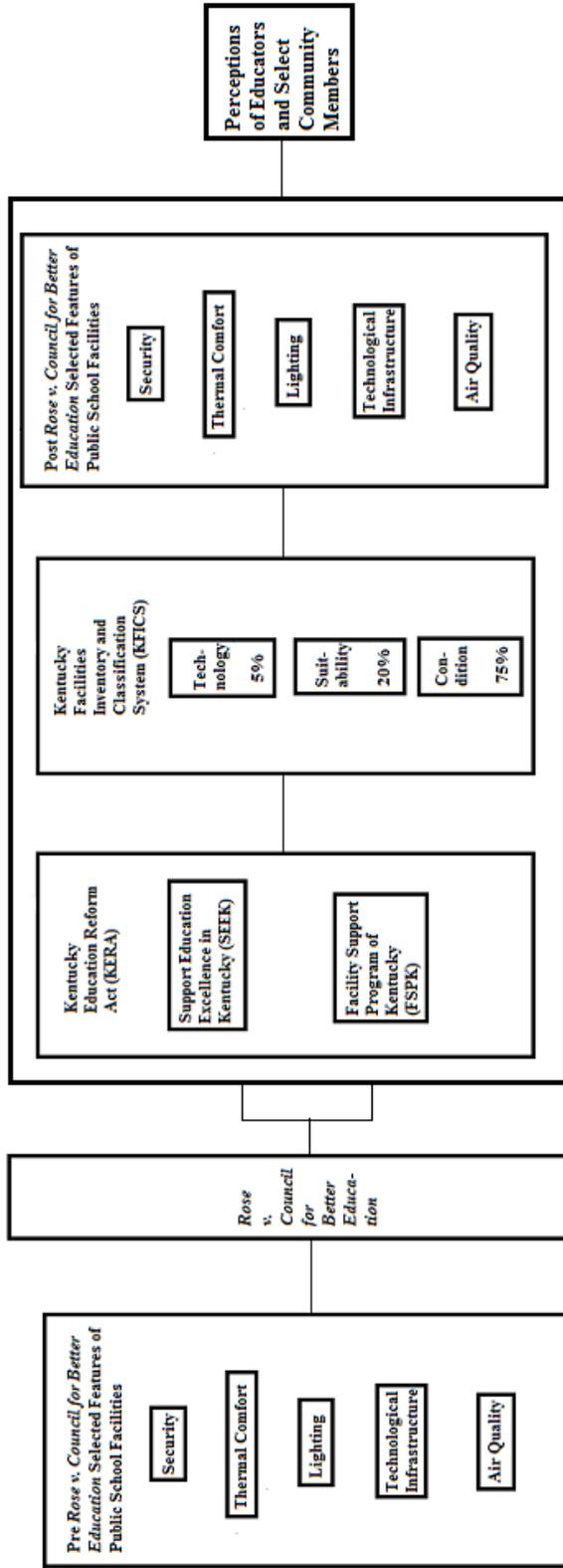


Figure 5. Conceptual framework for the study plan

Security

Tragic incidents of violence and trespassing on public school campuses nationwide have elevated the need for public school facility safety and security measures. Security implies freedom from harm and distress.³⁵² The term also encompasses measures taken to prevent and respond to harmful or disruptive activities that are dangerous or threatening.³⁵³ Public school security has become a recent and critical expectation for school facilities.

There is a growing literature concerning security processes and facilities in schools; however, to date, there have been only a few empirical studies. Many state departments of education and the federal government offer school facilities manuals published online.³⁵⁴ The Kentucky Department of Education's *Building Assessment System* list *security* as one of its main elements. Therefore, this feature is recognized by the state as an important part of the learning environment.³⁵⁵

Schneider (2010) outlines aspects of public school facility security that are necessary to prevent crime to include surveillance, access control, territoriality, and maintenance.³⁵⁶

Surveillance is the capability to view what is occurring on and around the school

³⁵² National Center for Education Statistics and the National Cooperative Education Statistics System, "Planning Guide for Maintaining School Facilities," 2003, accessed January 20, 2013, <http://nces.ed.gov/pubs2003/2003347.pdf>.

³⁵³ U.S. Department of Homeland Security, "Primer: To Design Safe School Projects in Case of Terrorist Attacks and School Shootings," 2012, accessed January 17, 2013, http://www.dhs.gov/xlibrary/assets/st/bips07_428_schools.pdf.

³⁵⁴ These manuals offer information pertaining to planning, financing, and structural design elements.

³⁵⁵ Kentucky Legislative Research Commission, "Kentucky Legislature: KRS 157.420." Paige Patterson-Grant, *Building Assessment System*, e-mail message to author, January 16, 2013.

³⁵⁶ Tod Schneider, "CPTED 101: Crime Prevention Through Environmental Design—The Fundamentals for Schools," *National Clearinghouse for Educational Facilities*, 2010, accessed November 18, 2012, <http://www.ncef.org/pubs/cpted101.pdf>.

grounds.³⁵⁷ The replacement of solid walls with wrought iron fencing illustrates this concept.³⁵⁸ Access control is the capacity to determine who is able to get on and off of school grounds.³⁵⁹ Reconfiguring outside doors so that they lock automatically when closed is a way to regulate access.³⁶⁰ Territoriality pertains to methods that reinforce the communication of ownership over school grounds.³⁶¹ Signs limiting access and guiding visitors to the office are methods to exercise territoriality.³⁶² Maintenance is the upkeep of the school building and grounds. A well-kept public school facility emphasizes the message the structure and grounds are cared for and looked after.³⁶³

Technological Infrastructure

In the current digital age, public school facilities are expected to have an up-to-date technological infrastructure. The term *infrastructure* refers to both the technological device and the cabling needed for the device.³⁶⁴ As part of the technological preparedness, public school facilities must have systems set in place to allow for wide

³⁵⁷ Ibid., 1.

³⁵⁸ U.S. Department of Homeland Security, “Primer: To Design Safe School Projects in Case of Terrorist Attacks and School Shootings.”

³⁵⁹ Schneider, “CPTED 101: Crime Prevention Through Environmental Design—The Fundamentals for Schools.”

³⁶⁰ Ibid.

³⁶¹ Ibid., 2.

³⁶² Ibid.

³⁶³ Ibid.

³⁶⁴ National Center for Education Statistics, “Technology in Schools: Suggestions, Tools, and Guidelines for Assessing Technology in Elementary and Secondary Education,” accessed January 20, 2013, <http://nces.ed.gov/pubs2003/2003313.pdf>; According to the National Center for Education Statistics, “Devices supporting technology in schools include specialized equipment (such as switches, routers, modems, or codecs) that link computers or video hardware to networks. Infrastructure also refers to cabling, whether wire, fiber optic, or coaxial. In newer systems, links between computers are wireless, in which case infrastructure refers to receivers and transmitters.”

access of internet connectivity. An adequate amount of internet availability is that which allows simultaneous usage by students and educators anywhere in the school building.³⁶⁵

The public school facilities' ability to provide timely and widespread internet connectivity at sufficient data transfer speeds is necessary in 21st century school learning environments.³⁶⁶

The Kentucky Department of Education's *Building Assessment System* includes technological readiness as one of the three major categories. Therefore, investigation of this element is recognized by the state as an important part of the learning environment.³⁶⁷

Lighting

Lighting is a consideration in public school facility design. Barrett et al. (2013) found it to impact the learning rates of primary school students.³⁶⁸ The quantity of light needed by students in schools is not in question, however, the type and quality of light is under inquiry.³⁶⁹ Researchers link student performance to sufficient lighting. Kuller and

³⁶⁵ U.S. Department of Education, "Infrastructure: Access and Enable," accessed November 18, 2012, <http://www.nrdc.org/health/kids/ocar/chap4.asp>.

³⁶⁶ International Society for Technology in Education, "Maximizing the Impact: The Pivotal Role of Technology in a 21st Century Education System," 2007, accessed January 20, 2013. http://www.setda.org/c/document_library/get_file?folderId=191&name=P21Book_complete.pdf.

³⁶⁷ Kentucky Legislative Research Commission, "Kentucky Legislature: KRS 157.420." Paige Patterson-Grant, *Building Assessment System*, e-mail message to author, January 16, 2013.

³⁶⁸ Peter Barrett, et al., "A Holistic, Multi-level Analysis Identifying the Impact of Classroom Design on Pupils' Learning," *Building and Environment*, 59 (2013): 678-689.

³⁶⁹ Lindsay Baker and Harvey Bernstein, "The Impact of School Buildings on Student Health and Performance: A Call for Research," *McGraw-Hill Construction Research Foundation and the Center for Green Schools*, accessed November 18, 2012. <http://mcgraw-hillresearchfoundation.org/wp-content/uploads/2012/02/GreenSchoolsWP-2012.pdf>.

Lindsten's (1992) study found that students lacking access to natural light demonstrated a diminished cortisol levels, potentially leading to decreased concentration abilities.³⁷⁰

In light of the *Rose* case and the revision of the statute outlining process for evaluating the public school facilities the Kentucky Department of Education's *Building Assessment System* was established. This implementation includes lighting. Investigation of this feature is documented by the state as a significant part of the learning environment.³⁷¹

Another study conducted by the Heschong Mahone Group in 1999 demonstrated a strong correlation between daylight and higher academic performance.³⁷² The research included over 2000 classrooms from three school districts.³⁷³ The study concluded that over the course of a school year, students with optimal classroom daylight exposure progressed 20% quicker on math tests and 26% quicker on reading tests than those students receiving the least amount of natural light exposure.³⁷⁴

Thermal Comfort

Thermal comfort pertains to the adequate heating or cooling of the public school facility. Revision of the Kentucky State Statute outlining the process for evaluating the public school facilities as a result of the *Rose* case prompted the Kentucky Department of

³⁷⁰ Rikard Küller and Carin Lindsten, "Health and Behavior of Children in Classrooms With and Without Windows," *Journal Of Environmental Psychology* 12, no. 4 (1992): 305-317.

³⁷¹ Kentucky Legislative Research Commission, "Kentucky Legislature: KRS 157.420." Paige Patterson-Grant, *Building Assessment System*, e-mail message to author, January 16, 2013.

³⁷² Lisa Heschong, "Daylighting in Schools: An Investigation into the Relationship between Daylighting and Human Performance," 1999, accessed on November 18, 2012, <http://www.h-m-g.com/downloads/Daylighting/schoolc.pdf>.

³⁷³ *Ibid.*, 2-3.

³⁷⁴ *Ibid.*

Education's *Building Assessment System*. Temperature evaluation is included in the assessment system. Exploration of this feature is acknowledged by the state as an important part of the learning environment.³⁷⁵

Early research has yielded results that indicate that slight temperature variations can affect student performance.³⁷⁶ Harner (1974) found that the best temperature range for learning reading and math is 68°F to 74°F and that the ability to learn the subject is adversely affected by temperatures above 74°F.³⁷⁷ Chan (1980) came to the conclusion from the results in his study that a significant relationship exists between students in air conditioned public school facilities and higher academic achievement.³⁷⁸ A study conducted in 1998 by Fang et al. on adults supports the belief that students perform best academically in classrooms with lower temperatures and lower humidity.³⁷⁹ This study involved thirty female participants exposed to predetermined environmental conditions who performed replicated office work and recorded their perceptions.³⁸⁰

³⁷⁵ Kentucky Legislative Research Commission, "Kentucky Legislature: KRS 157.420." Paige Patterson-Grant, *Building Assessment System*, e-mail message to author, January 16, 2013.

³⁷⁶ Baker and Bernstein, "The Impact of School Buildings on Student Health and Performance: A Call for Research."

³⁷⁷ David P. Harner, "Effects of Thermal Environment on Learning Skills," *CEFP Journal*, 12, no. 2 (1974): 4-6.

³⁷⁸ Tak Cheung Chan, "Physical Environment and Middle Grade Achievement," *Greenville County School District*, (1980), ERIC Document Reproduction Service, No. ED 198 645.

³⁷⁹ L. Fang, et al., "Impact of Indoor Air Temperature and Humidity in an Office on Perceived Air Quality, SBS Symptoms and Performance," *Indoor Air* 14, (2004): 74.

³⁸⁰ *Ibid.*

In a more current study Wargoeki and Wyon (2007) found an increase in student test-taking speed on the identical tests when temperatures were decreased from 77°F to 68°F.³⁸¹

Air Quality

The quality of air is an important factor to examine when accessing the condition of a public school facility. The statute revision outlining the process for evaluating the public school facilities in Kentucky as a result of the decision in *Rose v. Council for Better Education* led to the creation of the Kentucky Department of Education's *Building Assessment System*. The assessment includes air quality as an element. Examination of this element is recognized by the state as a vital component of the learning environment.³⁸²

Shaughnessy et al. examined the relationship between air indoor air quality in public school facilities to student achievement.³⁸³ Researchers concluded a significant relationship existed between classroom-level ventilation rate and student achievement.³⁸⁴

There are contaminants found in air such as volatile organic compounds (VOCs) that evaporate easily at room temperature,³⁸⁵ mold, and bacteria. These carbon-based compounds and the microorganisms have been linked to respiratory issues, visual

³⁸¹ Pawel Wargoeki and David P. Wyon, "The Effects of Moderately Raised Classroom Temperatures and Classroom Ventilation Rate on the Performance of Schoolwork by Children," *HVAC & R Research* 13, no. 2 (2007): 193.

³⁸² Kentucky Legislative Research Commission, "Kentucky Legislature: KRS 157.420." Paige Patterson-Grant, *Building Assessment System*, e-mail message to author, January 16, 2013.

³⁸³ Richard J. Shaughnessy, et al., "A Preliminary Study on the Association Between Ventilation Rates in Classrooms and Student Performance".

³⁸⁴ *Ibid.*

³⁸⁵ Baker and Bernstein, "The Impact of School Buildings on Student Health and Performance: A Call for Research."

ailments, and memory deficiencies.³⁸⁶ Mold, has been associated with respiratory sickness and asthma.³⁸⁷ These air pollutants present in poor air quality contribute to student illness and absenteeism.³⁸⁸ Smedje and Norback (1999) determined that in affected children a connection exists between airborne bacteria and mold to asthma which fostered an increase in student absentee rates.³⁸⁹

Proper air ventilation prevents the build-up of these toxins in the public school facility. Since ventilation removes and or dilutes the pollutants, proper implementation of it is vital, particularly since children bring in a larger volume of air in relation to their body weight than adults.³⁹⁰

Relationship Between Public School Facilities and Student Achievement

There has been a long-running debate concerning the relationship between school facilities and student academic achievement. Research studies have been conducted to determine whether there exists a significant relationship between the condition of a school facility and academic achievement. This topic is a body of work that is progressing. Researchers have recognized the link between student achievement and school facilities, however, it is not the focus of this study. Even though the focus of the study does not address the topic, it is necessary to address the relationship between public

³⁸⁶ Ibid.

³⁸⁷ Ibid.

³⁸⁸ Mark Schneider, "Do School Facilities Affect Academic Outcomes?," *National Clearinghouse for Educational Facilities*, 2002, accessed on November 18, 2012, <http://www.ncef.org/pubs/outcomes.pdf>; Jim Holland, "Heath Wise," *American School and University*, 82 (2009): 21-22.

³⁸⁹ Greta Smedje and Dan Norback, "The School Environment: Is it Related to the Incidence of Asthma in the Pupils?," *Indoor Air*, 5 (1999).

³⁹⁰ Schneider, "Do School Facilities Affect Academic Outcomes?," 2.; National Resources Defense Council, "Our Children At Risk: The Five Worst Environmental Threats to Their Health," last modified November 25, 2012, <http://www.nrdc.org/health/kids/ocar/chap4.asp>.

school facilities and student achievement as the results of many studies have determined a positive correlation between the two areas.

Chan's study, often cited, focused on a specific element of a building and how the presence of the element related to student achievement.³⁹¹ Using analysis of covariance controlling for socioeconomic status, the study examined the presence of air conditioning, carpeting, fluorescent lighting and room wall color with academic achievement as measured by the Iowa Test of Basic Skills (ITBS).³⁹² Chan used data from 191 public standard schools containing eighth grade students in a district in the State of Georgia.³⁹³ No significant differences were found in student's score in reading, language, word study, and mathematics sections of the ITBS.³⁹⁴ The findings led to the conclusion the students in the air conditioned building scored higher on the tests.³⁹⁵ The relationship between air conditioning and ITBS scores were statistically significant at the p value of .05.³⁹⁶

In her doctoral dissertation Cash tested a theoretical model as shown in Figure 6 that posited that there existed both indirect effects and direct effects between school facilities and student achievement.³⁹⁷ Her study examined high school students in urban Virginia

³⁹¹ Chan, "Physical Environment and Middle Grade Achievement."

³⁹² *Ibid.*, 4.

³⁹³ *Ibid.*

³⁹⁴ *Ibid.*, 5-6.

³⁹⁵ *Ibid.* 5.

³⁹⁶ *Ibid.*, 8.

³⁹⁷ Carol S. Cash, "Building Condition and Student Achievement and Behavior," (doctoral dissertation, Virginia Polytechnic Institute and State University, 1993).

public schools.³⁹⁸ Student achievement was charted based on the Test of Academic Proficiency results for grade eleven.³⁹⁹ Building conditions were based on evaluations conducted by the Commonwealth Assessment of Physical Environment.⁴⁰⁰ Her conclusions stated student achievement was higher among students who attended the schools considered to be in superior condition.⁴⁰¹

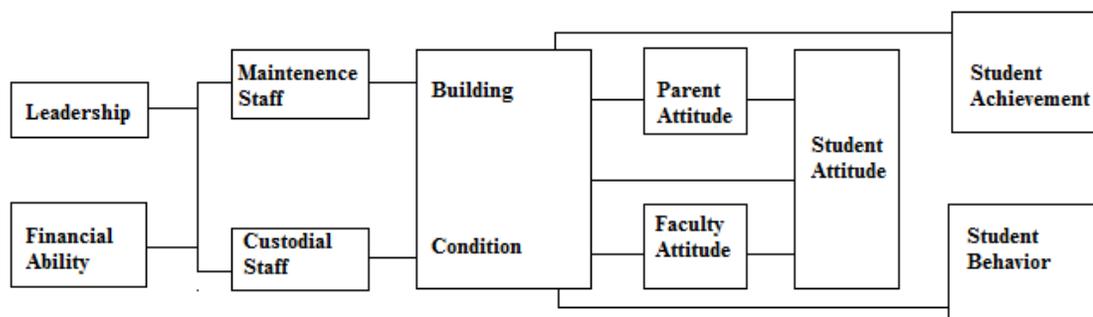


Figure 6. Cash's theoretical model

Source: As adapted from Carol Cash, "Building Condition and Student Achievement and Behavior," (doctoral dissertation, Virginia Polytechnic Institute and State University, 1993). Permission to use granted by the author.

Hines (1996) employed Cash's model in his doctoral dissertation.⁴⁰² His study also examined urban Virginian high schools and produced the findings that student achievement scores were higher in schools with better building conditions.⁴⁰³ As in Cash's study, the Commonwealth Assessment of Physical Environment of determined building condition and the Test of Academic Proficiency determined student

³⁹⁸ Ibid., 30.

³⁹⁹ Ibid., 33.

⁴⁰⁰ Ibid.

⁴⁰¹ Ibid., 77.

⁴⁰² Eric W. Hines, "Building Condition and Student Achievement and Behavior," (doctoral dissertation, Virginia Polytechnic Institute and State University, 1996), 86.

⁴⁰³ Ibid., 38.

achievement.⁴⁰⁴ A survey format was used to collect data and achievement scores were adjusted for socioeconomic standing and variables were studied using analysis of covariance and correlations.⁴⁰⁵

Lemasters (1997) developed a model based on a meta-analysis of qualifying research studies conducted between 1980 and 1996 on the relationship between public school building conditions and student achievement.⁴⁰⁶ This model extended both the Cash (1993) and the Hines (1996) models by redefining building conditions into two sub-categories: structural conditions and cosmetic conditions.⁴⁰⁷ Her findings concluded that building condition is directly related to student achievement.⁴⁰⁸

Later, Lanham III (1999) extended both the Cash and Lemaster models to specifically elucidate the relationship among building and classroom conditions by directly influencing student attitudes and behaviors and indirectly and directly influencing student achievement.⁴⁰⁹ Using a random sample of 300 elementary schools (grades 3-5) data on building condition, classroom condition, and school demographics were collected using a survey completed by building principals.⁴¹⁰

⁴⁰⁴ Ibid., 39-41.

⁴⁰⁵ Ibid., 39.

⁴⁰⁶ Linda K. Lemasters, "A Synthesis of Studies Pertaining to Facilities, Student Achievement, and Student Behavior," (doctoral dissertation, Virginia Polytechnic Institute and State University, 1997).

⁴⁰⁷ Ibid.

⁴⁰⁸ Ibid., 196.

⁴⁰⁹ James Warren Lanham III, "Relating Building and Classroom Conditions to Student Achievement in Virginia's Elementary Schools," (doctoral dissertation, Virginia Polytechnic Institute and State University, 1997).

⁴¹⁰ Ibid., 49-50.

Al-Enezi (2002) in a comparison of school facilities between Kuwait and Pennsylvania developed an extensive theoretical model incorporating the Cash, Lemasters, and Lanham III models.⁴¹¹ This model also incorporated a feedback of administrator perceptions between structural conditions and administrative decisions.⁴¹² The study population consisted of 56 high schools offering Science and Art majors.⁴¹³ High schools principals completed the Commonwealth Assessment of Physical Environment instrument to assess building conditions. Final examination scores collected by the Information Center at the Ministry of Education were used to measure student achievement.⁴¹⁴ Pearson r was used to conclude if there was a relationship between building conditions and student achievement.⁴¹⁵ A significant positive relationship was found between the overall, structural, and cosmetic building condition and student achievement in the Sciences and Arts majors.⁴¹⁶

Barrett et al. (2013) sought to determine if school facility design impacted learning rates of primary school students.⁴¹⁷ 751 students from 34 classrooms in seven schools in the United Kingdom participated.⁴¹⁸ The design parameters in the study consisted of

⁴¹¹ Mutlaq M. Al-Enezi, "A Study of the Relationship between School Building Conditions and Academic Achievement of Twelfth-Grade Students in Kuwaiti Public High Schools," (doctoral dissertation, Virginia Polytechnic Institute and State University, 2002).

⁴¹² Ibid.

⁴¹³ Ibid.

⁴¹⁴ Ibid.

⁴¹⁵ Ibid.

⁴¹⁶ Ibid.

⁴¹⁷ Peter Barrett, et al., "A Holistic, Multi-level Analysis Identifying the Impact of Classroom Design on Pupils' Learning."

⁴¹⁸ Ibid.

color, connection, complexity, flexibility, and light.⁴¹⁹ Data was collected by observation, measurement, and teacher interviews.⁴²⁰ The design factors previously mentioned were found to have had an impact on the learning rates of primary school students.⁴²¹

Shaughnessy et al. (2006) examined indoor air quality in public school facilities to student performance.⁴²² Data collection included the CO₂ concentrations in 54 fifth grade classrooms within a school district in the United States.⁴²³ The researchers concluded a significant relationship existed between classroom-level ventilation rate and student achievement with $p < .10$.⁴²⁴

On the basis of these works, there is growing evidence that facilities and academic achievement are related and the Kentucky Department of Education recognizes this relationship. The Kentucky Department of Education rates certain criteria as part of the *Building Assessment System*.⁴²⁵ Under the umbrella of Suitability, Condition, and Technology Readiness is a checklist rating the existence of certain criteria in the public school facility. “Interior Environment” are rated on their “Environment” as

⁴¹⁹ Ibid., 681.

⁴²⁰ Ibid., 680.

⁴²¹ Ibid., 687.

⁴²² Shaughnessy, et al., “A Preliminary Study on the Association Between Ventilation Rates in Classrooms and Student Performance,” 465-468.

⁴²³ Ibid., 466.

⁴²⁴ Ibid., 468.

⁴²⁵ Paige Patterson-Grant, *Building Assessment System*, e-mail message to author, January 16, 2013.

“EXCELLENT,” “GOOD,” “FAIR,” “POOR,” or “UNSATISFACTORY.”⁴²⁶ An “Excellent” score entails “The facility provides an inviting and stimulating environment. Spatial configurations, interior circulation, natural light, acoustics, temperature, air quality, lighting levels, and the overall aesthetics support and promote learning.”⁴²⁷ The Kentucky Department of Education’s *Building Assessment System*, in using the language “promote learning” is making the connection between facilities and achievement along with the studies mentioned.

As demonstrated in the mentioned studies, researchers have examined public school facility lighting, thermal comfort, and air quality in relation to student achievement. However, studies have not addressed security and technological infrastructure relative to student achievement. Even though the research stream has not looked at these elements, they are a valid consideration. Both are modern facets of parental, educators, and national concern.⁴²⁸ The Kentucky Department of Education’s *Building Assessment*

⁴²⁶ Ibid. As noted above under the sections listed in the Building Assessment System are five categories for rating, “EXCELLENT,” “GOOD,” “FAIR,” “POOR,” and “UNSATISFACTORY.” The document rates these categories accordingly, “EXCELLENT: The facility provides an inviting and stimulating environment. Spatial configurations, interior circulation, natural light, acoustics, temp, air quality, lighting levels, and the overall aesthetics support and promote learning. GOOD: Facility has most elements to provide an inviting and stimulating environment. Most spatial configurations, interior circulation, natural light, acoustics, temp, air quality, lighting levels and the overall aesthetics support and promote learning. FAIR: Facility has some elements to promote an inviting and stimulating environment. Some spatial configurations, interior circulation, natural light, acoustics, temp, air quality, lighting levels and the overall aesthetics support and promote learning. POOR: Facility has few elements to provide an inviting and stimulating environment. Few spatial configurations, interior circulation, natural light, acoustics, temp, air quality, lighting levels and the overall aesthetics support and promote learning. UNSAT: Facility has no elements to provide an inviting and stimulating environment. No spatial configurations, natural light, acoustics, temp, air quality, lighting levels and the overall aesthetics support and promote learning.”

⁴²⁷ Ibid.

⁴²⁸ U.S. Department of Homeland Security, “School Safety,” accessed January 20, 2013, <http://www.dhs.gov/school-safety>; National Center for Education Statistics, “Technology in Schools: Suggestions, Tools, and Guidelines for Assessing Technology in Elementary and Secondary Education.”

System includes all five of the components in evaluating public school facilities in the Commonwealth, as further evidence of their significance.

In contrast, fewer studies support the idea there is not a relationship between facilities and student academic achievement. Studies conducted by McGowen⁴²⁹ and Tanner⁴³⁰ have yielded varying results. McGowen explored student outcomes from data gathered in Texas high schools. The Total Learning Environment Assessment, completed by principals at participating schools was the tool measuring the facility condition. Upon examination of the data, the researcher concluded the relationship between student achievement and facilities was not statistically significant.⁴³¹

Tanner's descriptive study consisted of examining third grade students from twenty-four elementary schools in the state of Georgia. The research examined the environmental influence of designated schools on the student's academic success.⁴³² The results of the study proved inconclusive. An association between facilities and academic achievement was recognized but a causal relationship could not be determined.⁴³³

Weinstein⁴³⁴ reviewed studies and determined the physical environment of a school had little bearing on academic achievement.⁴³⁵ Research led her to determine the only link between the two was found in classroom seating arrangement.

⁴²⁹ Robert S. McGowen, "The Impact of School Facilities on Student Achievement, Attendance, Behavior, Completion Rate and Teacher Turnover Rate in Selected Texas High Schools," (doctoral dissertation, Texas A & M University, 2008).

⁴³⁰ Kenneth C. Tanner, "Explaining Relationships Among Student Outcomes and the School's Physical Environment," *Journal of Advanced Academics*, 19, no. 3 (2008).

⁴³¹ McGowen, "The Impact of School Facilities on Student Achievement," iii-iv.

⁴³² Tanner, *Journal of Advanced Academics*, 455.

⁴³³ *Ibid.*, 466.

⁴³⁴ Carol S. Weinstein, "The Physical Environment of the School: A Review of the Research,"

Literature Overview

Kentucky offers a specific example in the court case *Rose v. Council for Better Education* where the state government was sued on the basis of the finance formula violating the state constitution.⁴³⁶ Plaintiffs won in this suit on the grounds the state was not providing a sound and efficient education as guaranteed in the Kentucky constitution.⁴³⁷ The court ruled the government was charged with the task of restructuring the current school funding formula.⁴³⁸ The court also implemented seven student capacities and nine principles for how the schools could keep measure to make certain they were providing a sound and efficient education as required.⁴³⁹

The new enactments bore the Kentucky Education Reform Act.⁴⁴⁰ This act helps to bring all the public school districts in the state up to an adequate standard through new funding methods.⁴⁴¹ The tax formula developed under the plan included facility construction.⁴⁴² The traditional place for instructional and developmental activities has

Review of Educational Research 49, no. 4 (1979): 598.

⁴³⁵ Ibid.

⁴³⁶ *The Council for Better Education v. Wilkinson*, 85 Ky. 1759, Cir. Ct. (1988), 3.

⁴³⁷ Ibid., 13.

⁴³⁸ Ibid., 14.

⁴³⁹ *Rose v. Council for Better Education*, 790 S.W.2d. 186 (Ky. 1989).

⁴⁴⁰ The act is codified in KY. REV. STAT. ANN. §156.000. The University of Kentucky, “KERA Information,”

⁴⁴¹ Ibid.

⁴⁴² Verstegen, “Kentucky,” In *A Quick Glance at School Finance: A 50 State Survey of School Finance Policies and Programs Vol. I: State by State Descriptions*.

been in a school facility.⁴⁴³ Since the law's inception the state has increased money spent on building construction and renovation.⁴⁴⁴ School districts in greatest need received adequate funding to bring their buildings to the sound and efficient level.⁴⁴⁵

A relationship between the case, *Rose v. Council for Better Education*, fiscal adequacy, the Kentucky Education Reform Act, and the current status of public school facilities has not been examined. Upgrades in school facilities were intended to provide the brick and mortar of an education outlined in the seven capacities for efficiency and nine 21st century principles.⁴⁴⁶ Nonetheless, a clear connection now needs to be investigated between the newly renovated school facilities and the capacities and the principles generated in the *Council for Better Education v. Wilkinson*.⁴⁴⁷ Other states may use Kentucky's model for future finance reform. Thus it is vital to explore beyond the history and discover if the revised funding formula resulted in facilities scoring relatively low on the *Kentucky School Report* has contributed to the concept of an adequate education. Is the additional money for facilities contributing to what Kentucky determined to be necessary for public school students to receive an adequate education? Outside observers have concluded the money added to facilities stemming from the finance reforms does make an adequate public educational environment.⁴⁴⁸ However,

⁴⁴³ National Center for Education Statistics, "Facilities Information Management: A Guide for State and Local Education Agencies."

⁴⁴⁴ Prichard Committee, "Ten Steps Forward, Sources, Details, and Trends to Support Kentucky Schools: Achieving the Top 20 by 2020."

⁴⁴⁵ Kentucky Legislative Research Commission, "Kentucky Legislature: SB 132."

⁴⁴⁶ *Rose v. Council for Better Education*, 790 S.W.2d. 186 (Ky. 1989).

⁴⁴⁷ *The Council for Better Education v. Wilkinson*, 85 Ky. 1759, Cir. Ct. (1988), 13.

⁴⁴⁸ Schrag, *Final Test: The Battle for Adequacy in America's Schools*, 93-94.

researchers have not taken a physical examination of a public school facility in Kentucky to decide if the visual evidence, interviews, and archival documents support this conclusion. A physical examination of the five specific features in the public school facilities including security, thermal comfort, lighting, technological infrastructure, and air quality were used to determine if receiving additional school facility funding improved the likelihood that students will receive an adequate education when compared to prior funding levels.

CHAPTER 3: METHODOLOGY

The landmark fiscal equity and adequacy case, *Rose v. Council for Better Education*, led to the overhaul of the entire public education system in Kentucky. This reform included a move toward ensuring adequacy in academic standards and accountability as in many other states, but unique to Kentucky at that time was the inclusion of a strategy to rebuild and renovate substandard school building facilities using a program of shared state and local funding. This effort can be interpreted as the deliberate acceptance of the relationship between facilities standards and the opportunity to receive an adequate education. The purpose of this instrumental case study is to describe *how* the additional funding for a purposefully selected Kentucky public school facility affected the provision of an adequate education.

Chapter three outlines the methodology that was utilized in the research process. Included is the research question, description of the case study explored, details regarding the case study site selection, the data collection process, types of data examined, validity components, data analysis format, and potential research biases.

Research Question

This qualitative case study has one overall research question and three sub-questions: How did the additional facilities funding since the *Rose* decision for a Kentucky public school affect the provision of an adequate education?

1. What is the history of the school facility and its community?
2. How did the security, technological readiness, lighting, thermal comfort and air quality change from prior to the *Rose* decision and after in this school?
3. How has the opportunity for an adequate education been diminished, stayed the same, or improved on the basis of facilities renovation prior to and since the *Rose* decision?

Case Study Description

There are many types of case studies, yet there has been some degree of convergence on a common definition.⁴⁴⁹ Case studies are defined as complex examinations of bounded entities that are studied contemporaneously.⁴⁵⁰ This approach situates a case study as a strategy or a method within a specific methodological approach.⁴⁵¹ This research relied heavily on Stake's instrumental case study strategy.

⁴⁴⁹ Robert E. Stake, *The Art of Case Study Research*, (Thousand Oaks: Sage Publications, 1995); Robert K. Yin, *Case Study Research: Design and Methods: Design and Methods*, (Thousand Oaks: Sage Publications, 2009).

⁴⁵⁰ Ibid.

⁴⁵¹ See Michael Crotty, *The Foundations of Social Research: Meaning and Perspective in the Research Process*, (Thousand Oaks: Sage Publications, 1998). According to Crotty, a methodology sits under the umbrella of the epistemology and the theoretical perspective that will be employed. A methodology is a plan of action, a strategy for accomplishing the objectives of the research question. This distinction is important because the repertoire of strategies that may be employed in the conduct of a research endeavor are encompassed within a methodology. Methodologies according to Crotty are experimental research, ethnography, survey research, ground theory research among others.

Stake differentiates case studies into three types: intrinsic, instrumental and collective. An intrinsic case is completed when the study of the case is for its own descriptive value with no real intent to generalize from the findings to a larger entity. This type uses deductive reasoning, or reasoning from a broad premise to attain a particular, non-preconceived conclusion.⁴⁵² A collective case study refers to a study involving multiple cases with the intent to develop conclusions by triangulation of case findings. Finally, an instrumental case (the one employed in this study) addresses an issue with specific research question(s) with the intent to add to the theoretical base knowledge.⁴⁵³ This type of case study uses an inductive approach, or reasoning that evaluates ideas stemming from particular examples.⁴⁵⁴ My study was inductive because I had specific research questions and sought to determine specific answers. An intrinsic case study uses the case to understand a related issue or something else in contrast to studying a case for its own intrinsic value.

Stake's case study method more broadly relies on the inductive approach employing a qualitative approach rather than attempting to confirm a theory (deductive). Performing a qualitative study includes the researcher's attempt to understand the multifaceted interrelationships between what occurs, an attempt to create through description a vicarious comprehension of the events for reader, and research questions focused on cases while pursuing patterns of unanticipated and anticipated associations.⁴⁵⁵

⁴⁵² Raymond J. McCall, *Basic Logic: The Fundamental Principles of Formal Deductive Reasoning*, (New York, NY: Barnes & Noble, 1952).

⁴⁵³ Stake, *The Art of Case Study Research*, 3-4.

⁴⁵⁴ Aidan Feeney and Evan Heit, *Inductive Reasoning: Experimental, Developmental, and Computational Approaches*, (Cambridge, NY: Cambridge University Press, 2007).

⁴⁵⁵ Stake, *The Art of Case Study Research*, 41.

This case study was based on a purposefully selected public school district in the state of Kentucky from a pool of districts that exhibit relatively low scores on the *Kentucky School Score Report*. I gathered evidence to answer the research question through interviews, site observation, and document review, but I treaded lightly as case studies are non-interventive; the researcher tries “not to disturb the ordinary activity of the case, not to test, not even to interview, if we can get the information by discrete observation or examination of records.”

Site Selection

According to Stake, “[c]ase study research is not sampling research.”⁴⁵⁶ It is assumed that some cases would do a better job than others in describing an issue. The first criterion is to select case(s) that can maximize the research potential, then pick cases that are easy to access, and finally, to select cases that are welcoming to inquiry from others.⁴⁵⁷

For this case study a Kentucky public elementary or middle school was the unit of analysis. Overall, the site selection process had two methods:

- 1) A systematic approach of selecting regular public middle schools based on the *Kentucky School Score Report* and previously mentioned criteria;
- 2) Contacting the Kentucky Department of Education for regular public school recommendations

Because the *Rose* case was particularly focused on the disparities in the opportunity to receive an adequate education between low fiscal capacity school districts and higher fiscal capacity districts either by lack of resources or by conditions (facilities), it was

⁴⁵⁶ Stake, *The Art of the Case Study*, 4.

⁴⁵⁷ Ibid.

important to examine how the changes in this opportunity changed in a school that initially exhibited deficiencies in facilities. Thus, public school districts that had one or more schools that had scored lower on 2010 *Kentucky School Score Report* were identified. The reason that the initial identification process focused on the district rather than the individual school was that several districts often had one school with a lower score. Whether due to community pressure not to close the school and transfer the students elsewhere, geographic isolation of the school community such that moving students to another school was not practical, or simply declining enrollments in the school among other reasons, it is assumed that inclusion of all districts in the report may not yield study sites that were exemplary of the contrast in facility condition prior to and post-*Rose* that the study sought to exploit. This purposeful selection of a case can be justified in that applying these delimiters frees the researcher to select a case that lends itself to identify how facility change is related to adequate educational opportunities.

One method for selecting case study site was based on regular public middle school facilities that earned a relatively low composite score on the 2010 *Kentucky School Score Report*.⁴⁵⁸ To establish a pool of districts that may qualify for the case study, districts were identified that contained at least one relatively low-scoring regular public middle school facility that has been renovated or rebuilt. The school was in a historically stable school in the community, built in the 1950s or 1960s with a current student enrollment of at least 400 students.⁴⁵⁹ Recruitment occurred at the district level through the district

⁴⁵⁸ Regular public middle schools used are those that are not alternative schools.

⁴⁵⁹ Public schools built in the 1950s and 1960s were built to accommodate the “Baby-Boomer” generation. The United States witnessed an abundance of public school facilities built during this period of time. See also, National Center for Education Statistics, “How Old Are America’s Public Schools?” 1999, <http://nces.ed.gov/surveys/frss/publications/1999048/>. A school with a larger student body population will

superintendent and not the school level, although with permission from the superintendent, specific schools were contacted.

Initially, the school districts identified for recruitment were ten relatively lowest scoring districts on the 2010 *Kentucky School Score Report*. As stated earlier in Chapter 2 of this document, this report ranked public school facilities according to a weighted composite of three individual scores. The categories and weighted percentages are Condition (75%), Suitability (20%), and Technology (5%).⁴⁶⁰

The outcome of the process for defining the proof of the relatively lowest scoring school districts for the case study is shown in Table 4 and in Appendix A.⁴⁶¹ All school districts assessed in the report were sorted into a final grouping of ten districts according to the following rules:

- a. The school district had at least one and less than five regular public middle schools in the district in the report; These were sorted out of the population of districts and schools in the report.
- b. Built in the 1950s or 1960s
- c. Student enrollment of at least 400 at the time of the *Kentucky School Score Report*
- d. A district containing more than one of the relatively lowest scored schools was counted only once in the compilation of the 10 districts.

yield a higher number of staff. The greater the number of staff members in the facility, the greater the likelihood they will be familiar with the facility status prior to the *Rose* case.

⁴⁶⁰ Kentucky Department of Education, “Facilities Inventory & Classification System Kentucky School Score Report.”

⁴⁶¹ For a more extensive table, see the Appendix A.

The districts were ranked by the value of their lowest scoring middle school to produce the pool for the initial recruitment. These were Clark, McCracken, Scott, Knox, Russell Independent, Garrard, Owensboro, Erlanger-Elsmere, Hopkins, and Larue. At the conclusion of the sorting, the Kentucky School Score by district (and school) ranged from 50.82 (Clark school district, Conkwright middle school) to 85.86 Larue school district, Larue Middle School).

Calculations do not always tell the entire story in public school facility renovations, therefore, in addition to utilizing the *Kentucky School Score Report* for site selection, the input of the Kentucky Department of Instruction was considered. Five additional regular public elementary schools were suggested for the study by the Kentucky Department of Instruction.⁴⁶² These schools were located in the following counties: Woodford, East Bernstadt Independent, Owsley, Boyle, and Laurel. Therefore, these counties are included in the site selection process.

The geographical location of each school district was indicated on a county and city map of Kentucky. The wide geographical dispersion of the school districts was visually evident as shown in Figure 7. The fact that these districts did not include the most fiscally stressed districts in the state and not more of the districts in counties and cities comprising the historically poor region of Appalachia is counterintuitive and unexpected. Perhaps because this district selection process is based on 2010 data collections that are no fewer than 21 years after the legislature acted in accordance with the remedy of the *Rose* decision, that many schools in this region have already been rebuilt new or renovated over the two decade time period, and thus, would not be included in the report.

⁴⁶² Suggested site selections were provided by Mr. Tim Lucas, Kentucky Department of Education.

A cursory examination of that premise by anecdotally noting the history of school facilities rebuilding in the Appalachian counties and cities suggests that there has been extensive renovation already completed in this region. At the time of this dissertation, 2010 is the most current available data. Therefore, it may be concluded that the schools in the 2010 report of low-scoring districts that have been renovated are among the very last to in the Commonwealth of Kentucky to do so. In an effort to use the most up-to-date information, the purposefully selected public middle school used in this case study originated from these most recently renovated facilities.

Table 4. Case study site selection for ten relatively low-scoring school districts

Rank	District	School Name ¹	Year Built	Gross Area ² (GSF)	SAAR Enrollment ³ 2010-2011	Kentucky School Score	Condition Score ⁴ weight = 75%	Suitability Score ⁵ weight = 20%	Technology Score ⁶ weight = 5%
114	Clark Co	Conkwright MS	1969	60,166	568	50.82	42.31	71.65	95.00
175	McCracken Co	Lone Oak MS	1966	98,403	748	57.59	51.45	74.13	83.45
180	McCracken Co	Reidland MS	1966	76,748	422	58.10	54.05	67.37	81.65
198	Scott Co	Scott Co MS	1954	110,756	753	59.85	54.49	75.96	75.95
312	McCracken Co	Heath MS	1968	82,993	448	68.08	65.87	72.97	81.75
360	Knox Co	Knox Co MS	1950	85,038	517	72.05	72.19	71.63	71.70
365	Russell Ind	Russell MS	1965	51,507	523	72.38	72.51	70.43	78.30
389	Garrard Co	Garrard Co MS	1964	102,838	600	74.61	75.04	72.08	78.30
392	Owensboro Ind	Owensboro MS South	1964	72,980	1204	74.83	77.01	69.94	61.70
402	Erlanger Elsmere Ind	Tichenor MS	1962	115,751	492	75.86	73.93	80.79	85.00
444	Hopkins Co	South Hopkins MS	1955	69,545	472	83.60	84.32	79.30	90.00
458	Larue Co	Larue Co MS	1958	111,045	557	85.86	91.56	68.45	69.95

Source: As adapted from Kentucky Department of Education, "Facilities Inventory & Classification System Kentucky School Score Report," accessed October 22, 2012, <http://education.ky.gov/districts/fac/Documents/KFICS%20State%20Report%20School%20List%20by%20District%20School%20.pdf>.

¹ Regular Public Middle Schools

² Gross Area (GSF) = Square Footage

³ SAAR Enrollment = Superintendent's Annual Attendance Report

⁴ Condition Score = The physical condition of the building which includes building systems and outside mechanisms.

⁵ Suitability Score = The sum of the values for each individual educational suitability standard question addressed. Questions were based on the purpose of the facility evaluated.

⁶ Technology Score = The sum of the values for each individual technology readiness standard question addressed. Questions were based on the purpose of the facility evaluated.

School District Recruitment Procedure

After identifying potential school districts, appropriate districts and schools within them were selected. Discussion with the Kentucky Department of Education Facilities Administrator, Mr. Tim Lucas, identified an ideal district and school from this group. The superintendent of the district was called to discuss the study, at which he indicated a willingness to participate. The superintendent received a follow-up email thanking him for his time along with a brief description of the study and informing him a packet was being mailed. The superintendents was postal mailed a packet containing solicitation materials. The packet contained:

1. A solicitation letter describing the research study, indicating the school that could be the analysis unit for the case study, and indicating UNC Charlotte Human Subjects Review Board approval
2. A District Consent Letter requesting a returned signed permission letter to the researcher on district letterhead.
3. Consent Forms for Interview Respondents (2 copies: one to be returned, one for the district to keep)
4. The Interview Protocol
5. A copy of the researcher's Curriculum Vitae

A contingency plan had been developed in the event that it was necessary to evaluate more than one school district and more than one agreed to participate. A telephone interview would be arranged with each of the prospective school district superintendents to determine which schools in their respective districts offered the most promising chances for data collection from multiple sources. The decision was based in part on the

length of employment of the teachers and administrators in the school to be selected and the availability of historical documentation of the school facility. It was more beneficial to interview individuals that have taught in the school prior to and after the renovations.

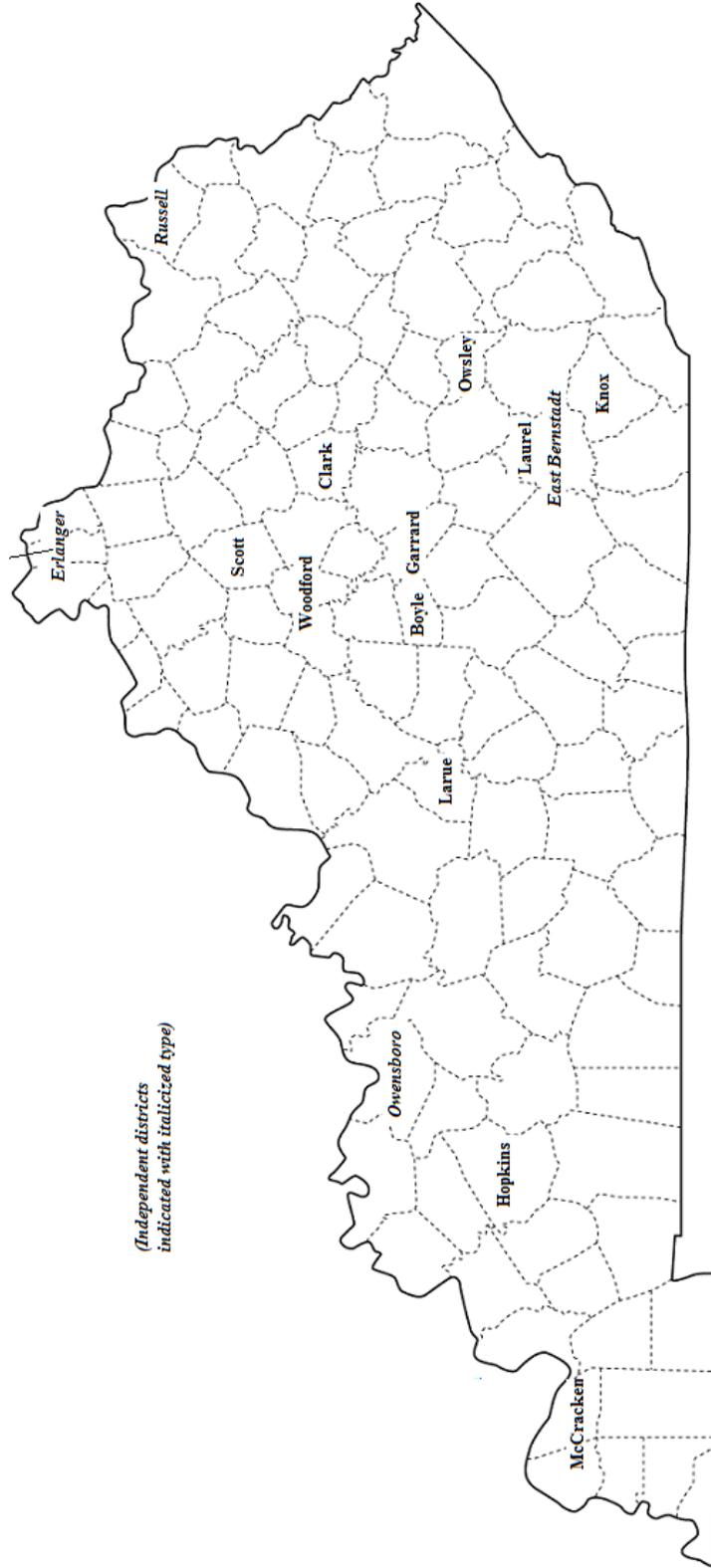
Plans were made as follows for two different scenarios whether or not a district agreed to participate in the study:

School District Agrees

1. Upon verbal agreement from the district superintendent(s), I will
 - a. decide with the advisement of the district superintendent and the school principal which single middle school within the district is best situated for the case study;
 - b. facilitate the signed return of the District level Consent Form to participate in the research study;
 - c. meet with the school principal(s) via telephone, email and other forms of communication to set up the earliest possible time period to visit the school site for between 3 and 5 consecutive days to:
 - i. commence interviews of the school principal and teachers
 - ii. commence interviews with other knowledgeable persons
 - iii. commence physical observations
 - iv. commence collecting documentary evidence
 - v. write reflexive field notes

No School District Agrees

In the event that none of the ten districts agrees to participate in the case study, I will perform a similar procedure with the following 10 school districts and recruit those districts, until such time a district and school is selected.



(Independent districts indicated with italicized type)

Figure 7. Districts with low-scoring public middle school facilities and recommended elementary schools

Source: Map adapted from Kentucky Department of Education, "Facilities Inventory & Classification System Kentucky School Score Report," accessed October 22, 2012, <http://education.ky.gov/districts/fac/Documents/KFICS%20State%20Report%20School%20List%20by%20District%20School%20.pdf>; Map adapted from Econsultant, Inc., "Kentucky," *Econsultant.com*, accessed on July 20, 2013, <http://www.econsultant.com/usa-state-maps-with-county-lines/ky-2-state-map-with-county-lines.gif>.

Relating the Research Questions to the Study Focus

According to the conceptual framework noted in Figure 1, the school examined in the case study was renovated subsequently to the 1989 decision in the *Rose v. Council for Better Education* case. Following the *Rose v. Council for Better Education* case the legislature put in place school funding practices that financed facility construction through a state and local contribution based on district fiscal capacity.⁴⁶³ Numerous facilities were built and renovated under this measure based on fiscal need, the quality of the existing structure, and the urgency of the situation.⁴⁶⁴ Details surrounding the original structure and its construction efforts and building design are important to document for comparing the former facilities' status to the renovated facility including school security, technological infrastructure, lighting, thermal comfort, and air quality.

This case study provides a description of how a specific school has been renovated and to what extent these renovations address the opportunity for an adequate education.

While focusing on the five above mentioned features, I conducted an on and off-site collection of data pertaining to the new building design, new structures, and any additions or changes to the classrooms and school facility. School photographs, interviews, observations, field notes, and archival documents are used to demonstrate the presence of facility modification and its relationship to adequacy in educational opportunity.

It is important to set the boundaries of a case study in order to avoid the unintended expansion of the case during the research process as new or unexpected insights provided from interviews, observations, and documents many tend to open new avenues for

⁴⁶³ Kentucky Department of Education, Office for State Budget Director, "Department of Education: Support Education Excellence in Kentucky (SEEK)."

⁴⁶⁴ Kentucky Department of Education, "Facilities Inventory & Classification System Kentucky School Score Report."

investigation. This case study was bounded by the issues and topics only directly related to the school under study.

Data Collection

As in most qualitative case studies, data collection for this research study included data from interviews, observations, documents, and field notes, some of which will be reflexive (Table 5). This section will address the data collection types and procedures. The analytical processes for the data will be discussed in the next section.

Interviews

In consultation with the district superintendent and the school principal, potential interview participants were identified and recruited. All participants elected to participate. The purposefully selected potential interview participants were given a telephone call and/or an email requesting their participation in the study (Appendix B). If the potential participants were interested in participating, they were sent an email thanking them and notifying them a packet has been postal mailed (Appendix C). The packet contained a consent letter (Appendix E). In addition to receiving the consent form, the district superintendent received a “Permission to Recruit Participants Off-campus” letter. The letter requested an approval letter to be signed on district letterhead and returned to the researcher. (Appendix D). A week later, a follow-up phone call (Appendix F) was made to potential participants to arrange a time for the interview. Snowball methods were used to identify other non-school participants.⁴⁶⁵

The participants were informed from the letter that there is no direct risk associated with this study, however, there may be risks which are currently unforeseeable. They

⁴⁶⁵ Snowball sampling is a type of research technique where current study participants recommend future study participants from among their associates.

were also notified of the intent to preserve their anonymity with respect to their responses and that the interviewed will be audio recorded. The decision to participate in this study was completely up to the participant. As part of the consent process, they were informed that if they decided they would like to be out of the study, they could stop at any time. They were also be given notice of the University of North Carolina at Charlotte's interest in the their being treated fairly and with respect, and they were provided the contact information for the University's Research Compliance Office (704-687-1871) in case they had any questions about how they were treated as a study participant. Participants were also given the researcher's contact information and supervising faculty contact information.

I conducted interviews with the district superintendent, the school principal, multiple teachers and other individuals as indicated. Other individuals included retired educators and persons who may possess unique insights into the historical aspects of the school and community. In total, 19 audio recorded interviews were completed. The participants were males and females between the ages of 35-80 who had knowledge of the school facility and the changes in the education process that may have been affected prior to the renovation and since. There were multiple respondents to ensure multiple viewpoints and the saturation of data. No current students or children were interviewed.

I chose the elite approach to interview methods.⁴⁶⁶ Elite interviewing involves interviewing individuals with specialized knowledge in a particular area. The information they provide is not widely available, thus their input is vital to the research outcomes.

⁴⁶⁶ Jeffery M. Berry, "Validity and Reliability Issues in Elite Interviewing," *PS: Political Science And Politics* 35, no. 4 (2002): 680.

Certain measures are necessary when interviewing such participants. Once they agreed to an interview I chose a time and place convenient for the participant and remained flexible.⁴⁶⁷ Four participants were unable to meet with me due to time constraints. One participant could not attend during the pre-arranged and located me while I was still on site for a make-up interview. I was prepared to demonstrate in-depth knowledge on the topic as this helps establish rapport, which should help encourage interviewees to open up and discuss.⁴⁶⁸ I listened to respondent's account of their experiences and perspectives and took notes.⁴⁶⁹

Questions asked during the interviews were developed prior to the meeting and followed a general protocol (Appendix G), but included probing follow-up questions where appropriate. Spradley's suggestion of using a "grand tour" question at the beginning of each interview to orient the respondent into the topic and as a probing strategy was used.⁴⁷⁰ The interview was planned to last about 30 minutes and was in person. Respondents were asked a set of questions and their responses were audio recorded. Participants were anxious to discuss their educationally related experiences at the school facility. I personally transcribed the audio recording of their responses. Each interview was fully transcribed, however, not verbatim.⁴⁷¹ Pauses, stutters, and double

⁴⁶⁷ Robert Mikecz, "Interviewing Elites: Addressing Methodological Issues," *Qualitative Inquiry*, 18, no. 6 (2012) 483.

⁴⁶⁸ *Ibid.*, 482.

⁴⁶⁹ *Ibid.*, 485.

⁴⁷⁰ James P. Spradley, *The Ethnographic Interview*, (Belmont, CA: Wadsworth-Cengage), 1979. The "grand tour" question is a method of asking questions in an interview that repeats phrases which allows the respondent to think and process the question over time during an interview. "It is asked, not as a simple statement, but with repeated phrases, expanding on the basic question.", 4.

⁴⁷¹ Elizabeth J. Halcomb and Patricia M. Davidson, "Is Verbatim Transcription of Interview Data Always Necessary?" *Applied Nursing Research*, 19 (2006): 38-42.

wordings were removed.⁴⁷² Almost all of what the interviewees said was transcribed, therefore, I do not believe this compromised the coding process.

Observations

Observations of participants and the site is one of the hallmarks of qualitative case studies. There is a continuum of engagement for the role of an observer that ranges from being a complete participant to being a complete observer.⁴⁷³ I was a complete observer with no participation in the activities of the school, district, or community.

The on-site observations included an exploration of security, technological infrastructure, lighting, thermal comfort, and air quality in the participating public Kentucky school district. The current status of the five features is described. The physical environment of the public school facility has been taken into account with respect to how the space is utilized and the interaction with the specific features.

Permission to observe (including photographing) classrooms, hallways, and other aspects of the facility when students were not present was requested. Classrooms were observed without students present. From these observations a *composite* picture has been described of the aspects of adequacy in the school's approach to education rather than individual details reported.

Documents and Archives

The case study includes details gleaned from document analysis regarding a variety of aspects of the facility studied. Information was sought on the facility's geographical

⁴⁷² Daniel G. Oliver, Julianne M. Serovich, and Tina L. Mason, "Constraints and Opportunities with Interview Transcription: Towards Reflection in Qualitative Research," *Soc Forces*, 84, no. 2 (2005): 1273-1289.

⁴⁷³ John W. Creswell, *Qualitative Inquiry and Research Design: Choosing Among Five Approaches*, (Thousand Oaks: Sage, 2013).

location in the community and in Kentucky location, the overall facility construction, the changes in the floor plans of the facility past and present, the number of students attending the school in the past, the grades included in the school, the surrounding community demographics, basic information about students with special needs attending the schools, and the academic offerings of the school. Located at the school district central office were archival materials and folders on the renovation of the facility. The district provided me with complete access to these documents. Over the course of a few days I reviewed every document regarding the renovation process of the school in the case study the district held.

State and local government documents outlining school facility conditions prior to the *Rose v. Council for Better Education* case, photographs, participant interviews, site-specific inspection, and field notes were gathered. Information from these various sources assisted in creating thorough research on the outcomes of the development of adequate public school facilities. When available, copies of documents having historical value to the study questions were obtained from local sources or from agencies in the Commonwealth of Kentucky.

Field Notes and Reflexive Field Notes

Field notes are an indispensable component of qualitative research. General field notes are used to record images and impressions of surroundings, individuals and processes that are not explicitly spoken about in interviews or documents. They provide data that explains, corroborates, or disconfirms observational data. Reflexive field notes are uniquely the researcher's reaction and feelings to the context of the study.

Contemporaneous field notes were taken, including those of a reflexive nature. Field notes are annotations based on observations and experiences recorded by the researcher. Field notes describe what the researcher is experiencing and witnessing at the study site.⁴⁷⁴ The information in the notes recorded included anonymously the person(s) present, where the observation occurred, what the environment was like, the social exchanges that took place, and what events happened.⁴⁷⁵ A special type of note, termed the reflexive field note, captures the feelings, impressions and struggles of the researcher. These notes are usually private, and help in the debriefing process of the findings and to document bias and disconfirming evidence throughout the study. These notes provide perspective in a behind the scenes sort of manner.

⁴⁷⁴ Michael Q. Patton, *Qualitative Evaluation and Research Methods*, (Newbury Park: Sage Publications, 1990), 239.

⁴⁷⁵ Ibid.

Table 5. Relationship of the research question to the sources of data

Research Question: How did the additional facilities funding since the *Rose* decision for a Kentucky public school affect the provision of an adequate education?

Research Sub-Question?	Source of Evidence (Data)	Of What?	Notes
1. What is the history of the school facility and its community?	Interviews Observations Documents Field Notes	Teachers, principals, district superintendent and school staff School facility, community, photographic images Archives, state and government documents, school documents Researcher	Question 3 in the Interview Protocol addresses this question. "Could you please describe the history of the school and community as you understand it?"
2. How did the security, technological readiness, lighting, thermal comfort and air quality change from prior to the <i>Rose</i> decision and after in this school?	Interviews Observations Documents Field Notes	Teachers, principals, district superintendent and others Specific features of the buildings, photographic images Archives, state and local government documents Researcher	Questions 4-8 in the Interview Protocol address this question. "What specific changes were made to this middle/or elementary school that you are aware of?"; "Can you tell me about teaching in the classroom before and after the renovations."; "How have the renovations made a difference in this school?"; "How have the changes to the regular middle/or elementary school classrooms and school buildings in the school district compared to what it was like before the renovations?"; and "Who else should I talk with? Where else should I go to get more documentation?"

Source: Research questions, methodology, and interview questions.

Table 4. Relationship of the research question to the sources of data (continued)

Research Question: How did the additional facilities funding since the *Rose* decision for a Kentucky public school affect the provision of an adequate education?

Research Sub-Question?	Source of Evidence (Data)	Of What?	Notes
3. How has the opportunity for an adequate education been diminished, stayed the same, or improved on the basis of facilities renovation prior to and since the <i>Rose</i> decision?	Interviews Observations Documents Field Notes	Teachers and school staff Facility observations, photographic images Contemporaneous documents Researcher	Questions 4-8 in the Interview Protocol addresses this question. "What specific changes were made to this middle/or elementary school that you are aware of?"; "Can you tell me about teaching in the classroom before and after the renovations."; "How have the renovations made a difference in this school?"; "How have the changes to the regular middle/or elementary school classrooms and school buildings in the school district compared to what it was like before the renovations?"; and "Who else should I talk with? Where else should I go to get more documentation?"

Source: Research questions, methodology, and interview questions.

Analysis of Data

The analysis of data precedes the report of the research findings. As in qualitative studies the researcher is the instrument of data collection, the researcher interprets the data in the analysis phase. The goal in this aspect of the study was to allow as much transparency as is reasonably possible. In this section the analytic strategies that were implemented are discussed. These include coding and trustworthiness strategies for the study findings. A discussion of anonymity and data security procedures is included.

Coding

All forms of data collected lend themselves to being coded. As mentioned earlier the researcher transcribed the audio recordings from the interviews into a transcript. Phrases in these transcripts were then coded in a holistic manner.⁴⁷⁶ Holistic coding is the attempt to identify themes as a whole in the entire passage rather than assigning codes in a line by line fashion in a transcript.⁴⁷⁷ The predetermined codes arose out of the prompted responses to the research question, however, emerging codes stemming from the respondent narrative were also included. The same process was performed with observations and photographs, documents, and field notes.

Trustworthiness

One criticism of qualitative research is that one finds what one is looking for. Validity is the degree to which a valuation measures what it claims to measure.⁴⁷⁸ The standard of

⁴⁷⁶ Johnny Saldana, *The Coding Manual for Qualitative Researchers*, (Thousand oaks, CA: Sage, 2013). “A code in qualitative inquiry is most often a word or short phrase that symbolically assigns a summative, salient, essence-capturing, and/or evocative attribute for a portion of language-based or visual data.” (p. 4).

⁴⁷⁷ Saldana, *The Coding Manual for Qualitative Researchers*, 142.

⁴⁷⁸ Dawson R. Hancock and Bob Algozzine, *Doing Case Study Research : A Practical Guide for Beginning Researchers*, 2nd ed. (New York: Teachers College Press, 2011), 93.

validity is employed in studies that possess predetermined definitions of the phenomena, issues, and constructs that are to be measured. In most qualitative studies this level of predetermination is not possible nor in keeping with the inductive reasoning process. Instead, qualitative studies utilize the concept of trustworthiness. Trustworthiness is a framework for ensuring rigor in qualitative research.

There are four criteria that in combination address the attainment of trustworthiness in qualitative research: credibility, transferability, dependability, and confirmability.⁴⁷⁹ Each of these will be discussed below.

Credibility

Credibility is broadly speaking the qualitative parallel to internal validity and the most important of the four criteria in establishing trustworthiness. According to Merriam, credibility asks the question, “How congruent are the findings with reality?”⁴⁸⁰ Strategies that were used in the conduct of the data analysis to establish credibility were data triangulation, peer debriefing, and negative (disconfirming) case analysis. The triangulation of the data involves the corroboration of codes and their resultant themes across multiple sources of data before the concept can be considered a finding of the study. Data triangulation involves researchers using several and diverse resources and methods to offer substantiating evidence.⁴⁸¹ The methods used were interviews, site observations, examining archived data, and taking field notes. The use of multiple techniques assisted in drawing accurate findings and conclusions through the

⁴⁷⁹ Egon G. Guba, “Criteria for Addressing the Trustworthiness of a Naturalistic Inquires,” *Education and Communication Journal*, 29, 1981.

⁴⁸⁰ Sharon B. Merriam, *Qualitative Research and Case Study Applications in Education*, (San Francisco: Jossey-Bass, 1998).

⁴⁸¹ John W. Creswell, *Qualitative Inquiry and Research Design: Choosing Among Five Traditions*, (Thousand Oaks: Sage, 1998), 202.

triangulation of evidence. A table of codes and the themes determined were presented in Chapter 4 for each of the three research sub-questions. Peer debriefing provides for a monitor on the study's progression by a peer reviewer.⁴⁸² The reviewer keeps the researcher truthful, by asking difficult questions about the study approach and evaluating the researcher's explanations. The reviewer also understandingly listens to the researcher's thoughts and concerns about the study and may offer helpful suggestions.⁴⁸³ For the purposes of this study, my dissertation advisor, Dr. Lisa G. Driscoll, was my reviewer. Finally, the openness to an emerging negative or disconfirming finding was sought by the researcher. My reflexive field notes were scrutinized for such evidence.

Transferability

Transferability refers to the extent to which the findings of the qualitative research can be applied or generalized to other situations and is somewhat analogous to external validity in post-positivistic or quantitative frames of research. Since the main purpose of a single case study is not to generalize to larger setting, this criteria is of lesser application. In an instrumental case study, however, generalization to a larger theory, concept or knowledge base as opposed to another setting or case is expected. The use of rich or thick description is necessary to allow the readers of the research to provide arbitration as the transferability of the study and permits the reader to decide the transferability merits.⁴⁸⁴ A detailed account of the study procedures, with the triangulation of participant perceptions, on-site observations, documents and researcher field notes that support conclusions giving the individual reading the study the

⁴⁸² Ibid.

⁴⁸³ Ibid.

⁴⁸⁴ Ibid., 203.

information necessary to resolve issues of transferability is provided. Therefore, readers are able to decide if the details and findings in the study have shared characteristics to other or future studies and rich, thick description of the study context permits transferability.⁴⁸⁵

Dependability

Dependability is related to the idea that research findings should be replicable by other researchers. In fact, the replicability of findings is the hallmark of building a theory or knowledge base in the scientific process. In quantitative research, dependability is similar to reliability. One way a researcher could address dependability in a study could be to provide an account of all methods and processes in detail such that another researcher could replicate the study. A second strategy for dependability is for the serious use of the field notes that will provide future researchers with an account of mitigating conditions for the study. In this study extensive field notes were taken such that the methods and processes may be audited by others.

Objectivity

Confirmability is the concern for objectivity in the findings. In addressing confirmability the researcher takes steps to ensure that the findings are the result of the interpretation of the information gleaned from respondents, observations of the site and documents rather than the preferences and beliefs of the researcher. Patton emphasizes the role of data triangulation to accomplish this.⁴⁸⁶ I developed findings through triangulation of multiple sources of data. Additionally, a prospective bias exists in the research, however, preventative measures were taken. It is a common concern in

⁴⁸⁵ Ibid.

⁴⁸⁶ Patton, *Qualitative Evaluation and Research Methods*.

qualitative research for the questions posed to the participants to carry bias.⁴⁸⁷

Formulated questions may be worded in a leading manner by a biased researcher forcing the participants to provide a predetermined answer. Steps were taken to minimize bias from the data collection and analysis process. I strove to conduct the interview in a neutral style that did not reflect my opinions, and I kept a reflexive journal where I record research notes and reflected on my partiality, and shared anonymous data with others for detecting bias.

Anonymity for Respondents and Data Security

Multiple measures to protect and isolate respondent's identity from his or hers responses were taken. The audio recording, the interview transcript and other data related to given respondent were assigned a 3-digit code number. No respondent names or other identifiers were present on the above items. The key with the code numbers assigned to each respondent was kept in a locked file cabinet or safe in a location separate from the data collected.

There was no guarantee of respondent anonymity, although measures were taken to ensure it. Data will be disposed of after six years. All paper data will be shredded, and electronic data will be dismantled and/or rendered useless.

Summary

The methodological strategies discussed in this chapter addresses how the additional state and local funding public school facilities scoring relatively low on the *Kentucky School Score Report* has contributed or detracted from the provision of an adequate education.

⁴⁸⁷ Norman K. Denzin, *Symbolic Interactionism and Cultural Studies : The Politics of Interpretation*, (Cambridge: Blackwell Publishers, 1992), 49-52.

This instrumental case study was performed in accordance with the qualitative tradition. Interviews, observations including photographic images, documents, and field notes were instruments of data collection. Coding data from these sources with triangulation among similar codes supported the development for interpretation. Numerous strategies were employed to ensure trustworthiness including data triangulation, debriefing, and rich description.

CHAPTER 4: RESULTS

Research Question

How did the additional facilities funding since the *Rose* decision for a Kentucky public school affect the provision of an adequate education?

Research Sub-Question #1

What is the history of the school facility and its community?

Data gathered during this phase of the research process was drawn from participant interviews, on-site observations, documentation, and field notes. Nineteen participants were interviewed, including administrators, teachers, and school staff. On-site observations were made by the researcher and included classrooms without students present, the facility interior, and the facility exterior. Photographs were taken of the facility. Contemporaneous documents were utilized.

History of the School Facility

The school selected for the case study has a long history and was originally built in 1937 as a high school.⁴⁸⁸ It was built in the era of the Works Progress Administration (WPA).⁴⁸⁹ The school was originally built on a hill, facing the street. The art deco structure showcased a prominent façade with a few steps leading to a flat entranceway. Upon entering the school would have been in the main building and facing the auditorium, with the office space to the left, office space to the right. A long hallway to the right would take you to the gym area and stair case. Further down this hallway were classrooms. The hallway to the right of the entranceway would take you to classrooms and a staircase. Upstairs were more classrooms and the library. The library was centrally located above the entranceway.

An additional wing was added to the facility in 1962.⁴⁹⁰ According to school district administrators, in 1967 it was converted to a middle school for 7th, 8th, and 9th graders.⁴⁹¹ In the late 1980s grade six was added to the middle school and grade nine was moved to the local high school. Student population in 1994 led the district to build a new middle

⁴⁸⁸ Kentucky Department of Education, “Kentucky Department of Education: Division of Facilities Management,” Project Application, 702 KAR 4: 160, Revised 3.21.05.

⁴⁸⁹ Works Project Administration (WPA) was part of the New Deal under President Franklin D. Roosevelt. It was an agency that employed millions of people to construct public works projects. These projects included public schools, public buildings, and roads. The Kentucky Heritage Council, “Kentucky Historic Schools Survey: An Examination of the History and Condition of Kentucky’s Older School Buildings.”

⁴⁹⁰ Tim Lucas, *School Building Inventory Sheet*, e-mail message to author, April 29, 2013.

⁴⁹¹ Interview with administrator.

school on the other side of town.⁴⁹² The student population went from approximately 1,000 students at that time to approximately 500.⁴⁹³

In 2003 this school was determined by the Kentucky Department of Education to be a Category 5, or *Urgent Needs School*,⁴⁹⁴ meaning that it was to be torn down and replaced due to poor conditions. According to many teachers the condition of the school was in a deplorable state.⁴⁹⁵ One situation illustrates the condition of the facility at the time of renovation. On the second floor of the school there was a crack in the floor, through which it was possible to see down into the classroom below.⁴⁹⁶

Upon learning the school was to be torn down and replaced, the school district solicited community feedback, holding a meeting for community members to voice viewpoints.⁴⁹⁷ When given the choice, the majority of the community favored preserving the school and renovating it instead of building a new facility.⁴⁹⁸ Community leaders felt the school's auditorium and the central location of the school could not be easily replicated. Additionally, many community members felt nostalgia for the old school as an integral part of their community.⁴⁹⁹ The school district in turn asked the Kentucky Department of Education for a waiver to renovate instead of a completely new middle

⁴⁹² Ibid.

⁴⁹³ Ibid.

⁴⁹⁴ Tim Lucas, *Kentucky Department of Education*, phone conversation with author, April 29, 2013.

⁴⁹⁵ Interview with teachers.

⁴⁹⁶ Interview with teacher.

⁴⁹⁷ Ibid.

⁴⁹⁸ Interview with administrator.

⁴⁹⁹ Ibid.

school facility⁵⁰⁰ and they agreed. After a contentious bidding process, an architect was selected for the project; similar to many community members, she had attended the school as a child. This individual was chosen due to her interest in preserving the historical aspects of the building while bringing it up to 21st century standards, something with which she had unique experience.⁵⁰¹ The renovations were completed in 2007,⁵⁰² at a cost of \$12,350,648.⁵⁰³

During the renovation process, the 1962 addition was torn down and two additional classroom wings were added.⁵⁰⁴ The original WPA auditorium and gymnasium remained and were updated.⁵⁰⁵ The façade interior, including the front and administrative offices underwent renovation.⁵⁰⁶ Upon driving up to the facility, I was struck by its large size, prominence on the hill, and multiple large windows. It is on a vast piece of property that houses a football and track field. When walking up to the entrance, I noted grand steps leading to a flat portico area before the front doors. A sign posted in one of the multiple front doors directed me to ring the bell. The office staff viewed me through windows, I heard a buzz, and the door unlocked. Upon entering, a second set of doors in front of me were locked and a sign read to go to the administrative offices (to the left). I entered the administrative area and was immediately struck by the clean, bright, fresh atmosphere.

⁵⁰⁰ Ibid.

⁵⁰¹ Interview with administrator.

⁵⁰² Kentucky School Designs, "Home," *KYschooldesigns.org*, accessed on May 21, 2013, <http://www.kyschooldesigns.org/index.php>.

⁵⁰³ Tim Lucas, *BG-1 Project Application*, e-mail message to author, April 29, 2013.

⁵⁰⁴ Ibid.; Kentucky Department of Education, "Kentucky Department of Education: Division of Facilities Management, Project Application."

⁵⁰⁵ Ibid.

⁵⁰⁶ Ibid.

After coming out of the office I was in the center of the building, facing the auditorium. I walked down the hallway to my right. Other office space for school guidance and administration was to the right in the hallway. Walking further down was a staircase to my left, and further still was classroom space and a trophy case. At the end of the hallway was a gym on the left, a concession stand on the right, and doors to the outside on the right.

I walked back to the center of the building and this time traveled down the hallway to my left. This hallway had a couple of classrooms and staff lounge; a staircase was at the end of the hallway. However, one could turn right at the staircase and there was a newly built hallway. The cafeteria, band room, library, computer rooms, special education classrooms and 8th grade level classroom wing with bathrooms were down this hallway. Another staircase was also in this hallway. I ascended the staircase first mentioned and entered a hallway housing 6th grade classrooms and bathrooms. This area was over above the administrative offices and school entranceway. Beginning back from the stairs I walked into a newly built hallway that was above the previously mentioned newly built hallway. This area houses the 7th grade classroom wing with bathrooms, art room, and home economics room. All hallways of the facility were clean with bright light exuding from the large windows.

Demographics of the School Facility Inhabitants

The current demographics of the student population is diverse when compared to the school district of the facility studied and Kentucky as a whole as noted in Table 6. Fewer males attend the school when compared to the district and state percentages. Comparatively, there are a higher percentage of students on free or reduced lunch at the

school in the case study than in the district and the state. This is further evidence that the school in the case study has a financially disadvantaged student population. The student to teacher ratio is the less than the district average and the same as the state's. There are 31 full time teachers and sixty staff members total.⁵⁰⁷

Table 6. Demographics of the school facility inhabitants

	Case Study School	Case Study School District	Kentucky
Student Enrollment	434 ⁵⁰⁸	6,785	649,688
Percent Race-Ethnicity			
Caucasian	70.8%	82.9%	81.4%
African-American	18.7%	10.2%	10.7%
Hispanic	3.2%	2.9%	4.2%
Asian	0.2%	0.7%	1.4%
Alaska Native	0.2%	0.1%	0.1%
Native Hawaiian/ Pacific Islander	0.0%	0.1%	0.1%
Two or More	6.9%	3.1%	2.1%
Percent Male	49.1%	50.9%	51.4%
Percent Students on Free/ Reduced Lunch	64%	59%	57%
Student/Teacher Ratio	15:1	14:1	15:1

Source: Kentucky Department of Education, Kentucky School Report Card," accessed May 21, 2013, <http://applications.education.ky.gov/SRC/Default.aspx>. These data are from the 2011-12 school year.

⁵⁰⁷ Interview with administrator. This number does not include administrators, guidance counselors, or media specialist.

⁵⁰⁸ Ibid.

History of the Community Surrounding the School Facility

The town where the case study took place is the county seat and named for one of the founding fathers of America—who later became a United States President. The center of town is situated at the intersection of a U.S. Highway that extends from the Upper Peninsula of Michigan to southern Florida, which forms Main Street. The population of this small town was 6,908 in the 1930s (when the school was built).⁵⁰⁹ Historically, the town's economy has been dependent on the railroad, coal, and tobacco. Before 1930, the town was a regional depot for coal. It was in the second largest coal producing county in the western coalfields of Kentucky. The railroad was used to ship the coal to other areas in the United States and around the world. The coal industry and railroad were important in maintaining the economic health and the tax base of the community. Local taxes help to support schools; therefore the schools are affected by the wealth of the community.

My personal background may have influenced my impressions of the town. I attended a modern high school in an affluent area of Raleigh, a capital city in North Carolina. Notwithstanding that personal background, my first impressions of the town were that it was small and less than affluent. When I exited the interstate and began to drive around the downtown area, I noticed a lack of diversity among the population. I saw large, not tall buildings that appeared to have been built in the 1930s and 1960s. The majority of the vehicles were pick-up trucks and economy-priced sedans. While driving around there were multiple times I crossed railroad tracks which were vital to the town's historical economy.

The current demographics of the town of the case study school is more diverse in comparison to the county and the state as noted in Table 7. In addition, when compared

⁵⁰⁹ U.S. Census Bureau, *Census.gov*, accessed June 28, 2013, <http://www.census.gov/>.

to state averages the population and property values are lower. The town's current economic situation made the school a good example as a case study. The county did not have the money to renovate the school independently without the assistance of the state. Therefore, it was an appropriate example of how state funds can assist and make a difference in public school renovations when a community's economic means are insufficient.

Table 7. Background of the community surrounding the school facility

	Case Study Site Town	Case Study Site County	Kentucky
Population ¹	19,798	46,718	4,380,415
Percent Race/Ethnicity ²			
Caucasian	83.3%	90.8%	87.8%
African-American	12.2%	6.7%	7.8%
Hispanic	2.2%	1.6%	3.1%
Asian	0.9%	0.5%	1.1%
American Indian and Alaska Native	0.1%	0.2%	0.2%
Native Hawaiian/Other Pacific Islander	0.1%	0.1%	0.1%
Percent High School ³ Completion or Percent Higher Level of Education	81.8%	79.9%	81.7%
Percent Hold a Bachelor's Degree or Higher ⁴	15.8%	13.4%	20.6%
Median Household Income ⁵	\$37,746	\$39,187	\$42,248
Median Value of Owner- Occupied Housing Units ⁶	\$89,700	\$79,700	\$118,700
Percent Living Below the Poverty Line ⁷	19.8%	19.6%	18.1%

Source: U.S. Census Bureau, *Census.gov*, Accessed June 28, 2013, <http://www.census.gov/>.

¹ 2012 Estimate.; ² 2010 Estimate.; ³ 2007-2011 Data.; ⁴ 2007-2011 Data.; ⁵ 2007-2011 Data.; 2007-2011 Data.; ⁷ 2007-2011 Data.

In the 1950s the increased mechanization of the coal industry affected jobs in a negative way. Machines replaced workers; therefore, the workforce dwindled.⁵¹⁰ The towns where citizens once depended on the coal mines for work found themselves with high rates of unemployment. In addition to the mechanization of the coal industry, the demand for coal has dropped due to the Federal Clean Air Act of 1990.⁵¹¹ The loss of jobs damaged the local economy, and these areas were forced to find other industries to employ their workers. After experiencing a loss of prosperity in the community due to these factors, the economy of the town of the case study school became reliant on manufacturing and service industries. Local industries that are big employers today include those that produce chicken, automotive parts, mechanical tools, and aviation equipment.⁵¹²

Back in the 1930s when the school was built, the area surrounding the school was the center of population.⁵¹³ Around the school were many small houses owned by the coal companies to house workers. A train track ran parallel to the school property.

Since the 1930s there have been many changes in the community; for example, the center of town is no longer surrounding the middle school studied. Within three miles of the school is low income housing. Surrounding the school are the same small houses

⁵¹⁰ Christopher Price, "The Impact of the Mechanization of the Coal Mining Industry on the Population and Economy of Twentieth Century West Virginia," *West Virginia Historical Society*, accessed on July 10, 2013, <http://www.wvculture.org/history/wvhs2203.pdf>.

⁵¹¹ U.S. Environmental Protection Agency, "Clean Air Act," accessed June 18, 2013, <http://www.epa.gov/air/caa/>. This law outlines the U.S. Environmental Protection Agency's duty to protect and improve the country's air quality and ozone layer.

⁵¹² Interview with Administrator.

⁵¹³ *Ibid.*

which are reminiscent of the housing coal companies would provide. Large Victorian-style houses line many of street corners which allude to the area's prosperous past.

The study school site and its community are not unlike many other rural areas across the country that have experienced substantial economic shifts, especially where mineral extraction and industry were once prominent. As an example, consider the coal mine industry, once a thriving economic engine in many small American towns similar to the one studied. The average number of coal mine employees in the United States has dwindled from 1978 to 2007. In 1978 underground mines averaged 143,993 employees and surface mines averaged 75,668 employees;⁵¹⁴ by 2007 underground mines averaged 52,387 employees and surface mines averaged 47,226 employees.⁵¹⁵ The number of coal operations in the country has declined as well during the same time period. In 1978 underground mines totaled 2,692 mines and surface mines totaled 3,293.⁵¹⁶ By 2007 underground mines totaled 628 and surface mines totaled 977.⁵¹⁷ The total number of hours worked in the coal mines also declined. In 1978 underground mines averaged 217,364,678 hours worked and surface mines averaged 129,816,972 hours worked;⁵¹⁸ by 2007 underground mines averaged 103,095,924 hours worked and surface mines averaged 88,605,892 hours worked. This is a 45% reduction in hours worked in just 30 years.

⁵¹⁴ U.S. Department of Labor, "Mining Industry Accident, Injuries, Employment, and Production Statistics: All Coal Mining Data," accessed July 15, 2013, <http://www.msha.gov/STATS/PART50/WQ/1978/wq78c103.asp>.

⁵¹⁵ Ibid.

⁵¹⁶ Ibid.

⁵¹⁷ Ibid.

⁵¹⁸ Ibid.

As the number of coal miner workers and job opportunities decreased in the United States, small towns across America similar to the one in the school site case study experienced many financial hardships. As employment in the coal industry slowed, lower paying light manufacturing and service industry jobs became the replacement. In response, both Pre K-12 schools and community colleges had to develop programs to educate youth to be competitive in the technologically advanced global economy. The school site of the case study, school district, and community are similar to many other rural towns and could be “Small Town, U.S.A” in any state.

Today, the county where the school is located focuses on education and has several educational programs that support students’ success. The county has many Head Start⁵¹⁹ programs and preschool programs. The school system offers programs such as Family Resource Centers where the focus is early learning and successful transition to school, academic success, graduation and the transition into adulthood.⁵²⁰ Other programs the school district supports supplies resources to migrant and homeless programs which includes the monitoring of academics, summer camps, tutoring, school supplies, and workshops for parents.⁵²¹ In addition, the school district’s high school freshmen are eligible to register in a workforce readiness program that provides tuition support at the local community college.⁵²² The community college in the area is one of the fastest growing community colleges in the nation. A university located in the county has been

⁵¹⁹ Head Start is a federal program run by the U.S. Department of Health and Human Services. It provides education, health, and nutrition to low-income children and their families.

⁵²⁰ Case study district webpage.

⁵²¹ Ibid.

⁵²² Ibid.

ranked for the last nineteen years as one of the top public universities in country by *U.S. News & World Report*.

The school is a community school in the sense that many students use the sidewalks that surround the school for walking or biking to school. According to several teachers, because a large proportion of students come from low-socioeconomic backgrounds, the school provides them with a safe and consistent place to spend a significant portion of their day. For many students the school is a point of pride in the community and it is also where they receive one of their two meals of the day.⁵²³

Members of the community use the facility for events such as concerts and theatrical plays. The school houses one of only two auditoriums in the area; therefore, different areas of the community use the auditorium for various occasions.

Teachers spoke of the reputation of the school prior to renovations. One teacher who coached sports mentioned when students would play at away games, the other players would yell out, “ghetto school.” The school was thought to be a poor, troubled place to send your kids.⁵²⁴ This persona regarding the school changed after the renovations. About four years after the renovations, the teacher who coached noticed when playing at away games, the students from other schools no longer referred to them as coming from the “ghetto school.”⁵²⁵

Summary of Results for Research Question #1

The school facility in this case study has a long history. The building was built in 1937, added onto in 1962, and renovated most recently in 2007. The original WPA

⁵²³ Interview with teacher.

⁵²⁴ Ibid.

⁵²⁵ Ibid.

auditorium and gymnasium remain in renovated form. The student population that the school serves is diverse, with five ethnicities represented.

The community surrounding the school has experienced changes since the 1930s when the building was first built. It is no longer the center of population in the town. However, it has remained a community-centered school with students living in close proximity. The community also utilizes the school facilities and has a sense of pride for the school.

Research Sub-Question #2

How did the security, technological readiness, lighting, thermal comfort and air quality change from prior to the *Rose* decision and after in this school?

When answering this research question, participant interviews were conducted, documents collected, and on-site observations made. Nineteen participants were interviewed, including administrators, teachers, and school staff. Multiple on-site observations were conducted by the researcher. The school district of the case study has a facilities administration department, which maintains documents for renovated schools. While conducting the case study in the district, I was able to review these documents. The following is information I gathered from that review.

In the sections to follow concerning research sub-question #2 the evidence is presented under the separate headings, *Interviews*, *Documents*, and *Observations*. The field notes taken on-site are integrated within this evidence where appropriate. Tables included below outline selected themes that emerged from the study and interview quotes. As in all qualitative studies, topics emerged that were unanticipated. In this case, the auditorium, disabled accessibility, and classrooms built for content area highlighted

issues I had not anticipated when planning the study. I will conclude each section with a summary of the study themes determined.

Security

Interviews

The main code that emerged from the interviews in this section was “Security.” The sub-codes that emerged included “Access to Building,” “Facility Door Locks,” “Communication: Telephones in Each Classroom,” “Security Cameras,” “Changes to the Administrative Side in the Entrance,” and “Facility Door Locks.” The themes that emerged are “Security Before Renovations” and “Security After Renovations.” These interviewees’ responses were coded and put into categories of sub-codes. From the sub-codes the responses were divided into themes as noted in Tables 8 and 9.

Administrators, teachers, and school staff all reported security had vastly changed from prior to the renovations and after in the school. The renovations were made possible by the state’s school finance restructuring as a result of the ruling in *Rose v. Council for Better Education*. Before the renovations there were many uncontrolled access points into the building.⁵²⁶ Visitors could walk into the building undetected by the school receptionists and administration.⁵²⁷ Administrative offices had one small window that looked out into the hallway. During the school day the only way to lock the building doors was by chain.⁵²⁸ Individual classroom doors locked; however, the locking mechanisms would often become jammed and unreliable.⁵²⁹ Not all classrooms had access to telephone lines. School surveillance outside of the building depended on the watchful eye of school staff from inside the building.

⁵²⁶ Interview with school staff.

⁵²⁷ Interview with teacher.

⁵²⁸ Interview with teacher.

⁵²⁹ Ibid.

During renovations the entranceway to the school was drastically changed. A remote admission system was installed to allow the front office to unlock the front doors and allow visitors into the building. In addition, this permitted the doors to remain locked throughout the school day. The walls to the administrative offices and receptionist area space were torn down and replaced with windows.⁵³⁰ This renovation permits the office to have a complete view of the front entrance and hallway areas of the building. All classroom doors in the facility were replaced and have reliable working locks. Teachers and administrators are able to lock and unlock each individual classroom door.⁵³¹ All classrooms have telephones.⁵³² According to administrators, teachers, and staff school surveillance cameras, not present previously, were installed during the renovations and cover outside areas of the facility and hallway areas. Cameras now monitor all exits and each hallway has multiple cameras. Many of the school staff and teachers mentioned how much safer the students feel in the school since the renovations.

⁵³⁰ Interview with teachers.

⁵³¹ Interview with administrator.

⁵³² Interview with teachers.

Table 8. Selected themes derived from interviews concerning security

Theme: Security Before Renovations	Supporting Data	Data Source
Access to Building	“You could just walk right in.”	Teacher 11 Interview, 5/15/13
	“Before in the old building there were so many ways to get into the school.”	School Staff 12 Interview, 5/15/13
Facility Door Locks	“It did not just look like a prison...the doors were chained for security.”	Teacher 4 Interview, 5/14/13
	“The doors sometimes could not lock. You had to place a peg in the door to get it to lock and many times it would fall out.”	Teacher 5 Interview, 5/14/13

Source: Participant interviews.

Table 9. Selected themes derived from interviews concerning security

Theme: Security After Renovations	Supporting Data	Data Source
Communication: Telephones in Each Classroom	“There are telephones in each classroom.”	Teacher 5 Interview, 5/14/13
Security Cameras	“And they did install the cameras. The surveillance system we have now; the cameras monitor all the exits.	School Staff 12 Interview, 5/13/13
Access to the building	“And the security of the building is a lot better. Because the doors are locked, except for the front door.”	School Staff 12 Interview, 5/13/13
	“Safety-wise, I feel it is 100% safer structurally than probably the old portion of the building because it was so old. The safety issues are so much better now than they were before.”	School Staff 13 Interview, 5/15/13
Changes to the Administration Side in the Entrance	“Safety, we now have, you know safety with design of the school and the office being redone now where they have safety features, we did not have before.”	Teacher 15 Interview, 5/15/13
Facility Door Locks	“Each teacher is able to lock their classroom doors.”	Administrator 3 Interview, 5/17/13

Source: Participant interviews.

Documents

Table 10 contains references from documents that were discovered during the research process regarding the planning of the facility in the case study. These materials substantiate the interviews and observations. The information they contain includes

invoices from companies, school district invoices, communications between the school system and general contractor, the architect's documents, and the architect's communications with the author.

Table 10. Documents concerning security

Topic	Document Content	Source
The telephone system, intercom system, and the security system	Project contract for installation of new systems	Computer consulting and network design company
Landscaping	Documents within the school district provide evidence the front of building landscape was completed.	District documents provided by the general contractor
Security Cameras	Installation invoice	School district invoice
Security System Cabling	Installation invoice	School district invoice
New Building Interior Façade	Public entry to historic building; Clear visual path to Administration and Receptionist; Information listed in the architectural firm's competed plans.; Opened interior lobby to natural daylight	KYschooldesigns.org website and documents provided by architect ⁵³³

Source: School district documents of school studied and information provided by architect. Kentucky School Designs, "Home," *KYschooldesigns.org*, accessed on May 21, 2013, <http://www.kyschooldesigns.org/index.php>.

⁵³³ Kentucky School Designs, "Home," *KYschooldesigns.org*, accessed on May 21, 2013, <http://www.kyschooldesigns.org/index.php>.

Table 10. Documents concerning security (continued)

Topic	Document Content	Source
New telephone sets and the relocation of existing telephone sets	Installation invoice	School district invoice
Air-lock entrance at the main administration area	Explanation of the addition to the building	Susan Hill, e-mail message to author, May 23, 2013.
All the windows now lock on the inside	Explanation of the addition to the building	Susan Hill, e-mail message to author, May 23, 2013.
Change in the façade	Before: main entrance hallway/entrance was a dark closed down 9 foot plaster ceiling (the architects opened this up); this was a very low, very dark space before the renovations	Susan Hill, e-mail message to author, May 23, 2013.
Facility door locks	The administration has control of all of the door locks when school is in session	Susan Hill, e-mail message to author, May 23, 2013.

Source: School district documents of school studied and information provided by architect. Kentucky School Designs, "Home," *KYschooldesigns.org*, accessed on May 21, 2013, <http://www.kyschooldesigns.org/index.php>.

Observations

Prior to conducting the on-site observations of the school in the case study, the architect provided me with pictures. These images demonstrate how the school appeared before renovations. Once I arrived at the school site, I took photographs documenting and contrasting the state of the facility after the renovations. Images 1, 2, 3, and 4 demonstrate the contrast between pre-renovations and post-renovations.

Image 1. Frontal view of the facility prior to renovations



Hill, Susan S. *School Facility Prior to Renovation*. Photograph. 2004. Tate.Hill.Jacobs: Architects, Inc.

Image 2. Frontal view of the facility prior to renovations



Hill, Susan S. *School Facility Prior to Renovation*. Photograph. 2004. Tate.Hill.Jacobs: Architects, Inc.

Image 3. Frontal view of the facility post renovations



Image 4. Frontal view of the facility post renovations



Hill, Susan S. *School Facility Post Renovation*. Photograph. 2007. Tate.Hill.Jacobs: Architects, Inc.

Before the facility was renovated, controlled visitor access was limited. A system was not available to screen individuals visiting the school. After the renovations, as seen in Image 5 and 6, the school added a remote admission system at the main entrance. I observed this feature being used to allow the school receptionist to determine by sight when to press a button and unlock the front door of the school. I was surprised to see this feature. Today, many districts in the country today are attempting to put this type of remote system in for added security. This school system and architect were ahead in planning for this feature in 2007 before many schools in the country.

Image 5. Remote admission system post renovations



Image 6. Remote admission system post renovations



Changes have been made to the entranceway of the building. Prior to the renovations the front doors opened straight into the hallway as seen in Image 7. After the renovations, this area was sectioned off so that school visitors must check in at the office. The surrounding doors are locked, except for the administrative offices to the left. The outside doors of the building lock automatically. The administrative office is in a glass

enclosure which allows them to see visitors entering. It became apparent to me that through these windows the administration and school staff are able to have multiple angles to view visitors and students. Images 8, 9, and 10 demonstrate the change in the entranceway. Signs as seen in Image 11 are posted that indicate to visitors they must check in with the office.

Image 7. Entranceway prior to renovations



Hill, Susan S. *School Facility Prior to Renovation*. Photograph. 2004. Tate.Hill.Jacobs: Architects, Inc.

Image 8. Entranceway post renovations



Image 9. Entranceway post renovations



Image 10. Entranceway post renovations



Hill, Susan S. *School Facility Post Renovation*. Photograph. 2007. Tate.Hill.Jacobs: Architects, Inc.

Image 11. Entranceway visitor sign



Prior to the renovations the school facility did not have video camera surveillance capabilities. During the renovation process, wiring was put in place and equipment added to allow for video camera monitoring outside the school and throughout the

hallways as seen in Images 12 and 13. I observed that outside cameras are on the corners of the building on the second floor.

Image 12. Outside video surveillance post renovations



Image 13. Hallway video surveillance post renovations



Prior to renovations some classrooms had telephones. However, after renovations every classroom has a telephone. I observed this security measure on a teacher's desk as seen in Image 14. In case of an emergency, the teacher is able to call the police directly

and alert the school administration in a quick manner. In contrast, prior to renovations an extra step was sometimes necessary, using the intercom to call the front office to ask them to call the police.

Image 14. Classroom telephones post renovations



Other security measures that were upgraded during the renovations were the classroom doors and windows. All of the classroom doors and all of the windows were replaced. Image 15 shows one of two original doors left in the building, which is comparable to those used prior to the renovations. Image 16 shows the doors that were used to replace the previous types of doors. I observed that the new doors allow each teacher to lock his/her classroom. Each teacher has a separate key for their individual classroom. In addition the cafeteria and kitchen have doors that are another entry point into the facility; these automatically lock.

In addition to the facility security upgrades, the school district has employed a School Resource Officer (SRO) for this site, who is shared with another middle school.⁵³⁴ All

⁵³⁴ Email correspondence from the school district administrator.

high schools in the district have their own dedicated SRO officer.⁵³⁵ Other than the SROs, there are no formal security forces in the school district.⁵³⁶ The district's inclusion of an SRO on school campuses indicates they are not relying solely on static security equipment; they are carrying the concept of security a step further with a trained officer for supervision and protection.

Image 15. One of two original doors remaining



Image 16. Classroom doors post renovations



⁵³⁵ Ibid.

⁵³⁶ Ibid.

Summary of Security Themes

Regarding security, notable findings centered around security cameras, new telephone systems, an air-lock entrance in the front of the building, and a centrally-coordinated locking system. Security cameras never existed in the old building. After the renovation, dozens of interior and exterior security cameras monitor all aspects of the school campus from a central viewing room. Unlike the old campus, in which it was expected that the general staff simply report anything unusual, most parts of the school are now monitored, resulting in an improved sense of safety as reported by the teaching staff and administrators.

The new telephone system enables teachers in each classroom to communicate not only with the administrative offices but also directly with police in the event of an emergency. With the old school's intercom-only system, communication could only occur with the administrative offices.

The access-controlled main entrance and centrally-coordinated locking systems are new systems after the renovation that were never features of the old school. Without these, access to the school was controlled by chains and a padlock around the front doors. Several administrators and teachers commented on how much easier it was for a stranger to gain access to the school prior to these new installations.

Taken as a whole, these new facility features substantially improved security in the studied school, creating a safe environment for learning without fear of disruption or criminal acts.

Technological Readiness

Interviews

The main code that emerged from the interviews in this section was “Technological Readiness.” The sub-codes that emerged included “Student Access to Technology” and “Inside Building Network and Cabling System.” The themes that emerged are “Technological Readiness Before” and “Technological Readiness After Renovations.” These interviewees’ responses were coded and put into categories of sub-codes. From the sub-codes the responses were divided into themes as noted in Tables 11 and 12.

All participants interviewed agreed and mentioned the advancement in the technological readiness of the facility when compared prior to renovations.⁵³⁷ Teachers agreed that before the school was renovated, a networking system did not exist that allowed for technology in the building.⁵³⁸ Technology was limited to non-interactive overhead projectors requiring transparency sheets.⁵³⁹ This lack of technological capability was evidenced by a lack of computers in the building, televisions on rolling stands, instruction that was not technologically interactive, and a building without wireless networking or high speed data connectivity.⁵⁴⁰ The cabling and wiring raceways that did exist at the school visibly ran along the hallways.⁵⁴¹

During the renovations networking cabling was installed and concealed in the ceiling and underground. This installation made it possible for the facility to have wireless

⁵³⁷ Interviews with administrators, school staff, and teachers.

⁵³⁸ Interview with teachers.

⁵³⁹ Interview with school staff.

⁵⁴⁰ Ibid.

⁵⁴¹ Ibid.

networking and high speed internet connectivity. These cabling additions allowed the facility multiple technological upgrades. Every classroom now has a Smartboard⁵⁴², flat screen television, ceiling projector, and networked computers for student and teacher use.⁵⁴³ The technologically-minded alterations to the building structure included the addition of three computer labs in the facility and networked student computers in the library.⁵⁴⁴ Following the renovations, ninety students can be on the computers in the facility at one time, not including the five or six computers located in each classroom.⁵⁴⁵ The wireless networking capability allows for the usage of tablets such as iPads.⁵⁴⁶ This type of learning tool requires wireless connectivity and prior to the renovations would not have been a possible learning tool for students to use in the facility.

⁵⁴² A Smartboard is an interactive whiteboard utilized by educators that has touch control and connects to a computer. The first Smartboard was introduced by Smart Technologies Corporation.

⁵⁴³ Interviews with teachers.

⁵⁴⁴ Interviews with staff.

⁵⁴⁵ Ibid.

⁵⁴⁶ Ibid. An iPad is an electronic tablet designed by Apple, Inc. The device has an interactive digital screen, virtual keyboard, and built in wireless internet capabilities.

Table 11. Selected themes derived from interviews concerning technological readiness

Theme: Technological Readiness Before Renovations	Supporting Data	Data Source
Student Access to Technology	“You were very limited in what you could do in reference to technology. You had chalk boards, you had some TVs that were in color and some that were in black and white.”	Administrator 1 Interview, 05/13/13
	“Teachers were using overhead projectors.”	School Staff 11 Interview, 05/15/13
	“But I know that technology wise it is way ahead of the way it used to be with all that we put in there. Technology was not good.”	Administrator 2 Interview, 05/14/13
	“We did not have Smartboards or computers that everyone could use. We did have a computer lab but it was just one, not multiple ones.”	Teacher 10 Interview, 05/14/13
	“I know in the old school we just had that one computer room. And a lot of kids didn’t have access to computers like they do now.”	Teacher 11 Interview, 05/15/13
Inside Building Network and Cabling System	“In the old building...they put the raceway right there along the ceiling, so you could actually see the raceway running along the ceiling.”	School Staff 23 Interview, 05/16/13

Source: Participant interviews.

Table 12. Selected themes derived from interviews concerning technological readiness

Theme: Technological Readiness After Renovations	Supporting Data	Data Source
Inside Building Network and Cabling System	“Technology changes because the building was a lot more accessible to having the technology put in there with internet connections and so forth so I think that had a big change in it.”	Administrator 3 Interview, 05/17/13
	“There is wireless connectivity in the whole building.”	School Staff 9 Interview, 05/14/13
	“All your wiring and networking stuff like that, it is all hidden.”	School Staff 23 Interview, 05/16/13
Student Access to Technology	“Well every room has a flat screen TV now, which we did not have. And they have the Smartboards in every classrooms and iPads. I mean there was a lot of technology that came in when we did the renovation.”	School Staff 12 Interview, 05/15/13
	“We have more computer rooms. They have more computers they [students] can get on.”	Teacher 11 Interview, 05/15/13
	“We also have four to five computers in a classroom that kids can access and we have three computer labs. I mean 90 kids could be using computers easily all at one time and you can’t say that will a lot of the schools.”	School Staff 9 Interview, 05/14/13

Source: Participant interviews.

Documents

Table 13 contains references from documents that were discovered during the research process regarding the planning of the facility in the case study. These materials substantiate the interviews and observations. The information they contain includes school district invoices, communications between the school system and general contractor, the architect's documents, and architect's communication with author.

Table 13. Documents concerning technological readiness

Topic	Document Content	Source
Inside building network and cabling system and video distribution system design.	Project contract for installation	Computer Consulting & Network Design, Inc.
TV brackets and projection screens	Work planned and past progress update sheet for project.	District documents provided by D.W. Wilburn, Inc.
Cables in classrooms and office, project management for installation of Smartboards, television monitors, and DVD players.	Project communication from architect with school district.	Fax from architect: "Communications System Implementation Costs for School District"
Wiring for computers in classrooms	Project communication from architect with general contractor.	Fax to general contractor from architect
Cabling and wiring for computer networking	Installation invoice	School district invoice

Source: School district documents of school studied and information provided by architect.; Kentucky School Designs, "Home," *KYschooldesigns.org*, accessed on May 21, 2013, <http://www.kyschooldesigns.org/index.php>.

Table 13. Documents concerning technological readiness (continued)

Topic	Document Content	Source
Data cabling	Data cabling; all of this is hidden, above ceilings, or in the walls, not visible elements.	Susan Hill, e-mail message to author, May 23, 2013.
High speed internet connectivity	State of the art when installed	Susan Hill, e-mail message to author, May 23, 2013.

Source: School district documents of school studied and information provided by architect. Kentucky School Designs, "Home," *KYschooldesigns.org*, accessed on May 21, 2013, <http://www.kyschooldesigns.org/index.php>.

Observations

Prior to the renovations the school facility did not have the wiring capabilities for high speed internet and digital cabling. During the renovations the technological infrastructure was added to accommodate technological in a way that was not possible previously. The school currently has wireless internet and I observed high speed internet being used which accommodates the three computer labs (Image 17), computers in the library for students (Image 18), classroom computers (Image 19), computers in the administrative offices, attendance office, counseling office, cafeteria, and maintenance office. However, unlike before the renovations, wires and cabling visibly ran alongside the hallways of the building as seen in Image 20. In contrast, the renovation process allowed these cables and wires to be concealed and placed in the ceiling as seen in Image 21. The walls are now clear and open up the space due to the removal of these obstructions. The internet capabilities of the renovated facility allowed an advancement in use of technology in the school. Images 22 and 23 taken after renovations showcase the addition of Smartboards now in every classroom and ceiling mounted projectors. Every classroom has a Smartboard and overhead projector. Wireless capability present at the school since renovations allows for the use of iPads by students and teachers. The school site does not have an individual computer server; rather, the school district houses a server for all schools in the system.⁵⁴⁷ An information technology (IT) staff member is not present at the school site, but the school district employs IT personnel to oversee all technological repair and ordering issues in the district.⁵⁴⁸

⁵⁴⁷ Email communication with the school district administrator.

⁵⁴⁸ Ibid.

Image 17. One of three computer labs post renovations

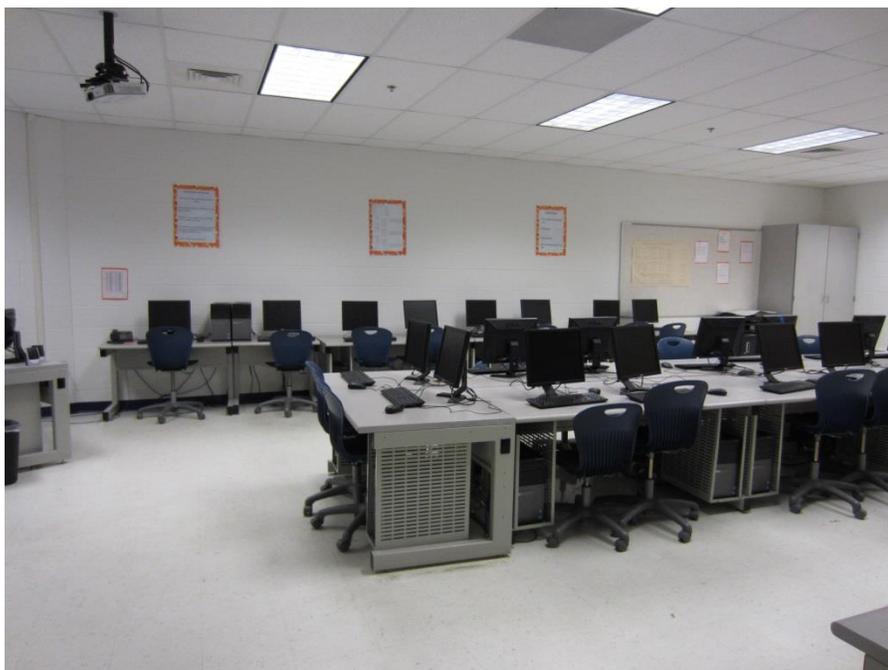


Image 18. Student computers in library post renovations



Image 19. Student classroom computers post renovations



Image 20. Wiring and cabling running along walls prior to renovations



Hill, Susan S. *School Facility Prior to Renovation*. Photograph. 2004. Tate.Hill.Jacobs: Architects, Inc.

Image 21. Wiring and cabling concealed post renovations



Hill, Susan S. *School Facility Post Renovation*. Photograph. 2007. Tate.Hill.Jacobs: Architects, Inc.

Image 22. Smartboards in every classroom post renovations



Image 23. Overhead projectors in every classroom post renovations



Summary of Technological Readiness Themes

Regarding technological readiness, notable findings included inside building network and cabling system, high-speed internet connectivity, wireless network, and wiring for computers, Smartboards, television monitors, and overhead projectors in classrooms, library, and three computer labs. Prior to the renovations at this facility, the inside network and cabling system was limited, which restricted the use of technological systems used in the facility. The new networking and cabling system allowed for a wide expanse of equipment use in the facility by administrators, school staff, teachers, and students.

Prior to renovations, high-speed connectivity was not present in the facility. The building simply did not have the technological infrastructure necessary for this connectivity to be available. The renovations allowed for this connectivity to be put in place. Teachers commented that this new capability saves time when students are

working on computers. There is less academic instructional time being wasted due to waiting on computer and network speed.

The infrastructure did not exist before renovations that would allow wireless internet connectivity. This situation meant that computers were not used in the building in laptop format. In addition iPads and other wireless devices were not able to be part of the learning environment. Several teachers commented on the increase in choice of academic technology use the teachers and students now have at their disposal due to widespread wireless networking in the facility.

Before renovations the wiring for technology was narrow. Only a few dozen computers were able to be part of the school curriculum and the technological infrastructure could not support more equipment. The upgrade of infrastructure during renovations has allowed Smartboards, television monitors, and overhead projectors in every classrooms, library, and three computer labs. As previously mentioned, at any given time more than ninety students can simultaneously be conducted coursework on the computers in the building. Several administrators, teachers, and school staff commented on the variety of technology that is now available in the building and the increase in instructional approaches this has meant for the students.

Taken together, these new facility features substantially improved technological readiness in the studied school, creating a more productive and technologically modern school environment for learning.

Lighting

Interviews

The main code that emerged from the interviews in this section was “Lighting.” The sub-codes that emerged included “Classroom Lighting,” “Windows,” “Building Lighting,” “Facility Paint Colors,” and “Fluorescent Lights.” The themes that emerged are “Lighting Before Renovations” and “Lighting After Renovations.” These interviewee’s responses were coded and put into categories of sub-codes. From the sub-codes the responses were divided into themes as noted in Tables 14 and 15.

Most teachers and staff members mentioned a change in lighting in the facility when compared prior to the renovations. Before renovations, teachers mentioned their classroom, “feeling like a dungeon” with dark maroon paint and limited lighting.⁵⁴⁹ Unrepaired Plexiglas⁵⁵⁰ windows were a problem mentioned by a couple of teachers.⁵⁵¹ Window air conditioning units blocking the natural light into the classroom space was mentioned.⁵⁵²

During renovations the amount of natural lighting was increased in the facility. All windows were replaced and window air conditioning units removed. The classrooms were repainted with fresh colors that according to one teacher, “opened up the space.” Another teacher commented, “The light, it is different. It seems brighter because the colors in the walls are a lot brighter. It was very dark brown before. The floors were

⁵⁴⁹ Interview with teachers.

⁵⁵⁰ Plexiglas is a named brand product. It is a translucent material that may be used in place of glass.

⁵⁵¹ Ibid.

⁵⁵² Interview with teacher.

tiled dark maroon and the walls were dark brown, so it was really cave-ish looking.”⁵⁵³

Most teachers mentioned that the classrooms seemed brighter, with more natural light.⁵⁵⁴

New fluorescent lighting replaced overhead elements. One teacher did mention missing the old windows because they could be easily opened.⁵⁵⁵

⁵⁵³ Ibid.

⁵⁵⁴ Interview with teachers.

⁵⁵⁵ Interview with teacher.

Table 14. Selected themes derived from interviews concerning lighting

Theme: Lighting Before Renovations	Supporting Data	Data Source
Classroom Lighting	“It was like a dungeon in your classroom.”	Teacher 5 Interview, 05/14/13
	“You had window air conditioning units.”	Administrator 1 Interview, 05/13/13
Windows	“...not to mention the Plexiglas windows that were milked over so you could barely see. If there was a hole in it they would not replace the window, they would just place a Plexiglas and glue it over the hole.”	Teacher 5 Interview, 05/14/13
Building Lighting	“Before the building was really dark. The hallways were kind of dark.”	Teacher 10 Interview, 05/14/13
	“The halls were just dark.”	Teacher 11 Interview, 05/15/13
	“It was so dingy and dark in areas before.”	School Staff 13 Interview, 05/15/13
Facility Paint Colors	“The lockers they were just so kind of maroon.”	Teacher 11 Interview, 05/15/13
	“It was very dark brown before. The floors were very dark maroon. Tiled and the walls were dark brown, so it was really cave-ish looking.”	School Staff 12 Interview, 05/15/13

Source: Interviews with participants.

Table 15. Selected themes derived from interviews concerning lighting

Theme: Lighting After Renovations	Supporting Data	Data Source
Fluorescent Lights	“You did not have the new fluorescent lights [before renovations].”	Administrator 1 Interview, 05/13/13
Building Lighting	“Basically, it is much more, there is a design, a lot of light in there.”	Administrator 1 Interview, 05/13/13
	“Now I think it is brighter and more open, and I like that.”	Teacher 10 Interview, 05/14/13
	“Now it is more open and bright. It is more comfortable now.”	School Staff 13 Interview, 05/15/13
	“Just the whole physical appearance of the inside goes from dark and gloomy into light and bright...”	Teacher 16 Interview, 05/15/13
Facility Paint Colors	“...the design now is very colorful, the hallways are wide and open.”	Administrator 1 Interview, 05/13/13
	“Now we have bright colored lockers. It makes everything a lot brighter.”	Teacher 11 Interview, 05/15/13
	“It’s different. It seems brighter because the colors in the walls are a lot brighter.”	School Staff 12 Interview, 05/15/13
	“We added color too.”	Teacher 15 Interview, 05/15/13

Source: Interviews with participants.

Documents

Table 16 contains references from documents that were discovered during the research process regarding the planning of the facility in the case study. These materials substantiate the interviews and observations. The information they contain includes the architect's documents and communication between the architect and author.

Table 16. Documents concerning lighting

Topic	Document Content	Source
Natural Daylight	High Performance Features listed in the architectural firm’s project completed plans. Historic buildings can have an abundance of natural light so the architect attempted to keep as much of it as possible.	KYschooldesigns.org website and documents provided by architect ⁵⁵⁶ ; Email from architect
All the windows were replaced	Explanation of the addition to the building.	Susan Hill, e-mail message to author, May 23, 2013.
Light paint colors in the facility	New bright paint colors compared to the dark colors before the renovations. They lighten up the building and according to the architect, “open up the freshness.”	Susan Hill, e-mail message to author, May 23, 2013.
New fluorescent overhead lighting	Entirely new lighting systems added	Susan Hill, e-mail message to author, May 23, 2013.

Source: School district documents of school studied and information provided by architect. Kentucky School Designs, “Home,” *KYschooldesigns.org*, accessed on May 21, 2013, <http://www.kyschooldesigns.org/index.php>.

⁵⁵⁶ Kentucky School Designs, “Home,” *KYschooldesigns.org*, accessed on May 21, 2013, <http://www.kyschooldesigns.org/index.php>.

Observations

Prior to renovations the facility was dark due to lack of sufficient lighting and dark paint that produced a hot feeling as seen in Images 20 and 24. During the renovations all windows were replaced as well as overhead lighting replaced with new fluorescent lighting. Some of the natural window lighting in the classrooms had been blocked by the window air conditioning units as seen in Image 1.

Image 24. Lighting and dark interior colors prior to renovations



Hill, Susan S. *School Facility Prior to Renovation*. Photograph. 2004. Tate.Hill.Jacobs: Architects, Inc.

An attempt was made by the architect to preserve the natural lighting in the building. I observed a great abundance of natural lighting in the classrooms, hallway areas, and staircases captured in Images 25, 26, and 27. Since the renovations, students have plentiful access to sufficient natural light in the classroom. They have many windows as well as overhead fluorescent recessed lighting. Upon observation, I noted the windows are long as seen in Image 28 which allows for an abundance of natural light to come in.

Image 25. Classroom lighting post renovations



Image 26. Hallway lighting post renovations

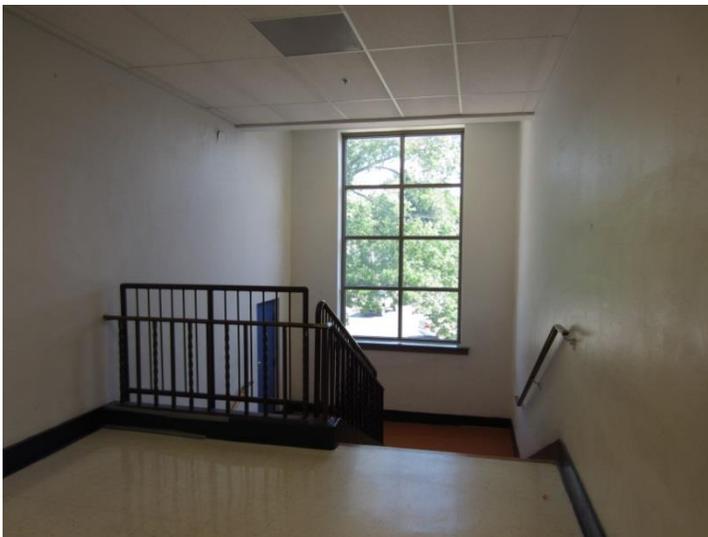


Hill, Susan S. *School Facility Post Renovation*. Photograph. 2007. Tate.Hill.Jacobs: Architects, Inc.

Image 27. Hallway lighting post renovations



Image 28. Use of long windows for lighting post renovations



In order to open up the space and allow light to come into the educational area, the architect chose to replace the dreary and dark paint with light paint to “open up the space.” Image 29 is of an area of the building prior to renovations. Image 30 demonstrates how after renovations light is able to bounce off the new colors while making it easier for students to see and learn in their school. I witnessed the manifestation of the brightly colored paint opening up the interior of facility and allowing light to be

reflected off of the natural light in the interior space. The paint colors and the natural daylight bounce off one another and create an inviting atmosphere. It feels as if one is outside while standing in many parts of the interior space due to the sense of openness and natural light.

Image 29. Interior colors and lighting prior to renovations



Hill, Susan S. *School Facility Prior to Renovation*. Photograph. 2004. Tate.Hill.Jacobs: Architects, Inc.

Image 30. Interior colors and lighting post renovations



Hill, Susan S. *School Facility Post Renovation*. Photograph. 2007. Tate.Hill.Jacobs: Architects, Inc.

Summary of Lighting Themes

Concerning lighting, noteworthy findings included natural daylight, the replacement of light paint colors in the facility, and new fluorescent lighting. Before renovations the natural daylight in the facility studied in the case study was restricted. Classroom windows were blocked by window air conditioning units. After the remodeling, the window air conditioning units were taken out and all windows were replaced.

Paint colors in the interior of the facility were dark prior to renovations. The paint colors did not allow light to bounce off of them, resulting in what a couple of teachers said, a cave-like atmosphere. During renovations these dark paints were replaced with light-colored paints. This change in paint and light opened up the facility and allowed the natural light to permeate into the classrooms and hallways spaces.

Before renovations hanging fluorescent lights were used, however, few were located in the facility when compared to after renovations. New, recessed fluorescent lighting replaced hanging overhead lights during the renovations. These light sources have more output and are of higher quality than those previously used in the facility studied.

As a whole, these new facility features greatly improved lighting in the studied school, creating a school environment more conducive to learning.

Thermal Comfort

Interviews

The main code that emerged from the interviews in this section was “Thermal Comfort.” The sub-codes that emerged included “No Central Heating or Air,” “Classroom Temperature,” “Window Units,” “Disconfirming Evidence: Classroom Temperature,” “No Window Air Conditioning Units,” “Heating, Ventilation, & Air Conditioning Unit (HVAC) Installed,” and “Disconfirming Evidence: HVAC Units Has Direct Digital Controls (DDC) or Remote Controlled Access to the Unit.” The themes that emerged are “Thermal Comfort Before Renovations” and “Thermal Comfort After Renovations.” These interviewee’s responses were coded and put into categories of sub-codes. From the sub-codes the responses were divided into themes as noted in Tables 17 and 18.

Prior to the school facility renovations the process of heating and cooling the school mechanical systems, and school and classroom temperature differed when compared to after to the renovations. The main source of heating the building was two boiler systems.⁵⁵⁷ The building did not have central air conditioning.⁵⁵⁸ Window air conditioning units were used for cooling the building.⁵⁵⁹ Teachers recounted the loudness and unreliability of the window units.⁵⁶⁰ A few classrooms did not have air conditioning at all due to lack of window units.⁵⁶¹ During the renovations, a Heating,

⁵⁵⁷ Interview with administrator and school staff.

⁵⁵⁸ Interview with administrator, school staff, and teachers.

⁵⁵⁹ Interview with teachers and school staff.

⁵⁶⁰ Interviews with teachers.

⁵⁶¹ Interview with teacher.

Ventilation, & Air Condition (HVAC) unit was added to the facility.⁵⁶² The school now has central cooling and heating. This allows for all rooms to be heated and cooled equally and consistently. Window air conditioning units were removed. Teachers commented on the ability of the district office to control the temperature of the HVAC unit and remotely trouble-shoot any issues that should arise.⁵⁶³ One teacher, however, expressed frustration with the range of temperature the central office has set the HVAC system on.⁵⁶⁴

⁵⁶² Ibid.

⁵⁶³ Interviews with teachers.

⁵⁶⁴ Interview with teachers.

Table 17. Selected themes derived from interviews concerning thermal comfort

Theme: Thermal Comfort Before Renovations	Supporting Data	Data Source
No Central Heating or Air	“We had no actual central air and it was all window air condition units in the whole school and it was controlled by two different boilers.”	School Staff 14 Interview, 05/16/13
	“You had window air conditioners, you had steam heat.”	Administrator 1 Interview, 05/13/13
	“A lot of the rooms did not have air conditioning.”	School Staff 13 Interview, 05/15/13
	“I remember the old heaters, you don’t want to touch those because they were burning up.”	Teacher 14 Interview, 05/15/13
Classroom Temperature	“In the Chorus Room [it was detached from the building] I remember is used to always be so hot in there.”	Teacher 15 Interview, 05/15/13
	“It would affect the band being an outside classroom because it did not have as much as the control air as the school building then, so I remember it would affect the instruments being if you’re playing on it, like in the winter and its cold, first is when it starts to get warm and like around now where it would be hotter in there, so that would affect our instruments and how they played.”	Teacher 17 Interview, 05/17/13
	“We used to have if you were hot, I mean you could go open a window and that’s about it, maybe bring a fan from home.”	Teacher 14 Interview, 05/15/13

Source: Interviews with participants.

Table 17. Selected themes derived from interviews concerning thermal comfort (continued)

Theme: Thermal Comfort Before Renovations	Supporting Data	Data Source
Window Units	<p>“I am loud anyway, you almost had to be...students sitting next to the air conditioning unit...you could not be loud enough [for them to hear].”</p>	Teacher 5 Interview, 05/14/13
	<p>“Before, I would have to talk over the window units. When we had heat, the heat rattled too.”</p>	Teacher 6 Interview, 05/14/13
	<p>“I had to build with my students an inside gutter. It was leaking inside the roof. We lined it with aluminum and made a pipe for it to go through so when it rained...it would not go through the seal and get on the desks. I could not turn the air conditioner on because I was afraid it would short. We had that for an entire year. One of the kids was putting it up and said, ‘We really are a ‘ghetto’ school, aren’t we?’ I told them school is made up by their students so would not worry about it.”</p>	Teacher 5 Interview, 05/14/13
	<p>“The window units usually in the rooms I taught in did not work. If it was hot outside you were so miserable we would have fans going so it was not a good situation.”</p>	Teacher 7 Interview, 05/14/13

Source: Interviews with participants.

Table 18. Selected themes derived from interviews concerning thermal comfort

Theme: Thermal Comfort After Renovations	Supporting Data	Data Source
Classroom Temperature	“It is cooler.”	Teacher 6 Interview, 05/14/13
Disconfirming Evidence: Classroom Temperature	“Well, I’m not really happy with the way they have the thermostat. They actually are controlling it at the central office there now. So, if you're burning up or if you're cold, you got to send an email and then somebody has got to request that somebody at the central office they send someone to regulate your room temperature.”	Teacher 8 Interview, 05/15/13
No Window Air Conditioning Units	“We do not have to listen to window air-conditioning units anymore.”	Teacher 6 Interview, 05/14/13
	“So I do not have to talk over that [window air conditioning unit]. So I think it is better now than it was before.”	Teacher 6 Interview, 05/14/13
Heating, Ventilation, & Air Conditioning Unit (HVAC) Installed	“We have central air and central heat.”	Teacher 7 Interview, 05/14/13
	“Everything is air-conditioned now. It is cool in the summer and warm in the winter now. There are still issues; there are some rooms that do not get as cool as others.”	School Staff 13 Interview, 05/15/13
Disconfirming Evidence: HVAC Units Has Direct Digital Controls (DDC) or Remote Controlled Access to the Unit.	“It [heating and air] is controlled by central office. There are some days when you come in and it is really cold and the kids are freezing and then there are days when you come in and it is like we have no air at all.”	Teacher 7 Interview, 05/14/13

Source: Interviews with participants.

Documents

Table 19 contains references from documents that were discovered during the research process regarding the planning of the facility in the case study. These materials substantiate the interviews and observations. The information they contain includes statement of costs and communications between the architect and the author.

Table 19. Documents concerning thermal comfort

Topic	Document Content	Source
Heating, Ventilation, & Air Conditioning	Completed plans and specifications; Prior to the renovations the facility utilized window air conditioning units to cool and a boiler system to heat the building.	“Statement of Probably Cost,” Kentucky Department of Education: Division of Facilities Management; Email from architect
The new mechanical systems have Direct Digital Controls (DDC)	DDC controls is a digital monitoring system. There are two ways it works: 1) the individual classrooms have control over the unit over the unit that feeds their classrooms and 2) the school district has the capacity through a remote laptop or computer to troubleshoot any units that may be in malfunctioning; it gives them a tight control from an energy use point of view.	Susan Hill, e-mail message to author, May 23, 2013.
School and classroom temperature	Temperatures in the school are held at a consistent range. Teachers have control of the temperature but they cannot go above or below a particular range.	Susan Hill, e-mail message to author, May 23, 2013.

Source: School district documents of school studied and information provided by architect. Kentucky School Designs, “Home,” *KYSchoolDesigns.org*, accessed on May 21, 2013, <http://www.kyschooldesigns.org/index.php>.

Observations

Prior to the renovations the school did not have central air and heat. Window air conditioning units (Images 1 and 20) were the cooling source and a boiler was the heat source in the facility (Image 20). During the renovation process, a centralized Heating, Ventilation, Air Conditioning (HVAC) unit was installed. This unit provides central heat and air for the building. During my on-site visitation I was shown one of the central air condition units, located in a closet behind the auditorium as shown in Image 31. While on-site I noticed a consistent and comfortable facility temperature. It was not too cold, nor too hot in the building. The temperature range was 68°F to 74°F. Little to no humidity was present.

Image 31. Central air conditioning post renovations



Summary of Thermal Comfort Themes

Regarding thermal comfort, important findings included the addition of the Heating, Ventilation, & Air Conditioning (HVAC) system, direct digital controls (DDC), and school and classroom regulated temperature. Prior to facility renovations, the school

building studied did not have central heat or air. Boilers were relied on for heat and window air conditioning units were depended on for air conditioning. The boiler was not a consistent sources of heat as one school staff member said it would often not work properly. According to many teachers, the window air conditioning units were loud and often not working properly. These units made it difficult for the students to hear the teachers' academic instruction, which both students and teachers found frustrating. By the addition of the HVAC unit during renovations, the facility now had central heating and air. The window air conditioning units were removed and the building had a consistent form of heating and cooling with centrally-regulated temperature and humidity.

The DDC controls attached to the HVAC unit allow the school district office to remotely monitor and trouble-shoot any malfunctions with the unit. Before renovations the school staff and teachers had to monitor the school temperature and determine when to adjust the boiler and report to the district office a broken air conditioning unit. After the DDC controls were added, the school employees are better able to focus on the instruction of the students instead of the thermal comfort and regulating the school and classroom temperature.

Together, these new facility features greatly improved thermal comfort in the studied school, creating a more consistent school temperature and environment for learning.

Air Quality

Interviews

The main code that emerged from the interviews in this section was “Air Quality.” The sub-codes that emerged included “Facility Ventilation,” “Chalkboards,” “Carbon Monoxide Detectors,” “Condition of School Facility,” “Replacement of Chalkboards with Whiteboards,” “Ventilation System,” and “Low Volatile Organic Compound (VOCs) Paints.” The themes that emerged are “Air Quality Before Renovations” and “Air Quality After Renovations.” These interviewees’ responses were coded and put into categories of sub-codes. From the sub-codes the responses were divided into themes as noted in Tables 20 and 21.

Administrators, teachers, and school staff commented several differences in the facility that resulted in a difference in air quality when compared to post renovations. Prior to renovations there was no central air and heat as previously mentioned, a ventilation system was not present at the facility, and chalkboards were used. A school staff member clearly recalled the effect the lack of central ventilation had in the building before renovations. In order to get air circulating in the facility after a weekend, on Monday morning, all the air conditioners would be turned on high and the classroom doors opened to allow forced cross-ventilation to take place.⁵⁶⁵

A couple of teachers commented on how dusty the building appeared before renovations.⁵⁶⁶ They felt the use of chalkboards instead of whiteboards contributed to the dust present in the classrooms. During renovations, these chalkboards were replaced with

⁵⁶⁵ Interview with school staff.

⁵⁶⁶ Interview with teachers.

whiteboards in each classroom. The boards require markers in lieu of chalk, thus creating less dust. Many teachers commented on how clean the building and classrooms are post renovations.⁵⁶⁷

The HVAC system added during renovations contains a filter.⁵⁶⁸ The incorporation of HVAC vents throughout the building and in classrooms⁵⁶⁹ make possible filtered air circulation through the entire facility.

Other measurements put into place at the time of renovations was the usage of paint with low Volatile Organic Compounds (VOCs) and carbon monoxide testers. Teachers noted the change in paint.⁵⁷⁰ Carbon monoxide testers monitor the air and alert if unhealthy compounds are detected.⁵⁷¹

⁵⁶⁷ Ibid.

⁵⁶⁸ Interview with school staff.

⁵⁶⁹ Ibid.

⁵⁷⁰ Interview with teachers.

⁵⁷¹ Interview with school staff.

Table 20. Selected themes derived from interviews concerning air quality

Theme: Air Quality Before Renovations	Supporting Data	Data Source
Facility Ventilation	“We had no air in the hall. We literally go in first thing on Monday, we'd open all the 8th grade classrooms and we flip all the air conditioning on high with the doors open. There was no ventilation in the hallways, there was no air on hallway.”	School Staff 14 Interview, 05/16/13
Chalkboards	“You [the facility] had chalkboards.”	Administrator 1 Interview, 05/13/13
Carbon Monoxide Detectors	“We did not [have these] before the renovations.”	School Staff 14 Interview, 05/16/13
Condition of School Facility	“It was kind of dirty, not dirty as in it was not clean, just dust and mold.”	Teacher 7 Interview, 05/14/13

Source: Interviews with participants.

Table 21. Selected themes derived from interviews concerning air quality

Theme: Air Quality After Renovations	Supporting Data	Data Source
Carbon Monoxide Detectors	We have carbon dioxide testers now. We did not before the renovations.	School Staff 14 Interview, 05/16/13
Replacement of Chalkboards with Whiteboards	“We have whiteboards now in classrooms. “That probably helps with asthma [less dust] as well.”	Teacher 6 Interview, 05/14/13
Ventilation System	“We have vents in each classroom and in the hallways.”	School Staff 14 Interview, 05/16/13
Low Volatile Organic Compound (VOCs) Paints	“The classrooms are fabulous, it has been painted.”	Teacher 5 Interview, 05/14/13
Condition of School Facility	“It is cleaner, brighter, and more inviting.”	School Staff 13 Interview, 05/14/13

Source: Interviews with participants.

Documents

Table 22 contains references from documents that were discovered during the research process regarding the planning of the facility in the case study. These materials substantiate the interviews and observations. The information they contain includes an installation notice, communications between the school system and the architect, and correspondence between the architect and the author.

Table 22. Documents concerning air quality

Topic	Document Content	Source
Energy-efficient HVAC	High Performance Features listed in the architectural firm’s project completed plans; Since the building was built in 1937 it did not have central air and heat until the renovations.	KYschooldesigns.org website and documents provided by architect ⁵⁷² ; Email from architect
Heating, Ventilation, & Air Conditioning	Completed plans and specifications; Prior to the renovations the facility utilized window air conditioning units to cool and a boiler system to heat the building	“Statement of Probably Cost,” Kentucky Department of Education; Division of Facilities Management; Email from architect
Low Volatile Organic Compound (VOCs) paints	High Performance Features listed in the architectural firm’s project completed plans; Paint was chosen by architect that contained low VOCs (not off gassing).	KYschooldesigns.org website and documents provided by architect ⁵⁷³ ; Email from architect
HVAC Vents	Listed along with HVAC contents	District Facilities Documents

Source: School district documents of school studied and information provided by architect. Kentucky School Designs, “Home,” *KYschooldesigns.org*, accessed on May 21, 2013, <http://www.kyschooldesigns.org/index.php>.

⁵⁷² Kentucky School Designs, “Home,” *KYschooldesigns.org*, accessed on May 21, 2013, <http://www.kyschooldesigns.org/index.php>.

⁵⁷³ Ibid.

Table 22. Documents concerning air quality (continued)

Topic	Document Content	Source
Facility ventilation	Updated ventilation code requirements that were more extensive during the renovation in comparison to those during the 1937 construction.	Susan Hill, e-mail message to author, May 23, 2013.
Filters in the HVAC system	Confirmation the HVAC units contain filters	Susan Hill, e-mail message to author, May 23, 2013.
Whiteboards	New whiteboards replaced chalkboards	Susan Hill, e-mail message to author, May 23, 2013.
Carbon monoxide detector	Installation notice	District Facilities Documents

Source: School district documents of school studied and information provided by architect.; Kentucky School Designs, "Home," *KYschooldesigns.org*, accessed on May 21, 2013, <http://www.kyschooldesigns.org/index.php>.

Observations

Before the school facility renovations, the school did not have a HVAC unit as previously mentioned. Therefore, there was no central ventilation system present in the building. In Image 32 a typical ceiling air vent, present in every room, is shown. These units have filters and not only allow for heat and air to be directed into the interior spaces, but allow for fresh air circulated within the building. I noticed that air filters, as depicted in Image 33, are also located in each classroom.

Image 32. Air vents post renovations



Image 33. Air filters post renovations



Chalkboards were located in every classroom prior to renovations. These boards required the use of chalk to write on the surface, creating large amounts of chalk dust. During renovation these boards were replaced with whiteboards as seen in Image 34. I did not see any remnants of the old chalkboards. These new whiteboards, located in every classroom, have a sleek surface and are written on with washable marker. Less dust is created with the use of markers.

Image 34. Whiteboards in every classroom post renovations



During renovation carbon monoxide detectors were added. Carbon monoxide is a colorless, odorless gas, which in great quantities is poisonous to humans. These units (as seen in Image 35) light up to alert if carbon monoxide levels are unhealthy. These units were not present in the building prior to renovations.

Image 35. Carbon monoxide detector post renovations



During original construction of the building in 1937, the presence of volatile organic compounds (VOCs) in paint was not known to be a problem. During the renovations of the facility, the presence of VOCs in the paint was considered, and low-VOC paint was selected. I observed the presence of newly painted walls, doors, staircases, and moldings as seen in Images 10 and 30.

Summary of Air Quality Themes

Concerning air quality, noteworthy findings included the addition of the Heating, Ventilation, & Air Conditioning (HVAC) system, HVAC vents, HVAC filters, facility ventilation and filters, use of low Volatile Organic Compound (VOCs) paints, whiteboards, and carbon monoxide detectors. The addition of the HVAC unit brought increased ventilation. According to school staff members before renovations there simply was no ventilation system in the facility. School employees were limited to opening a window to allow fresh air in. The facility did not have fans, so the air

remained stagnant. Renovations added vents and filters to each room and in hallways as part of the new HVAC system.

During the renovations, it was important to the architect that the use of paints with low VOCs be used in the facility. These paints are less off-gassing, meaning they release fewer paint compound particles into the air. In addition, they contain lower amounts of compounds that may be health hazardous. Prior to renovations, the use of paints with low VOCs was not a consideration. It is unclear whether the paints used in the building prior to renovations was more hazardous; however, it is clear that the modern use of paints with low VOCs are healthier for students, than paint typically used previously in such applications.

Before renovations, the use of chalkboards were present in every classroom. These boards are known to create dust from the use of chalk. Teachers mentioned the school facility being dusty and they related it to the use of chalkboards. One teacher described the decrease in asthma in her students when these boards were replaced during the renovations. The boards were replaced with whiteboards, requiring markers to write on, not chalk.

The facility renovations introduced a new carbon monoxide monitoring unit in the school facility, previously not present. This instrument will measure the levels of carbon monoxide in the air and sounds an alert should the gas be detected. This is an air quality measure not possible before the renovations. The employees of the facility previously did not have a way to detect this hazardous gas.

Together, these new facility features greatly improved air quality in the studied school, creating a cleaner and consistent environment for learning. However, it was not

apparent in this study if the increase in air quality has had an effect on the student absenteeism rate.

Auditorium

Interviews

The main code that emerged from the interviews in this section was “Auditorium.” The sub-codes that emerged included “Keeping the Auditorium,” “Part of the Original Building that Remained,” “Participants Thankful the Auditorium Remained,” “Studio,” “New Seating,” and “Community Use of Auditorium.” The themes that emerged are “Auditorium Before Renovations” and “Auditorium After Renovations.” These interviewee’s responses were coded and put into categories of sub-codes. From the sub-codes the responses were divided into themes as noted in Tables 23 and 24.

Table 23. Selected themes derived from interviews concerning the auditorium

Theme: Auditorium Before Renovations	Supporting Data	Data Source
Keeping the Auditorium	<p>“Also [people in the school system] they were concerned with losing things like an auditorium that new funding would probably not be available for. And they had an existing auditorium as well as the gym. So they felt like they could save money by staying there and just refurbish the auditorium and gym and not have to build a new one.”</p>	Administrator 2 Interview, 05/14/13
	<p>“We are one of the only of two schools in Hopkins County who have an auditorium and I don’t know if they demolished the building and built a new school, I don’t know if that would have been gotten the space in that they have here now with an auditorium as well.”</p>	School Staff 9 Interview, 05/14/13

Source: Interview with participants.

Table 24. Selected themes derived from interviews concerning the auditorium

Theme: Auditorium After Renovations	Supporting Data	Data Source
Part of the Original Building that Remained	<p>“Two whole wings were torn down. The only thing that remained was the front of the building section and the gymnasium and the auditorium which was the part of the front of the building and the two other wings were torn down including two outdoor classrooms that were there and then they rebuilt adding a wing and a partial wing off of that but the main front was renovated, the gym was renovated, the auditorium was renovated.”</p> <p>“About the only thing that was preserved in the building was the gymnasium and the auditorium. Everything else we went through two extensive building stages. The only thing remaining from the old [school] was the auditorium and the gymnasium. They were remolded and updated. Everything else was torn down and put back with new construction.”</p> <p>“We just had the 50th reunion this past year and some of them just commented on how different it was and you know how up to date it was how 21st century classrooms were you know, everything had changed so much but yet they still went and saw up under the auditorium where some of the signatures are still there and the gym is still there.”</p>	<p>Teacher 15 Interview, 05/15/13</p> <p>Administrator 1 Interview, 05/13/13</p> <p>Administrator 3 Interview, 05/17/13</p>
Participants Thankful the Auditorium Remained	<p>“We're fortunate that we have the auditorium, that we have football field, a lot of middle schools don't have those facilities that we have, that's about it.”</p> <p>“The high schools don't have this auditorium and they don't have – and we got to track the other middle schools don't have that so if it has kept our character and our history a lot but it has given us the new modern conveniences and comforts.”</p>	<p>Teacher 8 Interview, 05/15/13</p> <p>Teacher 15 Interview, 05/15/13</p>

Source: Interviews with participants.

Table 24. Selected themes derived from interviews concerning the auditorium (continued)

Theme: Auditorium After Renovations	Supporting Data	Data Source
Studio	“And we have our own studio where they... we also have a projector screen in the auditorium. On award days they can watch movies or special presentations of speakers here or something like that.”	School Staff 11 Interview, 05/14/13
New Seating	“With our auditorium... They put new seats in.”	School Staff Interview, 05/16/13
Community Use of Auditorium	“With us having the only auditorium, a lot of different areas of the community use our auditorium for different things.”	School Staff 13 Interview, 05/15/13
	“A lot of people from the community even come in and use the auditorium for different things and they've done an awesome job.”	School Staff 9 Interview, 05/14/13

Source: Interviews with participants

Documents

Table 25 contains references from documents that were discovered during the research process regarding the planning of the facility in the case study. These materials substantiate the interviews and observations. The information they contain includes statement of completed plans and specifications between the architect and the general contractor.

Table 25. Documents concerning the auditorium

Topic	Document Content	Source
Auditorium Seating	Completed plans and specifications.	Fax from architect to general contractor
Auditorium Paint	Specifications.	Fax from architect to general contractor
Auditorium Carpet	Specifications.	Fax from architect to general contractor
Auditorium Acoustic Panels	Specifications.	Fax from architect to general contractor

Source: School district documents of school studied and information provided by architect.; Kentucky School Designs, "Home," *KYschooldesigns.org*, accessed on May 21, 2013, <http://www.kyschooldesigns.org/index.php>.

Observations

Before the renovations the facility housed an auditorium (Image 36), a rare find in a middle school building. It was built when the original structure was used as a high school. Many members of the community wanted the school to be renovated instead of being rebuilt for fear of losing the auditorium.

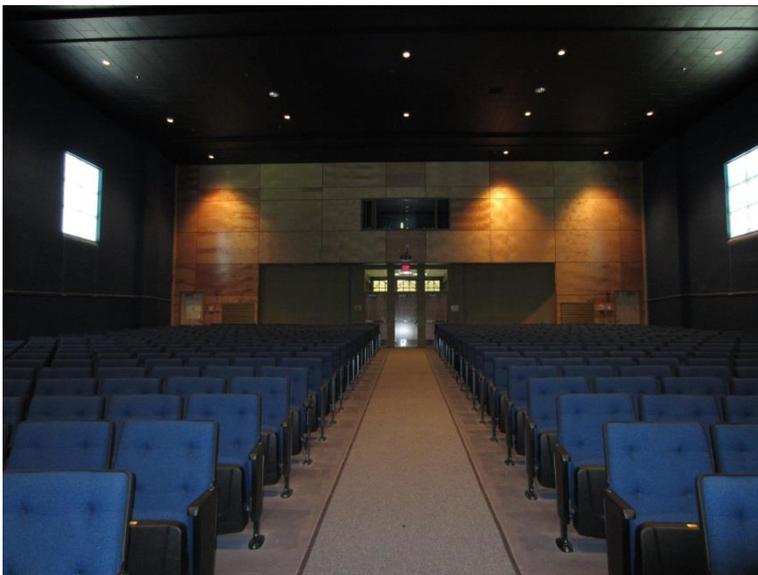
During the renovations the chairs in the auditorium were refurbished and a studio was added. The studio is above the auditorium and is an area where students are able to learn about stage lighting and sound. Image 37 demonstrates the newly renovated auditorium. Upon entering the space, it is an expansive room that appears to have many uses. I noted an orchestra pit for student use. The choice of dark paint keeps light out in order to better view the stage. It was impressive to see the beautiful wood paneling that adorns the back of the room. The auditorium was being set up for 8th grade graduation ceremonies when I was on-site. I noted the students, teachers, and families were able to remain on campus in their school environment for the ceremony instead of traveling off campus for the event, thereby clearly linking the recognition of learning milestones to the site where that learning took place.

Image 36. Auditorium prior to renovations



Hill, Susan S. *School Facility Prior to Renovation*. Photograph. 2004. Tate.Hill.Jacobs: Architects, Inc.

Image 37. Auditorium post renovations



Summary of Auditorium Themes

Concerning the auditorium, significant findings included the communities' desire to keep the auditorium during the renovation process, the participant's thankfulness it remained, the addition of the studio, new seating, and community use of the space. Prior

to the renovations the school had an original WPA auditorium. There was concern among community members there would not be enough money to rebuild a new one should the school facility be torn down and replaced. Therefore, many of the participants noted how glad they were that the facility was renovated and the auditorium remained.

The renovation process updated the seating, paint, and carpet. A new wooden panel was added to the back of the room, along with a studio for student use. The community along with the school members continue to use the facility.

Combined, these new facility features greatly improved the auditorium space, maintaining and generating a use of the structure that added to the learning environment for the students and community.

Disabled Accessibility

Interviews

The main code that emerged from the interviews in this section was “Disabled Accessibility.” The sub-codes that emerged included “Elevator” and “Disability Accessibility was a Priority.” The themes that emerged are “Disabled Accessibility Before Renovations” and “Disabled Accessibility After Renovations.” These interviewee’s responses were coded and put into categories of sub-codes. From the sub-codes the responses were divided into themes as noted in Tables 26 and 27.

Table 26. Selected themes derived from interviews concerning the disabled accessibility

Theme: Disabled Accessibility Before Renovations	Supporting Data	Data Source
Elevator	“We did not have [prior to renovations] an elevator in our building.”	School Staff 14 Interview, 05/16/05

Source: Interviews with participants.

Table 27. Selected themes derived from interviews concerning the disabled accessibility

Theme: Disabled Accessibility After Renovations	Supporting Data	Data Source
Disability Accessibility was a Priority	“Handicap accessibility was a high priority.”	Administrator 1 Interview, 5/13/13
Elevator	“By law they had to put an elevator in.”	School Staff 14 Interview, 05/16/05

Source: Interviews with participants.

Documents

Table 28 contains references from documents that were discovered during the research process regarding the planning of the facility in the case study. These materials substantiate the interviews and observations. The information they contain include a school district invoice.

Table 28. Documents concerning the disabled accessibility

Topic	Document Content	Source
Installation of New Elevator	Completed plans and specifications.	School district invoice

Source: School district documents of school studied and information provided by architect. Kentucky School Designs, "Home," *KYschooldesigns.org*, accessed on May 21, 2013, <http://www.kyschooldesigns.org/index.php>.

Observations

Before the renovations the facility did not have disabled accessibility. At the time the school was originally built this was not a building requirement. Disabled students had to rely on others to assist them in the restrooms and moving up and down the stairs. During the renovations the school was updated to accommodate the disabled. An elevator was added as seen in Image 38. Disabled students are now able to move more independently around the facility. While on-site I did not observe students, therefore, I did not witness disabled students utilizing the new elevator or disability-accessible restrooms. However, participants spoke of the new upgrades as helpful for students.

Image 38. Elevator Post Renovations



Summary of Disabled Accessibility Themes

Concerning the disabled accessibility, important findings included the addition of new accommodations for those affected. Prior to the renovations disability accessibility was not a top priority when constructing buildings. In many situations disabled students may not have attended regular schools. In modern times disabled persons are common to the

learning environment, and new building requirements state that upgrades must be made in public schools. During the renovations, disability accessibility was a priority. This is evident in the installment of an elevator and restroom facility upgrades.

Together, these new facility features greatly improved the facility access for disabled students, thus providing an environment more conducive to learning for that group.

Classroom Renovations According to Content Area

Interviews

The main code that emerged from the interviews in this section was “Classroom Renovations According to Content Area.” The sub-codes that emerged included “Band Classroom,” “Home Economics Classroom,” “Art Room,” “Computer Labs,” “Overall Change Regarding Classroom Renovations According to Content Area,” and “Science Rooms.” The themes that emerged are “Classroom Renovations According to Content Area Before Renovations” and “Classroom Renovations According to Content Area After Renovations.” These interviewees’ responses were coded and put into categories of sub-codes. From the sub-codes the responses were divided into themes as noted in Tables 29 and 30.

Table 29. Selected themes derived from interviews concerning classroom renovations according to content area

Theme: Classroom Renovations According to Content Area Before Renovations	Supporting Data	Data Source
Band Classroom	“What I have heard being talked about is the band program was in the portable classrooms and trailers outside. They did not even have their own classroom.”	Administrator 2 Interview, 05/14/13
	“[The band room] It used to be in a portable.”	Teacher 10 Interview, 05/13/13
	“You [students] had to go outside to get to the Band and Chorus Rooms and that – it was probably half the size of what they are now. I remember, I was in chorus and we had like 60 kids in there, but it was cramped. We didn’t have all the space that they have now and you had to go outside when there's just this leaky awning thing.”	Teacher 18 Interview, 05/15/13
	“[Students would] have to go outside to go to the Chorus Room and the Band Room.”	School Staff 9 Interview, 05/14/13
Home Economics Classroom	“...[the] home economics teacher had a classroom which was with 4 walls and 30 desks.”	Teacher 15 Interview, 05/15/13
Art Room	“We did not have an art room before.”	Teacher 15 Interview, 05/15/13
Computer Labs	“And [the computer labs] went from computers in a regular sized classroom. You could barely get up down the aisles before so the size has helped that a lot.”	Teacher 16 Interview, 05/15/13
	“He [computer teacher] was basically in four walls with computers stuffed in there.”	Teacher 15 Interview, 05/15/13

Source: Interviews with participants.

Table 30. Selected themes derived from interviews concerning classroom renovations according to content area

Theme: Classroom Renovations According to Content Area After Renovations	Supporting Data	Data Source
Overall Change Regarding Classroom Renovations According to Content Area	<p>“[We have] been able to locate our areas nicer ‘Exploratories’ [the non-core subject areas] all together now where we were spread out.”</p> <p>“Now we have rooms designed for actually with what the content is.”</p>	<p>Teacher 15 Interview, 05/15/13</p> <p>Teacher 15 Interview, 05/15/13</p>
Band Classroom	<p>“The band room is now in the building.”</p> <p>“Now, we have a beautiful Band Room inside the building as well as the Chorus Room and the Music and Education Room, which houses 30 small keyboard. You know, to teach kids the basic chording and keyboarding skills.”</p>	<p>Teacher 10 Interview, 05/13/13</p> <p>School Staff 9 Interview, 05/14/13</p>
Home Economics Classroom	<p>“they have renovated and now [we] have 4 kitchens so that has changed.”</p>	<p>Teacher 15 Interview, 05/15/13</p>
Art Room	<p>“We have an art room now.”</p> <p>“So we have a new art room that has water in it. There is a kiln room.”</p>	<p>Teacher 15 Interview, 05/15/13</p> <p>Teacher 15 Interview, 05/15/13</p>
Computer Labs	<p>“Now a larger classroom where there is more room... so the size has helped that a lot.”</p>	<p>Teacher 16 Interview, 05/15/13</p>
Science Rooms	<p>“Well the science teachers, they have really nice setups with the cabinets and the emergency shower and all that kind of stuff.”</p>	<p>Teacher 16 Interview, 05/15/13</p>

Source: Interviews with participants.

Documents

Table 31 contains references from documents that were discovered during the research process regarding the planning of the facility in the case study. These materials substantiate the interviews and observations. The information they contain includes installation invoices, communications between the architect and the general contractor, communications between the architect and school district, and Kentucky Department of Education documents.

Table 31. Documents concerning classroom renovations according to content area

Topic	Document Content	Source
Science Room Equipment	Completed plans and specifications.	Fax from architect to general contractor
Science Room Tables	Installation invoice.	Fax from architect to district
Home Economics Ranges	Installation invoice.	Fax from architect to district
Home Economics Dishwashers	Installation invoice.	Fax from architect to general contractor
Home Economics Refrigerators	Installation invoice.	Fax from architect to district
Home Economics Four Kitchen Stations	Installation invoice.	Fax from architect to district
Art Room Square Footage Increase	New design work and additional square footage details	“Comparison of KDE Facilities Requirements Based on Curriculum & Population: New Design Work”

Source: School district documents of school studied and information provided by architect. Kentucky School Designs, “Home,” *KYschooldesigns.org*, accessed on May 21, 2013, <http://www.kyschooldesigns.org/index.php>.

Table 31. Documents concerning classroom renovations according to content area (continued)

Topic	Document Content	Source
Art Room Cabinet Space Increase	New design work and additional square footage details	“Comparison of KDE Facilities Requirements Based on Curriculum & Population: New Design Work”
Band Room Square Footage Increase	New design work and additional square footage details	“Comparison of KDE Facilities Requirements Based on Curriculum & Population: New Design Work”

Source: School district documents of school studied and information provided by architect. Kentucky School Designs, “Home,” *KYschooldesigns.org*, accessed on May 21, 2013, <http://www.kyschooldesigns.org/index.php>.

Observations

Before the renovations the layout of the facility was such that it was not feasible for all classrooms to fit the content areas being taught. The band classroom was outside of the main building in a portable unit, the art room did not have a sink, storage cabinets, or a kiln room, the science rooms did not have proper desks, the home economics classroom did not have necessary appliances and kitchens for instruction, and the computer room was not content-specific. Prior to renovations content area classrooms were spread out and not situated in like-subject areas.

During the renovations the above situations mentioned classrooms were altered to accommodate the subjects being taught. While on-site I noted the band classroom inside the main building with additional square footage when compared to its location before. I noted the art room has a sink, storage cabinets, and a kiln room. The science rooms have desks specifically outfitted for science education. The home economics classroom has four kitchens and a variety of other appliances such as a washer, dryer, and dishwasher for student learning. The computer room(s) have desks that allow space for computers, electronic equipment, and sufficient outlets. The exploratory classrooms, those classrooms that are not core-curriculum subjects, are in a separate hallway in the facility as seen in Image 39. Similar subject areas are grouped together and I observed that no classrooms are located outside of the main building.

Image 39. Exploratory hall post renovations



Summary of Classroom Renovations According to Content Area Themes

Concerning the classroom renovations according to content area, noteworthy findings included the additions to the band classroom, art room, home economics room, computer classroom, and science rooms. Prior to the renovations the school facility was unequipped to provide sufficient learning areas according to content.

The renovation process updated the facility, while adding additional classroom space, storage, desks, and appliances for student academics. Collectively, these new facility features greatly improved the ability for the classroom space to be used for content specific purposes.

Summary of Results for Research Question #2

The security, technological readiness, lighting, thermal comfort, and air quality changed from prior to the *Rose* decision and after in the school facility studied. As in all qualitative studies, topics emerged that were unanticipated. In this case study these themes are the auditorium, disabled accessibility, and classrooms built for content area.

Participant interviews, the collection of documentation, and on-site observations were used to determine the findings regarding this research question. Each feature experienced change during the renovation period. The three methods of data collection, interviewing, documentation, and observation allowed for rich description for this question.

Research Sub-Question #3

How has the opportunity for an adequate education been diminished, stayed the same, or improved on the basis of facilities renovation prior to and since the *Rose* decision?

The term *adequacy* is used in the study to mean the fiscal sufficiency to meet a qualitative achievement standard required by the state, either by policy promulgated by its state board of education, or in state statute, rather than a standard of academic achievement.

Student opportunities for an adequate education have improved on the basis of facilities renovation prior to and since the *Rose* decision for various reasons. Participant interviews, the collection of documentation, and on-site observations were used to determine the findings regarding this question. Several aspects of the facility were determined to provide improved opportunities for a student's adequate education in this facility. These facets include technological readiness, lighting, and thermal comfort. Regarding security features and air quality in relation to adequacy, the evidence gathered was inconclusive in these two areas. In addition, further student opportunities for an adequate education have been improved by the facility's auditorium renovations, the addition of disabled accessibility, and classroom renovation according to content area.

Security

Interviews

Regarding security, incidents of violence and trespassing on public school campuses nationwide have elevated the need for public school facility safety and security measures. Security implies freedom from harm and distress.⁵⁷⁴ The term also encompasses measures taken to prevent and respond to harmful or disruptive activities that are dangerous or threatening.⁵⁷⁵

Administrators, teachers, and school staff all mentioned the improvements in this area in the school facility. There was genuine consensus that this feature had been drastically upgraded by the implementation of new equipment and a new networking system that supported it. One teacher went as far as to say security had been improved 100%.⁵⁷⁶ However, no participant specifically mentioned improved security as a feature that enhanced the adequacy of the education.

Although the literature supports the link between security and a more adequate education, these data collected did not provide a conclusive connection between the two, in this school. More data needs to be collected in order to make the association between the two concepts.

⁵⁷⁴ National Center for Education Statistics and the National Cooperative Education Statistics System, "Planning Guide for Maintaining School Facilities."

⁵⁷⁵ U.S. Department of Homeland Security, "Primer: To Design Safe School Projects in Case of Terrorist Attacks and School Shootings."

⁵⁷⁶ "Safety-wise, I feel it is 100% safer structurally than probably the old portion of the building because it was so old. The safety issues are so much better now than they were before." School Staff 13 Interview.

Documents

As seen in Table 10, many documents feature information pertaining to the implementation of security upgrades at the school facility. Correspondences between the district, the security network company, the general contractor, the architect and other sources such as school district invoices and the *KYschooldesigns.org* website provide evidence of the advancements to security. These improvements include the telephone system, intercom system, the security system, landscaping, security cameras, security system cabling, new building interior façade, new telephone sets, the relocation of existing telephone sets, air-lock entrance at the main administration area, all inside locking windows, changes to the administration side in the entrance, and facility door locks.

Observations

My observations made of the school facility following the implementation of the addition of the security features led me to be unable to determine if the opportunity for an adequate education has been improved by these measures. While it is true students have added security, the evidence gathered in the study did not show a clear link between security and students having a better opportunity to receive an adequate education.

Technological Readiness

Interviews

Concerning technological readiness, in the modern digital age, public school facilities are expected to have an up-to-date technological infrastructure. The term *infrastructure* refers to both the technological device and the cabling needed for the device.⁵⁷⁷ As part of the technological preparedness, public school facilities must have systems in place to allow for wide access of internet connectivity. An adequate amount of internet availability is that which allows simultaneous usage by students and educators anywhere in the school building.⁵⁷⁸ In the facility studied, a modern technological infrastructure was present due to renovations. A network system and cabling were put in place that allowed for high speed internet connectivity, wireless networking, and the use of many new technology learning devices for instruction. All students have access to technology in the facility in a way that prior to renovations was not possible. Therefore, as administrators, teachers, and school staff commented, students now have the opportunity for 21st century learning exposure in a way they did not previously, which creates a more adequate learning environment as noted in Table 32.

⁵⁷⁷ National Center for Education Statistics, “Technology in Schools: Suggestions, Tools, and Guidelines for Assessing Technology in Elementary and Secondary Education.”; According to the National Center for Education Statistics, “Devices supporting technology in schools include specialized equipment (such as switches, routers, modems, or codecs) that link computers or video hardware to networks. Infrastructure also refers to cabling, whether wire, fiber optic, or coaxial. In newer systems, links between computers are wireless, in which case infrastructure refers to receivers and transmitters.”

⁵⁷⁸ U.S. Department of Education, “Infrastructure: Access and Enable.”

Table 32. Interviews concerning technological readiness

Theme: Technological Readiness	Supporting Data	Data Source
Increased frequency in taking Accelerated Reader ⁵⁷⁹ tests.	“When they [students] got ready to do their AR tests, they [teachers] send them to the library, now a lot of the rooms have their own computers and that way they can just take the AR test right there. They can stay inside the room and the teachers do not have to worry about going to the library. Sometimes the teachers take some of the students down to the library to look up a reference or something and then the students wants to take the AR test they can’t, because there’s no computers available. Now they have them in the classrooms so they can take their AR test right there.”	Teacher 11 Interview, 05/14/13
Student access to technology	“You [students] were very limited in what you [students] could do in reference to technology.”	Administrator 1 Interview, 05/13/13
	“Now, since the renovations we have so much more technology because the rooms are updated. The biggest thing for the teaching and for the students is the advancement we have in technology in the building.”	School Staff 13 Interview, 05/14/13

Source: Interviews with participants.

⁵⁷⁹ Accelerated Reader (AR) is an educational program owned by Renaissance Learning. A student may take the tests on a computer. Tests are based on the content of books in the library of the school. Students have goals for AR tests that are based on their reading level.

Table 32. Interviews concerning technological readiness (continued)

Theme: Technological Readiness	Supporting Data	Data Source
Student access to technology	“Well every room has a flat screen TV now, which we did not have. And they have the Smartboards in every classrooms and iPads. I mean there was a lot of technology that came in when we did the renovation.”	School Staff 12 Interview, 05/15/13
	“We are top of the line when it comes to technology. We have everything. If we had not renovated this building we would have been able to having these things.”	School Staff 13 Interview, 05/14/13
	“We also have four to five computers in a classroom that kids can access and we have three computer labs. I mean 90 kids could be using computers easily all at one time and you can’t say that with a lot of the schools.”	School Staff 9 Interview, 05/14/13
	“I think one of the biggest thing is I think there's a lot more room for technology in the school, like I remember we didn't have the big screen TVs, we [students] had like the small ones and not everyone could see them in the classroom and we [students] had to watch the Channel 1 News and take quizzes and it made it hard because unless you sat closer to it, you can only see and then you get what you hear, so there's just a lot more technology that the kids have and I think that helps.”	Teacher 17 Interview, 05/15/13

Source: Interview with participants.

Table 32. Interviews concerning technological readiness (continued)

Theme: Technological Readiness	Supporting Data	Data Source
Varied instruction made possible	<p>“I am a math teacher and when I was a math student everything was done on an overhead projector. Now, that we have a Smartboard, we can do things interactively. It’s not just about taking notes; you can get up and do things.”</p>	Teacher 10 Interview, 05/16/13
	<p>“Because of the technology, I think a lot of the teachers were able to, I don’t know, use the technology to better teach, or had more options to teach in different ways. The Smartboard would enable teachers to write still up on the big screen where the kids could look at it and write it down; instead of passing out papers or writing it on the board.”</p>	School Staff 12 Interview, 05/14/13

Source: Interviews with participants.

Documents

As seen in Table 13, many documents include material pertaining to the application of technological readiness upgrades at the school facility. Communications from the contractor to the school district, a networking company, and architect all provide evidence the following was added to the technological readiness of the building: Inside building network and cabling system and video distribution system design, TV brackets and projection screens, cables in classrooms and office, project management for installation of Smartboards, television monitors, and DVD players, wiring for computers in classrooms, cabling and wiring for computer networking, data cabling, and high speed internet connectivity.

Observations

My observations led me to determine the opportunity for an adequate education students have regarding technological readiness in this school has improved since the *Rose* decision and renovations. The school facility had many technological upgrades unavailable prior to renovations. Smartboards in every classroom, wireless internet, high speed connectivity, computers in each classroom, three computer labs, computers in the library, overhead projectors in every classroom, and flat screen televisions in every classroom make the technological resources available to students striking when compared to what they previously had. Students had fewer computers to use, slow internet, and none of the other items mentioned above. Post renovations, teachers are able to deliver instruction in a variety of ways not present previously. These additional instructional tools offer students multiple ways to learn. Students are also better prepared for the technological age of the 21st century, as they are able to experience and become familiar with technology in a way they could not before. Since an adequate education now demands familiarity and comfort with the use of a variety of internet-connected computing devices, the students at this school have now much greater opportunity to achieve that education.

Lighting

Interviews

Lighting issues are a significant concern in public school facility design. In the study conducted by Barrett et al. (2013), it was found to impact the learning rates of primary school students.⁵⁸⁰ The quantity of light needed by students in schools is not in question; however, the type and quality of light is under inquiry.⁵⁸¹ Researchers link student performance to sufficient lighting. Kuller and Lindsten's (1992) study found that students lacking access to natural light demonstrated diminished cortisol levels, potentially leading to decreased concentration abilities.⁵⁸² There is a dramatic improvement in lighting in this school facility presently when compared prior to renovations. There is more natural lighting and more overhead lighting. Bright paints line the hallways, allowing for the natural light to permeate the facility. Therefore, as administrators, teachers, and school staff commented, students now have the opportunity to learn in a more illuminated academic environment, without learning barriers created by a poorly-lit learning space as noted in Table 33.

⁵⁸⁰ Peter Barrett, et al., "A Holistic, Multi-level Analysis Identifying the Impact of Classroom Design on Pupils' Learning".

⁵⁸¹ Baker and Bernstein, "The Impact of School Buildings on Student Health and Performance: A Call for Research."

⁵⁸² Küller and Lindsten, "Health and Behavior of Children in Classrooms With and Without Windows," 305-317.

Table 33. Interviews concerning lighting

Theme: Lighting Before Renovations	Supporting Data	Data Source
Classroom Lighting	“It was like a dungeon in your classroom.”	Teacher 5 Interview, 05/14/13
Building light	“Basically, it is much more, there is a design, a lot of light in there.”	Administrator 1 Interview, 05/13/13
	“It is cleaner, brighter, and more inviting.”	School Staff 13 Interview, 05/14/13
Bright Paint Colors	“When they did the colors at first, everyone was like wow, but from our understanding it was done to promote different ways of learning and moods. The classrooms have certain colors to promote a more soothing, calm area. It is 100% better place than it was.”	School Staff 13 Interview, 05/14/13

Source: Interviews with participants.

Documents

As seen in Table 16, many documents contain details relating to the employment of lighting improvements at the school facility. Messages between the district and architect provide evidence these advancements in lighting occurred. Communication content included natural daylight, the replacement of all windows, light paint colors added, and new fluorescent overhead lighting added.

Observations

On-site observations led to the determination that students have improved opportunities for an adequate education due to lighting improvements in this school facility since the *Rose* decision and renovations. The facility has many lighting modernizations when compared prior to renovations. Before the remodeling, lighting was blocked in the classrooms due to window air conditioning units, the quality of overhead lighting was lacking, and dark paints lined the hallways and classrooms. This situation gave the building a gloomy appearance and made it more difficult for students to view their school work and remain alert. Since the remodeling the hallways and classrooms are brighter due to the removal of classroom window air conditioning units, repainting the building using bright paints, the replacement of all windows, and the addition of new overhead fluorescent lighting. Post renovations, students receive a more adequate education in that their school no longer has lighting deficiencies. They are able to better see their school work and stay alert due to higher-quality lighting in the learning environment.

Thermal Comfort

Interviews

Regarding thermal comfort, this term relates to the suitable heating or cooling of a public school facility. Research has yielded results that indicate that slight temperature variations can affect student performance.⁵⁸³ Harner (1974) found that the best temperature range for learning reading and math is 68°F to 74°F and that the ability to learn the subject is adversely affected by temperatures above 74°F.⁵⁸⁴ Chan (1980) came to the conclusion from the results in his study that a significant relationship exists between students in air conditioned public school facilities and higher academic achievement.⁵⁸⁵ Students in the facility studied have central air conditioning and heating due to school renovations. Before the addition of the HVAC unit, the school facility did not have a consistent temperature range. Students were often cold in the winter months and hot in the spring/summer months due to lack of a central thermal unit. The renovations allowed students to learn in a comfortable academic setting with consistent heat in the winter and air conditioning in the spring/summer. Therefore, as administrators, teachers, and school staff commented, students now have the opportunity to be in a thermally appropriate academic environment, which creates a learning space that is more adequate by eliminating the distractions to learning of temperature extremes (Table 34).

⁵⁸³ Baker and Bernstein, "The Impact of School Buildings on Student Health and Performance: A Call for Research."

⁵⁸⁴ Harner, "Effects of Thermal Environment on Learning Skills," 4-6.

⁵⁸⁵ Chan, "Physical Environment and Middle Grade Achievement."

Table 34. Interviews concerning thermal comfort

Theme: Thermal Comfort	Supporting Data	Data Source
Classroom Temperature	“It would affect the band being an outside classroom because it did not have as much as the control air as the school building then, so I remember it would affect the instruments being if you’re playing on it, like in the winter and its cold, first is when it starts to get warm and like around now where it would be hotter in there, so that would affect our instruments and how they played.”	Teacher 17 Interview, 05/17/13
Window Units	“I don’t have to worry about the air conditioner screaming in my ear because we had all wind air conditioning units while I am teaching.”	Teacher 5 Interview, 05/14/13
	“We do not have to listen to window air-conditioning units anymore.”	Teacher 6 Interview, 05/14/05
Heating, Ventilation, & Air Conditioning Unit (HVAC) installed	“We have central air and central heat.”	Teacher 7 Interview, 05/14/05
	“Everything is air-conditioned now. It is cool in the summer and warm in the winter now.”	School Staff 13 Interview, 05/15/05

Source: Interviews with participants.

Documents

As seen in Table 19, many documents encompass information concerning the application of thermal comfort modernizations at the school facility. Correspondences between the district and the architect demonstrate proof improvements to thermal comfort occurred. The following items were added to the facility: a Heating, Ventilation, & Air Conditioning (HVAC) unit, the new The new mechanical systems have Direct Digital Controls (DDC), and the setting of a fixed range of school and classroom temperature.

Observations

Facility observations assisted me in deciding that students have improved opportunities for an adequate education regarding thermal comfort in this facility since the *Rose* decision and renovations. The improvements made in this area directly impact students. Students are now better able to concentrate and focus on their work instead of being hot in the spring and cool in the winter due to unpredictable heating and air. The installation of the Heating, Ventilation, & Air Conditioning (HVAC) unit improved the consistency of school temperature. In addition, students are better able to hear their teacher during class interaction. Before the removal of the window air conditioning units students may have missed their teacher's instruction. Improved opportunities for adequacy include having thermal comfort in their learning environment and sufficiently hearing the instructions given by the teacher.

Air Quality

Interviews

Air quality is commonly assessed when examining the condition of a public school facility. Shaughnessy et al. assessed the relationship between indoor air quality and student achievement in public school facilities.⁵⁸⁶ The researchers concluded a significant relationship existed between classroom-level ventilation rate and student achievement.⁵⁸⁷

There are contaminants found in air such as mold, bacteria, and volatile organic compounds (VOCs) which evaporate easily at room temperature.⁵⁸⁸ The microorganisms and VOCs have been linked to respiratory issues, visual ailments, and memory deficiencies.⁵⁸⁹ Mold has been associated with respiratory sickness and asthma.⁵⁹⁰ These air pollutants contribute to student illness and absenteeism.⁵⁹¹ Smedje and Norback (1999) determined that in affected children a connection exists between airborne bacteria and mold to asthma which fostered an increase in student absentee rates.⁵⁹²

Proper air ventilation prevents the build-up of these toxins in the public school facility. Since ventilation removes and or dilutes the pollutants, proper implementation

⁵⁸⁶ Shaughnessy, et al., "A Preliminary Study on the Association Between Ventilation Rates in Classrooms and Student Performance."

⁵⁸⁷ Ibid.

⁵⁸⁸ Baker and Bernstein, "The Impact of School Buildings on Student Health and Performance: A Call for Research."

⁵⁸⁹ Ibid.

⁵⁹⁰ Ibid.

⁵⁹¹ Schneider, "Do School Facilities Affect Academic Outcomes?"; Holland, "Heath Wise," 21-22.

⁵⁹² Smedje and Norback, "The School Environment: Is it Related to the Incidence of Asthma in the Pupils?"

of it is vital, particularly since children bring in a larger volume of air in relation to their body weight than adults.⁵⁹³

Air quality conditions at the school studied improved greatly as a result of the renovations. This was due to the installation of a central air and heat system, improved facility ventilation, the addition of facility filters, the use of low VOC paint, replacement of chalkboard with whiteboards, and new carbon monoxide detector. Only a couple of participants commented on the change in air quality and the improvements made since renovations. Prior to renovations the building did not have central air and heat. There was no ventilation system, and dusty chalkboards were still being used. However, no participant mentioned improved air quality as a feature that enhanced the adequacy of the education. Although the literature supports the connection between air quality and adequacy, the evidence collected in this study did not provide a direct link between air quality and a students receiving a more adequate education. More evidence needs to be collected in order to make the connection.

Documents

As seen in Table 22, many documents include material regarding the employment of air quality upgrades at the school facility. Communications between the district and the architect and other sources such as school district facility documents and the *KYschooldesigns.org* website provided provide evidence these advancements took place. The papers provided proof the following items were added to the facility to assist in air quality: a Heating, Ventilation, & Air Conditioning (HVAC) unit, HVAC vents, HVAC

⁵⁹³ Schneider, "Do School Facilities Affect Academic Outcomes?," 2.; National Resources Defense Council, "Our Children At Risk: The Five Worst Environmental Threats to Their Health." .

filters, low Volatile Organic Compound (VOCs) paints, water source heat pumps with direct digital controls, facility ventilation, whiteboards, and carbon monoxide detectors.

Observations

On-site observations led me to be unable to determine if students have improved opportunities for an adequate education as a result of concerning air quality improvements in this school facility since the *Rose* decision and renovations. While it is apparent the facility has many air quality improvements when compared prior to renovations, the evidence collected in the study did not indicate a link between air quality and students having a better opportunity to receive an adequate education.

Additional Student Opportunities

There are other areas relating to the school renovations that have improved the opportunity for an adequate education since the *Rose* decision in the school studied. Improved aspects include the use of the remaining Works Progress Administration (WPA) auditorium, disability accessibility, and classrooms built for content.

Auditorium

Interviews

Regarding the auditorium, it was part of the original construction and built in 1937. It was built as part of the Works Progress Administration (WPA).⁵⁹⁴ During the renovation planning process, it was determined it would not be feasible to build another auditorium should the community decide to build another school to replace the one studied instead of renovating it. Therefore, the administrators, teachers, and school staff decided that was

⁵⁹⁴ Works Project Administration (WPA) was part of the New Deal under President Franklin D. Roosevelt. It was an agency that employed millions of people to construct public works projects. These projects included public schools, public buildings, and roads. Mary McLaren, Jennifer Bartlett, and Angelia Pulley, "WPA: An Important Chapter in U.S. and Kentucky History," *Library Presentations*, accessed, July 10, 2013, http://uknowledge.uky.edu/libraries_present/32.

in the students' best interest to renovate the existing facility instead of building a new facility in another location. The students currently use the auditorium for school-wide events such as talent shows, band/choral events, 8th grade graduation, among other significant events. The students would have lost the opportunity to use this facility had the school been replaced rather than renovated. Therefore, as study participants commented, students have the opportunity to remain in a renovated learning facility with access to an auditorium, which creates a more adequate education for students as noted in Table 35.

Table 35. Interviews concerning the auditorium

Theme: Auditorium	Supporting Data	Data Source
Studio	“And we have our own studio where they... we also have a projector screen in the auditorium. On award days they can watch movies or special presentations of speakers here or something like that.”	School Staff 11 Interview, 05/14/13
Keeping the Auditorium	“Also [people in the school system] they were concerned with losing things like an auditorium that new funding would probably not be available for. And they had an existing auditorium as well as the gym. So they felt like they could save money by staying there and just refurbish the auditorium and gym and not have to build a new one.”	Administrator 2 Interview, 05/14/13

Source: Interviews with participants.

Documents

Documents pertaining to the renovation of the auditorium were located at the district board of education (Table 25). These documents include invoices for new auditorium seating, carpet, paint, and acoustic panels.⁵⁹⁵ New security cameras added to the building and carbon monoxide detectors were also part of the auditorium’s renovation.

Observations

Access to an auditorium offers students an improved opportunity for an adequate education. Should the school have been rebuilt in another location, the students would have lost the chance to have this space. While making on-site observations of the

⁵⁹⁵ District invoice from architect.

building, I noticed the auditorium has an orchestra pit for the school musicians to play, a studio room above the auditorium for students to learn about stage lighting and sound, and the 8th grade held their graduation in the auditorium while I was on-site. These are opportunities for learning that provide students with a more adequate education.

Disabled Accessibility

Interviews

Concerning handicap accessibility, this is a necessary consideration when examining school facilities. Under Section 504 of the United States Rehabilitation Act of 1973 and the 1990 Americans with Disabilities Act, the rights of students with handicaps are protected.⁵⁹⁶ Part of these acts prohibits discrimination against those with disabilities. Prior to renovations there was not a handicap elevator to assist students getting up and down stairs. Students relied on faculty assistance. An administrator stated, “handicap accessibility was a high priority” during the renovation process.⁵⁹⁷ This sense of importance included the addition of the elevator as well as making certain school restrooms were handicap accessible. Disabled access allows these students the same independent physical opportunities as other students, therefore making their education more adequate than before the renovations. Therefore, disabled students are now educated in an academic atmosphere with more opportunities, which creates a more productive and adequate learning environment for those students as noted in Table 36.

⁵⁹⁶ U.S. Department of Education, “Office for Civil Rights: Protecting Students with Disabilities,” *Ed.gov*, accessed May 30, 2013, <http://www2.ed.gov/about/offices/list/ocr/504faq.html>.

⁵⁹⁷ Interview with administrator.

Table 36. Interviews concerning disabled accessibility

Theme: Disabled Accessibility	Supporting Data	Data Source
Disabled Accessibility was a Priority	“Handicap accessibility was a high priority.”	Administrator 1 Interview, 5/13/13
Elevator	“We did not have [prior to renovations] an elevator in our building. By law they had to put an elevator in.”	School Staff 14 Interview, 05/16/05

Source: Interviews with participants.

Documents

A document concerning the addition of a disabled accessible elevator during facility renovations was located at the district board of education (Table 28). This was a district internal document outlining the contractor, type of submittal required, and approval status.⁵⁹⁸ The installation of a new elevator during renovations was submitted and approved by the district.

Observations

Disabled access in a school facility offers physically challenged students an improved opportunity for an adequate education. During my on-site observations, I noted the addition of the elevator and upgraded restrooms facilities for the disabled. Before renovations these students required additional assistance to get up and down the stairs and when using the restroom facilities. Disabled access allows these students the same independent physical opportunities as other students, therefore making their education more adequate than before the renovations.

⁵⁹⁸ District internal document.

Classroom Renovations According to Content Area

Interviews

Pertaining to classrooms built for content area, there is limited research discussing this topic as it relates to student academics. However, teachers mentioned the effect the lack of content specific classrooms had on student learning in the facility studied. Prior to renovations the classrooms were not built for the content being taught, so in many situation students did not have access to a proper work space, depending on the class. For example, the home economics room did not have kitchens, the art room did not have a kiln, sinks, or supply storage, the science room did not have science desks, equipment outlets, and emergency shower, and the band room lacked sufficient square footage for students and their instruments. After the renovations all of the above items were added, along with more classroom square footage. Renovations of these classroom spaces provided students the opportunity to learn a subject in a room constructed for the course being taught. The renovations allowed students to receive a total learning experience in the content area, thus delivering more learning opportunities for students. Therefore, as teachers commented, students are now experiencing improved educational adequacy since they are learning in classrooms that have optimal characteristics needed for the content area as noted in Table 37.

Table 37. Interviews concerning classroom renovations according to content area

Theme: Classroom Renovations According to Content Area	Supporting Data	Data Source
Band Room	“What I have heard being talked about is the band program was in the portable classrooms and trailers outside. They did not even have their own classroom. The condition of the building was not good.”	Administrator 2 Interview, 05/14/13
Home Economics Classroom	“...[the] home economics teacher had a classroom which was with 4 walls and 30 desks, they have renovated and now [we] have 4 kitchens so that has changed.”	Teacher 15 Interview, 05/15/13
Art Room	“We have an art room now. We did not have an art room before. It was so everything that we had before the renovations and the new building was four walls. All classrooms were four walls. I was in four walls. He [the computer teacher] was basically in four walls with computers stuffed in there. Now we have rooms designed for actually with what the content is. So we have a new art room that has water in it. There is a kiln room.”	Teacher 15 Interview, 05/15/13
Disconfirming Evidence	“There are computer hookups and they're right beside the sinks and I'm going, it just really doesn't make a lot of sense and then there are other places where you need hookups that they're not there and part of that are just probably results of it being the old building that they renovated. It didn't lend itself really well to being updated and getting those things where they needed to be.”	Teacher 8 Interview, 05/15/13

Source: Interviews with participants.

Table 37. Interviews concerning classroom renovations according to content area (continued)

Theme: Classroom Renovations According to Content Area	Supporting Data	Data Source
Computer Labs	“And [the computer labs] went from computers in a regular sized classroom to now a larger classroom where there is more room. You could barely get up down the aisles before so the size has helped that a lot.”	Teacher 16 Interview, 05/15/13
Science Rooms	“Well the science teachers, they have really nice setups with the cabinets and the emergency shower and all that kind of stuff.”	Teacher 16 Interview, 05/15/13

Source: Interviews with participants.

Documents

Documents regarding the renovation of classrooms specifically aligned with the content area being taught were located at the district board of education (Table 31). These internal district documents included orders for science room equipment, science room tables, home economics ranges, dishwashers, refrigerators, four kitchen stations, art room square footage increase, cabinets, and increase in band room square footage.⁵⁹⁹

Observations

Content specific classrooms made possible by school facility renovations allowed students an improved opportunity for an adequate education. During my on-site visit, I toured classrooms and made many observations regarding the conditions of the classrooms. I noted the home economics room contained 4 ovens, 4 stoves, 4 sinks, 4

⁵⁹⁹ District internal documents.

microwaves, washer and dryer. I found the art room to have a kiln room, sink, storage cabinets, and storage closets for paper and art supplies. The science rooms have counter space for experiments, sinks, and cabinets for equipment storage. The band room, now located inside the building contained a large center room for orchestra style practice, separate practice rooms on the side, and storage rooms for extra instruments. The renovations of these classroom spaces provided students the opportunity to learn a subject in a room constructed for the course being taught. Before renovations these students were not receiving the total learning experience in the content area. Therefore, they were lacking opportunities for an adequate education. The renovations provided these classroom spaces with the characteristics necessary for students to have an optimal learning experience.

Summary of Results for Research Question #3

The opportunity for an adequate education has been improved on the basis of facilities renovation prior to and since the *Rose* decision in the school facility studied in regards to technological readiness, lighting, and thermal comfort, the facility's auditorium renovations, added disabled accessibility, and classroom renovations according to content area. Participant interviews, the collection of documentation, and on-site observations were used to determine the findings regarding this research question. The evidence concerning security features and air quality upgrades did not provide a direct relationship which afforded enhanced opportunities for a student's adequate education in this facility.

CHAPTER 5: SUMMARY, FINDINGS, AND CONCLUSIONS

Introduction

The decision in the 1989 landmark Kentucky case, *Rose v. Council for Better Education*, initiated many reforms to ensure that children have access to an adequate education, including funding new construction and renovations for school facilities.⁶⁰⁰ As a result of the case, the legislature restructured the public education funding formula and provided more revenue for public school facilities.⁶⁰¹ The court's ruling led to the creation of the Kentucky Education Reform Act (KERA). The statute called for reform of the Kentucky educational system. In addition to funding, the legislature in 2010 mandated under the Kentucky Facilities and Inventory Classification System (KFICS) an assessment of school facilities based on the three criteria of technology, suitability, and physical condition.⁶⁰² Scored evaluations of public school facilities in Kentucky based on these measurements resulted in a number of schools receiving relatively low scores, leading to renovations and the rebuilding of public schools facilities.⁶⁰³ How fiscal

⁶⁰⁰ Kentucky Legislative Research Commission, "Kentucky Revised State Statute, 157.310."

⁶⁰¹ Ibid.

⁶⁰² Kentucky Legislative Research Commission, "Kentucky Legislature: KRS 157.420."

⁶⁰³ Kentucky Department of Education, "Facilities Inventory & Classification System Kentucky School Score Report," accessed October 22, 2012, <http://education.ky.gov/districts/fac/Documents/KFICS%20State%20Report%20School%20List%20by%20District%20School%202.pdf>.

adequacy is expressed in the public school facilities was determined by physical examination of five features found in the public school facilities of regular elementary or middle schools in one representative Kentucky school district. When examined together, I made the assumption that these five features are indicators of adequacy. To date, these findings are largely quantitative, focused on an economic model of decision-making, and therefore, narrowly focused on architectural features. Often the information is gathered in checklist format. A more in-depth qualitatively-focused investigation that addresses *how* the facility renovation based on five features (security, technological readiness, lighting, thermal comfort, and air quality) affected the educators' and others' perceptions of the provision of an adequate education was necessary. This study offers a specific and detailed examination of the perceptions of educational professionals. The data gathered through this process provides an account of the experiences and impressions of educators working in the school.

Problem and Method

One of the outcomes of *Rose v. Council for Better Education* and the finance reforms was an increase in funding for facility renovations of regular public elementary and middle schools.⁶⁰⁴ A prudent question exists in the aftermath of the funding of these renovations: Has receiving additional school facility funding improved the likelihood that students will receive an adequate education when compared to prior funding levels? Other states may use Kentucky's model for future finance reform. Thus it is vital to explore beyond the history and discover if the revised funding formula resulting in facilities scoring relatively low on the *Kentucky School Report* has contributed to the

⁶⁰⁴ Most K-12 public school facilities were renovated, thus these renovations were not limited to regular elementary and middle. This study focused on regular elementary and middle schools.

provision of an adequate education. Outside observers have concluded the money added to facilities stemming from the finance reforms does make an adequate public educational environment.⁶⁰⁵ However, researchers have not taken a physical examination of a public school facility in Kentucky to decide if the visual evidence, interviews, and archival documents support this conclusion. A physical examination of the five specific features in the public school facilities including security, thermal comfort, lighting, technological infrastructure, and air quality were used to determine if receiving additional school facility funding improved the likelihood that students will receive an adequate education when compared to prior funding levels.

In this research five features found in the public school facilities of a purposefully selected school in one Kentucky public school district have been examined to describe how the additional school facility funding post-*Rose* affected the provision of an adequate education when compared to these features in the facility prior to the renovations.

The assessment process of the public school facilities in Kentucky are a direct result of the case, *Rose v. Council for Better Education*, which upheld the state constitution's mandate that every child receive an efficient and adequate education. Legislation enacted as a result of the verdict in the case led to the amendment of Kentucky State Statute 157.⁶⁰⁶ In efforts to uphold adequacy as prescribed by the case, this amendment outlined the process for evaluating and the three areas to assess in the public school facilities. These areas include the physical state, educational appropriateness, and technological

⁶⁰⁵ Schrag, *Final Test: The Battle for Adequacy in America's Schools*, 93-94.

⁶⁰⁶ Kentucky Legislative Research Commission, "Kentucky Legislature: KRS 157.420."

preparedness of the schools as they relate to state standards and guidelines.⁶⁰⁷ Five of these facets included in these three categories to determine the weighted-score of each public regular elementary or middle school were security, thermal comfort, lighting, technological infrastructure, and air quality. Studying the current renovated status of these elements in the regular public school facilities determines how the additional funding for Kentucky public school facilities scoring relatively low on the *Kentucky School Score Report* has contributed to the improvement and provision of an adequate education. When examined together, these five elements may be considered to be indicators of adequacy from the educators' point of view.

This case study was based on a purposefully selected public school district in the state of Kentucky from a pool of districts that exhibited relatively low scores on the *Kentucky School Score Report*. Data collection for the case study included interviews, document review, and a site observation. During the interview process, nineteen study participants, including administrators, teachers, and school staff were asked a series of eight questions (Appendix G). The researcher transcribed the audio recordings from the interviews into a transcript. Phrases in these transcripts were then coded in a holistic manner.⁶⁰⁸ The predetermined codes arise out of the research question, however, emerging codes stemming from the respondent narrative were also included. Themes emerged out of the codes.

⁶⁰⁷ Kentucky Department of Education, "Facilities Assessment Project."

⁶⁰⁸ Saldana, *The Coding Manual for Qualitative Researchers*. "A code in qualitative inquiry is most often a word or short phrase that symbolically assigns a summative, salient, essence-capturing, and/or evocative attribute for a portion of language-based or visual data." (p. 4) Holistic coding is the attempt to identify themes as a whole in the entire passage rather than assigning codes in a line by line fashion in a transcript, (p. 142).

Documents gathered during this phase included contemporaneous renovation plans and school site maps. The facilities administration department of the school district of the case study housed the documents for renovated schools. While conducting the case study in the district, these documents were reviewed.

On-site visits were made by the researcher and included observations of classrooms without students present, the facility interior, and the facility exterior. Photographs were taken of the facility. Field notes were taken to record what the researcher experienced and witnessed at the study site.⁶⁰⁹ The information in the notes recorded included anonymously the person(s) present, where the observation occurred, what the environment was like, the social exchanges that took place, and what events happened.⁶¹⁰ The researcher coded the field notes in a holistic manner.

The use of the various data collection methods allowed for triangulation of the data. This process involves the corroboration of codes and their resultant themes across multiple sources of data before the concept can be considered a finding of the study. Themes emerged from the participant's interviews and observations. These findings were used to determine how the Kentucky method has been a productive strategy yielding positive results for public school facilities by contributing to what the state determined to be necessary for public school students to receive an adequate education.

⁶⁰⁹ Patton, *Qualitative Evaluation and Research Methods*.

⁶¹⁰ Ibid.

Research Questions

As a result of the *Rose v. Council for Better Education* case, the Kentucky legislature changed the state public school finance formula in order to create an equitable and adequate educational system. Public school facilities received more money than previously allocated prior to the case in order to meet the adequacy standard. An unresolved question is how has the additional funding for Kentucky public school facilities scoring relatively low on the *Kentucky School Score Report* affected the provision of an adequate education? This qualitative case study has one overall research question and three sub-questions:

How did the additional facilities funding since the *Rose* decision for a Kentucky public school affect the provision of an adequate education?

1. What is the history of the school facility and its community?
2. How did the security, technological readiness, lighting, thermal comfort and air quality change from prior to the *Rose* decision and after in this school?
3. How has the opportunity for an adequate education been diminished, stayed the same, or improved on the basis of facilities renovation prior to and since the *Rose* decision?

Findings and Data Analysis

Question one addresses the history of the school facility and its community. The school facility in the case study was built in 1937, added onto in 1962, and renovated most recently in 2007. The original WPA auditorium and gymnasium remain in renovated form. The current school population is diverse with five ethnicities represented.

The community surrounding the school has experienced changes since the building was first built. It is no longer the center of population in the town. However, it has remained a community-centered school with students living in close proximity. The community also utilizes the school facilities and has a sense of pride for the school.

Question two addresses how did the security, technological readiness, lighting, thermal comfort, and air quality change from prior to the *Rose* decision and after in this school? The security, technological readiness, lighting, thermal comfort, and air quality changed from prior to the *Rose* decision and after in the school facility studied. As in all qualitative studies, topics emerged that were unanticipated. In this case, these themes include the auditorium, disabled accessibility, and classrooms built for content area. These were additional areas that experienced changes in the facility due to renovations.

Question three addresses how has the opportunity for an adequate education been diminished, stayed the same, or improved on the basis of facilities renovation prior to and since the *Rose* decision? The opportunity for an adequate education has been improved on the basis of facilities renovation prior to and since the *Rose* decision in the school facility studied in regards to technological readiness, lighting, and thermal comfort, the facility's auditorium renovations, added disabled accessibility, and classroom renovations

according to content area. These were areas that were significantly upgraded to allow for more the improved opportunity of students to receive an adequate education in the facility. The evidence concerning security features and air quality upgrades did not provide a direct relationship to afford enhanced opportunities for a student's adequate education in this facility. More data is necessary to demonstrate a relationship.

Conclusions

The additional facilities funding since the *Rose* decision for a selected Kentucky public school affected the provision of an adequate education by creating a more adequate learning environment for students as outlined in the principles of the case.⁶¹¹ The case study site was in a community with needs due to its geographic location in a less affluent county and the poor conditions of the public school facility. The Kentucky Department of Education policies recognized this and funded the renovations. These renovations of the facility studied increased student opportunities, thus provided students with a more adequate education than prior to renovations. Specifically, six areas of improvement were found, including technological readiness, lighting, thermal comfort, and the facility's auditorium renovations, added disabled accessibility, and classroom renovations according to content area.

Regarding security, actions taken during renovations that added security features to this facility have produced a more secure learning environment for students. Although the literature supports the link between security and a more adequate education, the data

⁶¹¹ Specifically, Principles 7, 8, and 9 that derived out of *Rose v. Council for Better Education* speak to the issue of adequacy. The Principles read, "(7) The premise for the existence of common schools is that all children in Kentucky have a constitutional right to an adequate education.; 8) The General Assembly shall provide funding which is sufficient to provide each child in Kentucky an adequate education.; 9) An adequate education is one which has as its goal the development of the seven capacities recited previously." *Rose v. Council for Better Education*, 790 S.W.2d. 186 (Ky. 1989).

collected did not provide a conclusive connection between the two in this case. More data needs to be collected in order to make the association between these two concepts. It is important to note that the facility in the study had many security features added in 2007 that districts across the country are attempting to add today. The school renovations added security features that placed the facility ahead of its peers at a national level.

Concerning technological readiness in the facility studied, a modern technological infrastructure was added during renovations. A network system and cabling were put in place allowing high speed internet connectivity, wireless networking, and the use of many new technology instructional learning devices. Every student has access to technology in the facility which was not possible prior to renovations. I was surprised at the level of technological upgrades that were put in place given that the time of renovations was the year 2007. With current technology norms, I would anticipate these additions being present in a school being renovated today; however, the case study school was renovated six years ago. Regarding technological readiness, this school has been well prepared before the norm. Therefore, more opportunities for an adequate education have been created by the forward-thinking renovations.

In regard to lighting, vast improvements have been made in the facility when compared prior to renovations. More natural light and additional more overhead lighting were made possible by the remodeling. The bright painted hallways and classrooms let the flow of natural light to permeate the facility. Students have more opportunity to learn in a better illuminated academic environment, thereby enhancing the adequacy of their education. I was surprised by the expanse of the windows and at how the bright color scheme of the building improved the interior lighting. The classroom spaces are bright

with natural lighting, highlighting the architect's emphasis on keeping and expanding the natural light during the facility's renovation.

Concerning thermal comfort, students in the facility studied have central air conditioning and heating due to school renovations. This current status is unlike before the renovations when the facility did not have central air and heat and a consistent temperature range. One teacher expressed frustration with not being able to control the classroom temperature. However, in taken as a whole, the comfort of the school facility has greatly with the renovations when compared to previously. The majority of administrators, teachers, and school staff recognized the improved in this area. Students now have an opportunity to learn in a comfortable environment, which is part of receiving an adequate education.

Pertaining to air quality at the school studied, the conditions were lacking prior to renovations when compared to after the renovations. There was no central air and heat and no ventilation or air filtration system. Low VOC paint was not used, dusty chalkboards were in all classrooms, and no carbon monoxide detectors were in use anywhere in the entire facility. The employment of all of the above features at the time of renovations greatly enhanced the facility air quality. I was impressed with the thought that went into choosing the correct details for the renovations, including low VOC paints for student health. Many public buildings today are without carbon monoxide detectors, yet in 2007 this school added them. This fact offers another example of how the school facility renovation was ahead of its time. However, the evidence collected in this study did not provide a direct link between air quality and students receiving a more adequate education. More evidence needs to be collected in order to make the connection.

Concerning the WPA auditorium, the renovations allowed for the students to keep their auditorium, which they currently use for school-wide events such as talent shows, band/choral events, 8th grade graduation. Students would have been unable to have access to an auditorium had the school not been renovated and the auditorium restored. Thus, the renovations enhanced the adequacy of their education by maintaining auditorium access.

Regarding disabled accessibility, this is a necessary element in school facilities. Prior to renovations the school facility studied did not have a way to independently allow disabled students to go up or down stairs. The addition of the elevator placed in the facility during renovations affords these students the same independent physical opportunities as other students, therefore making their education more adequate than before the renovations.

Pertaining to classrooms being built according to content area, renovations altered the situation at this school facility. Prior to renovations the classrooms were not built for the content being taught, resulting in students not having access to an appropriate work space. I was taken aback at the thought that the students went as long as they did without an art room and kitchens in the home economics room. The lack of appropriate content area space for learning was not ideal for student learning. Renovations of these classroom spaces gave students the chance to learn a subject in a classroom built for the course being taught. Students were provided with the total learning experience in the content area due to remodeling, thus delivering greater learning opportunities. Students are now experiencing an adequate education being taught in classrooms containing characteristics necessary for optimum learning for each content area.

Overall, the renovations made in this facility due to funding resulted in a more adequate education for students in six of the eight features studied. These six areas of improvement include technological readiness, lighting, thermal comfort, the facility's auditorium renovations, added disabled accessibility, and classroom renovations according to content area. These enhancements added to the educational opportunities afforded to the students, which would not have been made possible without funding for facilities.

The renovations made to the facility were state of the art. However, the state should not rest on its laurels; adequacy is a moving target. What is considered necessary to provide an adequate education today may differ tomorrow. Teachers interviewed mentioned that since the 2007 renovations the case study school had not been revisited for further upgrades.⁶¹² The needs of students evolve with the changing society, so districts in the state of Kentucky will continue to need money to maintain adequacy for their students. Vigilance is necessary to maintain adequacy in school facilities yearly since what is adequate this year may not be so next year.

Implications

The results of the study imply the school facility funding as a result of the *Rose* decision has created an adequate education for students in a facility that previously might have delivered an inadequate educational experience. School administrators and policy makers can use additional funding to this aim in a similarly-situated school and be satisfied that the funding will advance adequacy in most areas. The school site of the case study, school district, and community are similar to many other rural towns across the United States. The changing economy of similarly-situated communities across the

⁶¹² Interview with teachers.

country has made it difficult for the public school districts to fund public school facility renovations. These towns, once located in the wealthiest regions in their states, have experience great economic challenges, with the result being that many schools in other states also have critical facility needs. Money spent on facility renovations made a difference in the case study school; in similar fashion, additional funding for facility renovation could make a difference in many other schools in similar communities across the United States.

Recommendation for Future Studies

Future studies that address security and air quality as they relate to a student's opportunity for an adequate education should be considered. The findings in this study were inconclusive regarding the effects of security and air quality on adequacy. Therefore, a study that further addresses these topics in the following manner is recommended. 1) Regarding security, a study addressing the students' and educators' perceptions of the learning environment prior to and after renovations in a public school facility is suggested. Interviews with students and educators concerning students' feelings of security and safety in the learning environment before and after renovations, the gathering of data including behavior incidents, and field observations of the facility after renovations will clarify whether facility security renovations have diminished, not affected, or improved a student's opportunity for an adequate education. 2) Concerning air quality, a study addressing the students' and educators' perceptions of the learning environment prior to and after renovations in a public school facility is encouraged. Interviews with students and educators concerning students' comfort level in the learning environment before and after renovations, the gathering of data including student

absentee rates, and field observations of the facility after renovations will shed more light on whether facility air quality renovations have diminished, not affected, or improved a student's opportunity for an adequate education.

REFERENCES

- 111th U.S. Congress. "American Recovery and Reinvestment Act of 2009." 123 STAT. 115. Accessed on November 30, 2012. <http://www.gpo.gov/fdsys/pkg/BILLS-111hr1enr/pdf/BILLS-111hr1enr.pdf>.
- Abbott v. Burke*, 100 N.J. 269 (1985).
- Adams, Jacob E. "School Finance Reform and Systemic School Change: Reconstituting Kentucky's Public Schools." *J. Educ. Fin.* 18, (1993): 318-345.
- Al-Enezi, Mutlaq M. "A Study of the Relationship between School Building Conditions and Academic Achievement of Twelfth-Grade Students in Kuwaiti Public High School." Doctoral dissertation, Virginia Polytechnic University, 2002.
- Appalachian Heritage Alliance. "Governor Bert T. Combs Statue Project." Accessed October 10, 2012. <http://www.appalachianheritagealliance.org/bertcombs.html>.
- Baker, Lindsay, and Harvey Bernstein. "The Impact of School Buildings on Student Health and Performance: A Call for Research." *McGraw-Hill Construction Research Foundation and the Center for Green Schools*. Accessed November 18, 2012. <http://mcgraw-hillresearchfoundation.org/wp-content/uploads/2012/02/GreenSchoolsWP-2012.pdf>.
- Barrett, Peter, Yufan Zhang, Joanne Moffat, and Khairy Kobbacy. "A Holistic, Multi-level Analysis Identifying the Impact of Classroom Design on Pupils' Learning." *Building and Environment*, 59 (2013): 678-689.
- Bennett, Rodney L. "Advisory: Funding for Capital Construction Summary." *Kentucky Department of Education Division Facilities Management*, (2010).
- Berne, Robert, and Leanna Stiefel. *The Measurement of Equity in School Finance : Conceptual, Methodological, and Empirical Dimensions*. Baltimore : Johns Hopkins University Press, 1984.
- Berry, Jeffery M. "Validity and Reliability Issues in Elite Interviewing." *PS: Political Science and Politics* 35, no. 4 (2002): 679-682.
- Boysen, Thomas C., and Kentucky State Board for Elementary and Secondary Education. "Kentucky School Facilities Planning Manual." (1992): 1-34.
- California Department of Education. "Notice of Settlement in *Eliezer Williams, et al. v. State of California, et al.*" Last modified on December 20, 2004. <http://www.cde.ca.gov/eo/ce/wc/yr04ltr1220.asp>.

- California Department of Education. "The Williams Case: An Explanation." Last Modified September 4, 2012. <http://www.cde.ca.gov/eo/ce/wc/wmslawsuit.asp>.
- Cash, Carol S. "Building Condition and Student Achievement and Behavior." Doctoral dissertation, Virginia Polytechnic Institute and State University, 1993.
- Chan, Tak Cheung. "Physical Environment and Middle Grade Achievement." *Greenville County School District* (1980).
- Claybrook v. City of Owensboro*, 23 F. 634, 635 (C.C.D. Ky. 1884).
- Colorado General Assembly. "An Act," 2000. Accessed on January 17, 2013. [http://www.leg.state.co.us/2000//inetcbill.nsf/billcontainers/817CA03BC575CA638725683A004DEBA7/\\$FILE/181_enr.pdf](http://www.leg.state.co.us/2000//inetcbill.nsf/billcontainers/817CA03BC575CA638725683A004DEBA7/$FILE/181_enr.pdf).
- Creswell, John W. *Qualitative Inquiry and Research Design: Choosing Among Five Traditions*. Thousand Oaks: Sage, 1998.
- Creswell, John W. *Qualitative Inquiry and Research Design: Choosing Among Five Approaches*. Thousand Oaks: Sage, 2013.
- Crotty, Michael. *The Foundations of Social Research: Meaning and Perspective in the Research Process*. Thousand Oaks: Sage Publications, 1998.
- Cubberley, Ellwood P. *School Funds and Their Apportionment: A Consideration of the Subject with Reference to a More General Equalization of Both the Burdens and the Advantages of Education*. New York: Columbia University, 1905.
- Denzin, Norman K. *Symbolic Interactionism and Cultural Studies : The Politics of Interpretation*. Cambridge: Blackwell Publishers, 1992.
- DeRolph v. State*, 78 Ohio St.3d. 193 (1997).
- District Court, Denver, Colorado. "*Lobato v. Colorado*." Accessed October 18, 2012. <http://schoolfunding.info/wp-content/uploads/2011/12/183-page-decision-issued-on-December-9-2011.pdf>.
- Dove, Ronald G. "Acorns in a Mountain Pool: The Role of Litigation, Law and Lawyers in Kentucky Education Reform." *J. Educ. Fin.* 17, (1991): 83-119.
- Econsultant, Inc. "Kentucky." *Econsultant.com*. Accessed on July 20, 2013. <http://www.econsultant.com/usa-state-maps-with-county-lines/ky-2-state-map-with-county-lines.gif>.
- Edgewood v. Kirby*, 777 S.W.2d. 391 (Tex. 1989).

- Education Law Center. "Abbott Decisions." Accessed on October 12, 2012.
<http://www.edlawcenter.org/cases/abbott-v-burke/abbott-decisions.html>.
- Education Law Center. "Abbott v. Burke." Accessed on October 1, 2012.
<http://www.edlawcenter.org/>.
- Education Law Center. "Safe and Adequate: Using Litigation to Address Inadequate K-12 School Facilities." Accessed October 25, 2012. http://www.edlawcenter.org/assets/files/pdfs/publications/Safe_and_Adequate.pdf.
- Education Law Center. "The History of *Abbott v. Burke*," Accessed on October 12, 2012.
<http://www.edlawcenter.org/cases/abbott-v-burke/abbott-history.html>.
- Erlichson, Bari A. "New Schools for a New Millennium: Court-Mandated School Facilities Construction in New Jersey." *J. Educ. Fin.* 27, no. 2 (2001): 663-682.
- Fang, L., David P. Wyon, Ralph Clausen, and Povl Ole Fanger. "Impact of Indoor Air Temperature and Humidity in an Office on Perceived Air Quality, SBS Symptoms and Performance." *Indoor Air* 14, (2004): 74-81.
- Feeney, Aidan, and Evan Heit. *Inductive Reasoning: Experimental, Developmental, and Computational Approaches*. Cambridge, NY: Cambridge University Press, 2007.
- Filardo, Mary W., Jeffrey M. Vincent, Ping Sung, and Travis Stein. "Growth and Disparity: A Decade of U.S. Public School Construction." Accessed July 19, 2013.
<http://www.eric.ed.gov/PDFS/ED498100.pdf>.
- Giardino v. Colorado State Board of Education*, 98CV0246, Denver District Court. (Colo. 1998).
- Glenn, William J., Lawrence O. Picus, Allan Odden, and Anabel Aportela. "The Equity of School Facilities Funding: Examples from Kentucky." *Education Policy Analysis Archives* 17, no. 14 (2009): 1-15.
- Guba, Egon G. "Criteria for Addressing the Trustworthiness of a Naturalistic Inquires." *Education and Communication Journal*, 29, 1981.
- Halcomb, Elizabeth J., and Patricia M. Davidson. "Is Verbatim Transcription of Interview Data Always Necessary?" *Applied Nursing Research*. 19 (2006): 38-42.
- Hancock, Dawson R., and Bob Algozzine. *Doing Case Study Research : A Practical Guide for Beginning Researchers*. 2nd ed. New York: Teachers College Press, 2011.
- Harner, David P. "Effects of Thermal Environment on Learning Skills." *CEFP Journal*, 12, no. 2 (1974): 4-6.

- Heschong, Lisa. "Daylighting in Schools: An Investigation into the Relationship between Daylighting and Human Performance." 1999. Accessed on November 18, 2012. <http://www.h-m-g.com/downloads/Daylighting/schoolc.pdf>.
- Hines, Eric W. "Building Condition and Student Achievement and Behavior." Doctoral dissertation. Virginia Polytechnic Institute and State University, 1996.
- Holland, Jim. "Heath Wise." *American School and University*, 82 (2009): 21-24.
- Hunter, Molly A. "All Eyes Forward: Public Engagement and Educational Reform in Kentucky." *Journal of Law & Education*, 28 (1999): 1-26.
- International Society for Technology in Education. "Maximizing the Impact: The Pivotal Role of Technology in a 21st Century Education System." 2007. Accessed January 20, 2013. http://www.setda.org/c/document_library/get_file?folderId=191&name=P21Book_complete.pdf.
- Kentucky Department of Education. "Construction." Last modified October 18, 2012. <http://education.ky.gov/districts/fac/Pages/Construction.aspx>.
- Kentucky Department of Education: Division of Facilities Management. "Project Application. 702 KAR 4: 160. Revised 3.21.05.
- Kentucky Department of Education. "Facilities Assessment Project." Last modified October 10, 2012. <http://education.ky.gov/districts/fac/Pages/Facilities-Assessment-Project.aspx>.
- Kentucky Department of Education. "Facilities Inventory & Classification System Kentucky School Score Report." Accessed October 22, 2012. <http://education.ky.gov/districts/fac/Documents/KFICS%20State%20Report%20School%20List%20by%20District%20School%202.pdf>.
- Kentucky Department of Education. "Kentucky Learning Goals and Academic Expectations." Accessed July 16, 2013. <http://education.ky.gov/curriculum/docs/Documents/Kentuckys%20Learning%20Goals%20and%20Academic%20Expectations.pdf>.
- Kentucky Department of Education, Office for State Budget Director. "Department of Education: Support Education Excellence in Kentucky (SEEK)." Accessed September 20, 2012. http://osbd.ky.gov/NR/rdonlyres/BDD61E11-A1E0-4B08-8247-C79ED6A48319/0/SupportEducationExcellence_in_Kentucky.pdf.
- Kentucky Legislative Research Commission. "A Review of the School Facilities Construction Commission." no. 332 (2006): 1-131.

- Kentucky Legislative Research Commission. "First Constitution of Kentucky (1792)." *Baldwin's Kentucky Revised Statutes Annotated*. September 23, 2012. Westlaw.
- Kentucky Legislative Research Commission. "Kentucky Legislature: Kentucky Constitution." Accessed October 12, 2012. <http://www.lrc.ky.gov/legresou/constitu/list1.htm>.
- Kentucky Legislative Research Commission. "Kentucky Legislature: Kentucky Constitution, Section 186." Accessed January 15, 2013, <http://www.lrc.ky.gov/Legresou/Constitu/186.htm>.
- Kentucky Legislative Research Commission. "Kentucky Legislature: KRS 157.420." Accessed January 20, 2013, <http://www.lrc.ky.gov/KRS/157-00/420.PDF>.
- Kentucky Legislative Research Commission. "Kentucky Legislature: Revised Kentucky Statutes." Accessed October 12, 2012. <http://www.lrc.ky.gov/krs/titles.htm>.
- Kentucky Legislative Research Commission. "Kentucky Revised State Statute, 157.310," Declaration of Legislative Intent. Accessed January 10, 2013, <http://www.lrc.ky.gov/KRS/157-00/310.PDF>.
- Kentucky Legislative Research Commission. "KRS 157.330: Fund to Support Education Excellence in Kentucky." *Kentucky Revised Statutes*. Accessed on January 15, 2013. <http://www.lrc.state.ky.us/KRS/157-00/330.PDF>.
- Kentucky Legislative Research Commission. "Ky Const § 183 General Assembly to Provide for School System." *Baldwin's Kentucky Revised Statutes Annotated*. September 23, 2012. Westlaw.
- Kentucky Legislative Research Commission. "Ky Const § 186 General Assembly to Provide for School System." *Baldwin's Kentucky Revised Statutes Annotated*. September 23, 2012. Westlaw.
- Kentucky Legislative Research Commission. "Planning for School Facilities Can Be Improved To Better Serve the Needs of All Students." no. 341, (2006): 1-120.
- Kentucky Legislative Research Commission. "Second Constitution of Kentucky (1799)." *Baldwin's Kentucky Revised Statutes Annotated*. September 23, 2012. Westlaw.
- Kentucky Legislative Research Commission. "Third Constitution of Kentucky (1850)." *Baldwin's Kentucky Revised Statutes Annotated*. September 23, 2012. Westlaw.
- Kentucky School Designs. "Home." *KYschooldesigns.org*. Accessed on May 21, 2013. <http://www.kyschooldesigns.org/index.php>.

- King, Richard A., Austin D. Swanson, and Scott R. Sweetland. "Designing Finance Structures to Satisfy Equity and Adequacy Goals." *Education Policy Analysis Archives* 13, no. 15 (2005): 1-28.
- Koski, William S., and Rob Reich. "When 'Adequate' Isn't: The Retreat from Equity in Educational Law and Policy and Why It Matters." *Emory Law Journal* 56, (2006): 545-617.
- Küller, Rikard, and Carin Lindsten. "Health and Behavior of Children in Classrooms With and Without Windows." *Journal Of Environmental Psychology* 12, no. 4 (1992): 305-317.
- Lanham III, James Warren. "Relating Building and Classroom Conditions to Student Achievement in Virginia's Elementary Schools." Doctoral dissertation, Virginia Polytechnic University, 1997.
- Lemasters, Linda K. "A Synthesis of Studies Pertaining to Facilities, Student Achievement, and Student Behavior." Doctoral dissertation, Virginia Polytechnic Institute and State University, 1997.
- Levin, Ben. "Approaches to Equity in Policy for Lifelong Learning." *The Organisation for Economic Co-operation and Development*, (2003): 1-42.
- Lobato v. Colorado*, 218 P.3d. 358 (Colo. 2009).
- Lord John Emerich Edward Dalberg-Acton, quoted in Hickrod, George Alan Karnes Wallis Hickrod. "A Reply to the "Forbes" Cover Story or The Political Theory of School Finance Revisited: A Victorian Essay." *J. Educ. Fin.* 12 (1987): 451.
- Lucas, Tim. "BG-1 Project Application." Kentucky Department of Education. e-mail message to author, April 29, 2013.
- Lucas, Tim. "Urgent-Needs Grant." Kentucky Department of Education. e-mail message to author, April 29, 2013.
- Malhoit, Gregory C., and Derek W. Black. "The Power of Small Schools: Achieving Equal Educational Opportunity through Academic Success and Democratic Citizenship." *Nebraska Law Review* 82 (2003): 1-36.
- McCall, Raymond J. *Basic Logic: The Fundamental Principles of Formal Deductive Reasoning*. New York, NY: Barnes & Noble, 1952.
- McGowen, Robert S. "The Impact of School Facilities on Student Achievement, Attendance, Behavior, Completion Rate and Teacher Turnover Rate in Selected Texas High Schools." Doctoral dissertation, Texas A & M University, 2008.

- McLaren, Mary, Jennifer Bartlett, and Angelia Pulley. "WPA: An Important Chapter in U.S. and Kentucky History." *Library Presentations*. Accessed on July 10, 2013, http://uknowledge.uky.edu/libraries_present/32.
- Meehan, Mary. "University of Kentucky Celebrates Historic WPA Collection." *Lexington Herald-Leader* (Lexington, KY), Sept. 3, 2012.
- Merriam, Sharon B. *Qualitative Research and case Study Applications in Education*. San Francisco: Jossey-Bass, 1998.
- Mikecz, Robert. "Interviewing Elites: Addressing Methodological Issues." *Qualitative Inquiry* 18, no. 6 (2012) 482-493.
- Morrison, Henry C. *School Revenue*. Chicago: University of Chicago Press, 1930.
- Mort, Paul R. *The Measurement of Educational Need*. New York: Columbia Teachers College, 1924.
- N.J. Const. (1947) Art. VIII, § 4.
- National Archives. "Charters of Freedom: Constitution of the United States." *Archives.gov*. Accessed October 12, 2012. http://www.archives.gov/exhibits/charters/constitution_amendments_11-27.html.
- National Center for Education Statistics. "Facilities Information Management: A Guide for State and Local Education Agencies." 2003. http://nces.ed.gov/forum/pub_2003400.asp.
- National Center for Education Statistics. "How Old Are America's Public Schools?: Overview". 1999, <http://nces.ed.gov/surveys/frss/publications/1999048/>.
- National Center for Education Statistics. "Technology in Schools: Suggestions, Tools, and Guidelines for Assessing Technology in Elementary and Secondary Education." Accessed January 20, 2013. <http://nces.ed.gov/pubs2003/2003313.pdf>.
- National Center for Education Statistics and the National Cooperative Education Statistics System. "Planning Guide for Maintaining School Facilities." Accessed January 20, 2013, <http://nces.ed.gov/pubs2003/2003347.pdf>.
- National Clearing House for Educational Facilities. "State Capital Spending on PK-12 School Facilities." Accessed September 25, 2012. http://www.ncef.org/pubs/state_capital_spending_on_school_facilities.pdf.
- National Education Access Network. "Equity and Adequacy School Funding Liability Court Decisions." Accessed on September 25, 2012, <http://schoolfunding.info/wp-content/uploads/2011/07/'Equity'-and-'Adequacy'-School-Funding-Decisions-by-Outcome1.pdf>.

- National Education Access Network. "Litigations Challenging Constitutionality of K-12 Funding in the 50 States." Accessed on September 25, 2012, <http://schoolfunding.info/wp-content/uploads/2011/07/Litigations-Challenging-Constitutionality-of-K-12-Funding7.pdf>.
- National Education Access Network. "School Funding Cases in Colorado." Last modified November 2011. <http://schoolfunding.info/2011/09/school-funding-cases-in-colorado/>.
- National Education Access Network. "School Funding Cases in Kentucky." Last modified November 2011. <http://schoolfunding.info/2012/05/school-funding-cases-in-kentucky/>.
- National Education Access Network. "School Funding Cases in New Jersey." Last modified November 2011. <http://schoolfunding.info/2011/11/school-funding-cases-in-new-jersey/>.
- National Education Association. "Modernizing Our Schools: What Will It Cost?" Accessed November 30, 2012. http://www.educationworld.com/a_issues/issues078.shtml.
- National Resources Defense Council. "Our Children At Risk: The Five Worst Environmental Threats to Their Health." Last modified November 25, 2012. <http://www.nrdc.org/health/kids/ocar/chap4.asp>.
- Oliver, Daniel G., Julianne M. Serovich, and Tina L. Mason. "Constraints and Opportunities with Interview Transcription: Towards Reflection in Qualitative Research." *Soc Forces*, 84, no. 2 (2005): 1273-1289.
- Patterson-Grant, Paige. *Building Assessment System*. E-mail message to author, January 16, 2013.
- Patton, Michael Q. *Qualitative Evaluation and Research Method*. Newbury Park: Sage Publications, 1990.
- Picus, Lawrence O., Allan Odden, and Mark Fermanich. "Assessing the Equity of Kentucky's SEEK Formula: A 10-Year Analysis." *J. Educ. Fin.* 29 (2004): 315-336.
- Price, Christopher. "The Impact of the Mechanization of the Coal Mining Industry on the Population and Economy of Twentieth Century West Virginia." *West Virginia Historical Society*. Accessed on July 10, 2013. <http://www.wvculture.org/history/wvhs2203.pdf>.
- Prichard Committee. "Ten Steps Forward, Sources, Details, and Trends to Support Kentucky Schools: Achieving the Top 20 by 2020." Accessed October 20, 2012. <http://www.prichardcommittee.org/about-us/top-20-by-2020>.

- Rebell, Michael A., and Jessica R. Wolff. "Litigation and Education Reform: The History and Promise of the Education and Adequacy Movement." *The Campaign for Educational Equity* (2006): 1-24.
- Retired Judges Mediation & Arbitration Services. "Ray Corns." Accessed January 10, 2013. <http://www.retiredjudgesmediation.com/retiredjudges%20site%20files/RAY%20CORNS.pdf>.
- Robinson v. Cahill*, 303 A.2d. 273 (N. J. 1973).
- Rose v. Council for Better Education*, 790 S.W.2d. 186 (Ky. 1989).
- Russman v. Lockett*, 391 Ky. S.W.2d. 694 (1965).
- Saldana, Johnny. *The Coding Manual for Qualitative Researchers*. Thousand oaks, CA: Sage, 2013.
- San Antonio Independent School District v. Rodriguez*, 411 U.S. 1 (1973).
- Schneider, Mark. "Do School Facilities Affect Academic Outcomes?" *National Clearinghouse for Educational Facilities*. 2002. Accessed on November 18, 2012. <http://www.ncef.org/pubs/outcomes.pdf>.
- Schneider, Tod. "CPTED 101: Crime Prevention Through Environmental Design—The Fundamentals for Schools." *National Clearinghouse for Educational Facilities*. 2010. Accessed November 18, 2012, <http://www.ncef.org/pubs/cpted101.pdf>.
- Schrag, Peter. *Final Test: The Battle for Adequacy in America's Schools*. New York: New Press, 2003.
- Serrano v. Priest*, 18 Cal.3d. 728 (1976).
- Shaughnessy, Richard J., Ulla Haverinen-Shaughnessy, Alec Nevalainen, and Demetrios Moschandreas. "A Preliminary Study on the Association Between Ventilation Rates in Classrooms and Student Performance." *Indoor Air*, 16 (2006): 465-468.
- Smedje, Greta, and Dan Norback. "The School Environment: Is it Related to the Incidence of Asthma in the Pupils?." *Indoor Air*, 5 (1999): 445-450.
- Spradley, James P. *The Ethnographic Interview*. Belmont: Wadsworth-Cengage, 1979.
- Stake, Robert E. *The Art of Case Study Research*. Thousand Oaks: Sage Publications, 1995.

- State of New Jersey 212th Legislature. "The School Funding Reform Act of 2008." Accessed September 20, 2012. http://www.njleg.state.nj.us/2006/Bills/A0500/500_I2.PDF.
- State of New Jersey Schools Development Authority. "Schools Development Authority." Accessed September 10, 2012. <http://www.njsda.gov/Archive/2002/>.
- Strayer, George D., and Robert M. Haig. *The Financing of Education in the State of New York*. vol. 1. New York: Macmillan, 1923.
- Talbott v. Kentucky State Board of Education*, 244 Ky. 826, 52 S.W.2d. 727 (1932).
- Tanner, Kenneth C. "Explaining Relationships Among Student Outcomes and the School's Physical Environment." *Journal of Advanced Academics*, 19, no. 3 (2008): 444-471.
- Texas Education Agency. "Chapter 41 Wealth Equalization." *Tea.state.tx.us*. Last modified September 7, 2012. http://www.tea.state.tx.us/index2.aspx?id=6796&menu_id=645.
- The Council for Better Education v. Wilkinson*, 85 Ky. 1759, Cir. Ct. (1988).
- The Kentucky Heritage Council. "Kentucky Historic Schools Survey: An Examination of the History and Condition of Kentucky's Older School Buildings." Accessed June 14, 2013. <http://www.heritage.ky.gov/NR/rdonlyres/186485D6-1783-488E-ACBC-F6E18166F284/0/KYHistoricSchoolsSurvey.pdf>.
- The University of Kentucky. "KERA Information," Accessed October 23, 2012. <http://education.uky.edu/site/KERAinformation>.
- Thompson, David C., R. Craig Wood, and Faith E. Crampton. *Money and Schools*. New York: Larchmont, 2008.
- Thro, William E. "The Third Wave: The Impact of the Montana, Kentucky, and Texas Decisions on the Future of Public School Finance Reform Litigation." *Journal of Law and Education* 19, (1990): 219-250.
- Thro, William E. "Judicial Analysis During the Third Wave of School Finance Litigation: The Massachusetts Decision as a Model." *Boston College Law Review* 35 (1994): 597-617.
- Updegraff, Harlan. *Rural School Survey of New York State: Financial Support*. New York: Forgotten Books, 2012.
- U.S. Census Bureau. *Census.gov*. Accessed June 28, 2013. <http://www.census.gov/>.

- U.S. Department of Education. "Apply for QZAB Grant." *Ed.gov*. Accessed February 23, 2013. http://www.qzab.org/?page_id=407.
- U.S. Department of Education. "Apply for QZAB Grant." *Ed.gov*. Accessed February 23, 2013. http://www.qzab.org/?page_id=416.
- U.S. Department of Education. "Apply for QZAB Grant: IRS." *Ed.gov*. Accessed February 23, 2013. http://www.qzab.org/?page_id=178.
- U.S. Department of Education. "Definitions." Accessed January 15, 2013. <http://www.ed.gov/race-top/district-competition/definitions>.
- U.S. Department of Education. "General: State Fiscal Stabilization Fund." *Ed.gov*. Last modified March 15, 2010. <http://www2.ed.gov/policy/gen/leg/recovery/factsheet/stabilization-fund.html>.
- U.S. Department of Education. "Infrastructure: Access and Enable." Accessed November 18, 2012. <http://www.nrdc.org/health/kids/ocar/chap4.asp>.
- U.S. Department of Education. "Office for Civil Rights: Protecting Students with Disabilities." *Ed.gov*. Accessed May 30, 2013. <http://www2.ed.gov/about/offices/list/ocr/504faq.html>.
- U.S. Department of Education. "Office of Educational Research and Improvement." "Notes From the Field: KERA in the Classroom." (2000): 1-23.
- U.S. Department of Education. "Maximus Face Amount." *QZAB.com*. Accessed February 23, 2013. <http://qzabs.com/qzab%20allocations.html>.
- U.S. Department of Education. "Qualified Zone Academy Bonds: A Tool That Works for Schools." *QZAB.com*. Accessed February 23, 2013. http://qzabs.com/tools_doe_qzab.html#examples.
- U.S. Department of Homeland Security. "Primer: To Design Safe School Projects in Case of Terrorist Attacks and School Shootings." 2012. Accessed January 17, 2013. http://www.dhs.gov/xlibrary/assets/st/bips07_428_schools.pdf.
- U.S. Department of Homeland Security. "School Safety." Accessed January 20, 2013. <http://www.dhs.gov/school-safety>.
- U.S. Department of Labor. "Mining Industry Accident, Injuries, Employment, and Production Statistics: All Coal Mining Data." Accessed July 15, 2013. <http://www.msha.gov/STATS/PART50/WQ/1978/wq78cl03.asp>.
- U.S. Environmental Protection Agency. "Clean Air Act." Accessed June 18, 2013. <http://www.epa.gov/air/caa/>.

- U.S. General Accounting Office. "School Facilities: Conditions of America's Schools." Accessed November 30, 2012. <http://www.gao.gov/assets/230/220864.pdf>.
- U.S. Government Printing Office. "Frequently Asked Questions." Accessed December 12, 2012. <http://bensguide.gpo.gov/support/faqs.html>.
- Verstegen, Deborah A. "A Framework for Determining the Cost of an Adequate Education: A Tale of Two States." *J. Educ. Fin* 32, no. 3 (2006): 202-236.
- Verstegen, Deborah A. "Kentucky." In *A Quick Glance at School Finance: A 50 State Survey of School Finance Policies and Programs Vol. I: State by State Descriptions*, Center for Research and Educational Planning, University of Nevada, Reno. Accessed July 16, 2013. <http://schoolfinancesdav.wordpress.com/>.
- Verstegen, Deborah A., and Terry Whitney. "From Courthouses to Schoolhouses: Emerging Judicial Theories of Adequacy and Equity." *Educational Policy* 11, no. 3 (1997): 330-352.
- Wargocki, Pawel, and David P. Wyon. "The Effects of Moderately Raised Classroom Temperatures and Classroom Ventilation Rate on the Performance of Schoolwork by Children." *HVAC & R Research* 13, no. 2 (2007): 193-220.
- Weinstein, Carol S. "The Physical Environment of the School: A Review of the Research." *Review of Educational Research* 49, no. 4 (1979): 577-610.
- Western Kentucky University. "Kentucky Education Reform Act (KERA)." *Libguides.wku.edu*. Last modified March 23, 2012. http://libguides.wku.edu/print_content.php?pid=242174& sid=1999460.
- Weston, Susan Perkins, and Robert F. Sexton. "Substantial and Yet Not Sufficient: Kentucky's Effort to Build Proficiency for Each and Every Child." *Campaign For Educational Equity*, no. 2 (2009): 1-49.
- Yin, Robert K. *Case Study Research: Design and Methods: Design and Methods*. Thousand Oaks: Sage Publications, 2009.

APPENDIX A: CASE STUDY SITE SELECTION

Table 38. Case study site selection for relatively low-scoring school districts

Rank	District ¹	School Name	Year Built	Gross Area ² (GSF)	SAAR Enrollment ³ 2010-2011	Kentucky School Score	Condition Score ⁴ weight = 75%	Suitability Score ⁵ weight = 20%	Technology Score ⁶ weight = 5%
37	Hazard Ind	Roy G Eversole MS (Grades 3-8)	1958	50,325	263	40.05	30.70	70.33	59.15
49	Boyd Co	Boyd Co MS	1974	111,528	725	42.11	36.08	67.75	30.00
56	Perry Co	Willard ES MS	1971	31,556	305	42.93	35.98	60.55	76.70
65	Perry Co	Robert W Combs ES MS	1962	52,001	390	44.32	37.51	63.60	69.30
72	Jefferson Co	Ahrens Brown ES MS HS	1926	152,327	682	45.87	39.69	63.82	66.65
87	Livingston Co	Livingston Co MS	1958	49,064	199	47.94	42.62	63.64	65.00
91	Trimble Co	Trimble Co MS	1981	41,938	380	48.23	39.87	74.52	68.45
97	Boyle Co	Boyle Co MS	1970	68,601	635	49.04	37.32	81.11	96.70
104	Pike Co	Kimper ES MS	1966	24,568	167	50.01	44.77	58.43	95.00
106	Pike Co	Elkhorn City ES MS	1981	109,735	531	50.23	40.23	77.79	90.00
110	Marshall Co	South Marshall MS	1956	65,667	274	50.50	45.91	64.49	63.30
112	Pike Co	Belfry MS	1937	99,741	595	50.64	44.76	68.26	68.35
114	Clark Co	Conkwright MS	1969	60,166	568	50.82	42.31	71.65	95.00
134	Jefferson Co	Frost MS	1966	77,553	487	54.11	46.61	75.17	82.50
145	Corbin Ind	Corbin MS	1931	77,280	443	55.22	54.37	53.87	73.35
147	Jefferson Co	Frederick Law Olmsted North MS	1927	152,553	810	55.41	52.39	59.37	85.00

Table 38. Case study site selection for relatively low-scoring school districts (continued)

Rank	District ¹	School Name	Year Built	Gross Area ² (GSF)	SAAR Enrollment ³ 2010-2011	Kentucky School Score	Condition Score ⁴ weight = 75%	Suitability Score ⁵ weight = 20%	Technology Score ⁶ weight = 5%
149	Jefferson Co	Johnson Traditional MS	1930	136,185	948	55.69	47.70	77.92	86.70
153	Mayfield Ind	Mayfield MS	1980	61,766	370	56.04	50.58	68.05	90.00
154	Jefferson Co	Thomas Jefferson MS	1962	206,213	1038	56.05	49.14	74.28	86.70
157	Ashland Ind	George M Verity MS	1983	97,642	490	56.36	51.39	69.93	76.65
161	Jefferson Co	Meyzeek MS	1928	134,645	1076	56.53	53.18	67.63	62.50
167	Whitley Co	Whitley Co MS	1972	99,680	665	56.77	52.89	67.98	70.00
172	Pike Co	Dorton ES MS	1950	44,263	326	57.27	52.52	66.89	90.00
175	McCracken Co	Lone Oak MS	1966	98,403	748	57.59	51.45	74.13	83.45
179	Jefferson Co	Frederick Law Olmsted South MS	1956	108,582	807	57.90	55.27	62.64	78.45
180	McCracken Co	Reidland MS	1966	76,748	422	58.10	54.05	67.37	81.65
181	Perry Co	Viper ES MS	1963	47,928	271	58.10	54.96	64.41	80.00
193	Mason Co	Mason Co MS	1971	70,950	658	59.30	55.64	69.92	71.70
198	Scott Co	Scott Co MS	1954	110,756	753	59.85	54.49	75.96	75.95
215	Jefferson Co	Lassiter MS	1973	103,834	829	61.30	57.55	70.25	81.70
216	Muhlenburg Co	Muhlenburg South MS	1976	68,788	579	61.30	57.84	65.86	95.00
220	East Bernstadt Ind	East Bernstadt ES MS	1936	38,991	506	61.54	62.60	55.45	70.00
228	Adair Co	Adair Co MS	1952	57,450	397	62.10	59.49	69.12	73.30
230	Paris Ind	Paris MS	1927	86,273	181	62.36	61.23	67.16	60.05

Table 38. Case study site selection for relatively low-scoring school districts (continued)

Rank	District ¹	School Name	Year Built	Gross Area ² (GSF)	SAAR Enrollment ³ 2010-2011	Kentucky School Score	Condition Score ⁴ weight = 75%	Suitability Score ⁵ weight = 20%	Technology Score ⁶ weight = 5%
245	Crittenden Co	Crittenden Co MS	1949	70,124	304	63.45	66.99	54.80	44.90
247	Covington Ind	Holmes MS	1926	89,600	742	63.69	63.83	60.34	75.00
249	Jefferson Co	Noe MS	1974	155,118	1322	63.89	61.68	63.16	100.00
250	Elliott Co	Elliott Co MS HS	1954	115,026	517	63.96	61.26	69.66	81.70
267	Jefferson Co	Carrithers MS	1973	92,976	527	65.27	65.51	63.21	70.00
297	Jefferson Co	Barret Traditional MS	1931	107,195	638	67.14	67.01	66.91	69.95
298	Harrison Co	Harrison Co MS	1977	90,583	734	67.23	67.67	66.56	63.30
302	Montgomery Co	McNabb MS	1986	134,737	1110	67.59	63.37	80.30	80.00
307	Marshall Co	Benton MS	1963	68,949	269	67.85	71.18	53.60	75.00
308	Fulton Co	Fulton Co ES MS	1974	59,500	365	67.87	64.22	77.28	85.00
312	McCracken Co	Heath MS	1968	82,993	448	68.08	65.87	72.97	81.75
328	Letcher Co	Whitesburg MS	1986	30,500	213	69.24	67.65	71.28	85.05
330	Lee Co	Lee Co MS	1968	32,388	256	69.47	65.81	79.33	85.00
338	Jefferson Co	Jefferson Co Traditional MS	1923	120,513	908	69.91	67.32	74.62	90.00
340	Beechwood Ind	Beechwood ES MS HS	1927	115,014	555	70.54	68.45	72.29	95.00
360	Knox Co	Knox Co MS	1950	85,038	517	72.05	72.19	71.63	71.70
362	Jefferson Co	Crosby MS	1974	99,894	1362	72.08	67.88	80.86	100.00
365	Russell Ind	Russell MS	1965	51,507	523	72.38	72.51	70.43	78.30

Table 38. Case study site selection for relatively low-scoring school districts (continued)

Rank	District ¹	School Name	Year Built	Gross Area ² (GSF)	SAAR Enrollment ³ 2010-2011	Kentucky School Score	Condition Score ⁴ weight = 75%	Suitability Score ⁵ weight = 20%	Technology Score ⁶ weight = 5%
369	Jackson Ind	Jackson City MS	1927	83,904	401	72.84	77.62	54.37	75.00
371	Madison Co	Foley MS	1978	86,174	866	73.02	71.70	76.22	80.00
379	Magoffin Co	Harold Whitaker MS	1989	69,237	355	73.79	74.89	66.85	85.00
381	Knox Co	Lynn Camp ES MS HS	1988	64,000	1108	73.92	73.88	70.86	86.70
385	Green Co	Green Co MS	1990	57,290	363	74.43	71.84	79.01	95.00
388	Hancock Co	Hancock Co MS	1960	53,758	378	74.61	73.67	75.57	84.95
389	Garrard Co	Garrard Co MS	1964	102,838	600	74.61	75.04	72.08	78.30
391	Jefferson Co	Conway MS	1971	101,137	885	74.81	76.57	66.47	81.75
392	Owensboro Ind	Owensboro MS South	1964	72,980	1204	74.83	77.01	69.94	61.70
397	Madison Co	Clark Moores MS	1972	64,624	461	75.44	76.67	68.46	85.00
402	Erlanger-Elsmere Ind	Tichenor MS	1962	115,751	492	75.86	73.93	80.79	85.00
417	Henry Co	Henry Co MS	1971	55,781	511	78.79	79.00	72.73	100.00
421	Paintsville Ind	Paintsville MS HS	1952	92,032	347	79.51	80.19	73.11	95.00
422	Jefferson Co	Westport MS	1961	169,768	838	79.76	78.18	83.13	90.00
433	Carlisle Co	Carlisle Co MS	1979	38,823	179	81.22	81.91	75.32	94.44
434	Bullitt Co	Bullitt Lick MS	1977	72,263	481	81.51	81.80	79.95	83.30
439	Powell Co	Powell Co MS	1988	67,742	561	82.52	83.59	79.12	79.95
444	Hopkins Co	South Hopkins MS	1955	69,545	472	83.60	84.32	79.30	90.00
455	Harlan Ind	Harlan MS HS	1964	70,148	498	85.57	89.93	70.61	79.95

Table 38. Case study site selection for relatively low-scoring school districts (continued)

Rank	District ¹	School Name	Year Built	Gross Area ² (GSF)	SAAR Enrollment ³ 2010-2011	Kentucky School Score	Condition Score ⁴ weight = 75%	Suitability Score ⁵ weight = 20%	Technology Score ⁶ weight = 5%
456	Lawrence Co	Louisa MS	1996	79,348	370	85.74	87.24	83.60	71.70
458	Larue Co	Larue Co MS	1958	111,045	557	85.86	91.56	68.45	69.95
465	Bullitt Co	Mt Washington MS	1948	89,403	486	87.59	87.64	89.70	78.45
474	Calloway Co	Calloway Co MS	1979	76,855	750	91.54	91.04	92.59	95.00
483	Russell Co	Russell Co MS	1953	67,850	457	94.62	98.80	79.24	93.40

Source: As adapted from Kentucky Department of Education, "Facilities Inventory & Classification System Kentucky School Score Report," accessed October 22, 2012, <http://education.ky.gov/districts/fac/Documents/KFICS%20State%20Report%20School%20List%20by%20District%20School%202.pdf>.

¹ Regular Public Middle Schools

² Gross Area(GSF)= Square Footage

³ SAAR Enrollment= Superintendent's Annual Attendance Report

⁴ Condition Score= The physical condition of the building which includes building systems and outside mechanisms.

⁵ Suitability Score= The sum of the values for each individual educational suitability standard question addressed. Questions were based on the purpose of the facility evaluated.

⁶ Technology Score= The sum of the values for each individual technology readiness standard question addressed. Questions were based on the purpose of the facility evaluated.

APPENDIX B: PARTICIPANT INITIAL TELEPHONE SCRIPTS

Hi Mr./Mrs. X. The purpose of this call is to tell you about a study I am conducting for my doctoral dissertation and inquire whether you may be interested in participating. I would like the opportunity to tell you more about the study. The title of the study is “Adequacy Post-*Rose v. Council for Better Education* in Kentucky Public School Facilities: A Case Study.” I will be examining how changes made to the facilities during the renovation process has influenced the learning process. Your participation will be kept anonymous. Students will not be included in the study, only adults. In an approximate thirty minute interview, you will be asked a series of eight questions. If you agree to participate, I will send you a consent packet and arrange a meeting time that is convenient for you. Should you have any questions, please feel free to contact me at (803) 413-7544. Thank you for your time.

Hi Mr./Mrs. X. The purpose of this call is to tell you about a study I am conducting for my doctoral dissertation and inquire whether you may be interested in participating. Mr. Tim Lucas, at the Kentucky Department of Education recommended a school in your school district as being an excellent example for my case study. I would like the opportunity to tell you more about the study. The title of the study is “Adequacy Post-*Rose v. Council for Better Education* in Kentucky Public School Facilities: A Case Study.” I will be examining how changes made to the facilities during the renovation process has influenced the learning process. Students will not be included in the study, only adults. In an approximate thirty minute interview, you will be asked a series of eight questions. If you agree to participate, I will send you a consent packet and arrange a meeting time that is convenient for you. Should you have any questions, please feel free to contact me at (803) 413-7544. Thank you for your time.

APPENDIX C: PARTICIPANT FOLLOW-UP EMAIL SCRIPT

Dear Mr./Mrs. X.

The purpose of this email is to thank you for your time as we spoke today. I appreciate your interest in the study I am conducting for my doctoral dissertation. The title of the study is “Adequacy Post-Rose v. *Council for Better Education* in Kentucky Public School Facilities: A Case Study.” I will be examining how changes made to the facilities during the renovation process has influenced the learning process. Students will not be included in the study, only adults. Your participation will be kept anonymous. In an approximate thirty minute interview, you will be asked a series of eight questions. I have sent you a consent packet and will call back in a week to arrange a meeting time that is convenient for you. I look forward to discussing the study with you in the future. Should you have any questions, please feel free to contact me at (803) 413-7544. Thank you for your time.

APPENDIX D: PERMISSION LETTER TO RECRUIT PARTICIPANTS
OFF CAMPUS



Educational Leadership
Phone: 704-687-8858
Fax: 704-687-3493

Caroline Wilson, Doctoral Candidate
c/o Dr. Lisa G. Driscoll, Associate Professor
Department of Educational Leadership
College of Education
9201 University City Blvd
Charlotte, NC 28223-0001
Cwils164@uncc.edu
April 29, 2013

Attention: District Superintendent
Kentucky Public School District of Potential Participant
Address
City, State Zip Code

Dear Kentucky Public School District Superintendent,

The purpose of this letter is to request permission to conduct research at (Name of school district) in fulfillment of the dissertation research requirement for the Doctoral degree. The project titled, "Adequacy Post-Rose v. Council for Better Education in Kentucky Public School Facilities: A Case Study" entails a case study research design involving a thirty minute interview either conducted at their office, via Skype or other remote video conferencing software, or on the telephone. Participants will remain anonymous and be asked a set of questions and responses audio recorded. The questions asked relate to process of public school facility funding in the state of Kentucky. The participant's responses will be kept anonymous. I will transcribe the audio recording of their answers to these questions. Participants will be given transcripts for them to review and amend, if necessary.

In addition to interviewing adult participants, I will visit one purposefully selected school facility in the district. While there I will take field notes and photographs to document changes in the facilities since the renovations took place. I will observe classrooms without students present. This study does not include photographs, videos, or observations of students.

I will request permission to review district archival documents to ascertain the facility history and renovation information.

The purpose of this research is to determine how the additional funding for Kentucky public school facilities has contributed to the improvement and provision of an adequate education. This study has the approval of the University of North Carolina at Charlotte Human Subjects Review Board and is being conducted by Caroline Wilson. Participants from your school district will be contacted and asked to participate in the study. Please advise regarding granting permission to conduct research on the campus of (Name of school district).

Upon approval of the study to be conducted in the school district, please return a signed permission letter on district letterhead to the above mailing address. Thank you.

Sincerely,

Caroline Wilson

Enclosures

APPENDIX E: PARTICIPANT CONSENT FORM



Educational Leadership
Phone: 704-687-8858
Fax: 704-687-3493

Participant Consent Form

“Adequacy Post-Rose v. Council for Better Education in Kentucky Public School Facilities: A Case Study.”

Dear Potential Participant,

Project Title and Purpose:

You have agreed to participate in a research study, “Adequacy Post-Rose v. Council for Better Education in Kentucky Public School Facilities: A Case Study.” The purpose of this study is to determine how the additional money funding Kentucky public school facilities is contributing to what the state determined to be necessary for public school students to receive an adequate education?

Investigator:

This study is being conducted by Caroline Wilson, Department of Education, University of North Carolina at Charlotte, in fulfillment of the dissertation requirement for the Doctoral degree. The supervising faculty member is Dr. Lisa G. Driscoll, Educational Leadership, University of North Carolina at Charlotte.

Description of Participation:

Interview

In an interview lasting approximately 30 minutes, you will be asked a series of questions. The data will be collected anonymously; that is, collected without any identifiers about you or how you respond. Audio recording and photography of the facility may be a part of the data collection. This study does not include photographs, videos, or observations of students. Classrooms will be observed without students present. The particular steps to ensure that anonymity include maintaining all collected data in a locked file cabinet which is only accessible by the investigator. Data will be disposed of after six years. All paper data will be shredded, and electronic data will be dismantled and, or rendered useless.

Length of Participation:

Should you agree to be a participant, your participation in this project will begin sometime in the 2nd quarter of 2013. The study will end in March, 2014. If you decide to

participate, you will be one of between ten and twenty adults anticipated to be participants in this study.

Risks and Benefits of Participation:

There is no risk associated with this study. There may be risks which are currently unforeseeable. In an effort to increase academic awareness of the funding impact on public school facilities the benefits of participation in this study include:

- Improved awareness of the funding impact on public school facilities following public school finance reform in Kentucky.

Volunteer Statement:

You are a volunteer. The decision to participate in this study is completely up to you. If you decide you would like to be out of the study, you may stop at any time.

Anonymity:

The data collected by the Investigator will not contain any identifying information or any link back to you or your participation in this study. The following steps will be taken to ensure this anonymity:

- You will never be mentioned by name in the reported results.
- You may choose to end participation in this project at any time.
- You may choose not to respond to any question.
- Only the principal investigator and the advisor will have access to the raw data which will not have your name on it anywhere.

Fair Treatment and Respect:

UNC Charlotte wants to make sure that you are treated in a fair and respectful manner. Contact the University's Research Compliance Office (704-687-1871) if you have any questions about how you are treated as a study participant. If you have any questions about the project, please contact Caroline Wilson at (803-413-7544), CWils164@uncc.edu or Dr. Lisa G. Driscoll at (704-687-8621), Lisa.Driscoll@uncc.edu.

Approval Date:

This form was approved for use on April 19th, 2013 for use for one year.

Participant Participation Postcard:

The Investigator will contact you to set up a meeting time. Thank you.

Name of Participant (PRINT)

DATE

Signature

DATE

Investigator Signature

DATE

APPENDIX F: PARTICIPANT FOLLOW-UP TELEPHONE SCRIPTS

Hi Mr./Mrs. X. The purpose of this call is to arrange a meeting time that is convenient for you when I can ask you the eight questions for the study I am conducting.

APPENDIX G: INTERVIEW PROTOCOL

1. Can you broadly tell me about your professional experience in this district?
2. In what capacity were you working in the school district when the schools were renovated? Prior to renovation?
 - Please tell me about your role in the process. Probe for detail.
3. Could you please describe the history of the school and community as you understand it?
 - Probe for detail.
4. What specific changes were made to this middle/or elementary school that you are aware of?
 - Probe for examples of how the change has affected practices in the school.
5. Can you tell me about teaching in the classroom before and after the renovations.
 - Probe for detail.
6. How have the renovations made a difference in this school?
 - Probe for detail.
7. How have the changes to the regular middle/or elementary school classrooms and school buildings in the school district compared to what it was like before the renovations?
 - Probe for detail.
8. Who else should I talk with? Where else should I go to get more documentation?

APPENDIX H: PERMISSION TO USE CASH'S MODEL

Re: Permission to use theoretical model
Cash, Carol [ccash48@vt.edu]
Sent: Friday, January 25, 2013 8:51 AM
To: Wilson, Caroline

You are very welcome to use the model, and I would love to hear what you are investigating in your study.

Carol S. Cash

From: <Wilson>, Caroline <cwils164@uncc.edu<mailto:cwils164@uncc.edu>>
Date: Thursday, January 24, 2013 10:16 PM
To: Carol Cash <ccash48@vt.edu<mailto:ccash48@vt.edu>>
Subject: Permission to use theoretical model

Dear Dr. Cash,

The purpose of this email is to request permission to use your theoretical model from your 1993 doctoral dissertation, "School Building Condition and Student Achievement and Behavior" in my doctoral dissertation. If you agree, I will use the model to assist in explaining the relationships between school building condition and student achievement. Thank you.

Respectfully,
Caroline Wilson

Caroline Wilson
Doctoral Candidate, Educational Leadership, Curriculum & Supervision
UNC Charlotte, Charlotte, North Carolina
Cwils164@uncc.edu<mailto:Cwils164@uncc.edu>

APPENDIX I: PERMISSION TO USE PRICHARD COMMITTEE GRAPH

FW: Permission to Use Graph
 Cindy Heine [cheine@prichardcommittee.org]
 Sent: Monday, January 28, 2013 10:59 AM
 To: Wilson, Caroline
 Cc: Stu Silberman [stu.silberman@prichardcommittee.org]; Pam
 Shepherd [pshepherd@prichardcommittee.org]
 Attachments: Report.2010.25th Anniversa~1.pdf (86 KB)

Ms. Wilson:

You have our permission to use the graph and will appreciate your giving us credit.
 Thank you for your interest in our work.

Cindy Heine

From: Prichard Committee [mailto:admin@prichardcommittee.org]
 Sent: Monday, January 28, 2013 9:03 AM
 To: 'Cindy Heine'
 Subject: FW: Permission to Use Graph
 From: Wilson, Caroline [mailto:cwils164@uncc.edu]
 Sent: Friday, January 25, 2013 2:18 PM
 To: admin@prichardcommittee.org
 Subject: Permission to Use Graph

To Whom It May Concern,

The purpose of this email is to request permission to use the “State Spending on New and Renovated Buildings” graph in my doctoral dissertation. If you agree, I will use the graph to assist in explaining Kentucky state spending on new and remodeled facilities. Attached please find the “Ten Steps Forward: Sources, Details, and Trends to Support Kentucky Schools: Achieving the Top by 2020” (p. 10) where it was located. Thank you.

Respectfully,
 Caroline Wilson

Caroline Wilson
 Doctoral Candidate, Educational Leadership, Curriculum & Supervision
 UNC Charlotte, Charlotte, North Carolina
 Cwils164@uncc.edu

APPENDIX J: PERMISSION TO USE LEGISLATIVE RESEARCH
COMMISSION CHARTS

RE: KDE Planning Information
Lucas, Tim - Division of District Support [tim.lucas@education.ky.gov]
Sent: Thursday, February 07, 2013 12:59 PM
To: Wilson, Caroline

Sure, they are public documents.

Good luck,

Tim Lucas

From: Wilson, Caroline [mailto:cwils164@uncc.edu]

Sent: Thursday, February 07, 2013 12:57 PM

To: Lucas, Tim - Division of District Support

Subject: RE: KDE Planning Information

Dear Mr. Lucas,

Thank you for detailed response. You answered my questions and provided further education on the district facility planning process in Kentucky. May I have permission to use the "District Facility Planning Process" charts (page 19 and 20 of the 2006 "A Review of the School Facilities Construction Commission") in my doctoral dissertation? If you agree, I will credit the Legislative Research Commission and use the charts to assist in explaining the facility planning process. Thank you

Respectfully,

Caroline Wilson

Caroline Wilson

Doctoral Candidate, Educational Leadership, Curriculum & Supervision

UNC Charlotte, Charlotte, North Carolina

Cwils164@uncc.edu

APPENDIX K: PERMISSION TO USE PHOTOGRAPHS

RE: Permission to use images request
 Susan Hill [susan@thjarch.com]
 Sent: Thursday, May 23, 2013 8:14 AM
 To: Wilson, Caroline

Yes Caroline, you have my permission.
 Good luck in completing all your work!
 Susan Hill

Susan Stokes Hill, AIA
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 CELL: 859.433.5995

From: Wilson, Caroline [mailto:cwils164@uncc.edu]
 Sent: Wednesday, May 22, 2013 3:21 PM
 To: susan@thjarch.com
 Subject: Permission to use images request

Dear Mrs. Hill,

The purpose of this email is to request permission to use the following images you emailed to me as part of my doctoral dissertation. They will be used to demonstrate the contrast between the school facility prior to and after renovations. You and your architectural firm will be cited and given credit for these sources. Thank you.

Respectfully,
 Caroline Wilson

103_0374	IM004979	IMG_3078	IMG_2612
IM005150	Old entry	106_0683	
Pictures from the data sheet (gym) 092009		05.07.07.034	
IM005152	Pictures from architect's proposal (not the floor plans)		
Old Auditorium	02.16.04 017	School Name4	
Picture 1	107_0759	IMG_2613	
Picture 2	IM005123	Picture 3	