ADEQUACY FOR EXCELLENCE IN KENTUCKY: REPORT 1 (OF 2)

Presented to the
Council for Better Education

Tom Shelton, President (Fayette County)
Nannette Johnston, Treasurer (Hardin County)
Ed McNeel, Vice President (Corbin Independent)
Anthony Strong, Vice President (Pendleton County)

2014
(Updated 12-02-2014)

Michael Goetz
Michael Griffith
Allan Odden
Lawrence O. Picus
Anabel Aportela
Adriane Williams

Picus Odden & Associates
August, 2014

ADEQUACY FOR EXCELLENCE
ADVISORY COMMITTEE MEMBERS

The following report was developed in cooperation with a 15 member Advisory Committee, representing various Kentucky stakeholders.

Justin Bathon, Assistant Professor, University of Kentucky

Robyn Baxter, KY Department of Education

Andrew Brennan, Senior, PL Dunbar High School

Michael Dailey, Associate Director for Student Achievement, Fayette County Public Schools

Representative Kelly Flood, House District 75, Fayette

Blake Haselton, Dean of School of Education and Human Development, U of Louisville

James Hodge, Lexington Traditional Middle School (LTMS), Fayette County

Mary Minyard, Principal, Young Elementary School, Jefferson County School District

Leon Mooneyhan, Chief Executive Officer, OVEC

Randy Poe, Superintendent, Boone County School District

Tom Richey, Superintendent, Henderson County School District

Matt Robbins, Daviess County Public School District's Asst. Sup of Business and Operations

Jack Rose, Professor, Department of Educational Studies, Murray State University

Joanna Howerton Stevens, Mathematics Lead Teacher, Lincoln County High School

Henry Webb, Superintendent of Floyd County Schools

Contents

Executive Summary 6

Comparison with Other States 6

An Evidence Based Adequacy Model 9

Chapter 1: Introduction 11

Purpose and overview of study 11

Chapter 2: Comparative State Analysis of Kentucky's School Finance Program 14

Selecting Comparative States 14

State Comparative Findings 15

Educational Expenditures 15

Student Population 15

Teachers 16

Student Achievement 16

Educational Funding Distribution Systems 16

Funding Special Student Populations 17

Education Funding Systems in Comparative States 17

Transportation and Capital Costs 20

State Funding Comparisons 22

Educational Expenditures 22

Per Student Expenditures 23

Per Student Expenditures Adjusted by the Comparable Wage Index 24

State Financial Commitment to Education 25

Factors That Drive Educational Expenditures 27

Student Population 27

Low-Income Student Population 29

English Learners 30

Special Education Student Population 31

Teachers 32

Teacher Salaries Adjusted by Comparable Wage Index 33

Federal Education Spending 35
Educational Outcomes 36
National Assessment of Educational Progress 36
NAEP - Scale Scores 36
NAEP – Student Achievement Levels 38
Above the National Average But Below the Highest Achieving State 39
Other Educational Measures 42
Below Average Funding 43
Below Average Teacher Salaries 45
Mixed Educational Outcomes 47
Mixed NAEP Results 48
Conclusion 49
Chapter 3: an Evidence-Based Adequacy Model 50
A. Student Counts, Preschool, Kindergarten and School Size Adjustments 57
A.1 Student Counts for Calculating Base Aid 57
A.2 Preschool 58
A.3 Full-Day Kindergarten 59
A.4 School Size for Purpose of Estimating Resources 60
B. Adequate Staffing for the Core Programs in Prototypical Schools 62
B.5 Core Content Teachers/Class Size 62
B.6 Specialist Teachers 64
B.7 Instructional Coaches/Technology Coordinators 65
C. Staffing for Extra Student Needs 67
C.8 Tutoring 68
C.9 Extended-Day Programs 70
C.10 Summer School 72
C.11 Exceptional Children (Students with Disabilities) 74
C.12 English Learners 76
C.13 Gifted and Talented Students 78
C.14 Career and Technical Education 81
D. Additional Staffing and Resource Needs 82

D.15 Substitute Teachers 82
D.16 Student Support 82
D.17 Supervisory Aides/Instructional Aides 84
D.18 Librarians 84
D.19 Principal 85
D.20 Assistant Principal 86
D.21 School Site Secretarial Staff 86
D.22 Professional Development 87
D.23 Technology and Equipment 88
D.24 Instructional Materials 89
D.25 Short Cycle Formative Assessments 92
D.26 Student Activities 93
E. District Resources 94
E.25 Central Office 94
E.26 Maintenance and Operations 95
F.27 Regional Cost Adjustment Factor 99
G. Summary of Staffing and other Resources for Small Schools 100
References 101
APPENDIX A: Additional Information on Components 115
Career and Technical Education 115
Professional Development 116
Instructional Materials 118
Regional Cost Adjustments 119
APPENDIX B: Comparing Kentucky's Education System to High Achieving States 121
Identifying Which States are High Achieving 121
Educational Outcomes 122
NAEP Math and Reading Results 122
High School Graduation Rates 124
Educational Expenditures 125
Household Income 127
Relative Effort 127

Enrollment Information 128

EXECUTIVE SUMMARY

ADEQUACY FOR EXCELLENCE IN KENTUCKY

Picus Odden & Associates
August 2014

This document describes Picus Odden & Associate's findings from a contemporary, independent review of Kentucky's school finance system. Under contract with the Council for Better Education (CBE),[1] the study, conducted December 2013 through August 2014, examines multiple aspects of the KY school finance system, including the following:

- An analysis of Kentucky's education system with comparative states.
- A series of models based on prototypical schools and districts that allow KY to determine the adequate cost of bringing students to state standards (2012-13).
- An additional study, requested by the Advisory Committee (Appendix A), follows a similar methodology as the comparative states work, but compares Kentucky to the most successful states in terms of academic performance.

In this report Picus Odden & Associates offers information and recommendations about the operation of the KY school finance system, with specific recommendations on how to determine the *cost of education* in Kentucky.

Overall, the review found that over the past decade Kentucky has consistently funded its schools below national averages, but funding levels have shown varied results against comparable states. Kentucky's teacher salaries have consistently been below national averages over the past decade. Kentucky's educational outcomes have generally been mixed when compared to both national averages and comparable states. In understanding the context of the following information, it is important to note that KY has again led the nation in new, higher standards of bringing students to be College and Career Ready as well as to meet the aggressive Common Core Standards. The importance of this context can be seen by the difference in these comparative states and the states of highest performing students—the latter states which, given current research, have the necessary funds to meet the standards set for in KY Senate Bill 1, the Common Core Standards, and a College and Career Ready student population.

Comparison with Other States

The study compared state-level data from Kentucky with national averages and information from seven comparable states (Alabama, Arkansas, Indiana, Missouri, Ohio, Tennessee, and West Virginia). The data reviewed for this study included educational outcomes, public school expenditures, student demographics, state budgets and teacher staffing. After reviewing all of the relevant data, three findings about Kentucky education system characteristics stand out: below average funding, below average teacher salaries, and mixed educational outcomes.

However, the student population in Kentucky is of import, in that its free and reduced priced

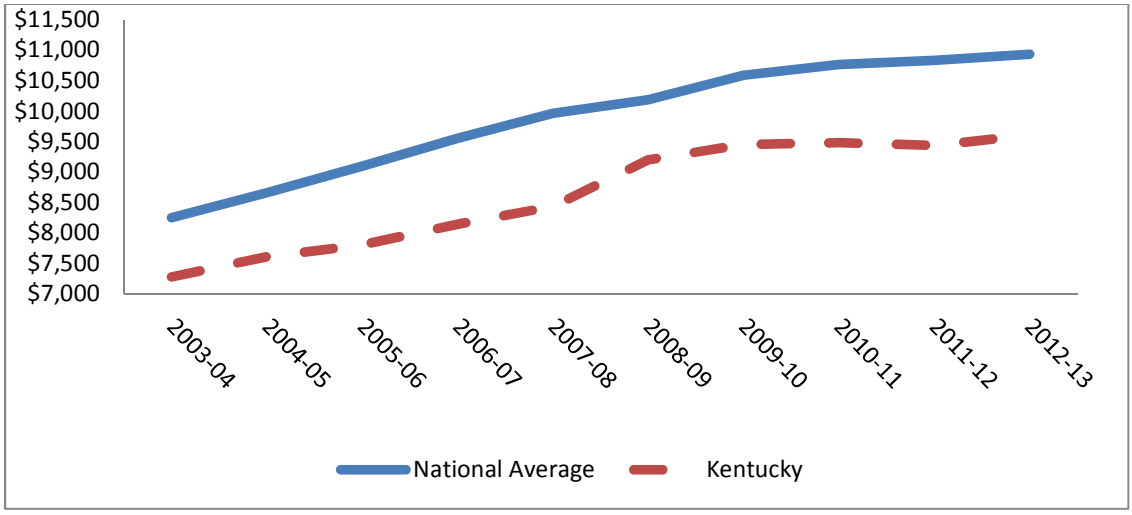
[1] A second study, *Adequacy and Excellence in Education in Kentucky: Report 2* provides information on the cost of the proposals detailed in this document, *Adequacy and Excellence in Education in Kentucky: Report 1*.

lunch counts surpassed the national average. In 2011-12, 54.4 percent of public school students in Kentucky qualified for free/reduced priced lunches – the 12th highest rate in the country. The national average was 49.6 percent with three comparative states Arkansas (60.9 percent), Alabama (57.5 percent) and Tennessee (57.5 percent) having a higher percentage than Kentucky and four comparative states Ohio (43.6 percent), Missouri (46.5), Indiana (48 percent) and West Virginia (52.8 percent) having a lower percentage of free/reduced price lunch students.

Below Average Funding

Kentucky's per-pupil funding for the 2012-13 school year ranked 28th in the nation and was behind 3 of the 7 comparable states. According to the National Education Association, in 2012-13 Kentucky spent $10,033 per enrolled student, versus the national average of $10,938 (NEA, 2014). The gap between per pupil spending in Kentucky and the national average has stayed fairly consistent over the past decade, as can be seen in chart 1.

Chart 1: Per Pupil Spending FY 2003-04 to 2012-13



Source: NEA (2014)

While Kentucky's per pupil funding amounts lag behind the national average, it has tended to fall in the middle of the seven comparable states. In 2012-13 three of the comparable states had higher per pupil amounts than Kentucky and four had lower amounts.

One issue that can explain part of Kentucky's below average per pupil spending is the state's commitment to K-12 education in its budget. Over the past decade Kentucky has committed a lower percentage of its total state expenditures to K-12 education than the national average; while the difference between Kentucky and the national average tends to be less than 2 percent, this small percentage makes a difference in education funding. In FY 2012-13, 19.6 percent of Kentucky's total state expenditures went to K-12 education – this was 0.4 percentage points below the national average of 20.0 percent.

<u>Below Average Teacher Salaries</u>

Data collected by NCES show that employee salaries and benefits account for just over 80 percent of all public school expenditures. The majority of these salary and benefit expenses can be traced to teacher salaries. Consequently, increases in teacher pay and/or increases in the number of teachers employed in a state can drive up total educational expenditures.

In 2012-13, the average teacher salary in Kentucky was $50,326, which was $6,057 (10.7 percent) lower than the national average teacher salary of $56,383. In 2003-2004 average teacher salaries in Kentucky were $40,240, or 13.8 percent lower than the national average of $46,704. Between 2003-04 and 2012-13 Kentucky's teacher salaries grew by $10,086, or 25.1 percent while the national average teacher salary during that time grew by $9,679 for an increase of 20.7 percent (NEA 2014).

Mixed Educational Outcomes

This study reviewed two different types of educational outcomes. The first outcome is high school graduation rates, and the second is National Assessment of Educational Progress (NAEP) exam results. According to National Center for Educational Statistics (NCES) Kentucky's four-year high school graduation rate generally exceeded the national average over the past five years.

While Kentucky's four-year high school graduation rate tends to be above the national average, it falls in the middle of rates for comparable states. In FY 2009-10 Kentucky's graduation rate of 79.9 percent trailed that of Missouri (83.7 percent), Ohio (81.4 percent) and Tennessee (80.4 percent), but it was above West Virginia (78.3 percent), Indiana (77.2 percent), Arkansas (75.0 percent) and Alabama (71.8 percent).

Mixed NAEP Results

Kentucky's 2013 results for the NAEP reading and math exams held constant. On the positive side, the percentage of Kentucky students finishing "at or above proficient" on the 4th and 8th grade reading exams was above the national average. The percentage of Kentucky students who finish at or above proficient on the 4th grade math exam was at the national average but Kentucky's 8th grade math students finished behind the national average.

These student performance results are notable because KY's percentage of FRPL students (54 percent) is higher than the national average of 49.6 percent (NCES, 2013).

An Evidence Based Adequacy Model

The Evidence-Based (EB) approach identifies a cohesive set of school-level resources, or elements, required to deliver a comprehensive and high-quality instructional program and describes the evidence on programmatic effectiveness. This approach then estimates an adequate expenditure level by placing a price on each element (e.g., an appropriate salary and benefits level for personnel) according to prototypical elementary, middle and high schools. School resources are aggregated to the district level, at which point central office staff and maintenance and operations resources are added, along with other costs that are not modeled in the Evidence-Based Approach (e.g., transportation and debt service). The final step involves aggregating the cost of all school- and district-level elements to a total statewide cost and to compare this cost with the 2012-13 SEEK expenditures.

The EB approach is based on a review of the research evidence, originating from three primary source types:

1. Research with randomized assignment to the treatment (the "gold standard" of evidence)
2. Research with other types of controls or statistical procedures that can help separate the impact of a treatment, including such methods as meta-analyses and longitudinal studies
3. Best practices either as codified in a comprehensive school design (e.g., Stringfield, Ross & Smith, 1996) or from studies of schools that have dramatically improved

student learning (e.g., Blankstein, 2010, 2011; Chenoweth, 2007; 2011; Odden, 2009; and Odden & Archibald, 2009).

CHAPTER 1: INTRODUCTION

Purpose and overview of study

A leader in the nation for educational reform, Kentucky again places itself at the forefront of change as the first state to implement curriculum and assessments aligned to the Common Core State Standards (CCSS). The General Assembly, through passage of Senate Bill 1 (2009), made clear that Kentucky will reform to ensure that students meet aggressive learning outcomes in English/language arts and mathematics. Kentucky now faces the challenge of systematically changing educational goals and the way in which students are educated. As Kentucky grows into this new system, it is imperative that the funding mechanisms to support such an ambitious endeavor continue to meet the constitutional requirements of an adequate and equitable funding system. This document outlines a way to assist the systemic reform necessary to match CCSS implemented in 2010.

It has been a decade since researchers completed formal, independent adequacy and equity analyses of Kentucky (see Adams & White, 2003; Odden, Picus, & Fermanich, 2003a, 2003b; Picus, Odden, & Fermanich, 2001; Verstegan, 2003). At the time of these studies, the funding was found to be *equitable* according to generally accepted statistics of horizontal equity and fiscal neutrality (i.e. educational expenditures were not dramatically unequal across districts and did not correlate substantially with property wealth). In terms of adequacy, though, the system fell short: the Picus, Odden, & Fermanich (2003) and Verstegan (2003) studies of the adequacy of the system found *inadequate* state educational funding from $740 million and $1.23 billion (both using 2001-02 data), respectively. Given the length of time since these studies were conducted, implementation of new, higher academic standards, and recent assessment outcomes, the adequacy of the Kentucky school finance system must again be evaluated, and likely recalibrated, now in light of CCSS.

This document describes Picus Odden & Associates' findings from a contemporary, independent review of Kentucky's school finance system, drawing on our work with many states developing student outcome-focused, adequacy-based funding systems. We are confident our approach to reviewing and evaluating school funding systems will meet Kentucky policymakers' expectations for assessing the state's need to find resource allocation strategies that will lead to improved student outcomes. Ten years ago the Kentucky Department of Education chose an Evidence-Based Approach to adequacy to understand the nature of the funding system. This method has been drastically improved in recent years by Picus Odden & Associate's Principal Partners to meet the changing needs of the school finance policy environment.

School finance has too often been focused just on equitable funding levels, initially securing more money for lower-wealth, lower-spending districts. More recently the focus has shifted to ensuring that all districts and schools have a sufficient level of money to meet academic proficiency levels—or adequate funding levels. However, money merely serves as a tool that produces the essential, desired end result of school finance equity and adequacy—more powerful instructional strategies that accelerates student learning. As a result, school finance should be viewed as operating in a nexus between identifying programs and services that produce higher

levels of learning, and evidence that the resources provided have been turned into instructional practice that boosts student achievement. In the case of Kentucky, as in most other states, this student achievement is primarily measured by the state-established assessment of the new and more rigorous Common Core State Standards.

Although this study focuses on generating, distributing and allocating fiscal resources, Picus Odden & Associates argues that an additional focus should be placed on what it takes to improve student performance. This includes the costs of educational programs and strategies that research evidence suggests will be successful. In addition, it entails the design of systems that, if implemented effectively and efficiently, can lead to student proficiency. *This combination—the cost of educational programs and policies and their relationship to student academic achievement—is the necessary ingredient to persuasive discussions of the resources necessary in an educational system.*

We work with individuals who have pioneered this Evidenced-Based approach to linking school resources to student outcomes and are uniquely positioned to ensure this study will not just be about resources, but about how resources can be turned into effective instruction that boosts student learning. In all aspects of the study components, we have worked with various individuals knowledgeable the current school finance system and their reasons for suggesting reform.

During the course our study, from December 2013 through June 2014, Picus Odden & Associates lead in Kentucky, Dr. Michael Goetz, held monthly Advisory Committee meetings, working through many of the toughest issues in school finance today. These meetings were filled with education leaders from across the state and across positions in the educational and political community. Picus Odden & Associates has also worked with the stakeholders who ultimately are the policymakers of school finance reform, to realize the implementation of any reforms necessary to meet adequacy mandates. These all-day meetings were held at the University of Kentucky National Center for Innovation in Education on February 24, March 17, April 21, and May 12, 2014.

In addition to these individuals, this study includes input from teachers and other educational professionals across the state. On April 16, 17, and 18, 2014, Picus Odden & Associates visited with teacher and business leaders in Hazard, Madison, and Louisville, respectively. Other regions in the state were represented on the Advisory Committee. These all-day meetings helped Picus Odden & Associates and the Advisory Committee solidify the study recommendations, particularly in terms of prototypical school resources.

Finally, we must mention that this study has been professionally assisted by the KY Department of Education, whose knowledge and vast data collection allow for more clear understanding of the current Kentucky school finance system.

Report findings are presented in three chapters, all of which provide context for the current KY education system. Chapter 1 is an introduction to general process of the study. Chapter 2 speaks

to the several KY fiscal and academic measures compared to other similar states over the ten years leading to the 2012-13 school year, the primary data used in this study.

Chapter 3 deals specifically with how the KY school finance system may change to support adequacy. It introduces the Evidence-Based Model for funding adequacy and relays findings of a movement to this methodology compared to Support Education Excellence in Kentucky (SEEK) program in 2012-13.

Appendix A includes a variety of data comparing Kentucky to high-performing states.

CHAPTER 2: COMPARATIVE STATE ANALYSIS OF KENTUCKY'S SCHOOL FINANCE PROGRAM

This chapter provides a comparative assessment of state school finance systems. The interstate comparison reviewed data from all 50 states, with an emphasis on data from the similar states. The study focuses on comparing school funding data from Kentucky with that of other states, with a focus on three areas:

1. Educational funding distribution systems
2. Expenditures and student achievement data over the past decade
3. School finance equity in comparison states

To address these questions, we reviewed data from national and state educational organizations as well as various peer reviewed academic sources. \

SELECTING COMPARATIVE STATES

In the description that follows, we compare information on Kentucky's status to national averages as well as to a set of comparable states. Weights were applied to data in two ways: comparable states were chosen based on whether the state borders Kentucky (25 percent) and how closely they matched Kentucky on a set of education statistics (75 percent). The following educational data was used to choose comparable states:

1. State student enrollment (National Center for Education Statistics, or NCES)
2. Number of districts (NCES)
3. Average number of students per district (NCES)
4. Percentage of students qualifying for free/reduced price lunch (U.S. DOE)
5. Average household income (U.S. Census)
6. Average expenditures per pupil (U.S. Census)
7. Relative tax effort (National Education Association)
8. State/Local/Federal education expenditure split (U.S. Census)
9. National Assessment of Educational Progress scores for reading and math in the 4^{th} & 8^{th} grades (NCES)
10. High school graduation rates (U.S. Department of Education)
11. College-going rates (CL Higher Education Center).

Using the above search criteria it was determined that the comparable states for this study would be:

1. Alabama – Matches Kentucky on 7 different categories (Student enrollment, free/reduced price lunch students, household income, per pupil expenditures and revenue from federal, state and local sources)
2. Arkansas - Matches Kentucky on 7 different categories (Free/reduced price lunch students, household income, per pupil expenditures, revenue from federal sources, 4^{th} and 8^{th} grade NAEP math scores and college going rates)
3. Indiana – A border state that matches Kentucky in 3 different categories (District size, K-12 revenue per $1,000 of income and percent of revenue from state sources)
4. Missouri – A border state that matches Kentucky in 6 different education categories

(Percent of revenue from federal sources, 4th and 8th grade NAEP reading and math scores and college going rates)

5. Ohio – A border state that also matches Kentucky in 3 different categories (4th and 8th grade NAEP reading scores and college going rates)
6. Tennessee – A border state that matches Kentucky in 3 different categories (Number of districts, free/reduced price lunch students and household income)
7. West Virginia – A border state that matches Kentucky in 5 different categories (Free/reduced price lunch students, household income and percentage of revenue from federal, state and local sources)

Five of the seven comparable states border Kentucky. Only two border states – Illinois and Virginia – were not included as comparable states. Both states only matched Kentucky in two categories and possessed extensive outliers in other categories. Illinois and Virginia student populations are significantly larger than Kentucky by 1.4 million and 546,000 respectively, and because of this their average district sizes are not comparable to Kentucky. In addition, both states spend more per pupil than Kentucky - 18.4 percent higher in Virginia and 30.0 percent higher in Illinois.

STATE COMPARATIVE FINDINGS

The findings from this interstate comparison can be summarized as follows:

Educational Expenditures

1. Kentucky's estimated per pupil funding for 2012-13 was $9,891 – which ranked 31st in the nation and was behind 5 of the 7 comparable states. In 2012-13 Kentucky spent $9,891 per pupil, which was $1,177 (10.6 percent less per pupil than the national average of $11,068 (NEA, 2013).
2. Between 2003-04 and 2012-13 Kentucky's per pupil expenditures grew by $2,395—an increase of 32 percent. During this same time period per pupil spending grew at the national level by $2,820 or a 40.6 percent increase.

Student Population

1. Between 2003-04 and 2012-13 Kentucky's student population of 631,852 increased by 30,493 (4.8 %) while at the national level the student population of 48,067,419 grew by 2.6 percent). The student populations of the comparative states on average grew by 2.5 percent during this same time period.
2. Average school district size in Kentucky increased during this time period by 217 students to 3,807 students per district. Kentucky's average school size ranked as the 17th largest in the nation with an average enrollment 629 students larger than the national average and 1,281 students per district larger than comparable states.
3. In 2011-12, 54.4 percent of public school students in Kentucky qualified for free/reduced priced lunches – the 12th highest rate in the country. The national average was 49.6 percent with three comparative states Arkansas (60.9 percent), Alabama (57.5 percent) and Tennessee (57.5 percent) having a higher percentage than Kentucky and four

comparative states Ohio (43.6 percent), Missouri (46.5), Indiana (48 percent) and West Virginia (52.8 percent) having a lower percentage of free/reduced price lunch students.

Teachers

1. In 2012-13 there were 42,022 full-time equivalent classroom teachers in the state of Kentucky – this was an increase of 1,360 teachers (3.3 percent) over a ten-year time period.
2. Kentucky's pupil to classroom teacher ratio in 2012-13 was 15.8 to 1 – which was just below the national average of 15.9 to 1.
3. The average teacher's salary in Kentucky in 2012-13 was $50,326 - an increase of $10,086 (25.1 percent) over the state's 2003-04 average salaries.
4. Kentucky's average teacher salary in 2012-13 ranked 27th highest and was $6,057 lower than the national average teacher salary. And the other statesis this going to be completed?

Student Achievement

1. Kentucky has a four-year high school graduation rate of 79.9 percent in 2009-10, which ranks 23rd nationally and is 1.7% above the national average.
2. Kentucky's scores on the National Assessment of Educational Progress (NAEP) exams in reading and math for 4th and 8th grades have been relatively flat since 2003. However, the state's students have consistently scored above the national average in reading in the 4th and 8th grades and in math in the 4th grade, despite it's greater than average poverty rate.

Educational Funding Distribution Systems

Each of the 50 states employs a unique system for allocating funds to local education agencies. These systems are developed in various ways and take into account state specific political and historical factors. These factors include political decisions, fiscal constraints and judicial mandates. While each state's funding system is unique, it is possible to place these funding systems into general categories for comparative purposes. A recent study by Deborah Verstegen (2011) at the University of Nevada, Reno put each of the 50 states' systems into one of four general funding categories:

1. *Foundation formula* (38 states) – Foundation formulas establish a guaranteed per pupil or per teacher funding level that is theoretically designed to pay for a basic or minimum education program. Local education agencies are required to contribute to the foundation amount - usually through a uniform tax rate. The state makes up the difference between local funding and the total foundation amount (for more details see Odden & Picus, 2008). In some states this system is known as a base or guaranteed funding system.
2. *District power equalization* (3 States) – District power equalization, frequently also called a Guaranteed Tax Base (GTB), is designed to provide state funding matches to local educational agencies based on their relative wealth. Theoretically this type of formula functions by guaranteeing an equal tax base to every local education agency in

the state. Verstegen (2011) assigns Vermont, Connecticut and Wisconsin to this category.
3. *Full state funding* (1 state) – The state of Hawaii operates as a single school district, and because of this 100 percent of school funding comes from state sources.
4. *Combination of formulas* (8 states) – Eight states use a combination of a foundation formula, power equalization formula, flat grants and/or other types of funding methods. These systems are often referred to as two-tier or multi-tier systems. A common approach is a first tier foundation level followed by a second tier of optional funding supported through guaranteed tax base or percentage power equalization.

Note that it can be difficult, bordering on impossible, to place each state's funding system into a single category - Kentucky's funding system is an example of this. This study defines the Kentucky system as using a foundation formula along with 37 other states. However, Kentucky like other states also makes use of equalization program for tier two, flat grants and other methods to fund their schools, essentially a Combination program (Foundation Program with a Guaranteed Tax Base).

Funding Special Student Populations

States often provide supplementary funding to local school districts for certain student populations that may require additional resources to meet their educational needs. This can include students enrolled in special education, students who are identified as at- risk or low income, and English learners. Forty-nine states provide additional funding for special education students – Rhode Island is the only exception. Thirty-four states provide additional funding for at-risk student populations – usually defined as low-income students who qualify for free/reduced priced lunch programs. Thirty-seven states provide additional funds for educating students who do not speak English as their first language.

Education Funding Systems in Comparative States

Our research has found that Kentucky's education funding system relies on a variation of a foundation formula that provides additional funding for special education, at-risk and English learners. In Kentucky special education funding is provided to districts by weighting students in the formula. A student's additional weight is based on the definition of their disability - low incidence disabilities receive an additional weight of 2.35, moderate incidence disabilities are weighted at 1.17, and high incidence disabilities receive an additional weight of 0.24 (*Kentucky Revised Statutes – 157.200*). Students who qualify for free lunch under the federal program receive an additional weight of 0.15 and students who have limited English proficiency receive an additional weight of 0.096. These weights are applied against the "foundation" level in KY. The approach used by Kentucky and each of the comparative states is summarized in Table 2.1. Important comparisons from this table include:

1. All 7 comparative states use a variation of a foundation formula to distribute funding to school districts.
2. While their systems may vary, all seven comparative states provide additional funding for special education and at-risk students.

3. Of the seven comparative states only West Virginia does not provide additional funding for English learners.
4. Six of the 7 comparative states provide districts with additional funding for student transportation – Arkansas is the only exception. Indiana, Tennessee and West Virginia provide transportation funding through their state's primary funding formula and Alabama, Missouri and Ohio provide funding through a system of allowable reimbursements.
5. Three comparative states (Indiana, Missouri and West Virginia) provide no funding to school districts for capital projects. Arkansas and Ohio provide funding for capital projects through approved grants, Tennessee funds capital projects through the state's funding formula and Alabama provides districts with grants to help cover the cost of debt service payments.

Table 2.1: Summary of Education Funding Systems across Comparative States

State	Funding Formula	Special Education Formula	At-Risk Formula	Limited English Proficiency Formula
Kentucky	Foundation with GTB in Tier 2 and unequalized 3rd tier	Per Pupil Weight	Students who qualify for free lunch receive an additional weight of 0.15	Identified students receive an additional weight of 0.096
Alabama	Foundation	Census	At-risk students are identified by their scores on the state's standardized tests. Each At-risk student receives an additional $100	Students who qualify for ELL services receive at-risk funding
Arkansas	Foundation	Cost Reimbursement	Districts receive additional funding based on a three tiered system of density	An additional $195 per identified student
Indiana	Foundation	Cost Reimbursement	At-risk students receive an additional weight of 0.4972 in 2013. The state also provides additional funding to districts with a high percentage of at-risk students.	Identified students receive an additional weight 0.22
Missouri	Foundation with a Guaranteed Tax Base for Tier 2 (a Combination Program).	Per Pupil Weight	An additional weight of 0.25 per student for districts with above average at-risk populations	If a district's student count is above a threshold set by the state then each student receive an additional weight of 0.60
Ohio	Foundation	A per pupil amount in the state formula based on 6 different disability categories.	Economically Disadvantaged (ED) students receive additional funding of $269 – this amount is adjusted up or down based on the percentage of students in the district who qualify as ED compared to the state average. The state estimates that the amount will range from $0 to $1,237 per pupil.	$1,500 in additional funding for Limited English Proficient (LEP) students in school less than 180 days, $1,125 for LEP students in school greater than 180 days and $758 for LEP students who are mainstreamed.
Tennessee	Foundation	Per Pupil Weight	Additional funding of approximately $518 per identified at-risk student	Districts receive funding for an additional teaching position for every 30 ELL students and an additional translator for every 300 ELL students
West Virginia	Foundation	Per Pupil Weight	Districts receive $18 for each student counted in net enrollment.	No additional funding

Sources: Verstegen, D. A. (2011), Griffith, M. & Workman E. (2013)

Transportation and Capital Costs

Two programs that tend to be funded by states outside of the primary funding formula are transportation costs and capital expenditures. Kentucky funds transportation costs outside of the formula based on the number of students per square mile who need to be transported greater than one mile (KRS 157.370). Of the other 49 states, 10 address transportation costs within the primary formula, and three states provide no funding at all, the remaining 36 states address this issue outside of the primary formula because transportation needs varies so greatly between districts. The various systems that states use to allocate transportation costs outside of the primary formula include:

1. Allowable reimbursement (16 states) – The state reimburses districts for a percentage of allowable transportation expenses
2. Density formulas (8 states) – The state funds districts based on the number of district students per square mile
3. Per pupil (5 states) – The state provides funding to each district based on a set amount per pupil
4. Full reimbursement (5 states) – The state reimburses each district the full cost of allowable transportation expenses
5. Equalized reimbursements (3 states) – The state provides a reimbursement to districts that are equalized based on their relative wealth.

States often address capital costs outside of the primary formula as well. Kentucky provides $100 per student within the state's funding formula for capital costs and also provides grants to districts to pay the cost of bonds for approved projects (*KRS 157.611*). Twelve states provide no funding for capital costs. Of the remaining 38 states – six use their primary formula to fund capital costs, four states use a combination of funding from their primary formula and other funding sources outside of the formula and the remaining 28 states use one or more funding programs outside the primary formula. The various types of funding that exist outside the formula are (Note: Some states use multiple funding systems):

1. Approved project grants (13 states)
2. Equalized project grants (10 states)
3. Equalized debt service (6 states)
4. State bond guarantees (5 states)
5. Subsidized loans to school districts (4 states)
6. Debt service grants to school districts (2 states).

Table 2.2 below summarizes the transportation and capital cost provisions of the school funding formulas in Kentucky and the seven other comparable states.

Table 2.2
Transportation & Capital Expenditures across Comparative States

State	Transportation	Capital Costs
Kentucky	Funding is based on a "Density formula" (KRS – 157.370)	Districts are provided with $100 per student for capital costs in the formula. In addition the state provides grants for capital and debt service.
Alabama	Allowable reimbursements	State grants for debt service
Arkansas	No state funding	Project grants
Indiana	Transportation funds provided in the primary funding formula	No state funding
Missouri	Allowable reimbursements	No state funding
Ohio	Allowable reimbursements	Project grants
Tennessee	Transportation funds provided in the primary funding formula	Funding provided in the primary formula. The following are the estimate per pupil amounts: K-4; $662, Grades 5-8; $729, Grades 9-12; $848
West Virginia	Transportation funds provided in the primary funding formula	No state funding

State Funding Comparisons

As part of this study, we compared education funding and student performance in Kentucky to all 50 states and conducted a more in-depth comparative analysis with the seven similar states. Educational expenditure, demographic and student achievement data were reviewed for all 50 states beginning with fiscal year 2000-2001 through 2012-13.

Educational Expenditures

Total K-12 Expenditures

A review of data from the United States Census Bureau (U.S. Census) shows that from fiscal year 2001-02 to 2010-11 state and local revenue for public K-12 education in Kentucky grew from $4.13 billion to $5.94 billion - an increase of just over $1.8 billion, or 43.7 percent. During this same period, state and local revenue for K-12 education in all 50 states increased by 35.7 percent ($138.3 billion). In the seven comparative states, local and state revenue for education increased at the rate of 29.9 percent ($13.9 billion). Table 2.3 shows these changes for all seven comparative states.

Table 2.3
Growth in Local & State Revenue for K-12 Education

	State and Local K-12 Revenue		Change from FY 2001-02 to FY 2010-11	
	FY 2001-02	FY 2010-11	Dollars	Percentages
National	$387,094,037	$525,438,983	$138,344,946	35.7%
Comparative States	$46,600,355	$60,533,830	$13,933,475	29.9%
Kentucky	$4,133,414	$5,938,604	$1,805,190	43.7%
Alabama	$4,618,431	$6,298,086	$1,679,655	36.4%
Arkansas	$2,804,754	$4,329,791	$1,525,037	54.4%
Indiana	$8,511,536	$10,827,175	$2,315,639	27.2%
Missouri	$6,852,442	$8,498,185	$1,645,743	24.0%
Ohio	$16,446,985	$20,253,505	$3,806,520	23.1%
Tennessee	$5,210,998	$7,372,769	$2,161,771	41.5%
West Virginia	$2,076,145	$2,954,319	$799,110	37.1%

Source: United States Census Bureau (2014)

Per Student Expenditures

As shown in Table 2.4, in FY 2002-03 Kentucky's average per pupil expenditure was $7,242, ranking 29th highest in the nation – $633 or 8.0 percent below the national average of $7,875 per pupil. In 2012-13 Kentucky's average per pupil expenditure grew to $9,891, which was $1,177 or 10.6 percent below the national average of $11,068. Kentucky's 2012-13 per pupil spending ranked 31st nationally. In 2012-13 in the other seven comparative states, spending ranged from $8,695 per pupil in Tennessee to $13,215 in Arkansas.

From fiscal year 2003-04 to 2012-13 Kentucky's per pupil expenditures for public primary and secondary schools increased by $2,395 or 32 percent. Kentucky's percentage spending growth was the 31st highest in the nation. Nationally, average spending per pupil increased by $2,820 or 34.2 percent. If Kentucky's per pupil spending had grown at the national average, spending in 2012-13 would have been $10,060 per pupil – or $169 greater than the actual spending level. In the other seven comparative states per student expenditures increases ranged from 10 percent in Ohio to 120.1 percent in Arkansas; Arkansas' large increase was due to a significant funding hike in response to a Supreme Court decree that the state adequately fund its schools. Details of these changes are displayed in Table 2.4.

Table 2.4
Growth in Per-Pupil Spending

	Per Pupil Expenditures *(National Rank)*		Growth in Expenditures *(National Rank)*	
	2003-04	2012-2013	Dollars	Percentage
National	$8,248	$11,068	$2,820	34.2%
Comparable States	$7,744	$10,175	$2,431	31.4%
Kentucky	$7,496 (29)	$9,891 (31)	$2,395 (30)	32.0% (31)
Alabama	$6,701 (41)	$8,779 (41)	$2,078 (39)	31.0% (37)
Arkansas	$6,005 (47)	$13,215 (14)	$7,210 (05)	120.1% (01)
Indiana	$8,414 (21)	$11,129 (22)	$2,715 (27)	32.3% (30)
Missouri	$6,947 (38)	$10,093 (34)	$3,164 (18)	45.3% (15)
Ohio	$9,035 (16)	$9,941 (30)	$906 (48)	10.0% (48)
Tennessee	$6,501 (44)	$8,695 (42)	$2,194 (34)	33.7% (26)
West Virginia	$9,018 (17)	$12,116 (17)	$3,098 (19)	34.4% (24)

Source: National Education Association's Rankings & Estimates (2014)

Per Student Expenditures Adjusted by the Comparable Wage Index

In an attempt to compare student expenditure data across states this study adjusted each state's per pupil expenditure amounts by the Comparable Wage Index (CWI). The CWI was created by the National Center for Education Statistics (NCES) in an attempt to measure the systematic, regional variations in salaries of college graduates who are not educators. This means that the CWI attempts to adjust funding amounts based on a state's cost of doing business. As shown in Table 2.5, in FY 2003-04 Kentucky's average per pupil expenditure adjusted by CWI was $7,855, ranking 29th in the nation – $393 or 4.8 percent below the national average of $8,248 per pupil. In 2012-13 Kentucky's average per pupil expenditure adjusted by CWI grew to $10,646 which was $422 or 3.8 percent below the national average of $11,068. That year, Kentucky's per pupil spending adjusted by CWI ranked 29nd nationally. In 2012-13, in the other seven comparative states, spending adjusted by CWI ranged from $8,971 per pupil in Tennessee to $14,815 in Arkansas.

From fiscal year 2003-04 to 2012-13 Kentucky's per pupil expenditures adjusted by CWI for public primary and secondary schools increased by $2,791 or 35.5 percent. Kentucky's percentage spending growth was the 26th highest in the nation. Nationally, average spending per pupil increased by $2,820 or 34.2 percent. Increases in the other seven comparative states per student expenditures, adjusted by CWI, ranged from 14.4 percent in Ohio to 118.7 percent in Arkansas. Details of these changes are displayed in Table 2.5.

Table 2.5
Per-Pupil Spending Adjusted by CWI

	Per Pupil Expenditures *(National Rank)*		Growth in Expenditures *(National Rank)*	
	2003-04	2012-2013	Dollars	Percentages
National	$8,248	$11,068	$2,820	34.2%
Comparative States	$7,937	$10,743	$2,805	35.3%
Kentucky	$7,855 (29)	$10,646 (29)	$2,791 (26)	35.5% (26)
Alabama	$7,107 (38)	$9,213 (42)	$2,106 (39)	29.6% (36)
Arkansas	$6,773 (41)	$14,815 (8)	$8,042 (03)	118.7% (01)
Indiana	$8,841 (17)	$12,106 (18)	$3,266 (20)	36.9% (24)
Missouri	$7,219 (37)	$10,873 (25)	$3,655 (16)	50.6% (15)
Ohio	$8,786 (18)	$10,051 (34)	$1,265 (48)	14.4% (48)
Tennessee	$6,554 (46)	$8,971 (43)	$2,417 (34)	36.9% (25)
West Virginia	$9,959 (06)	$13,175 (14)	$3,216 (22)	32.3% (31)

Source: National Education Association's Rankings & Estimates (2014)

State Financial Commitment to Education

In comparing per pupil expenditures for education across states it is important to consider how "hard" a state works to reach its spending level. One approach for estimating this level of effort is to analyze K-12 education expenditures per $1,000 of personal income. State and local spending for K-12 education in Kentucky during the 2009-10 school year (the most recent year for which data are available) was $42 per $1,000 of personal income. Kentucky has the 26th highest level of effort in supporting education when computed in this manner. The national average in 2009-10 was $41 per $1,000 of income, a figure that was unchanged from 1999-2000. In the other comparative states in 2009-10, the amount ranged from $32 in Iowa to $49 in West Virginia. See Table 2.6 for more detailed findings.

Another way to assess a state's fiscal commitment to education is to determine the percentage of the state's budget devoted to K-12 public schools. During the 2012-13 fiscal year K-12 expenditures accounted for 19.6 percent of total state expenditures in Kentucky while the national average was 20.0 percent. The percentage of Kentucky's budget going to K-12 education has remained fairly consistent since 2003-04 – only varying from a high of 20.6

percent in 2007- 08 to a low of 19.3 percent in 2003-04 (National Association of State Budget Officers, 2012). Table 2.7 summarizes the share of each comparative state's budget devoted to K-12 education in 2003-04 and 2010-11.

Table 2.6
K-12 Spending Per $1,000 of Income

	K-12 Spending per $1,000 of Income *(National Rank)*		Change in Expenditures *(National Rank)*	
	2000-2001	2009-2010	Dollars	Percentages
National	$42	$41	-$1	-2.4%
Comparative States	$43	$42	-$1	-2.3%
Kentucky	$41 (28)	$42 (26)	$1 (17)	2.4% (18)
Alabama	$40 (34)	$37 (40)	-$3 (33)	-7.5% (35)
Arkansas	$41 (28)	$44 (16)	$3 (12)	7.3% (13)
Indiana	$50 (4)	$46 (10)	-$4 (36)	-8.0% (36)
Missouri	$41 (28)	$43 (20)	$2 (14)	4.9% (16)
Ohio	$48 (10)	$41 (28)	-$7 (45)	-14.6% (45)
Tennessee	$31 (50)	$32 (46)	$1 (17)	3.2% (17)
West Virginia	$52 (03)	$49 (9)	-$3 (33)	-5.8% (33)

Source: National Education Association

Table 2.7
State K-12 Expenditures as a Percent of Total State Expenditures

	K-12 Expenditures as a % of total state expenditures *(National Rank)*		Change in Expenditures *(National Rank)*
	2003-04	2012-2013	
National	21.4%	20.0%	**-1.7%**
Comparative States	19.7%	19.7%	**0.0%**
Kentucky	19.3% (29)	19.6% (22)	
Alabama	23.4% (21)	21.4% (18)	-2.0% (32)
Arkansas	16.3% (43)	15.5% (36)	-0.8% (23)
Indiana	22.9% (22)	31.3% (02)	8.4% (01)
Missouri	24.5% (14)	22.8% (15)	-1.7% (29)
Ohio	19.4% (27)	19.8% (20)	0.4% (09)
Tennessee	16.3% (43)	17.8% (29)	1.5% (06)
West Virginia	11.8% (49)	9.5% (49)	-2.3% (34)

Source: National Association of State Budget Officers (2014)

FACTORS THAT DRIVE EDUCATIONAL EXPENDITURES

There are multiple factors that can influence the growth, or reduction, of education spending in a state. These can include: changes in the size of the state's student population, increases in teacher/staff compensation, growth in the number of teachers/staff and increases in costs outside of the state/districts powers (i.e. fuel or energy costs). A number of these issues have impacted Kentucky over the past decade.

Student Population

Over the past decade Kentucky has experienced growth in its K-12 student population. Between 2003-2004 and 2012-13, Kentucky's K-12 public school population increased 4.8 percent from 631,852 to 662,345 (NEA, 2013)– an increase of 30,493 students. This was the 15th largest percentage population increase in the nation. During this same period of time the national K-12 public school population increased by 2.6% and the student population in comparative states grew by 2.5 percent. State enrollment data can be found on Table 2.8.

While the state's student population was increasing, the number of school districts remained essentially the same. As a result, Kentucky's average district size increased by 217 students or

6.0 percent between 2003-04 and 2012-13. For the 2012-13 fiscal year Kentucky had the 17th largest average district size in the country at 3,807 students per district. Data on comparable states and the national average school district size is displayed in Table 2.9.

Table 2.8
Student Population Changes

	Total Student Enrollment		**Change in Enrollment** *(National Rank)*	
	2003-2004	**2012-2013**	**Students**	**Percentages**
National	48,067,419	49,326,517	1,259,098	2.6%
Comparative States	6,130,624	6,286,774	156,150	2.5%
Kentucky	631,852	662,345	30,493 (15)	4.8% (15)
Alabama	729,339	735,605	6,266 (27)	0.9% (28)
Arkansas	452,036	472,733	20,697 (19)	4.6% (16)
Indiana	1,010,492	1,042,018	31,526 (14)	3.1% (21)
Missouri	892,872	906,811	13,939 (24)	1.6% (25)
Ohio	1,845,428	1,867,582	22,154 (18)	1.2% (26)
Tennessee	919,896	979,806	59,910 (8)	6.5% (13)
West Virginia	280,561	282,219	1,658 (30)	0.6% (29)

Source: National Education Association (2013)

Table 2.9
Average School District Sizes

	Average District Size (National Rank)	
	2003-04	*2012-13*
National	3,129	3,177
Comparative States	2,972	3,293
Kentucky	3,590 (21)	3,807 (17)
Alabama	5,610 (13)	5,490 (13)
Arkansas	1,468 (41)	1,854 (35)
Indiana	3,281 (24)	2,824 (25)
Missouri	1,704 (39)	1,731 (38)
Ohio	2,071 (35)	1,838 (36)
Tennessee	6,814 (11)	7,204 (10)
West Virginia	5,101 (14)	5,131 (14)

Source: National Education Association. Rankings and Estimates, 2000 through 2013

Low-Income Student Population

A recent study found that the majority of states use a student's qualification for the federal free or reduced price lunch program to identify students as at-risk (Verstegen 2011). A student qualifies for the free lunch program if his/her family income is 130 percent or less than the federal poverty level. Students qualify for a reduced price lunch if their family income is between 130 percent and 185 percent of the federal poverty rate. In the 2011-12 school year 54.4 percent of Kentucky's students qualified for the F/R price lunch program – this is a 3.1 percent increase from 2006-07 – the year prior to the start of the recession. The percentage of students who qualify for the F/R price lunch program in Kentucky has actually decreased from its high of 56.6 percent in 2010-11.

Table 2.10
Low-Income Students by State

	Percentage of Students Eligible for Free/Reduced Price Lunch *(National Rank)*	
	2006-07	2011-2012
National	42.4%	49.6%
Comparative States	42.0%	50.2%
Kentucky	51.3% (8)	54.4% (12)
Alabama	51.0% (10)	57.5% (10)
Arkansas	58.7% (05)	60.9% (06)
Indiana	37.6% (27)	48.0% (26)
Missouri	39.1% (24)	46.5% (29)
Ohio	33.8% (35)	43.6% (33)
Tennessee	48.7% (13)	57.5% (09)
West Virginia	49.7% (12)	52.8% (16)

Source: U.S. Department of Education

English Learners

In 2010-11, 2.7 percent of students in Kentucky were identified as "English Learners" (ELs) ranking the state 42nd in the country. At the national level 9.8 percent of students were identified as EL – this is over four times higher than the rate in Kentucky. All of the comparative states EL populations were below the national average - ranging from Arkansas at 6.6 percent to West Virginia at 0.6 percent. Between 2006-07 and 2010-11 Kentucky saw an increase in their EL population from 1.7 percent to 2.4 percent - an increase of 0.7 percent or approximately 4,600 students.

Table 2.11
English Learners by State

	Percentage of Students who Qualify as English Learners *(National Rank)*	
	2006-07	2010-2011
National	8.8%	9.8%
Comparative States	2.5%	3.0%
Kentucky	1.7% (46)	2.4% (42)
Alabama	2.5% (41)	2.4% (42)
Arkansas	4.9% (27)	6.6% (21)
Indiana	4.1% (36)	4.7% (32)
Missouri	1.9% (43)	2.3% (45)
Ohio	1.6% (47)	2.1% (46)
Tennessee	3.0% (39)	3.0% (37)
West Virginia	0.8% (51)	0.6% (51)

Source: U.S. Department of Education (2014)

Special Education Student Population

Between 2007-08 and 2011-12 the percentage of students in Kentucky who qualify for special education services under the federal -part B decreased from 16.4 percent to 14.7 percent. This decrease in the special education population mirrors a national trend – during this same time period the number of students qualifying for special education services in the United States decreased from 13.4 percent to 12.9 percent. Even with the decrease the percentage of special education students in Kentucky is still 1.8 percent above the national average. The percentage of students receiving special education services varied in comparative states from a low of 10.6 percent in Alabama to a high of 15.7 percent in Indiana and West Virginia.

Table 2.12
Special Education Students by State

	Percentage of Students Qualifying Under The Federal Individuals with Disability Act, Part B *(National Rank)*	
	2007-08	2011-2012
National	13.4%	12.9%
Comparative States	14.5%	13.9%
Kentucky	16.4% (9)	14.7% (15)
Alabama	11.4% (43)	10.6% (48)
Arkansas	13.8% (30)	13.4% (31)
Indiana	17.1% (05)	15.7% (09)
Missouri	15.1% (15)	13.6% (26)
Ohio	14.8% (18)	14.9% (14)
Tennessee	12.5% (37)	12.6% (36)
West Virginia	16.9% (06)	15.7% (09)

Source: U.S. Department of Education

Teachers

Data collected by NCES show that employee salaries and benefits account for just over 80 percent of all public school expenditures. The majority of these salary and benefit expenses can be traced to teacher salaries. Consequently, increases in teacher pay and/or increases in the number of teachers employed in a state can drive up total educational expenditures.

In 2012-13, the average teacher salary in Kentucky was $50,326, which was $6,057 (10.7 percent) lower than the national average teacher salary of $56,383. In 2003-2004 average teacher salaries in Kentucky were $40,240 or 13.8 percent lower than the national average of $46,704. Between 2003-04 and 2012-13 Kentucky's teacher salaries grew by $10,086 or 25.1 percent while the national average teacher salary during that time grew by $9,679 for an increase of 20.7 percent. These data are displayed in Table 2.13.

Table 2.13
State Average Teacher Salaries

	Average Teacher Salaries *(National Rank)*		Salary Increases *(National Rank)*	
	2003-04	2012-13	Dollars	Percentages
National	$46,704	$56,383	$9,679	20.7%
Comparative States	$41,300	$50,992	$9,692	23.5%
Kentucky	$40,240 (33)	$50,326 (27)	$10,086 (24)	25.1% (17)
Alabama	$38,285 (42)	$47,949 (38)	$9,664 (26)	25.2% (16)
Arkansas	$39,314 (36)	$46,632 (44)	$7,318 (40)	18.6% (40)
Indiana	$45,791 (16)	$51,456 (25)	$5,665 (48)	12.4% (47)
Missouri	$38,278 (43)	$47,517 (40)	$9,239 (27)	24.1% (20)
Ohio	$47,482 (14)	$58,092 (14)	$10,610 (20)	22.3% (26)
Tennessee	$40,318 (32)	$48,289 (35)	$7,971 (37)	19.8% (35)
West Virginia	$38,461 (39)	$46,405 (46)	$7,944 (38)	20.7% (32)

Source: National Education Association. Rankings and Estimates, 2000 through 2013

Teacher Salaries Adjusted by Comparable Wage Index

In an attempt to compare teacher salary data across states this study adjusted each state's per pupil expenditure amounts by the Comparable Wage Index (CWI). In 2012-13, the average teacher salary adjusted by CWI in Kentucky was $54,170 that was $2,213 (3.9 percent) lower than the national average teacher salary of $56,383. In 2003-2004 average teacher salaries adjusted by CWI in Kentucky were $5,102 or 11.1 percent lower than the national average of $46,704. Between 2003-04 and 2012-13 Kentucky's teacher salaries adjusted by CWI grew by $12,001 or 28.5 percent while the national average teacher salary during that time grew by $9,679 for an increase of 20.7percent. These data are displayed in Table 2.14.

Table 2.14
State Average Teacher Salaries Adjusted for CWI

	Average Teacher Salaries Adjusted by Comparable Wage Index *(National Rank)*	
	2003-04	2012-13
National	$46,704	$56,383
Comparative States	$43,564	$53,668
Kentucky	$42,168 (32)	$54,170 (26)
Alabama	$40,603 (42)	$50,319 (37)
Arkansas	$44,342 (22)	$52,279 (31)
Indiana	$48,113 (08)	$55,975 (21)
Missouri	$39,774 (45)	$51,189 (33)
Ohio	$46,174 (15)	$58,736 (11)
Tennessee	$40,648 (40)	$49,825 (38)
West Virginia	$42,476 (30)	$50,461 (36)

Sources: National Education Association (2013), National Center for Education Statistics (2013)

For this study the teaching positions includes only "classroom teachers" as defined by the NEA's Rankings & Estimates publications. This would include "… staff members assigned the professional activities of instructing pupils in self-contained classes or courses, or in classroom situations" (NEA, 2013). This definition would not include other instructional and non-instructional staff such as administrative staff, guidance personnel, librarians, principals or psychological personnel. In Kentucky from 2003-04 to 2012-13 the number of full-time equivalent (FTE) teaching positions increased by 776, or 1.9 percent, which includes core content and specialist teachers. Nationally the number of teachers increased by 2.2 percent and in the comparison states they decreased by 3.2 percent. The number of teaching positions in Kentucky increased at a slightly great rate the number of students, which has led to a slight reduction in the student to teacher ratio from 16.1 to 1 in 2003-04 to 15.8 to 1 in 2012-13 (NEA, 2013). Nationally, average student to teacher ratio in 2012-13 was 15.9 to 1 and the average in the comparative states was 15.6 to 1 in that same year. Note that these are not class size ratios, but the ratios of the number of classroom teachers to student enrollment.

Table 2.15
Student to Teacher Ratios

	Change in FTE Teaching Positions 2003-04 to 2012-13 *(National Rank)*		Teacher to Student Ratios *(National Rank)*	
	Total	Percentage	2003-04	2012-13
National	65,555	2.2%	15.9	15.9
Comparative States	-13,121	-3.2%	15.4	15.6
Kentucky	776 (28)	1.9% (31)	16.1 (35)	15.8 (32)
Alabama	-11,770 (48)	-20.3% (50)	12.6 (3)	15.9 (35)
Arkansas	322 (33)	1.0% (33)	14.7 (21)	15.2 (26)
Indiana	3,663 (14)	6.1% (18)	16.9 (40)	16.4 (40)
Missouri	3,553 (15)	5.5% (19)	13.9 (16)	13.2 (11)
Ohio	-15,242 (49)	-12.5% (45)	15.2 (29)	17.5 (41)
Tennessee	6,533 (07)	11.0% (12)	15.7 (32)	14.8 (25)
West Virginia	-180 (38)	-0.9% (39)	14.0 (17)	14.2 (20)

Source: Teacher data and administrator data – Education Commission of the States, 2000 through 2013.

Federal Education Spending

From 2001-02 to 2010-11 the percentage of K-12 educational spending in Kentucky coming from federal sources increased from 10.5 percent to 16.4 percent. During this same time period the national average of funding from federal sources increased from 7.8 percent to 12.3 percent. This increased reliance on federal funding for education, both in Kentucky and on a national level, can be traced to two developments. First, in 2009 the federal government passed the American Recovery and Reinvestment Act that pumped an additional $70 billion into K-12 education between 2008-2009 and 2011-12 (Education Commission of the States, 2009). At this same time, most states were decreasing their own budgetary commitment to K-12 education. These two factors worked to increase the percentage of funds that are derived from federal sources. For a state-by-state breakdown see Table 2.16.

Table 2.16
K-12 Funding From Federal Sources

	Percentage of K-12 Funding From Federal Sources *(National Rank)*	
	2001-2002	2010-2011
National	7.8%	12.3%
Comparative States	7.4%	12.4%
Kentucky	10.5% (12)	16.4% (8)
Alabama	9.9% (14)	14.6% (16)
Arkansas	10.6% (11)	16.0% (10)
Indiana	5.8% (43)	8.6% (43)
Missouri	7.4% (31)	13.7% (23)
Ohio	5.6% (44)	11.1% (33)
Tennessee	9.6% (16)	14.7% (15)
West Virginia	10.7% (10)	14.7% (15)

Educational Outcomes

Overall, Kentucky's students perform slightly above average on standardized tests compared to students in the United States, and are at about the average in performance among the eight comparative states. Below we show how Kentucky compares on the National Assessment of Educational Progress (NAEP).

National Assessment of Educational Progress

NAEP assessments are administered periodically to students in reading, mathematics, science, writing, U.S. history, civics, geography, and other subjects since 1969 (NCES, 2013). Federal law now requires all states that receive Title I funds – which currently all states receive – to participate in NAEP reading and mathematics assessments at fourth and eighth grades (NAEP, 2013). Because of this comparable fourth and eighth grade math and reading NAEP results exist for all states for the 2003, 2005, 2007, 2009, 2011 and 2013 assessments.

NAEP - Scale Scores

Cross state comparisons using NAEP data can be made using average scale scores, or student achievement levels. When reviewing Kentucky's average scale scores on the NAEP Math and Reading exams for the 4^{th} and 8^{th} grade, there are some positive conclusions and some areas

where the results suggest more can be done. Overall, a review of NAEP scores from 2003-2013 show positives and areas of concern.

Positives:

1. In every year that was reviewed, Kentucky's 4th and 8th grade reading scores were above the national average
2. Kentucky's 4th and 8th grade reading scores ranked 1st among comparable states
3. Kentucky's test scores for both math and reading in the 4th and 8th grades improved from 2003 to 2013

Kentucky NAEP – Math & Reading Scores *(National Rank)*

	2003	**2013**
Math – 4th Grade	237 (19)	245 (18)
Math – 8th Grade	274 (35)	281 (35)
Reading – 4th Grade	219 (27)	224 (17)
Reading – 8th Grade	266 (20)	270 (15)

Areas of Concern:

1. Kentucky's 8th grade math scores consistently finished below the national average between 2003 and 2013.
2. Test results for 2013 show that students who are eligible for free/reduced price lunch in Kentucky are half as likely to have NAEP test results that are at or above proficient as students who are not eligible for this program

Table 2.17a
Percentage of Students Finishing At or Above Proficient – 2013

	Students Eligible for Free/Reduced Price Lunch	Students Not Eligible for Free/Reduced Price Lunch
4th Grade Math	28%	56%
8th Grade Math	16%	44%
4th Grade Reading	23%	51%
8th Grade Reading	25%	50%

NAEP – Student Achievement Levels

Student test results are divided into four different student achievement levels – advanced, proficient, basic and below basic. These performance standards are set by the National Assessment Governing Board and provide a context for interpreting student performance on NAEP, based on recommendations from panels of educators and members of the public (NAEP, 2011). For comparison purposes this study reviewed NAEP student test results that were at or above basic and at or above proficient. Table 2.17b shows the results for Kentucky's students between 2003 and 2013.

Table 2.17b
Summary of Kentucky's Reading and Math NAEP results, 2003 to 2013 Percent of Students Who Scored At or Above Basic

Percent of Students Who Scored At or Above Basic

	2003	2005	2007	2009	2011	2013
Math - 4th grade	72%	75%	79%	81%	85%	84%
Math – 8th grade	65%	64%	69%	70%	72%	71%
Reading – 4th grade	64%	65%	68%	72%	72%	71%
Reading – 8th grade	78%	75%	73%	79%	79%	80%

Table 2.17c
Percent of Students Who Scored At or Above Proficient

	2003	2005	2007	2009	2011	2013
Math - 4th grade	22%	26%	31%	37%	39%	41%
Math – 8th grade	24%	23%	27%	27%	31%	30%
Reading – 4th grade	31%	31%	33%	36%	35%	36%
Reading – 8th grade	34%	31%	28%	33%	36%	38%

Above the National Average But Below the Highest Achieving State

In 2013 Kentucky had a higher percentage of students score at or above basic and proficient in 4th and 8th grade reading and at or above basic in 4th grade math than the national average. The only time that Kentucky did not finish above the national average was for students performing at or above both basic and proficient in 8th grade math. However, the percentage of students who scored at or above basic and proficient was consistently higher in Massachusetts, a state whose students consistently finish at the top on national exams.

Table 2.18
Kentucky's Math and Reading NAEP Results Compared to Massachusetts and the National Average for 2013

	At or above	Kentucky	National	Massachusetts
Math 4th Grade	Basic	84%	82%	93%
	Proficient	41%	41%	58%
Math 8th grade	Basic	71%	73%	86%
	Proficient	30%	34%	55%
Reading 4th grade	Basic	71%	67%	79%
	Proficient	36%	34%	47%
Reading 8th grade	Basic	80%	77%	84%
	Proficient	38%	34%	48%

Table 2.19 provides more detail on how Kentucky students did on the NAEP and compares Kentucky's result to both the comparative states, and to national outcomes.

Table 2.19
Kentucky NAEP results along with Comparative State and National Averages, Math and Reading NAEP Scale Scores 2003 to 2013

Math 4th Grade	Kentucky Scores			National Average Scores
Year	Average	National Ranking	Comparative State Ranking	
2003	237	19	6	234
2005	241	19	6	237
2007	244	10	6	239
2009	244	15	4	239
2011	245	9	3	240
2013	245	18	3	241

Math 8th Grade	Kentucky Scores			National Average Scores
Year	Average	National Ranking	Comparative State Ranking	
2003	274	35	4	276
2005	274	37	4	278
2007	279	34	4	280
2009	279	35	4	282
2011	282	32	4	283
2013	281	36	4	284

Reading 4th Grade	Kentucky Scores			National Average Scores
Year	Average	National Ranking	Comparative State Ranking	
2003	219	27	4	216
2005	220	27	3	217
2007	222	26	2	220
2009	226	11	1	220
2011	225	10	1	220
2013	224	17	1	221

Reading 8th Grade	Kentucky Scores			National Average Scores
Year	Average	National Ranking	Comparative State Ranking	
2003	266	20	3	261
2005	264	25	3	260
2007	262	30	4	261
2009	267	18	3	262
2011	269	12	1	264
2013	270	15	1	266

Other Educational Measures

There are other ways to measure student achievement beyond the use of student test scores. Comparisons of graduation rates, for example, show that the percentage students who graduated from Kentucky's high schools within four years in the 2009-10 school year (the most recent available) were 79.9 percent (NCES, 2013)[2]. Kentucky's graduation rate was 1.7 percentage points higher than the national average and 23rd highest in the country. Between 2001-02 and 2009-10 Kentucky's high school graduation rate improved by 10.1 percentage points. Table 2.20 shows the high school graduation rates for Kentucky and other comparable states.

[2] The National Center for Education Statistics calculates four-year graduation rates by using the *"…aggregate student enrollment data to estimate the size of an incoming freshman class and aggregate counts of the number of diplomas awarded 4 years later*."

Table 2.20
High School Graduation Rates -Average freshmen four-year graduation rates

	Graduation Rates *(National Rank)*		Changes in Rates *(National Rank)*
	2001-2002	2009-2010	
National	72.6%	78.2%	5.6%
Kentucky	69.8% (39)	79.9% (23)	10.1% (4)
Alabama	62.1% (46)	71.8% (43)	9.7% (5)
Arkansas	74.8% (26)	75.0% (41)	0.2% (44)
Indiana	73.1% (32)	77.2% (30)	4.1% (29)
Missouri	77.8% (15)	83.7% (12)	6.9% (14)
Ohio	77.5% (18)	81.4% (19)	3.9% (31)
Tennessee	59.6% (50)	80.4% (21)	20.8% (1)
West Virginia	74.2% (30)	78.3% (28)	4.1% (29)

Source: National Center for Education Statistics, 2000 through 2013.

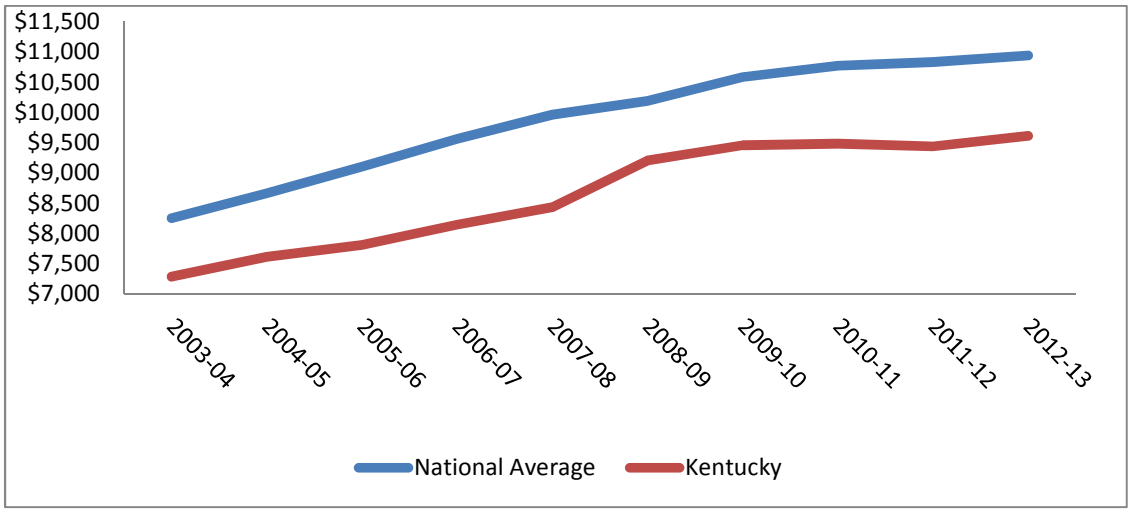
Another measure that is frequently used to gauge student performance is the number of high school graduates who enroll in college – this is commonly known as the "college going rate." The college going rate is a measure of the number of students who graduate from high school and begin college in the fall of the next school year. Kentucky's college going rate for 2007-08 was 60.9 percent, which was the 20th lowest in the country.[3] The national college going rate for that year was 63.8 percent. Because of the way that this number is measured, states that have a low high school graduation rate often have high college going rates – due to the fact that students who do not complete high school are not part of the equation. For this reason Mississippi, which had the 3rd lowest high school graduation rate at 63.9 percent, had the highest college going rate in the country at 77.4 percent

Below Average Funding

Kentucky's per pupil funding for the 2012-13 school year ranked 28th in the nation and was behind 3 of the 7 comparable states. In 2012-13 Kentucky spent $633 (8.0 percent) less per pupil than the national average (NEA, 2014). The gap between per pupil spending in Kentucky and the national average has stayed fairly consistent over the past decade, as can be seen in Chart 2.1.

[3] Calculated by the CL Higher Education Center using data from the U.S. Department of Education.

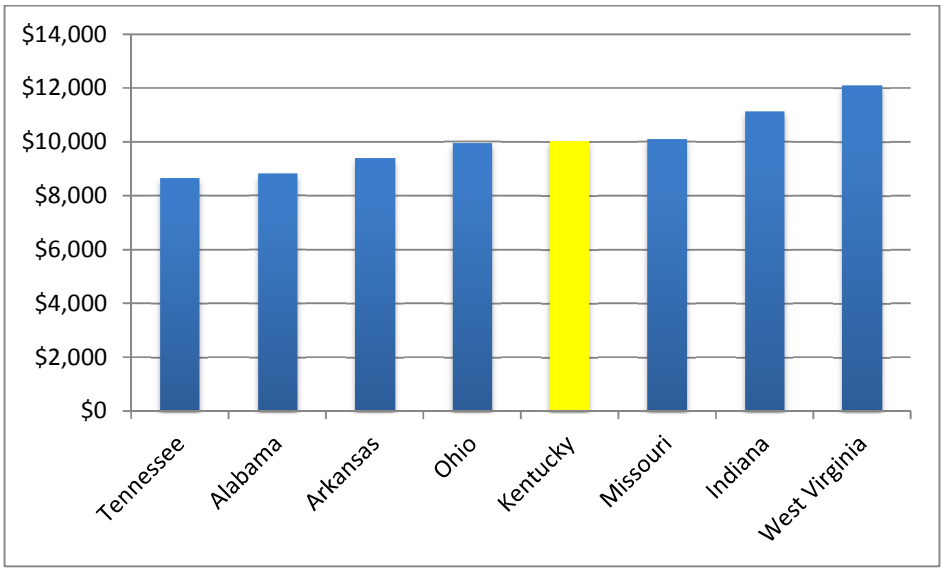
Chart 2.1
Per Pupil Spending FY 2003-04 to 2012-13



Source: NEA Rankings and Estimates, 2004 to 2014.

While Kentucky's per pupil funding amounts lag behind the national average they tend to rank in the middle of comparable states. In 2012-13 three of the comparable states had higher per pupil amounts than Kentucky and four had lower amounts (See Chart 2.2).

Chart 2.2
Per Pupil Spending FY 2012-13



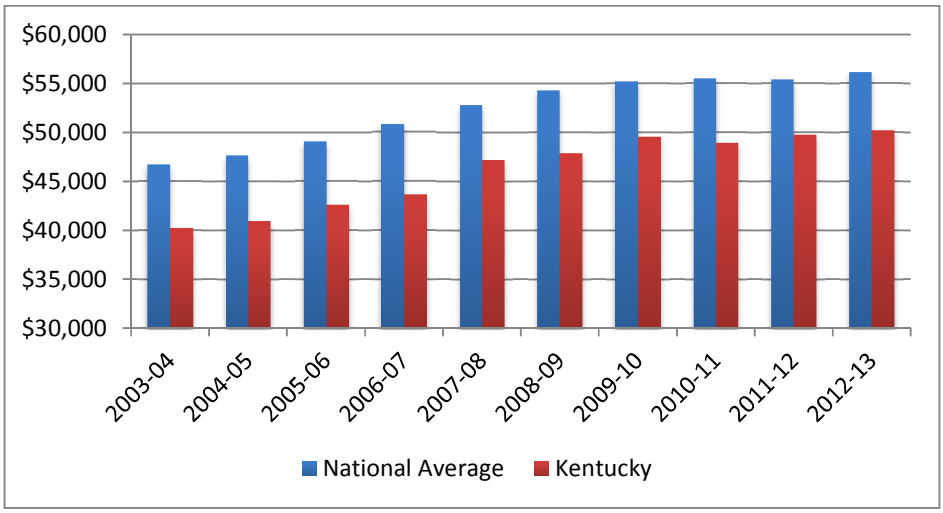
Source: NEA (2014)

One issue that can explain part of Kentucky's below average per pupil spending is the state's commitment to K-12 education in the state budget. Over the past decade Kentucky has committed a lower percentage of its total state expenditures to K-12 education than the national average – while the difference between Kentucky and the national average tends to be below 2 percent - that can still make a difference in education funding. In FY 2012-13 19.6 percent of Kentucky's total expenditures went to K-12 education – this was 0.4 percent below the national average of 20.0 percent. If Kentucky had increased its K-12 expenditures to meet the national average it would have provided an additional $101.7 million for K-12 education equating to an additional $153.60 per pupil.

Below Average Teacher Salaries

Over the past decade Kentucky's average classroom teacher salary has trailed the national average. In FY 2012-13 the average classroom teacher salary in Kentucky was $50,203, which was $5,900 (10.5 percent) below the national average. Between FY 2003-04 and FY 2012-13 Kentucky's average classroom teacher salaries trailed the national average by between 10.2 percent and 14.1 percent. To view the gap in average teacher salaries see Chart 2.3.

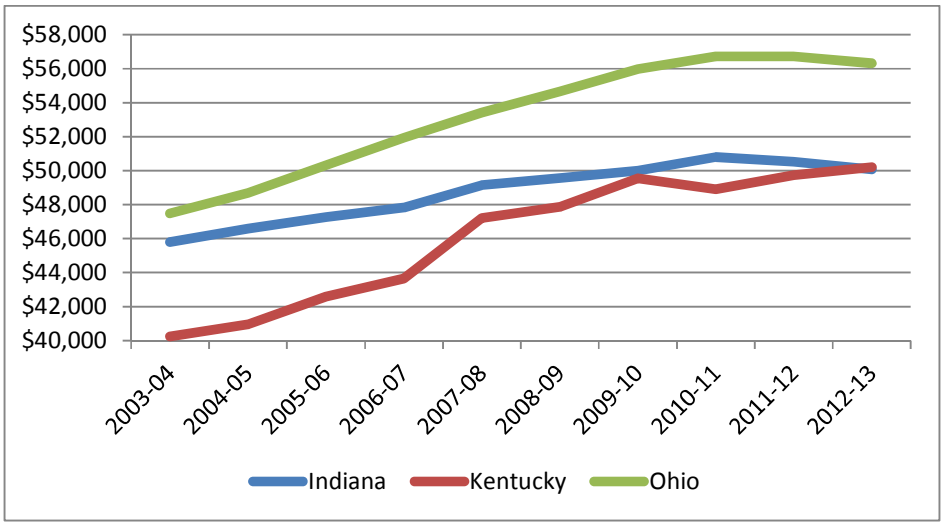
Chart 2.3
Average Classroom Teacher Salaries – FY 2003-04 to 2012-13



Source: NEA (2014)

Some school districts in Kentucky have to compete with school districts in Indiana and Ohio to hire or retain teachers. In FY 2003-04 the average classroom teacher pay in Indiana was13.8 percent higher than Kentucky while the average pay in Ohio was 18.0 percent higher. Over the decade the gap between classroom teacher pay between Kentucky and Ohio has closed somewhat to 12.2 percent while the gap between Kentucky and Indiana has completely closed (see Chart 2.4).

Chart 2.4
Average Classroom Teacher Pay

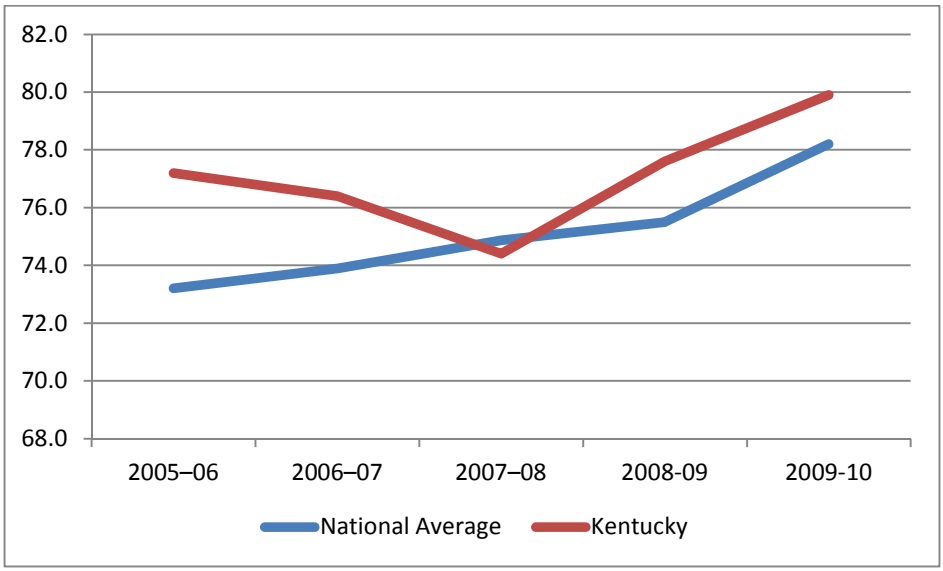


Source: NEA (2014)

Mixed Educational Outcomes

This study reviewed two different types of educational outcomes the first is high school graduation rates and the second is the National Assessment of Educational Progress (NAEP) exam results. According to National Center for Educational Statistics (NCES) Kentucky's four-year high school graduation rate generally exceeded the national average over the past five years (see Chart 2.5).

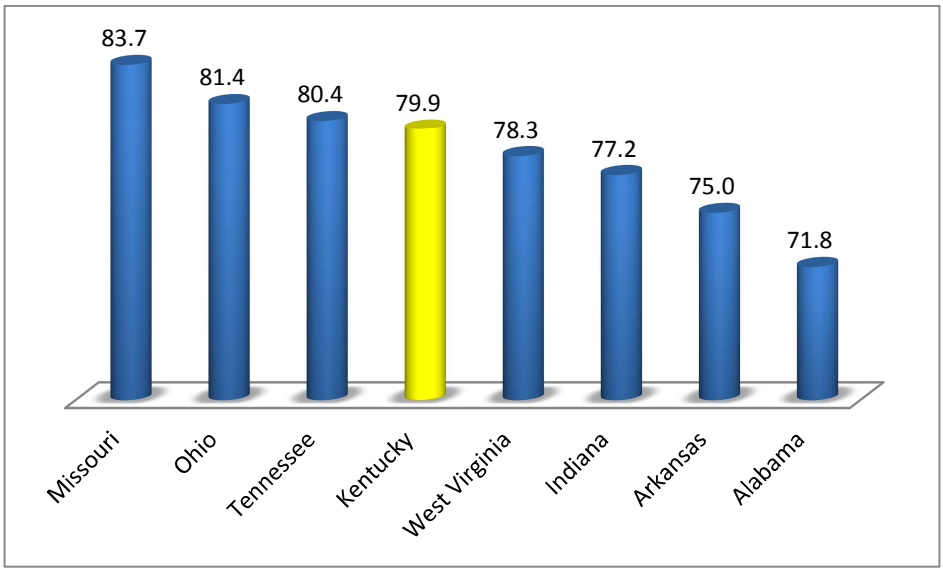
Chart 2.5
Four-Year High School Graduation Rates



Source: NCES (2014)

While Kentucky's four-year high school graduation rate tends to be above the national average it also tends to fall in the middle of the comparable states. In FY 2009-10 Kentucky's graduation rate of 79.9 percent trailed that of Missouri (83.7 percent), Ohio (81.4 percent) and Tennessee (80.4 percent) but above West Virginia (78.3 percent), Indiana (77.2 percent), Arkansas (75.0 percent) and Alabama (71.8 percent) (see Chart 2.6).

Chart 2.6
Four-Year High School Graduation Rates – 2009-10



Source: National Center for Educational Statistics

Mixed NAEP Results

Kentucky's 2013 results for the NAEP reading and math exams were mixed. On the positive side the percentage of Kentucky students finishing "at or above proficient" on the 4th and 8th grade reading exams was above the national average. The percentage of Kentucky students who finish at or above proficient on the 4th grade math exam was at the national average but Kentucky's 8th grade math students finished behind the national average.

	At or above	Kentucky	National
Math 4th Grade	Proficient	41%	41%
Math 8th grade	Proficient	30%	34%
Reading 4th grade	Proficient	36%	34%
Reading 8th grade	Proficient	38%	34%

The mixed educational outcome data shows that there are some bright spots for Kentucky's education system but there are also areas that need improvement.

CONCLUSION

This section of the study reviewed national data to determine how Kentucky's public K-12 education system compares to other states. There was a specific focus on the seven states whose education systems are the most comparable to Kentucky (Alabama, Arkansas, Indiana, Missouri, Ohio, Tennessee and West Virginia). This study looked at state level information about educational outcomes, public school expenditures, student demographics, state budgets and teacher staffing. After reviewing all of the relevant data three findings stand out. Over the past decade the Kentucky education system has experienced:

1. Below Average Funding: Over the past decade Kentucky has consistently funded its schools below national averages, but funding levels have shown mixed results against comparable states.
2. Below Average Teacher Salaries: Kentucky's teacher salaries have consistently been below national averages over the past decade.
3. Above average student performance: Kentucky's educational outcomes have generally been positive when compared to both national averages and comparable state but there are some instances where the state's outcomes trail both the national average and comparative states.

CHAPTER 3: AN EVIDENCE-BASED ADEQUACY MODEL

The Evidence-Based (EB) approach identifies a cohesive set of school-level resources, or elements, required to deliver a comprehensive and high-quality instructional program and describes the evidence on programmatic effectiveness. This approach then estimates an adequate expenditure level by placing a price on each element according to the needs of prototypical elementary, middle and high schools. School resources are aggregated to the district level, at which point central office staff and maintenance and operations resources are added, along with other costs that are not modeled in the Evidence-Based Approach (e.g., transportation and debt service). The final step involves aggregating the cost of all school- and district-level elements to a total statewide cost and to compare this with cost with the 2012-13 SEEK expenditures.

The EB approach is based on a review of the research evidence, originating from three primary source types:

1. Research with randomized assignment to the treatment (the "gold standard" of evidence)
2. Research with other types of controls or statistical procedures that can help separate the impact of a treatment, including such methods as meta-analyses and longitudinal studies
3. Best practices either as codified in a comprehensive school design (e.g., Stringfield, Ross & Smith, 1996) or from studies of schools that have dramatically improved student learning (e.g., Blankstein, 2010, 2011; Chenoweth, 2007; 2011; Odden, 2009; Odden & Archibald, 2009).

The tables that follow explain how school level resources are distributed, and present alterations in resources for small schools, as well as the models used for district-level resource needs.

- **Table 4.1 Kentucky Prototypical Elementary, Middle and High School Models** provides a summary of various school-level components of the EB approach, identified within three prototypical schools—elementary, middle, and high.
- **Table 4.2 EB School Staffing and Resource Models for K-12 English Learners, Low Income students, Special Education and Career and Technical Education (CTE) Programs** provides a summary of the resources available for students who need additional resources to achieve proficiency.
- **Table 4.3: EB Model Resources for PK Programs** provides a summary of the resources for a prototypical pre-kindergarten program.
- **Table 4.4: EB Model for Small Districts** provides staffing levels for districts that are smaller than a typical linear path allows for providing sufficient staff and resources to provide an adequate education.
- **Table 4.5: Kentucky Prototypical Central Office** provides staffing levels for a Central Office serving 3900 students.

Table 4.1
Kentucky Prototypical Elementary, Middle and High School Models

School Element	Elementary Schools	Middle Schools	High Schools
School Configuration	K-5	6-8	9-12
Prototypical school size	450	450	600
Class size	K-3: 15; 4-5: 25	6-8: 25	9-12: 25
Full-day kindergarten	Yes	NA	NA
Length of Teacher Contract	192 work days: Instruction: 174, Holidays: 4 Open/Close Schools & Parent Conferences: 4 Professional Dev.: 10 (total includes 6 additional PD days)		
Personnel Resources			
Core Content Teachers	26	18	24
Specialist Teachers	20% more 5.2	20% more 3.6	33.33% more assuming a 90 minute block schedule; teachers teach 3 blocks daily: 8.0
Instructional Coaches	1 per 200 students: 2.25	1 per 200 students: 2.25	1 per 200 students: 3.0
Total Core Content Specialist and Coaches	33.45	23.85	35.0
Tutors (non-FRPL)	1.0	1.0	1.0
Substitute Teachers	5% extra core content, specialist, SPED, Tutors & instructional coaches: 1.72	5% extra core content, specialist, SPED, Tutors & instructional coaches: 1.24	5% extra core content, specialist, SPED, Tutors & instructional coaches: 1.80
Counselors	1.0	1.0 /250 students 1.8	1.0 /250 students 2.4
Nurses	1/750 students 0.6	1/750 students 0.6	1/750 students 0.8
Instructional Aides	0	0	0
Supervisory Aides	2.0	2.0	3.0

Table 4.1 (continued)
Kentucky Prototypical Elementary, Middle and High School Models

School Element	Elementary Schools	Middle Schools	High Schools
Librarian	1.0	1.0	1.0
Principal	1.0	1.0	1.0
Asst. Principal/ Program Coordinator	0.0	0.0	1.0
School Site Secretary	2.0	2.0	3.0
Dollar per Pupil Resources			
Additional Professional development	; $100/student, in addition to extra PD days and Instructional Coach resources, above		
Technology Equipment	$250/student	$250/student	$250/student
Instructional Materials including Library Resources	$140/student	$140/student	$175/student
Short Cycle Formative Assessments	$25/student	$25/student	$25/student
Student Activities	$250/student	$250/student	$250/student
Gifted/talented students	$25/student (based on total school students)	$25/student (based on total school students)	$25/student (based on total school students)

Table 4.2
EB School Staffing and Resource Models for K-12 English Learners, Low Income Students, Special Education, and Career and Technical Education (CTE) Programs

School Element	Resources
English Learners	
EL Teachers	1 teacher for every 100 EL students
Substitutes	5 percent of teacher positions
Professional Development	As with all teachers, 6 additional PD days for each certified EL position
Instructional Materials	$10 per EL student beyond what each generates through the core model
Low Income	
Tutors	1 teacher for every 125 FRPL students
Extended Day	3.33 teachers for every 100 FRPL students, times 0.25, which equals 1/120 FRPL
Summer School	3.33 teachers for every 100 FRPL students, times 0.25, which equals 1/120 FRPL
Additional Pupil Support	1 teacher support position for every 100 FRPL students
Substitutes	5 percent of teacher positions
Professional Development	As with all teachers, 6 additional PD days for each certified Pupil Support position
Instructional Materials	$10 per FRPL pupil for each of 4 programs (tutors, extended day, summer school and pupil support)
Students with Mild and Moderate Disabilities*	
Special Education – mild and moderate disabilities	1.0 teacher and 1.0 aide for every 150 regular students (to be used to provide special education services)
Substitute	5 percent of teacher positions
Professional Development	As with all teachers, 6 additional PD days for each certified SPED position
Instructional Materials	$10 for every regular student to be used to provide special education services
Career and Technical Education	
Equipment Resources	$9,000 per CTE teacher FTE

*Special Education for students with severe and profound disabilities is 100% state funded with a state-level aid program.

Table 4.3
EB Model Resources for Pre-K Programs

School Element	Pre-K Programs
Program Configuration	Pre-K
Prototypical Program Size	150
Class size	15
Length of Teacher Contract	192 days: Instruction: 174, Holidays: 4 Open/Close Schools & Parent Conferences: 4 Professional Dev.: 10 (total includes 6 additional PD days)
Personnel Resources	
Core Content Teachers	10
Specialist Teachers	20% more 2.0
Instructional Coaches	1 per 200 students: 0.75
Total Core Content, Specialist, and Coach Teachers	12.75
Pupil Support	1 FTE support position for every 100 FRPL students: 1.5
Special Education – mild and moderate disabilities*	1.0 Teacher and 1.0 Aide for every 150 regular students (to be used to provide special education services) 1.0 Teacher, 1.0 Aide
Substitute Teachers	5% extra classroom, specialist, SPED & instructional coaches: 0.78
Instructional Aides	1 per classroom: 10
Supervisory Aides	.75
Assistant Principal/ Program Coordinator	1.0
Program Site Secretary	1.0
Dollar per Pupil	
Professional development	$100/student
Technology/equipment	$250/student
Instructional Materials including Library Resources	$140/student
Short Cycle formative Assessments	$25/student

Table 4.4:
EB Model for Small Districts

	District 390 390 Students Resources	District 195 195 Students Resources	District 97.5 97.5 Students Resources
Personnel Resources			
Core Teachers (K-8)	14.00	0.00	0.00
Core & Spec Teachers (K-	0.00	6.00	0.00
Elective Teachers (K-8)	3.00	0.00	0.00
Core Teachers (9-12)	5.00	0.00	0.00
Core & Spec Teachers (6-	0.00	7.00	0.00
Elective Teachers (9-12)	2.00	0.00	0.00
Staff (K-12)	0.00	0.00	14.00
Instructional Facilitators	2.00	1.00	0.00
Substitute Teachers	1.30	0.70	0.00
Counselors/Nurse	2.00	1.00	0.00
Supervisory Aides	2.00	1.00	0.00
Librarians	1.00	0.50	0.00
Principals	1.00	1.00	0.00
Assistant Principals	1.00	0.00	1.00
School Secretary	2.00	1.00	0.00
Dollar per Pupil Resources			
PD Resources	$100/student	$100/student	$100/student
Technology/Equipment	$250/student	$250/student	$250/student
Instructional Materials	$152/student	$152/student	$152/student
Formative Assessments	$25/student	$25/student	$25/student
Student Activities	$250/student	$250/student	$250/student
Gifted Funds	$25/student	$25/student	$25/student
Central Office			
Professional Staff	2.00	1.00	1.00
Support Staff	2.00	1.00	1.00
Misc. and Communication (	$350/student	$350/student	$350/student
M&O			
Custodians	2.00	1.00	0.50
Maintenance	1.00	0.50	0.25
Groundskeepers	1.00	0.50	0.25
Utilites	$197/student	$197/student	$197/student
Supplies	$0.07/sq foot	$0.07/sq foot	$0.07/sq foot

Table 4.5:
Kentucky Prototypical Central Office (3900 Students)

Central Office	
	Resources
Superintendents Office	
Superintendent	1.0
Secretary	1.0
Business Office	
Business Manager	1.0
Director of Human Resources	1.0
Accounting Clerk	1.0
Accounts Payable	1.0
Secretary	1.0
Curriculum and Support	
Asst. Superintendent	1.0
Director of Pupil Services	1.0
Director of SPED	1.0
Director of Assessment and Evaluation	1.0
Secretary	3.0
Technology	
Director of Technology	1.0
Computer Technician	1.0
Secretary	1.0
Operations and Maintenance	
Director of M&O	1.0
Secretary	1.0
Other Expenses	
Misc. (communication, purch services, insurance, supplies, legal, audit, association fees, elections, technology, etc.)	$350/student

A. STUDENT COUNTS, PRESCHOOL, KINDERGARTEN AND SCHOOL SIZE ADJUSTMENTS

This section includes discussion of four elements: student counts for the state aid formula, preschool, kindergarten and school size. These elements serve to set the stage for the rest of the analysis relative to the SEEK formula as they define the parameters used—who is counted, how they are counted, and the assumptions we make regarding the prototypical school size.

A.1 Student Counts for Calculating Base Aid

Current Kentucky Policy	Evidence-Based Model
Guaranteed Base: Kentucky uses an Adjusted Average Daily Attendance (AADA) in the SEEK formula. End count from previous year is adjusted for weather-related low attendance days as well as the lowest five days of attendance. Adjustments are made for current year increases, if applicable, and not made for declines in current year AADA.	The EB approach supports Kentucky's use of an ADM count, instead of an AADA count for the basic aid formula. In addition, the EB approach would use the greater of a rolling three-year ADM (e.g., from SY9, SY10 and SY11 for SY12 aid) or the estimated/actual (SY 12) pupil count for districts, the determination at the district level which addresses both declining, stable or rising student counts, though will not alter schools individually by this method. The EB approach would use the same pupil count for most elements of the funding system – determining property wealth per pupil, calculating state aid, and counting the number of students in a school and school district.
Stakeholder Panel Recommendation	**Advisory Committee Recommendation**
Adopt ADM but make sure the approach does not create financial difficulties for schools/districts with large decreases in enrollment by using an average.	Build the model with ADM and AADA in funding formula, with option to switch between the two methods. Greater of current year and three-year rolling average for funding purposes.
Analysis and Evidence	
Average Daily Attendance (ADA) and Average Daily Membership (ADM) are two commonly used approaches for counting students for the purposes of funding. ADA is the average number of attending students over the course of a school year. ADM is a count of students taking into consideration the varying school membership over the course of a year. There is little research supporting one approach to counting students over the other, but there are distinctions between the two and different funding outcomes as a result of their implementation. Examining attendance patterns among schools serving various populations could reveal potential	

disadvantages of one approach over another. Most notably, ADA often disadvantages schools and districts with high need students, who have greater absenteeism rates.

A similar situation exists with the use of an Adjusted ADA (AADA) in that it is primarily based on daily attendance. However, the adjustments made to counts (e.g. severe weather cancellations, unselecting lowest attendance days) brings these counts closer to ADM.

To address enrollment declines, a three-year rolling average student count would provide schools and districts time to adjust to a decline in funding (Cavin, Murnane & Brown, 1985). Where there are increasing enrollments this approach will create shortfalls, so an alternative for increasing enrollments should be considered, such as using the greater of the three year rolling average and the current student count. Instituting an alternative that provides an opportunity to adjust to declining enrollments while immediately addressing increasing enrollments will produce "phantom" students, who are partially counted in multiple jurisdictions throughout the rolling average period, and therefore affect the funding schools and districts receive.

A.2 Preschool

Current Kentucky Policy	Evidence-Based Model
Kentucky funds 0.5 ADA for pre-kindergarten programs, independent of actual ADA FTE status of students in the program. So it funds a half day program for what age kids??? 3 and 4	The EB model supports full-day preschool for all 3 and 4 year olds. Taking costs into consideration, children from families with an income at or below 200 percent of the poverty level should have primary access to full-day preschool. The staffing and fiscal resources detailed in Table 4.3 allow elementary schools to fully integrate the preschool program into schools.
Stakeholder Panel Recommendation	**Advisory Committee Recommendation**
Fund full-day PK for 3 and 4 year olds, but prioritize 4 year olds if funds are limited. Full-day PK for low-income 4 years olds is preferable to half day for 3 and 4 year olds.	Fund actual FTE ADM count (0.5 or 1.0) for PK programs. Additional recognition may be necessary for facilities to allow for such programs.
Analysis and Evidence	
Preschool offered for a full day and taught by fully certified and trained teachers using a rigorous but appropriate early childhood curriculum can reduce achievement gaps linked to race and income by half. There is also increasing recognition that preschool should be provided for all students because it produces significant gains for children from middle class backgrounds and even larger gains for students from lower income backgrounds (Barnett, Brown & Shore, 2004). The gains for low-income students include significant and positive effects on future student academic achievement and other desired social and community outcomes (Barnett, 2011;	

Camilli, et. al., 2010; Reynolds, et al., 2001, 2011; Schweinhart et al., 2005). Students from lower income backgrounds who experience a high quality, full-day preschool program gain more basic skills in elementary school, score higher on academic goals in middle and high school, attend college at a greater rate, and as adults, earn higher incomes and engage in less socially-undesirable behavior. There is a return over time of *eight to ten dollars* for every one dollar invested in high quality preschool programs (Barnett, 2007; Barnett & Masse, 2007; Karoly et al., 1998; Reynolds et al., 2011).

In California, Georgia, Illinois, Kentucky, New York and Ohio the achievement gap between low and middle income students is narrower for low-income students who attended preschool (Jacobson, 2003). Two-year preschool programs in some of New Jersey's urban districts narrowed the achievement gap by 40 percent in second grade (Frede, Jung, Barnett et al., 2007).

Preschool quality is largely a function of staff (Camilli, et al., 2010; Whitebrook, 2004). And staff quality depends in part on salary levels. Including preschool students in a district's pupil count for state aid purposes and including preschool teachers on the same salary schedule as teachers of other grades is the most straight-forward way to fund preschool services and help to insure the programs re staffed with quality teachers. At the same time, if this funding and salary approach is followed, districts should be encouraged to allow multiple institutions and organizations to provide preschool services, not just the public schools.

A.3 Full-Day Kindergarten

Current Kentucky Policy	Evidence-Based Model
Kindergarten students are counted as 0.5 AADA, even if enrolled in a full day kindergarten program.	Since research suggests that children from all backgrounds can benefit from full-day kindergarten programs, the EB model provides support for a full day program for all students, by counting such students as 1.0 FTE in the state aid formula. If students attend a half-day program, they should be counted as 0.5 FTE students in the state aid formula.
Stakeholder Panel Recommendation	**Advisory Committee Recommendation**
Same as EB Model.	Same as EB Model.
Analysis and Evidence	
Full-day kindergarten, particularly for students from low-income backgrounds, has significant, positive effects on student learning in the early elementary grades (Cooper et al, 2010, Denton, West & Walston, 2003, Elicker & Mathur, 1997, Fusaro, 1997, Gullo, 2000; Slavin, Karweit & Wasik, 1994). Children participating in full-day kindergarten programs gain more basic skills in reading, writing, and mathematics in the primary grades than children who receive only a half-day program or no kindergarten at all.	

In 2003, using nationally-representative, longitudinal data from the Early Childhood Longitudinal Study, Kindergarten Class of 1998–99 (ECLS–K), Denton, West & Walston (2003) showed that children who attended full-day kindergarten had a greater ability to demonstrate reading knowledge and skill than their peers in half-day programs, across the range of family backgrounds. Cooper, et al.'s (2010) comprehensive meta-analysis reached similar conclusions finding the average effect size of students in full day versus half-day kindergarten to be +0.25. Moreover, a randomized control trial, the "gold standard" of education research, found the effect of full-day versus half-day kindergarten to be about +0.75 standard deviations (Elicker & Mathur, 1997). As a result of this research, funding full day kindergarten for 5 year-olds as well as for 4 year-olds is an increasingly common practice among the states (Kauerz, 2005).

Children from all backgrounds can benefit from full-day kindergarten programs. The EB model provides support for a full day program for all students, and counting them for their actual FTE status in the program.

A.4 School Size for Purpose of Estimating Resources

Current Kentucky Policy	Evidence-Based Model
Kentucky does not consider school size in determining school funding.	To indicate the relative level of resources in schools, the EB model uses prototypical school units of: • 450 student K-5 elementary schools • 450 student 6-8 middle schools • 600 student 9-12 high schools These prototypical school sizes reflect research on the most effective school sizes, though in reality few schools are exactly the size of the prototypes. As a result, the general EB formulas (e.g. core content teachers, librarians, tutors) are designed in a way that they can be proportionately reduced or increased based on how a school's student count compares to the prototypical models. The model also can be used to estimate a district-level expenditure per pupil figure. Further, when actual school sizes are substantially larger than the prototypes, the EB suggest that schools divide themselves into schools-within-schools, and have the individual schools-within-schools operate as semi-independent units. The EB proposals should not be construed to imply that Kentucky needs to replace all school sites with smaller (or larger) buildings.
Stakeholder Panel Recommendation	**Advisory Committee Recommendation**

Same as EB Model with a note that an exception be made for necessarily small schools.	Same as EB Model.

Analysis and Evidence

Most of the research on school size addresses the question of whether large schools – those significantly over 1,000 students – are both more efficient and more effective than smaller school units (schools of 300 to 500) – and whether cost savings and performance improvements can be identified by consolidating small schools or districts into larger entities. School units of roughly 400-600 elementary students and between 500 and 1,000 secondary students are the most effective and most efficient (Lee & Smith, 1997; Raywid, 1997/1998). Other studies suggest the optimum size for elementary schools is between 300-500 students and between 600-900 students for high schools (Andrews, Duncombe & Yinger, 2002, Duncombe and Yinger, 2010).

The research on diseconomies of small and large scale, which needs to assess both costs and outcomes, generally does not provide solid evidence for a consolidation policy. From an economic perspective, the concept of diseconomies of scale includes both costs and outputs. In an early 1981 review of the literature, Fox (1981) concluded that little research had analyzed output in combination with input and size variables. Ten years later, after assessing the meager extant research that did address costs as well as outcomes, Monk (1990) concluded that there was little support for either school or district consolidation.

These findings suggest that the very large urban districts and schools across America are far beyond the optimum size and perhaps need to be downsized somehow, and that the potential cost savings from consolidation are realistically scant. In sum, the research suggests that elementary school *units* be in the range of 400-500 students and that secondary school *units* be in the range of 500-1,000 students.

There is little evidence to support consolidation because very little research has been done that examines the necessary variables on costs and outputs (Fox, 1981, Monk, 1990). Expected cost savings from school and district consolidation programs that have been implemented have not been realized (Guthrie, 1979; Ornstein, 1990).

B. ADEQUATE STAFFING FOR THE CORE PROGRAMS IN PROTOTYPICAL SCHOOLS

This section covers personnel staffing for the major elements of the regular education program: core teachers, specialist teachers, and instructional coaches.

B.5 Core Content Teachers/Class Size

Current Kentucky Policy	Evidence-Based Model
There is no specific provision in the KY SEEK formula for this element.	Staffing ratios for **core content teachers** are: • 15 to 1 for grades K-3 • 25 to 1 for grades 4-12 Core content teachers are defined as the grade-level classroom teachers in elementary schools and the core content area teachers. Core content areas subjects include mathematics, science, language arts, social studies, and world language, the latter in middle and high schools.
Stakeholder Panel Recommendation	**Advisory Committee Recommendation**
Same as EB Model. Class size needs to be capped at the K-3 ratios. 25:1 is not universally appropriate above 4th grade. The combination of student academic needs in a classroom should be considered.	Same as EB Model.
Analysis and Evidence	
The Tennessee STAR study, a randomized controlled trial experiment, found that students in kindergarten to grade 3 in the small classes achieved at a significantly higher level than those in regular class sizes, and that the impact was even larger for low income and minority students (Finn, 2002; Finn and Achilles, 1999; Grissmer, 1999; Krueger, 2002; Word, et al., 1990). The same research also showed that a regular class of 24-25 with a teacher and an instructional aide *did not* produce a discernible positive impact on student achievement, a finding that undercuts proposals and wide spread practices that place instructional aides in elementary classrooms (Gerber, Finn, Achilles, & Boyd-Zaharias, 2001). The positive impacts of the small classes in the Tennessee study persisted into middle and high school years, and even the years beyond high school (Finn, Gerger, Achilles & J.B. Zaharias, 2001; Konstantopulos & Chung, 2009; Krueger, 2002; Mishel & Rothstein, 2002; Nye, Hedges & Konstantopulos, 2001a, 2001b). The longer students were in small classes (i.e., in grades K, 1, 2 and 3) the greater the impact on grade 4-8 achievement. This study concluded that the full treatment – small classes in all of the first four grades – had the greatest short- and long-term impacts (Konstantopoulos and Chung, 2009). Longitudinal research on class size reduction also found that the lasting benefits of small classes can include a reduction in the achievement gap in reading and mathematics in later grades (Krueger & Whitmore, 2001).	

Evidence on the most effective class sizes in grades 4-12 is harder to find. Most of the research on class size reduction has been conducted at the elementary level. The national average class size in middle and high schools is about 25. Nearly all comprehensive school reform models are developed on the basis of a class size of 25, which is the result of general practice and professional judgment (Odden, 1997a; Stringfield, Ross & Smith, 1996).

Finally in these times when funds for schools are scarce, it is legitimate to raise the issue of the cost of small classes versus the benefits. Whitehurst and Cringos (2011) argue that though the Tennessee STAR study supports the efficacy of small classes, recent research has produced more ambiguous conclusions related to class size. They also note that this more recent research includes class size reductions in grades above K-3 and most of it relies on "natural experiments" rather than randomized controlled trials. Moreover, they conclude, while the costs of small classes are high, the benefits, particularly the long-term benefits, outweigh the costs and conclude that small class sizes "pay their way." Research that allegedly counters the Tennessee STAR study has generally been conducted using less rigorous methods (Whitehurst and Cringos, 2011) but even these authors conclude that benefits of small classes in grades K-3 outweigh the costs.

Thus the investment in small classes appears to be part of the long-term solution for improving student performance. It is possible that some of the strategies for struggling students and for professional development can provide more immediate gains at a lower initial cost. Policy makers should investigate cost-benefit differences between various strategies when implementing fiscal reform over time.

B.6 Specialist Teachers

Current Kentucky Policy	Evidence-Based Model
There is no specific provision in the KY SEEK formula for this element.	Resources for specialist teachers are provided in addition to the number of core content teachers, at the following rate: • 20 percent for elementary teachers • 20 percent middle school teachers • 33 percent high school teachers The EB approach defines specialist teachers as all teachers for subject areas not included in core content areas. For example, art, music, physical education, health, and career and technical education. The proposed ratios offer not only an enriched student curriculum, but also allow for all teachers to have planning and prep time.
Stakeholder Panel Recommendation	**Advisory Committee Recommendation**
General agreement with EB Model. High schools may be better served by a 40 percent rate instead of 33.33 percent	Same as EB Model.

Analysis and Evidence

Specialist courses can be divided into several categories, like the arts, physical education, and career and technical education. There is limited research on the general impact of specialist courses on student academic outcomes, but there are a few examples of rigorous research that do reflect a positive relationship between some types of specialist courses and academic achievement.

According to correlational analysis using a national data set of 8th to 12th graders (NELS:88), students who were involved in the arts had greater academic gains than those who were not (Catterall, Chapleau & Iwanaga, 1999). This impact held for low-income children. Students consistently involved in the arts had greater gains in mathematics achievement. Music students, in a study using the Louisiana state test results, produced higher mean mathematics scores (Baker, 2012). In the NELS:88 study, low-income students involved in theater arts had greater gains in reading, but also had greater self-concept, motivation, empathy, and tolerance. Furthermore, arts education is associated with advanced cognitive capacities that are often associated with career-ready skills, such as being an independent and organized thinker, having the capacity to test ideas, and persisting in tasks individually and as part of a team (Burton, Horowitz & Abeles, 1999). Cognitive psychologists suggest that arts integration can have a positive impact on knowledge retention, which positively influences motivation (Rinne, Gregory, Yarmolinskaya & Hardiman, 2011).

A review published by the Centers for Disease Control (CDC, 2012) found positive relationships between physical education and academic achievement. This review consisted of 50 studies of varying methodologies with no particular weight on methods.

Arguments about the value of CTE tend to rely on the research examining the relationship between relevance (or authentic intellectual work) and academic achievement. The work of Woolley, Rose, Orthner, Akos, and Jones-Sanpei (2013) uses that relationship as the foundation for their 3-year study of career relevant (pre-occupational) instruction in the middle grades, where such instruction had a positive impact on mathematics performance but not on reading performance. At the high school level, while CTE concentrators tended to take fewer core science courses and score lower on the 12th grade National Assessment of Educational Progress (NAEP), "concentrators in agriculture, business finance, communications and design, computer and information science, and engineering technology score[ed] higher than or not measurably different from non-concentrators" (Levesque, Wun & Green, 2010), which suggests the need to look more closely both at the students who choose these fields but also at the content of the concentrations as they may be contributing to better outcomes.

B.7 Instructional Coaches/Technology Coordinators

Current Kentucky Policy	Evidence-Based Model
There is no specific provision in the KY SEEK formula for this element.	EB provides one instructional coach position for every 200 students. The EB model does not specifically fund technology positions, however, schools and districts can use coaching positions to fulfill a technology role if needed.
Stakeholder Panel Recommendation	**Advisory Committee Recommendation**
Same as EB Model.	Same as EB Model.
Analysis and Evidence	
Early research found strong effect sizes for coaches as part of professional development (Joyce & Calhoun, 1996; Joyce & Showers, 2002). A 2010 evaluation of a Florida program that provided reading coaches for middle schools found positive impacts on student performance in reading (Lockwood, McCombs & Marsh, 2010). A related study found that coaches provided as part of a data-based decision making initiative also improved both teachers' instructional practice and student achievement (Marsh, McCombs & Martorell, 2010). More importantly, a recent randomized control trial of coaching (Pianta, Allen & King, 2011) found significant, positive impacts in the form of student achievement gains across four subject areas – mathematics, science, history, and language arts. Most comprehensive school designs (see Odden, 1997; Stringfield, Ross & Smith, 1996), and EB studies conducted in other states – Arizona, Arkansas, Kentucky, North Dakota, Wyoming, Washington and Wisconsin – call for school-based instructional facilitators or instructional coaches (sometimes called mentors, site coaches, curriculum specialists, or lead teachers). These individuals coordinate the instructional program but most importantly provide the critical ongoing instructional coaching and mentoring that the professional development literature shows	

is necessary for teachers to improve their instructional practice (Garet, Porter, Desimone, Birman, & Yoon, 2001; Joyce & Calhoun, 1996; Joyce & Showers, 2002). This means that they spend the bulk of their time in classrooms, modeling lessons, giving feedback to teachers, and helping improve the instructional program. Instructional coaches also work with collaborative teams helping them analyze student data and its implications for instruction and interventions. We expand on the rationale for these individuals in the section on professional development, but include them here as they represent teacher positions. The few instructional coaches who also function as school technology coordinators would provide the technological expertise to fix small problems with the computer system, install all software, connect computer equipment so it can be used for both instructional and management purposes, and provide professional development to embed computer technologies into the curriculum at the school site.

C. STAFFING FOR EXTRA STUDENT NEEDS

Because not all students will meet standards with just the core instructional program, districts and schools need a powerful sequence of additional and effective strategies for struggling students. The EB approach identifies a series of specific, supplementary programs for struggling students including:

- Tutoring to provide immediate, intensive assistance to keep struggling students on track
- Extended day programs to provide more time on task for struggling students
- Summer school to provide more instructional time for struggling students
- Sheltered English and ESL instruction for Learners (ELs) students
- A "census" approach to funding special education

These programs all extend the learning time for struggling students in focused ways. The key concept is to implement the maxim of standards-based education reform: keep standards high, but vary the instructional time so students can become proficient.

The EB elements for extra help are also embedded in the "response to intervention" (Fuchs, D & Fuchs, L.S., 2006) schema:

- Tier 1 includes the regular instruction provided to all students. The proposals for class size, time for collaborative work during regular school hours and ongoing, systemic professional development are designed to make core instruction as effective as possible.
- Tier 2 includes the staffing for tutoring and other interventions during the regular school day, extended day and summer school, with the tutoring staff covering nearly all possible small group Tier 2 intervention programs.
- Tier 3 includes EL and special education which provides the more intensive extra help services for these special populations.

Kentucky uses Free Priced Lunch counts (as opposed to Free *and Reduced* Priced Lunch counts) when determining targeted aid. At risk aid is applied as a 0.15 weight over the SEEK guaranteed base. This weight is the same for every district in the current system, and the value of the weight does not vary school by school or district by district.

For tutors, extended day and summer school, the EB model uses the number of low-income students as a proxy for the number of students who need extra help to achieve to standards in each school. This proxy is used because of the persistent correlation between poverty and low achievement (Gamoran, A. & Long, D.A., 2006). The EB approach supports a move toward using full Free *and Reduced* Priced Lunch counts in its targeted aid.

C.8 Tutoring

Current Kentucky Policy	Evidence-Based Model
Kentucky uses Free Priced Lunch enrollment counts (as opposed to Free *and Reduced* Priced Lunch counts) when determining targeted aid. At risk aid applied as a .15 weight against the SEEK guaranteed base. The Division of Nutrition and Health Services supplies this information to the DOE. The SEEK formula does not stipulate how funds are used.	One (1.0) fully licensed teacher-tutor position in each prototypical school. One (1.0) fully licensed teacher-tutor position for every 125 pupils eligible for free and reduced price lunch.
Stakeholder Panel Recommendation	**Advisory Committee Recommendation**
Same as EB Model	Same as EB Model

Analysis and Evidence

The most powerful and effective extra help strategy to enable struggling students to meet state standards is individual one-to-one tutoring provided by licensed teachers (Shanahan, 1998; Wasik & Slavin, 1993). Students who must work harder and need more assistance to achieve to proficiency levels (i.e. students who are EL, low income, or have minor disabilities) especially benefit from preventative tutoring (Cohen, Kulik, & Kulik, 1982).

The impact of tutoring programs depends on how they are staffed and organized, their relation to the core program, and tutoring intensity. Researchers (Cohen, Kulik, & Kulik, 1982; Farkas, 1998; Shanahan, 1998; Wasik & Slavin, 1993) and experts on tutoring practices (Gordon, 2009) have found greater effects when the tutoring includes the following:

- Professional teachers as tutors
- Tutoring initially provided to students on a one-to-one basis
- Tutors trained in specific tutoring strategies
- Tutoring tightly aligned to the regular curriculum and to the specific learning challenges, with appropriate content specific scaffolding and modeling
- Sufficient time for the tutoring
- Highly structured programming, both substantively and organizationally

The above research suggests several specific structural features of effective one-to-one tutoring programs:

- First, each tutor would tutor one student every 20 minutes, or three students per hour. This would allow one tutor position to tutor 18 students a day. (Since tutoring is such an intensive activity, individual teachers might spend only half their time tutoring; but a 1.0 FTE tutoring position would allow 18 students per day to receive 1-1 tutoring.). Four positions would allow 72 students to receive individual tutoring daily in the prototypical elementary and middle schools.
- Second, most students do not require tutoring all year long; tutoring programs generally assess students quarterly and change tutoring arrangements. With modest changes such as

these, close to half the student body of a 450-pupil school unit could receive individual tutoring during the year.

Third, not all students who are from a low-income background require individual tutoring, so a portion of the allocation could be used for students in the school who might not be from a lower income family but nevertheless have a learning issue that could be remedied by tutoring. What has been effective with adolescents is a model combining intensive academic intervention such as tutoring with socio-emotional support with at a ratio of about 1:8 where the adult is a college-educated person but not necessarily a trained teacher. A randomize-control trial conducted by Cook, Dodge, Farkas, Fryer, et al (2014) produced as many as three years of growth in a single year with one-hour daily intervention. Such a study supports the EB at-risk elements, which include both tutoring (an intensive academic intervention) and additional pupil support/counseling staff.

It is important to note that the instruction for all student groups needing extra help needs to be more explicit and sequenced than that for other students. Young children with weakness in knowledge of letters, letter sound relationships and phonemic awareness need explicit and systematic instruction to help them first decode and then learn to read and comprehend. As Torgeson (2004: 12) states:

> Explicit instruction is instruction that does not leave anything to chance and does not make assumptions about skills and knowledge that children will acquire on their own. For example, explicit instruction requires teachers to directly make connections between letters in print and the sounds of words, and it requires that these relationships be taught in a comprehensive fashion. Evidence for this is found in a recent study of preventive instruction given to a group of high at-risk children in kindergarten, first grade and second grade …..only the most [phonemically] explicit intervention produced a reliable increase in the growth of word-reading ability … schools must be prepared to provide very explicit and systematic instruction in beginning word-reading skills to some of their students if they expect virtually all children to acquire work-reading skills at grade level by the third grade …. Further, explicit instruction also requires that the meanings of words be directly taught and be explicitly practiced so that they are accessible when children are reading text…. Finally, it requires not only direct practice to build fluency…. but also careful, sequential instruction and practice in the use of comprehension strategies to help construct meaning.

One- to-one tutoring works with 20 minutes of tutoring per student for positive effects, a one-to-three or one-to-five grouping requires a longer instructional time for the small group – up to 45 minutes (Elbaum, Vaughn, Hughes & Moody, 1999, Torgeson 2004). The two latter groupings, with 45 minutes of instruction, reduced the rate of reading failure to a miniscule percentage.

For example, if the recommended numbers of tutors are used for such small groups, a one FTE reading position could teach 30 students a day in the one-to-three setting with 30 minutes of

instruction per group, and 30+ students a day in the one-to-five setting with 45 minutes of instruction per group. Four FTE tutoring positions could then provide this type of intensive instruction for up to 120 students daily. In short, though we have emphasized 1-1 tutoring, and some students need 1-1 tutoring, other small group practices (which characterize the bulk of Tier 2 interventions) can also work, with the length of instruction for the small group increasing as the size of the group increases.

Though Torgeson (2004) states that similar interventions can work with middle and high school students, the effect, unfortunately, is smaller as it is much more difficult to undo the lasting damage of not learning to read when students enter middle and high schools with severe reading deficiencies.

C.9 Extended-Day Programs

Current Kentucky Policy	Evidence-Based Model
Kentucky uses Free Priced Lunch enrollment counts (as opposed to Free *and Reduced* Priced Lunch counts) when determining targeted aid. At risk aid applied as a 0.15 weight against the SEEK guaranteed base. The Division of Nutrition and Health Services supplies this information to the DOE. The SEEK formula does not stipulate how funds are used.	The EB model seeks to provide funding for extended day classes of 15 students for two hours a day five days a week. It does this by funding one (1) teacher position for every 30 attending free and reduced-price lunch students, which assumes only half of students will attend for class sizes of 15:1(or 3.33 FTE per 100 such students), • The EB model assumes 50 percent of the free and reduced-price lunch eligible pupils will attend the program • Position is paid at the rate of 25 percent of the position's annual salary—enough to pay a teacher for a 2-hour extended-day program, 5 days per week. • This formula equates to 1 teacher position for every 120 free and reduced price lunch students. These resources could be used for a different mix of teachers and other non-certified staff, with teachers providing at least one hour of homework help or after school tutoring.
Stakeholder Panel Recommendation	**Advisory Committee Recommendation**
Same as EB Model	Same as EB Model
Analysis and Evidence	
At both elementary and secondary school levels, some struggling students are likely to benefit from after-school or extended-day programs, even if receiving Tier 2 interventions during the	

regular school day. Extended day programs are created to provide more time for academic support and embedded professional development time as well as to provide a safe environment for children and adolescents after the school day ends.

Extended day programs can produce positive academic outcomes for students, particularly if they are low-income students (Farbman, Goldber, and Miller, 2014 and Patall, Cooper, and Allen, 2010). The quality of research is variable, but the consistent finding concerns how the extra time is used. If the additional time is used on activities that are known to improve student outcomes and they are well-designed and administered, then student outcomes will improve with additional benefits for disadvantaged students (Fashola, 1998; Patall, Cooper, and Allen, 2010; Posner & Vandell, 1994; Vandell, Pierce and Dadisman, 2005).

Overall, studies have documented positive effects of extended day programs on the academic performance of students in select after-school programs. However, the evidence is mixed both because of research methods (few randomized trials), poor program quality and imperfect implementation of the programs studied. Researchers have identified several structural and institutional supports necessary to make after-school programs effective:

- Staff qualifications and support (staff training in child or adolescent development, after-school programming, elementary or secondary education, and content areas offered in the program, staff expertise; staff stability/turnover; compensation; institutional supports)
- Program/group size and configuration (enrollment size, ages served, group size, age groupings and child staff ratio) and a program culture of mastery
- Financial resources and budget (dedicated space and facilities that support skill development and mastery, equipment and materials to promote skill development and mastery; curricular resources in relevant content areas; location that is accessible to youth and families)
- Program partnerships and connections (with schools to connect administrators, teachers and programs; with larger networks of programs, with parents and community)
- Program sustainability strategies (institutional partners, networks, linkages; community linkages that support enhanced services; long term alliances to ensure long term funding).

C.10 Summer School

Current Kentucky Policy	Evidence-Based Model
Kentucky uses Free Priced Lunch enrollment counts (as opposed to Free *and Reduced* Priced Lunch counts) when determining targeted aid. At risk aid applied as a 0.15 weight against the SEEK guaranteed base. The Division of Nutrition and Health Services supplies this information to the DOE. The SEEK formula does not stipulate how funds are used. No summer school program is specifically funded.	One (1.0) FTE position for every 30 free and reduced price lunch students or 3.33 per 100 such students. The EB model assumes 50 percent of the free and reduced-price lunch eligible students will attend the program. This ratio will fund class sizes of approximately 15 in summer school programs. Although a summer school term of six 8 weeks will have fewer hours than five day a week extended day programs, we continue to fund this at the same rate to allow for teacher planning time for the summer school program – something that is less needed in extended day programs. A six-hour day would also allow for two hours of non-academic activities. Simplified, the EB summer school formula equates to 1 teacher position for every 120 free and reduced price lunch students.
Stakeholder Panel Recommendation	**Advisory Committee Recommendation**
Same as EB Model	Same as EB Model
Analysis and Evidence	
Many students need extra instructional time to achieve their state's high proficiency standards. Thus, extended year or summer learning opportunities should be part of the set of programs available to provide struggling students the additional time and help they need to achieve to standards and earn academic promotion from grade to grade (Borman, 2001). Providing additional time to help all students master the same content is an initiative that is grounded in research (National Education Commission on Time and Learning, 1994). On average, students lose a little more than a month's worth of skill or knowledge over the summer break (Cooper, Nye, Charlton, Lindsay, & Greathouse, 1996). Summer breaks have a larger deleterious impact on poor children's reading and mathematics achievement. This summer learning loss (sometimes known as "summer slide" or "summer melt') can reach as much as one-third of the learning during a regular nine-month school year (Cooper et al., 1996). These income-based summer learning differences *accumulate* over the elementary school years, such that poor children's achievement scores – without summer school – fall further and further behind the scores of middle class students as they progress through school grade by grade (Alexander and Entwisle, 1996). There is consensus that what happens (or does not happen) during the summer can significantly impact the achievement of students from low-income backgrounds, and help reduce (or increase) the poor and minority achievement gaps in the	

United States (Allington, R.I, McGill-Franzen, A., Camilli, G., Williams, L. et al, 2010; Kim, J.S. & Quinn, D.M., 2013).

Evidence on the effectiveness of summer programs in improving achievement or closing the achievement gap, however, is mixed. Though past research linking student achievement to summer programs shows some promise, several studies suffer from methodological shortcomings and the low quality of the summer school programs themselves (Borman & Boulay, 2004).

The average student in summer programs among 93 studied outperformed about 56% to 60% of similar students not receiving the programs, but the quality of the studies and programs compromise the conclusions (Cooper, Charlton, Valentine, & Muhlenbruck, 2000).

The distinction between summer programs and specific learning opportunities is worth attending to in this instance. Specific types of learning activities can be tied more closely to improved achievement (Allington, R.I. et al, 2010; Kim, J.S. & Quinn, D.M., 2013) than the more generic summer school program, though randomized trial research of summer school reached more positive conclusions about how such programs can positively impact student learning (Borman & Dowling, 2006; Roberts, 2000). For example, Borman, Goetz, and Dowling (2009) found both practical and statistical significance of summer school participation in Developmental Reading Assessment (DRA) and the Word List A assessments in high poverty schools.

Borman and Dowling (2006) and Roberts (2000) note several program components related to improved achievement effects for summer program attendees, including:

- Early intervention during elementary school
- A full 6-8 week summer program
- A clear focus on mathematics and reading achievement, or failed courses for high school students
- Small-group or individualized instruction
- Parent involvement and participation
- Careful scrutiny for treatment fidelity, including monitoring to ensure good instruction in reading and mathematics is being delivered
- Monitoring student attendance

Summer programs that include these elements hold promise for improving the achievement of at-risk students and closing the achievement gap.

The effects of summer school are largest for elementary students when the programs emphasize reading and mathematics and for high school students when programs focus on courses students failed during the school year. The more modest effects frequently found in middle school programs can be partially explained by the emphasis in many middle school summer school programs on adolescent development and self-efficacy, rather than academics

C.11 Exceptional Children (Students with Disabilities)

Current Kentucky Policy	Evidence-Based Model
High Incidence Disability weight of 0.24 over guaranteed funding level. (Defined as communication disorders of speech or language.) *Moderate Incidence Disability* weight of 1.17 over guaranteed funding level. (Defined as mild mental disability, orthopedic impairment or physically disabled, other health impaired, specific learning disabilities, and developmental delay.) *Low Incidence Disability* weight of 2.35 over guaranteed funding level. (Defined as functional mental disability, hearing impairment, emotional-behavioral disability, visual impairment, multiple disabilities, deaf-blind, autism, and traumatic brain injury.) *Home and Hospital Funding*: Students qualifying for Home and Hospital have an additional 1.0 weight over guaranteed funding, less the capital outlay allotment of $100.	A census approach to funding special education services for disabled students in the high incidence/lower cost categories. One (1.0) teacher and 1.0 aide positions for every 150 regular education students. This results in 3 teachers and 3 aide positions for each of the 450-student prototypical elementary and middle school, and 4 teachers and 4 aide positions for the 600-student prototypical high school. This census approach provides resources for high and moderate incidence disabilities. The EB Model includes the state reimbursing districts for 100 percent of the costs for the low incidence students with severe and profound disabilities, minus Federal Title VIb funds for such students.
Stakeholder Panel Recommendation	**Advisory Committee Recommendation**
Same as EB Model with particular support for 100 percent state coverage for severe disabilities.	Same as EB Model with particular support for 100 percent state coverage for severe disabilities.
Analysis and Evidence	
Providing appropriate education services for students with disabilities, while containing costs and avoiding over-identification of students, particularly minority students, presents several challenges (see Levenson, 2012). Many mild and moderate disabilities, particularly those associated with students learning to read, are correctable through strategic early intervention, including the kinds of effective core instruction and targeted intervention programs, particularly one-to-one tutoring, discussed above. For example, several studies (e.g., Landry, 1999) have documented that through a series of intensive instructional interventions nearly 75 percent of struggling readers identified in kindergarten and first grade can be brought up to grade level without the need for placement in special education. Other studies have noted decreases in disability labeling of up to 50 percent (see for example, Levenson, 2011; Madden, Slavin, Karweit, Dolan & Wasik, 1993; Slavin,	

1996) with interventions of this type.

In many instances this approach requires school-level staff to change their practice and cease functioning in "silos" that serve children in "pull-out" programs identified by funding source for the staff member providing the services (e.g. General Fund, Special Education, Title I). Instead, all staff would team closely with the regular classroom teacher to identify deficits and work together to correct them as quickly as possible. This is a common sense approach that could be second nature in schools, but in many cases schools have heretofore been rooted in a "categorical culture" that must be corrected through professional development and strong leadership from the district office and the site principal.

Allocating a fixed census level of staffing (3.0 FTE teachers and 3.0 FTE aides) for an elementary school of 450 students) can meet the needs of children with mild and moderate disabilities if a functional, collaborative early intervention model such as the one outlined above can be implemented. We note that our staffing for the preceding programs for at-risk students meets this requirement – tutoring, extended day, summer school and EL.

For children with more severe disabilities, clustering them in specific schools to achieve economies of scale is generally the most effective strategy and provides the greatest opportunity to find ways to mainstream them (to the extent feasible) with regular education students. In very sparsely populated areas this is often not feasible but should be explored. Students in these categories generally include: severely emotionally disturbed (ED); severely mentally and/or physically handicapped; and children within the spectrum of autism. The FRPL and autism populations have been increasing dramatically across the country, and it is likely that this trend will continue in the future. To make the provision of services to these children cost-effective it makes sense to explore clustering of services where possible and design cost parameters for clustered services in each category. In cases where students need to be served individually or in groups of two or three because of geographic isolation it would be helpful to cost out service models for those configurations as well but provide full state funding for those children. This would reduce the likelihood of overwhelming the financial capacity of a small school district that happens to be the home of a child with a severe disability.

To implement these approaches to services for students with disabilities, states have begun to fund special education services using the "census" approach. The census approach, which can be simply funded by providing additional teacher resources for prototypical schools, assumes the incidence of these categories of disabilities is approximately equal across districts and schools and includes resources for providing needed services at an equal rate for all schools and districts. The census approach has emerged across the country for several reasons:

- The continued rise in the number and percentage of "learning disabled" and continued questioning by some of the validity of these numbers
- Under-funding of the costs of severely disabled students
- Over labeling of poor, minority, and EL students into special education categories, which often leads to lower curriculum expectations, and inappropriate instructional services
- Reduction of paper work

Often, the census approach for the high incidence, lower cost students with disabilities is combined with a different strategy for the low-incidence, high-need students, whose costs are funded separately and totally by the state, as these students are not found proportionately in all districts. For example, California approved a census-funding system, in part because many felt the old system created too many fiscal incentives to identify students as needing special education, and in part to improve the equity of the distribution of state aid for special education. Other reasons included the desire to give the local districts more flexibility while holding them accountable, and having a system that was easy to understand.

Today, diverse states such as Alabama, Arkansas, California, Montana, North Dakota, Pennsylvania, and the New England states of Massachusetts and Vermont all use census-based special-education funding systems. Moreover, all current and future increases in federal funding for disabled students are to be distributed on a census basis.

C.12 English Learners

Current Kentucky Policy	Evidence-Based Model
English Learner Funding is determined by prior years' counts of LEP students with a weight of .075 over the guaranteed base funding.	One (1) FTE teacher position for every 100 EL students. Additionally, in order to ensure that all EL students receive appropriate extra help, the EB Approach recommends using an unduplicated count of EL and FRPL supplying resources for all EL students whether they are FRPL or not.
Stakeholder Panel Recommendation	**Advisory Committee Recommendation**
Same as EB Model with attention to the needs of districts serving diverse ELs with varying levels of schooling across the immigrant and refugee groups	Same as EB Model with special state allocated grants serving high numbers of EL students or EL students coming into the system with vast quantities of different languages.
Analysis and Evidence	
Research, best practices and experience show that English Learners (ELs) need additional support to access content while learning acadmic English This support can include some combination of small classes, English as a second language classes, professional development for teachers to help them teach eltered English classes, and "reception" centers for districts with large numbers of EL students who arrive at the school throughout the year. Good EL programs work, whether the approach is structured English immersion (Clark, 2009) or initial instruction in the native language, often called bilingual education. However, bilingual education is difficult to provide in most schools because students come from so many different language backgrounds.	

In a best-evidence synthesis of 17 studies on bilingual education, Slavin & Cheung (2005) found that ELs in bilingual programs outperformed their non-bilingual program peers. Using studies focused primarily on reading achievement, the authors found an effect size of +0.45 for ELs. A more recent randomized control trial also produced strong positive effects for bilingual education programs (Slavin, et al., 2011), but concluded that the language of instruction is less important than the approaches taken to teach reading.

In *The Elementary School Journal*, Gersten (2006) concludes that ELs can be taught to read in English if, as shown for monolingual students, the instruction covers phonemic awareness, decoding, fluency, vocabulary and reading comprehension. Gersten's studies also showed that ELs benefit from instructional interventions initially designed for monolingual English speaking students, the resources for which are included above.

Beyond the provision of additional teachers to provide English as a second language instruction to students who need that help, research shows that ELs need a solid and rigorous core curriculum as the basis from which to provide any extra services (Gandara & Rumberger, 2008; Gandara, Rumberger, Maxwell-Jolly, & Callahan, 2003). This research suggests that ELs students need:

- Effective teachers – a core goal of all the staffing in this chapter
- Adequate instructional materials and good school conditions
- Good assessments of ELs so teachers know in detail their English language reading and other academic skills
- Less segregation of ELs
- Rigorous and effective curriculum and courses for all ELs, and affirmative counseling of such students to take those courses
- Professional development for all teachers, focusing on sheltered English teaching skills

Hakuta (2011) supports these conclusions but also notes that English language learning takes time (one reason we include the above resources for every grade level) and that "academic language" is critical to learning the new Common Core Standards. The new standards require more explicit and coherent EL instructional strategies and extra help services if these are to be effective at ensuring that ELs learn the subject matter, English generally and academic English specifically.

Additional staff is needed to provide instruction during the school day to students deemed English Learner, such as having ELs take ESL in lieu of a specialist course. Although the potential to eliminate some specialist classes exists if there are large numbers of ELs who need to be pulled out of individual classrooms, it is generally agreed that to fully staff a strong EL program each 100 EL students should trigger one additional EL teaching position. This makes it possible to establish pullout classes for ELs and give them an additional dose of English instruction. The goal of this programming is to reinforce ELs learning of academic content and English so at some point the students can continue their schooling in English only.

For example, a school with 100 students who qualify for free and reduced price lunch (or some alternative measure of low income students) and no ELs would receive 1.0 tutor position. But if the 100 low-income children were all ELs, the school would receive an additional 1.0 teacher position – in addition to the 1.0 tutor and any extended day, summer school and pupil support resources as outlined above.

Given these realities, it is more appropriate to view the EB approach to extra resources for ELs as including both resources for students from lower income backgrounds and EL specific resources (Jimenez-Castellanos & Topper, 2012).

C.13 Gifted and Talented Students

Current Kentucky Policy	Evidence-Based Model
No additional resources exist in the SEEK forward targeted to this population of students.	Resources for gifted and talented students are provided at a rate of $25 per regular pupil.
Stakeholder Panel Recommendation	**Advisory Committee Recommendation**
General agreement with EB Model with some disagreement to the allocation due to a lack of evidence.	Agree with EB Model.

Analysis and Evidence

There is little evidence that gifted and talented programs produce any meaningful academic outcomes for students (Bui, Craig, Imberman, 2012). In a sample of 14,000, students at the margins, meaning those on either side of the cut point for entry into a program, showed no significant different in performance on standardized tests of math, science, reading, social studies, and language arts. Historically, research on gifted programs indicates that the effects on student achievement vary by the strategy of the intervention. Enriched classes for gifted and talented produce effect sizes of about +0.40 and accelerated classes for gifted and talented students produce somewhat larger effectives sizes of +0.90 (Gallagher, 1996; Kulik & Kulik, 1984; Kulik & Kulik, 1992).

Regardless, a complete analysis of educational adequacy should include the gifted, talented, and able and ambitious students, most of who perform above state proficiency standards. This is important for all states whose citizens desire improved performance for students at all levels of achievement. Research shows that developing the potential of gifted and talented students requires:

- Effort to discover the hidden talent of low income and/or culturally diverse students
- Curriculum materials designed specifically to meet the needs of talented learners
- Acceleration of the curriculum
- Special training in how teachers can work effectively with talented learners.

<u>Discovering hidden talents in low-income and/or culturally diverse high ability learners</u>. Research studies on the use of performance assessments, nonverbal measures, open-ended tasks, extended try-out and transitional periods, and inclusive definitions and policies produce increased and more equitable identification practices for high ability culturally diverse and/or low-income learners. Access to specialized services for talented learners in the elementary years

is especially important for increased achievement among vulnerable students. For example, high ability culturally diverse learners who participated in three or more years of specialized elementary and/or middle school programming had higher achievement at high school graduation, as well as other measures of school achievement, than a comparable group of high ability students who did not participate (Struck, 2003).

Access to curriculum. Overall, research shows that curriculum programs specifically designed for talented learners produce greater learning than regular academic programs. Increases in the complexity of the curricular material is a key factor (Robinson & Clinkenbeard, 1998). Large-scale curriculum projects in science and mathematics in the 1960s, such as the Biological Sciences Curriculum Study (BCSC), the Physical Science Study Committee (PSSC), and the Chemical Bond Approach (CBA), benefited academically talented learners (Gallagher, 2002). Further, curriculum projects in the 1990s designed to increase the achievement of talented learners in core content areas such as language arts, science, and social studies produced academic gains in persuasive writing and literary analysis (VanTassel-Baska, Johnson, Hughes & Boyce, 1996; VanTassell-Baska, Zuo, Avery & Little, 2002), scientific understanding of variables (VanTassel-Baska, Bass, Ries, Poland & Avery, 1998), and problem generation and social studies content acquisition (Gallagher & Stepien, 1996; Gallagher, Stepien & Rosenthal, 1992).

Access to acceleration. Because academically talented students learn quickly, one effective option for serving them is acceleration of the curriculum. Many educators and members of the general public believe acceleration always means skipping a grade. However, there are at least 17 different types of acceleration ranging from curriculum compacting (which reduces the amount of time students spend on material) to subject matter acceleration (going to a higher grade level for one class) to high school course options like Advanced Placement or concurrent credit (Southern, Jones & Stanley, 1993). In some cases, acceleration means *content* acceleration, which brings more complex material to the student at his or her current grade level. In other cases, acceleration means *student* acceleration, which brings the student to the material by shifting placement. Reviews of the research on different forms of acceleration have been conducted across several decades and consistently report the positive effects of acceleration on student achievement (Kulik & Kulik, 1984; Southern, Jones & Stanley, 1993), including Advanced Placement classes (Bleske-Rechek, Lubinski & Benbow, 2004). Multiple studies also report participant satisfaction with acceleration and benign effects on social and psychological development.

Access to trained teachers. Research and teacher reports indicate that general classroom teachers make very few, if any, modifications for academically talented learners (Archambault, et al, 1993), even though talented students have mastered 40 to 50 percent of the elementary curriculum before the school year begins. In contrast, teachers who receive appropriate training are more likely to provide classroom instruction that meets the needs of talented learners. Students report differences among teachers who have had such training, and independent observers in the classroom document the benefit of this training as well (Hansen & Feldhusen, 1994). Curriculum and instructional adaptation requires the support of a specially trained coach

at the building level, which could be embedded in the instructional facilitators recommended above (Reis & Purcell, 1993). Overall, learning outcomes for high ability learners are increased when they have access to programs whose staff have specialized training in working with high ability learners, which could be accomplished with the professional development resources recommended below.

Practice implications. At the elementary and middle school level, our understanding of the research on best practices is to place gifted students in special classes comprising all gifted students and accelerate their instruction because such students can learn much more in a given time period than other students. When the pull out and acceleration approach is not possible, an alternative is to have these students skip grades in order to be exposed to accelerated instruction. Research shows that neither of these practices produces social adjustment problems. Many gifted students get bored and sometimes restless in classrooms that do not have accelerated instruction. Both of these strategies have little or no cost, except for scheduling and training of teachers (which is covered in the professional development staffing).

The primary approach to serve gifted students in high schools is to enroll them in advanced courses – advanced placement (AP), International Baccalaureate (IB) – to participate in dual enrollment in postsecondary institutions, or to have them take courses through distance learning mechanisms.

We confirmed our understanding of best practices for the gifted and talented on research prior to 2005 with the directors of three of the Gifted and Talented research centers in the United States: Dr. Elissa Brown, Director of the Center for Gifted Education, College of William & Mary; Dr. Joseph Renzulli, The National Research Center on the Gifted and Talented at the University of Connecticut; and Dr. Ann Robinson, Director of the Center for Gifted Education at the University of Arkansas at Little Rock.

C.14 Career and Technical Education

Current Kentucky Policy	Evidence-Based Model
There is no specific provision in the KY SEEK formula for this element.	Most programs recommend class sizes of 25, consistent with the national median and the EB model. Professional development and most of the computer technologies would be covered by the professional development and computer resources provided by the EB model. Some of the PLTW concentration areas require a one-time purchase of expensive equipment, which can be covered by the $9,000 per career-technical education teacher in the EB model.
Stakeholder Panel Recommendation	**Advisory Committee Recommendation**
Same as EB Model.	Would like more discussion of the levels (both in type and bureaucracy of support given to different CTE programs). Separate review requested.
Analysis and Evidence	
Career and technical education programs are bridges to postsecondary licensure and/or additional training that have become essential in the 21st century economy. It is the one area in public education with a direct career connection. Community colleges are struggling to keep up with the high cost of the kinds of equipment necessary to train for the most technical careers, but they are finding the means by partnering with businesses to maintain their capacity to prepare their graduates for the changing labor market. The situation facing high school is somewhat different. A review conducted for a Wisconsin school finance adequacy task force by a national expert (Phelps, 2006) concluded that the best of the new career-technical programs did not cost more, according to a finance adequacy review, especially if the district and state made adequate provisions for professional development and computer technologies (Phelps, 2006). These conclusions generally were confirmed by a cost analysis (Odden & Picus, 2010) of Project Lead the Way (PLTW), one of the most highly rated and "expensive" career and technical education programs in the country.	

D. ADDITIONAL STAFFING AND RESOURCE NEEDS

This section completes the identification of resources for the prototypical schools and includes discussions of substitute teachers, pupil support personnel, librarians, aides, school administration, professional development, and allocations of dollars per pupil to fund other items.

D.15 Substitute Teachers

Current Kentucky Policy	Evidence-Based Model
There is no specific provision in the KY SEEK formula for this element.	The EB model includes resources for substitute teachers at the ratio of 5 percent of all teacher positions (which provides about 10 days per teacher on a 188 day teacher year).
Stakeholder Panel Recommendation	**Advisory Committee Recommendation**
Same as EB Model.	Same as EB Model.
Analysis and Evidence	
Schools need some level of substitute teacher allocations in order to cover classrooms when teachers are sick for one or two days, absent for other reasons, on long term sick or pregnancy leave, etc. A good approximation of the substitute resources needed is to add an additional five percent of teachers to the sum of all teacher positions identified above, a standard we have used successfully in other states and consistent with typical practice.	

D.16 Student Support

Current Kentucky Policy	Evidence-Based Model
There is no specific provision in the KY SEEK formula for this element.	Staffing ratios are: • One (1) guidance counselor for every 450 elementary school students (grades K-5) • One (1) guidance counselor for every 250 middle school students (grades 6-8) • One (1) counselor for every 250 Grade 9-12 students. • One (1) nurse for every 750 students • One (1) professional pupil support position for every 100 students eligible for free and reduced price lunch These staffing provisions enable districts and schools to allocate FTE staff to serve as guidance counselors, nurses, psychologists, and social workers, in a way that best addresses student needs from the perspective of each district and school.

Stakeholder Panel Recommendation	**Advisory Committee Recommendation**
Same as EB Model.	Same as EB Model, though suggest that current counselors spend most of their time with formative and summative testing rather than guidance; an additional position may be appropriate for these latter duties.
Analysis and Evidence	
Schools need a student support strategy that is responsive to student needs and specific to grade levels needs. For instance, schools serving students in areas of concentrated poverty may require a complex strategy whereas schools serving students concentrations of high poverty English learners will require even greater complexity. Elementary students need different support strategies than do middle and high schools. Various comprehensive school designs have suggested different ways to provide such a program strategy (Stringfield, Ross & Smith, 1996; for further discussion, see Brabeck, Walsh & Latta, 2003). The general standard is one licensed professional for every 100 students from a low-income background, with a minimum of one for each prototypical school. The EB model uses the standards from the American School Counselor Association (ASCA), which is one counselor for every 250 secondary students. This produces 1.8 guidance counselor positions in the prototypical middle school and 2.4 guidance counselors in the prototypical high schools. Because most states also require a guidance counselor in elementary schools at about the size of our 450 student prototypical elementary school, the EB model also includes one guidance counselor at the level. The EB model provides school nurses at the rate of 1 FTE nurse position for every 750 students, the staffing standard of the American School Nurse Association. The EB model provides additional pupil support personnel to schools on the basis of free and reduced price lunch counts, an indicator of more non-academic need. The EB model provides one professional pupil support position for every 100 students eligible for free and reduced price lunch, in addition to the above counselor and nurse staff. These staffing provisions enable districts and schools to allocate FTE staff to serve as guidance counselors, nurses, psychologists, and social workers, in a way that best addresses student needs from the perspective of each district and school.	

D.17 Supervisory Aides/Instructional Aides

Current Kentucky Policy	Evidence-Based Model
There is no specific provision in the KY SEEK formula for this element.	Staffing ratios are: • One (1) FTE supervisory aide position for every 225 elementary and middle school students • One (1) FTE supervisory aide position for every 100 high school students The EB model also includes 1 instructional aide position for every 15 Pre-K students.
Stakeholder Panel Recommendation	**Advisory Committee Recommendation**
Same as EB Model.	Same as EB Model
Analysis and Evidence	
Instructional aides, as they are typically used in schools, do not positively impact student academic achievement (Gerber, Finn, Achilles & Boyd-Zaharias, 2001). They could be used to tutor students. Farkas (1998) has shown that if aides are selected according to clear and rigorous literacy criteria, are trained in a specific reading tutoring program, provide individual tutoring to students in reading, and are supervised, then they can have a significant impact on student reading attainment. Another study by Miller (2003) showed that such aides could also have an impact on reading achievement if used to provide individual tutoring to struggling students in the first grade. Neither of these studies supports the typical use of instructional aides as teacher helpers.	

D.18 Librarians

Current Kentucky Policy	Evidence-Based Model
There is no specific provision in the KY SEEK formula for this element.	Staffing ratios are: • One (1) librarian for every 450 student elementary and middle school • One (1) librarian for every 600 student high school
Stakeholder Panel Recommendation	**Advisory Committee Recommendation**
Same as EB Model with a desire to maintain librarians in necessarily small schools.	Same as EB Model.
Analysis and Evidence	
There is little academic research on the impact of libraries on student achievement, but in 2003 six states conducted studies of the impacts of libraries on student achievement: Florida, Minnesota, Michigan, Missouri, New Mexico, and North Carolina. And, in 2012 Colorado conducted a statewide study using data from 2005-2011. The general finding is that children with access to endorsed librarians working full time perform better on state reading assessments regardless of income level (Rodney, M.J., Lance, K.C. & Hamilton-Rennell, C, 2003; Lance, K.C. & Hofschire, L, 2012). The Michigan study found that regardless of whether the librarian	

was endorsed, student achievement was better for low-income children, but having an endorsed librarian was associated with higher achievement than having an unendorsed librarian (Rodney, M.J., Lance, K.C. & Hamilton-Rennell, C, 2003). Each state examined the issue differently, but library staffing and the number of operating hours were generally associated with higher academic outcomes.

D.19 Principal

Current Kentucky Policy	Evidence-Based Model
There is no specific provision in the KY SEEK formula for this element.	Staffing ratios are: • One (1) principal for every 450 student elementary school • One (1) principal for every 450 student middle school • One (1) principal for every 600 student high school
Stakeholder Panel Recommendation	**Advisory Committee Recommendation**
Same as EB Model.	Same as EB Model.
Analysis and Evidence	
There is no research evidence on the performance of schools with or without a principal. The fact is that essentially all schools in America, if not the world, have a principal. All known comprehensive school designs, and all known prototypical school designs from all known professional judgment studies around the country, include a principal for every school unit. However, few if any comprehensive school designs include assistant principal positions. And very few school systems around the country provide assistant principals to schools with 500 students or less. Since we also recommend that instead of one school with a large number of students, school buildings with large numbers of students be sub-divided into multiple school units within the building, we recommend that each unit have a principal. This implies that one principal would be required for each school unit.	

D.20 Assistant Principal

Current Kentucky Policy	Evidence-Based Model
There is no specific provision in the KY SEEK formula for this element.	Staffing ratios are: • One (1) assistant principal for every 600 student high school
Stakeholder Panel Recommendation	**Advisory Committee Recommendation**
Same as EB Model.	Same as EB Model.
Analysis and Evidence	
There is no research on the role or effectiveness of assistant principals, but just as principals are ubiquitous in schools, assistant principals are ubiquitous in large schools. The practical need for additional administrative support in large organizations is generally accepted, whether it be breaking larger schools into smaller programs and retaining additional principals, or adding additional assistant principals to deal with additional administrative and student support.	

D.21 School Site Secretarial Staff

Current Kentucky Policy	Evidence-Based Model
There is no specific provision in the KY SEEK formula for this element.	Staffing ratios are: • Two (2) FTE school clerical positions for every 450 student elementary school • Two (2) FTE school clerical positions for every 450 student middle school • Three (3) FTE school clerical positions for every 600 student high school
Stakeholder Panel Recommendation	**Advisory Committee Recommendation**
Same as EB Model.	Same as EB Model.
Analysis and Evidence	
Every school site needs secretarial support to provide clerical and administrative assistance support to administrators and teachers, to answer the telephone, greet parents when they visit the school, help with paper work, and other tasks essential to the operation of a school site.	

D.22 Professional Development

Current Kentucky Policy	Evidence-Based Model
There is no specific provision in the KY SEEK formula for this element.	The EB model includes the following: • 10 days of pupil free time for training • Funds for training at the rate of $100 per pupil These resources are in addition to: • Instructional Coaches • Collaborative work with teachers in their schools during planning and collaborative time periods.
Stakeholder Panel Recommendation	**Advisory Committee Recommendation**
Same as EB Model, assuming the PD was of high quality and not necessarily mandated as entirely during the summer.	Same as EB Model, with concern that districts would actually add the days to the calendar.

Analysis and Evidence

All school faculties need ongoing professional development, especially today with the challenge of implementing the Common Core Standards and preparing all students to be college and career ready. Improving teacher effectiveness through high quality professional development is arguably as important as all of the other resource strategies identified. Effective teachers are the most influential individual school-based factor in student learning (Rowan, Correnti & Miller, 2002; Wright, Horn & Sanders, 1997) and a more systemic and uniform deployment of effective instruction is key to improving learning and reducing achievement gaps (Odden, 2011a; Raudenbusch, 2009).

There is recent and substantial research on effective professional development and its costs (e.g., Crow, 2011; Odden, 2011b). Effective professional development is defined as professional development that produces change in teachers' classroom-based instructional practice that can be linked to improvements in student learning. The practices and principles researchers and professional development organizations use to characterize "high quality" or "effective" professional development draw upon a series of empirical research studies that linked program strategies to changes in teachers' instructional practice and subsequent increases in student achievement. Combined, these studies and recent reports from Learning Forward, a national organization focused on professional development (see Crow, 2011), identified six structural features of effective professional development: form, duration, collective participation, content focus, active learning, and coherence.

It should be clear that the longer the duration, and the more the coaching, the more time is required of teachers as well as professional development trainers and coaches.

Note that there is little support in this research for the development of individually oriented professional development plans; the research implies a much more systemic approach.

Form, duration, collective participation, and active learning require various amounts of both teacher and trainer/coach/mentor time, during the regular school day and year and, depending on the specific strategies, outside of the regular day and year as well. This time costs money.

Further, all professional development strategies require some amount of administration, materials and supplies, and miscellaneous financial support for travel and fees. Both the above programmatic features and the specifics of their cost implications are helpful to comprehensively describe specific professional development programs and their related resource needs.

D.23 Technology and Equipment

Current Kentucky Policy	Evidence-Based Model
There is no specific provision in the KY SEEK formula for this element	The EB model provides: $250 per every PK-12 student
Stakeholder Panel Recommendation	**Advisory Committee Recommendation**
Same as EB Model but some concern that it may not be sufficient for the increasingly rigorous science standards.	Same as EB Model, with concern about initial cost of technology.

Analysis and Evidence

Infusing technology into the school curriculum has associated costs for computer hardware, networking equipment, software, training and personnel associated with maintaining and repairing these machines. The level of needs is dependent upon the curricular choices of a given district and the needs to engage in the various computer-dependent programs and interventions.

- The *Total Cost* of purchasing and embedding technology into the operation of schools identifies both the direct and indirect costs of technology and its successful implementation.
    - The *direct costs* of technology include hardware, software, and labor costs for repairing and maintaining the machines.
    - *Indirect costs* include the costs of users supporting each other, time spent in training classes, casual learning, self-support, user application development and downtime costs.

This element identifies only direct technology costs, as the indirect costs, which are primarily training, are included in the overall professional development resources. Districts also need individuals to serve as technical support for technology embedded curriculum and management systems, though the bulk of that work can be covered by warranties purchased at the time computers are acquired.

A detailed analysis of the costs of equipping schools with ongoing technology materials (Odden, 2012) estimated four categories of technology costs that totaled $250 a pupil. The amounts by category should be considered flexible as districts and schools will need to allocate dollars to their highest priority technology needs outlined in state and district technology plans. The per pupil costs for each of the four subcategories are:

- Computer hardware: $71
- Operating systems, productivity and non-instructional software: $72
- Network equipment, printers and copiers: $55
- Instructional software and additional classroom hardware: $52

This per pupil figure would be sufficient to purchase, upgrade and maintain computers, servers, operating systems and productivity software, network equipment, and student administrative system and financial systems software, as well as other equipment such as copiers. Since the systems software packages vary dramatically in price, the figure would cover medium priced student administrative and financial systems software packages.

The $250 per pupil would allow a school to have one computer for every two to three students. This ratio would be sufficient to provide every teacher, the principal, and other key school-level staff with a computer, and to have an actual ratio of about one computer for every three-to-four students in each classroom. This level of funding would also allow for the technology needed for schools to access distance learning programs, and for students to access the new and evolving local online testing programs.

Districts should either incorporate maintenance costs in lease agreements or, if purchasing the equipment, buy 24-hour maintenance plans, to eliminate the need for school or district staff to fix computers.

D.24 Instructional Materials

Current Kentucky Policy	Evidence-Based Model
There is no specific provision in the KY SEEK formula for this element**.** A targeted instructional materials grant has, at times, been used.	The EB model also includes funding for library texts and electronic services of $20, $20, and $25 for elementary, middle, and high school students, respectively. Textbooks and consumables are funded at the rate of $120, $120, and $150 for elementary, middle, and high school students, respectively.
Stakeholder Panel Recommendation	**Advisory Committee Recommendation**
Same as EB Model with a request to determine the cost effectiveness of e-texts versus print texts in the context of rapidly changing standards and the need to stay current particularly in science.	Same as EB Model, with request to investigate the intersection of this component with technology component.
Analysis and Evidence	
The need for up-to-date instructional materials is paramount. Newer materials contain more accurate information and incorporate the most contemporary pedagogical approaches. To ensure that materials are current, twenty states have instituted adoption cycles in which they specify or	

recommend texts that are aligned to state learning standards (Ratvitch, 2004). Up-to-date instructional materials are expensive, but vital to the learning process. Researchers estimate that up to 90 percent of classroom activities are driven by textbooks and textbook content (Ravitch, 2004). Adoption cycles with state funding attached allow districts to upgrade their texts on an ongoing basis instead of allowing these expenditures to be postponed indefinitely.

The type and cost of textbooks and other instructional materials differ across elementary, middle school, and high school levels. Textbooks are more complex and thus more expensive at the upper grades and less expensive at the elementary level. Elementary grades, on the other hand, use more workbooks, worksheets and other consumables than the upper grades. Both elementary and upper grades require extensive pedagogical aides such as math manipulatives and science supplies that help teachers to demonstrate or present concepts using different pedagogical approaches. As school budgets for instructional supplies have tightened in the past, consumables and pedagogical aides have typically been the first items to be cut as teachers have been forced to make due or to purchase materials out of their own pockets.

The price of textbooks ranges widely. In reviewing the price of adopted materials from a variety of sources, the top end of the high school price band is notable at $120 per book (see Table 3). Ten to fifteen years ago such prices for textbooks at the high school level were uncommon, but as more students move to take advanced placement courses, districts have been forced to purchase more college-level texts at college-level prices.

Costs of Textbooks and Instructional Supplies by School Level (in annual dollars per pupil)

	Elementary School	**Middle School**	**High School**
Textbooks	$45 - $70 ($60)	$50 - $80 ($70)	$75 - $120 ($100)
Consumables and Pedagogical Aides	$60	$50	$50
Total	**$120**	**$120**	**$150**

The total figure would provide sufficient funds for adequate instructional materials and texts for most non-severe special education students. Modifications for severe special education cases would need to be funded from Special Education funds.

Adoption Cycle. Assuming a purchase of one textbook per student annually allows for a six-year adoption cycle. The six-year adoption cycle fits nicely with the typical secondary schedule of six courses in a six period day. It also comes close to matching the content areas covered at the elementary level.

Potential Secondary Six Year Adoption Cycle

Year	2012	2013	2014	2015	2016	2017
Content Area	Science Health P.E.	Social Studies	Foreign Language	Fine Arts	English Language Arts	Mathematics

At the elementary level, there are fewer subject areas to be covered leaving the opportunity for a sixth year in the cycle to be used for purchasing not only additional supplementary texts but also consumables/pedagogical aides.

Potential Elementary Six Year Adoption Cycle

Year	2012	2013	2014	2015	2016	2017
Content Area	Language Arts	Mathematics	Social Studies	Science/ Health	P.E., Visual and Performing Arts	Supplements, Consumables, Manipulatives

Library Funds. The average national per pupil expenditure for library materials in the 1999-2000 school year was $15 (excluding library salaries). This average varied by region with the West spending $14 per pupil annually and the Eastern states spending $19, and the North Central Region spending $16, with about 40 percent of the total used to purchase books and the remainder was spent on other instructional materials and/or services such as subscriptions to electronic databases (Michie & Holton, 2005).

As the world shifts to more digital resources, libraries are purchasing or using electronic databases such as online catalogs, the Internet, reference and bibliography databases, general article and news databases, college and career databases, academic subject databases, and electronic full-text books. In 2002, 25 percent of school libraries across the nation had no subscriptions, 44 percent had 1-3 subscriptions to electronic databases, 14 percent had 4-7 subscriptions, and 17 percent had subscriptions to 7 or more. Usually larger high schools subscribed to the most services (Scott, 2004).

Electronic database services vary in price and scope and are usually charged to school districts on an annual per pupil basis. Depending on content of these databases, costs can range from $1-5 per database per year per pupil.

Inflating these numbers to adequately meet the needs of the school libraries, the EB model includes funding of $25 per pupil for elementary and middle schools and $30 per pupil for high schools to pay for library text and electronic services. These figures modestly exceed the national average, allowing librarians to strengthen print collections. At the same time, it allows schools to provide, and experiment with, the electronic database resources on which more and more students rely (Tenopir, 2003).

D.25 Short Cycle Formative Assessments

Current Kentucky Policy	Evidence-Based Model
There is no specific provision in the KY SEEK formula for this element	The EB model provides: $30 per every PK-12 student
Stakeholder Panel Recommendation	**Advisory Committee Recommendation**
Same as EB Model.	Same as EB Model, with request to investigate the intersection of this component with Instructional Materials component.

Analysis and Evidence

Data-based decision making has become an important element in school reform over the past decade. It began with the seminal work of Black and Wiliam (1998) on how ongoing data on student performance could be used by teachers to frame and reform instructional practice, and continued with current best practice on how professional learning communities use student data to improve teaching and learning (DuFour, et al., 2010; Steiny, 2009). The goal is to have teachers use data to inform their instructional practice, identify students who need interventions and progress monitor the results, and hone overall strategies to improve student performance (Boudett, City & Murnane, 2007). As a result, data based decision making has become a central element of schools that are moving the student achievement needle (Odden, 2009, 2012).

Recent research on data-based decision making has documented significant, positive impacts on student learning. For example, Marsh, McCombs and Martorell (2010) showed how data-driven decision making in combination with instructional coaches produced improvements in teaching practice as well as student achievement. Further, a recent study of such efforts using the gold standard of research -- *randomized controlled trial* – showed that engaging in data-based decision making using interim assessment data improved student achievement in both mathematics and reading (Carlson, Borman & Robinson, 2011).

There is some confusion in terminology when referring to these new assessment data. Generally, these data are student performance data different from those provided by state accountability or summative testing. The most generic term is “interim data,” meaning assessment data collected in the interim between the annual administrations of state tests, though some practitioners and writers refer to such data as “formative assessments.” There are at least two kind of such “interim” assessment data. Benchmark assessments, such as those provided by the Northwest Evaluation System called MAP (www.nwea.org), which are given 2-3 times a year, often at the beginning, middle and end of the year. They are meant to provide “benchmark” information so teachers can see during the year how students are progressing in their learning. Sometimes these benchmark assessments are given just twice, once in the fall and again in late spring, and function just as a pre- and post-test for the school year, even though some practitioners erroneously refer to tests used this way as “formative assessments.” They cannot be used for progress monitoring in a Response to Intervention program of extra help for struggling students.

A second type of assessment data is collected at shorter time cycles within every quarter, such as monthly, and often referred to as “short cycle” or “formative” assessments. These more “micro”

student outcome data are meant to be used by teachers both to plan instructional strategies before a curriculum unit is taught and to track student performance for the two-to-three curriculum concepts that would normally be taught during a nine week or so instructional period.

Examples of "short cycle" assessments include STAR Enterprise from Renaissance Learning, which in an online, adaptive system that provides data in reading and mathematics for grades Prek-12. The basic package costs less than $10 a student per subject, takes students just about 10-15 minutes to take the test, is now aligned to the Common Core, and can be augmented with professional development activities and programs. Many Reading First schools as well as many schools we have studied (Odden & Archibald, 2009; Odden, 2009) use the Dynamic Indicators of Basic Early Literacy Skills (DIBELS) formative assessments (http://dibels.uoregon.edu).

The Wireless Generation (www.wirelessgeneration.com), now incorporated into the Fox Corporation's Amplify Education program, has created a formative assessment, quite similar to DIBELS, that can be used with a handheld, mobile, electronic device. The company also offers a web service that provides professional development for teachers on how to turn the results into specific instructional strategies, including video clips of how to teach certain reading skills.

D.26 Student Activities

Current Kentucky Policy	Evidence-Based Model
There is no specific provision in the KY SEEK formula for this element**.**	The EB provides: $250 per pupil for student activities at all grade levels.
Stakeholder Panel Recommendation	**Advisory Committee Recommendation**
Same as EB Model with a request for a provision that prevents the exclusive use of funds for athletics.	Same as EB Model.
Analysis and Evidence	
Elementary, middle and high schools typically provide an array of after-school programs, from clubs, bands, and other activities to sports. Teachers supervising or coaching in these activities usually receive small stipends for these extra duties. Further, research shows, particularly at the secondary level, that students engaged in these activities tend to perform better academically than students not so engaged (Feldman & Matjasko, 2005), though too much extra-curricular activity can be a detriment to academic learning (Committee on Increasing High School Students' Engagement and Motivation to Learn, 2004; Steinberg, 1997). In earlier adequacy work in a variety of states, the EB model included amounts in the range of $60/pupil for middle school students and $120/pupil for high school students. But subsequent research in additional states has found that these figures were far below what districts and schools actually spend. An amount of $250/pupil across all grade levels more accurately reflects an adequate level of student activities resources, though the figures could vary by school level and state.	

E. DISTRICT RESOURCES

In addition to school-based resources, education systems also need resources for district level expenditures including the district office and operations and maintenance. These are outlined below.

E.25 Central Office

Current Kentucky Policy	Evidence-Based Model
There is no specific provision in the KY SEEK formula for this element**.**	The EB Model computes a dollar per pupil figure for the Central office based on the number of FTE positions generated and the salary and benefit levels for those positions.
Stakeholder Panel Recommendation	**Advisory Committee Recommendation**
Same as EB Model.	Same as EB Model. Although positions may be different; the cost seemed to be logical.

Analysis and Evidence

Elizabeth Swift used professional judgment panels to determine staffing for a prototypical district of 3,500 students (see also Swift, 2005, Picus & Odden, 2010, Odden &Picus, 2014). Swift's work formed the basis of state analyses, where in three states (Washington, Wisconsin and North Dakota) professional judgment panels reviewed the basic recommendations that emerged from Swift's research to estimate central office staffing requirements.

The central office resources required for a district of 3,500 students is about 8 professional staff (superintendent, assistant superintendent for curriculum, business manager, and directors of human resources, pupil services, special education, technology and special education) and nine clerical positions. Although the research basis for staffing school district central offices is relatively limited, analysis of the Education Research Service Staffing Ratio report shows that nationally school districts with between 2,500 and 9,999 students employ an average of one central office professional/administrative staff member for every 440.0 students (Education Research Services, 2009). This works out to almost exactly eight central office professionals (7.95) in a district of 3,500 students.

The prototypical school district for the EB model is slightly larger than 3,500 at 3,900 students, so a district would include four 450 student elementary schools, two 450 student middle schools, and two 600 student high schools. This larger size also supports the testing and evaluation, and computer technician staff, which are needed today, while staying generally within the ERS parameters. The EB model includes ten professional staff positions and nine clerical staff for the central office of a prototypical school district with 3,900 students.

In addition to staffing, central offices need a dollar per pupil figure for such costs as insurance, purchased services, materials and supplies, equipment, association fees, elections, district wide technology, communications, and other costs.

Larger districts would be provided the resources for a larger central office by prorating up the per pupil cost of this 3,900 pupil central office, and also could have more differentiated staff with coordinators as well as a full-fledged legal counsel for large districts.

E.26 Maintenance and Operations

Current Kentucky Policy	Evidence-Based Model
There is no specific provision in the KY SEEK formula for this element**.**	Using the formulas described below, EB computes a dollar per pupil figure for the maintenance and operations based on the number of FTE positions generated and the salary and benefit levels for those positions.
Stakeholder Panel Recommendation	**Advisory Committee Recommendation**
Same as EB Model.	EB Model seems logical, but point of reference due to lack of current funding made it difficult to determine adequacy.
Analysis and Evidence	

Recommendations in this section are based on several analyses of the cost basis for maintenance and operations (e.g., Picus & Odden, 2010; Picus & Seder, 2010), including the costs for custodians (school level), maintenance staff (district level) and groundskeepers (school and district level), as well as the costs of materials and supplies to support these activities.

Custodians*:* Custodial workers' duties are time-sensitive, structured, and varied. Zureich (1998) estimates the time devoted to various custodial duties:

- Daily duties (sweep or vacuum classroom floors; empty trash cans and pencil sharpeners in each classroom; clean one sink with faucet; and, security of room), which take approximately 12 minutes per classroom.
- Weekly duties (dust reachable surfaces; dust chalk trays and clean doors; clean student desk tops; clean sink counters and spots on floors; and, dust chalk/white boards and trays), each of which adds 5 minutes a day per classroom.
- In addition to these services, non-cleaning services (approximately 145 minutes per day) provided by custodians include: opening school (checking for vandalism, safety and maintenance concerns), playground and field inspection, miscellaneous duties (teacher/site-manager requests, activity set-ups, repairing furniture and equipment, ordering and delivering supplies), and putting up the Flag and PE equipment.

A formula that takes into consideration these cleaning and non-cleaning duties has been developed and updated by Nelli (2006). The formula takes into account teachers, students, classrooms and Gross Square Feet (GSF) in the school. The formula is:

- 1 Custodian for every 13 teachers, plus
- 1 Custodian for every 325 students, plus
- 1 Custodian for every 13 classrooms, plus

- 1 Custodian for every 18,000 Gross Square Feet (GSF), and
- The total divided by 4.

The formula provides a numeric equivalent of the number of custodians needed at prototypical schools. The advantage of using all four factors in estimating the number of custodians needed is it will accommodate growth or decline in enrollment and continue to provide the school with adequate coverage for custodial services over time.

The table below illustrates custodial computations for a prototypical school district with four 450-student prototypical elementary schools, two 450-student middle schools, and two 600-student high schools. Column 2 displays the enrollment of each school. Column 3 indicates the number of classrooms that enrollment generates at the pupil teacher ratios described above. This figure includes classrooms for special education programs as well as the regular program. Column 4 provides the number of teachers at each school. The fifth column uses current Arkansas facility standards to estimate the gross square footage of the prototypical schools in our prototype district.[4] The number of custodians in each school is computed using the formulas above and displayed in Column 6. A half time custodian is added for the high school to accommodate the higher number of after school and evening activities that typically occur at high schools. For this prototypical school district, total custodians would amount to 23 including a half time custodian at the district office.

Prototypical District Custodial Computations

School Type (1)	Enrollment (2)	Classrooms (3)	Teachers (4)	Gross Square Feet (5)	Custodians (6)
Elementary	450	34	34	62,950	2.53
Elementary	450	34	34	62,950	2.53
Elementary	450	34	34	62,950	2.53
Elementary	450	34	34	62,950	2.53
Middle	450	27	27	62,784	2.26
Middle	450	27	27	62,784	2.26
High School	600	39	38	106,887	3.93
High School	600	39	38	106,887	3.93
District Total *	3,900	268	266	591,142	22.48

*Includes half time custodian at the district office

Maintenance Workers: Maintenance workers function at the district level, rather than at individual schools. Core tasks provided by maintenance workers include preventative maintenance, routine maintenance and emergency response activities. Individual maintenance worker accomplishment associated with core tasks are: (a) HVAC systems, HVAC equipment,

[4] Arkansas standards are used as an approximation of the square footage requirements for prototypical schools. Many states have school facility standards that are described and outlined in a variety of alternative methods. The Arkansas standards are in about the middle of state standards that are available (see Seder, 2012).

and kitchen equipment; (b) Electrical systems, electrical equipment; (c) Plumbing systems, plumbing equipment; and, (d) Structural work, carpentry and general maintenance/repairs of buildings and equipment (Zureich, 1998).

Zureich (1998) recommends a formula for maintenance worker FTEs incorporated into the funding model for instructional facilities as follows:

[(# of Buildings in District) x 1.1 + (GSF/60,000 SqFt) x
1.2 + (ADM/1,000) x 1.3
+ General Fund Revenue/5,000,000) x 1.2] / 4
= Total number of Maintenance Workers needed.

Using $10,000 per pupil in revenues to *estimate* the number of maintenance workers in the prototypical district. Applying this formula to the prototypical district described for custodians results in just over nine maintenance workers for a prototype district.

Maintenance Workers in Prototypical School District

Category	Number	Factor	Combined
Number of Buildings	9	1.1	9.9
Gross Square Footage	9.68	1.2	11.82
Enrollment /1,000	3.83	1.3	5.07
General Fund Revenue (10,000/student)	7.66	1.2	9.36
Total FTE Maintenance Workers			9.04

Maintenance and Custodial supplies are estimated at $0.70 per gross square foot. The school gross square feet are 591,142 plus an estimated 10 percent more for the central office, bringing total district gross square footage to 650,256 and the cost of materials and supplies to $447,414 or $116.88 per pupil.

Grounds Maintenance: The typical goals of a school grounds maintenance program are generally to provide safe, attractive, and economical grounds maintenance (Mutter & Randolph, 1987). This, too, is a district level function. An example of a work crew's responsibility at various school levels in acres and days per year is below, which uses the prototypical school district as an example.

Groundskeeper Example

Facility Type	Crew Members	Site Acres	Days	Factor
Elementary School	3 Groundskeepers	14.2	62 days = [31 acre site hours x 16 acres/8 hrs. per day]	1
Middle School	3 Groundskeepers	24.2	93 days = [31 acre site hours x 24 acres/8 hrs. per day]	1.5
High School	3 Groundskeepers	40.6	155 days =[31 acre site hours x 40 acres/8 hrs. per day]	2.5

These factors can be used for the prototypical school district to estimate the total number of Grounds staff needed grounds keeping as follows:

Groundskeepers in Prototypical School District

School Type	Acres	Days	Factor	Total Days
Elementary	14.2	62	1	62
Elementary	14.2	62	1	62
Elementary	14.2	62	1	62
Elementary	14.2	62	1	62
Middle	24.2	93	1.5	139.5
Middle	24.2	93	1.5	139.5
High school	40.6	155	2.5	387.5
High school	40.6	155	2.5	387.5
Total Days Required				1,302.00
Number of FTE at 220 days per FTE				5.92
Additional Groundskeeper for Central Office				1

Total Maintenance and Operations FTE in Prototypical School District

Category	FTE
Custodians	22.48
Maintenance	9.04
Groundskeepers	6.92
Total	38.44

To estimate the district's expenditures for maintenance and operations, the number of positions in each category would be multiplied by the average total compensation for each position and added to the $447,415 for materials and supplies. This figure is easily computed on a per-pupil basis by dividing by district enrollment.

It is necessary to add the per pupil costs of utilities and insurance to these totals. It is unlikely that a district has much control over these costs in the short run and thus each district can best

estimate future costs using their current expenditures for utilities and insurance as a base.

APPA, a professional association dedicated to educational facilities management offers staffing ratios that can be used to estimate resource needs for schools districts. APPA has staffing standards for maintenance workers, custodians, and groundskeepers; the same staff categories for which funding was estimated above. These staff resources are allocated according to different service care and stewardship levels. APPA's web site and publications (APPA, 1998, 2001, 2002), which are considered industry standards for educational facilities, offered a strong research basis for establishing an appropriate benchmark for estimating the cost basis for O&M.

F.27 REGIONAL COST ADJUSTMENT FACTOR

A few states, including Kentucky, include a factor in the state aid formula that seeks to adjust the dollars provided to each district for differences in educational costs caused by regional differences in the purchasing price of the education dollar.

Current Kentucky Policy	Evidence-Based Model
There is no specific provision in the KY SEEK formula for this element	The EB approach suggests that Kentucky use a Comparable Wage Index to adjust professional salary levels.
Stakeholder Panel Recommendation	**Advisory Committee Recommendation**
Model both with and without the CWI to determine how districts with varying levels of resources will be affected different by each approach.	Agreed that a regional cost index should be applied.

Analysis and Evidence

Though several different approaches can be taken in constructing cost-of-education indices (Chambers, 1981), there is substantial correlation among price indices constructed with different methodologies (Chambers, 1981). Whatever methodology is used, price differences can vary substantially across districts. In earlier studies of California (Chambers,1980), Missouri (Chambers, Odden, and Vincent, 1976), New York (Wendling, 1981b), and Texas (Monk and Walker, 1991), within-state price variations ranged from 20 percent (10 percent above and below the average) in California to 40 percent (20 percent above and below the average) in Texas. And price ranges remain about the same according to more recent studies of Wyoming and Texas (e.g., Baker, 2005; Taylor, 2004). These are substantial differences. These results mean that high-cost districts in California must pay 20 percent more for the same educational goods as low-cost districts; thus, with equal per-pupil revenues, high-cost districts are able to purchase only 75 percent of what low-cost districts can purchase. The differences in Texas are even greater. Such price differences, caused by circumstances and conditions essentially outside the control of district decision makers, qualify as a target for adjustments in some state aid formulas.

In early 2001, Fowler and Monk (2001) created a primer on how to develop price indices in education, using largely the hedonic index approach. Shortly after this primer was developed, however, a new approach to developing geographic adjustments for teacher salaries entered into school finance scholarly and policy debates. Rather than using the hedonic approach, which had

been used for the preceding 30 years, the new method takes a "comparable wage" approach. Under this new approach, the adjustment for teachers is taken from salary variations in occupations other than teaching (for a recent study, see Taylor, 2010). Taylor and Fowler (2006) used all occupations requiring a bachelor's degree or greater while Imazeki (2006) used salaries only for occupations that were similar to teaching. Imazeki's analysis showed, moreover, that the indices produced for all occupations were different from those produced only for occupations similar to teachers.

States can take two different approaches in using a price or cost-of-education index. First, state aid can be multiplied by the price index, thus ensuring that equal amounts of state aid will purchase equal amounts of educational goods. But this approach leaves local revenues unadjusted by price indices. A better method is to multiply the major elements of a school aid formula by the price index to ensure that total education revenues can purchase the same level of resources. Thus, the price index is applied to the foundation expenditure level in a foundation program, the tax base guaranteed by the state in a GTB program, the state-determined spending level in a full-state-funding program, or total current operating expenditures for a percentage equalizing formula.

As such, including a price index in a school finance formula is relatively simple. And NCES has recently produced comparative wage indices that can be used for all districts and all states, (Taylor and Fowler, 2006) with updated figures for through 2011 (at (http://bush.tamu.edu/research/faculty/taylor_CWI/).

While the existence of the NCES price indices alleviates the need for analysis, price indices do alter the distribution of state aid. In general, education price indices are higher in urban and metropolitan areas than in rural areas. Thus, with a given amount of state aid, use of a price index shifts the shares of state aid at the margin from rural to urban school districts. This distributional characteristic injects an additional dimension to constructing a politically viable state aid mechanism. Nevertheless, prices vary across school districts and affect the real levels of education goods and services that can be purchased. Including an education price index in the school aid formula is a direct way to adjust for these circumstances that are outside the control of school district policymakers.

G. SUMMARY OF STAFFING AND OTHER RESOURCES FOR SMALL SCHOOLS

For small schools with 50 or fewer students or with a KDE status as "alternative" the Evidence-Based (EB) model provides a different formula for estimating the cost of education. For schools of these types, the model allocates one Assistant Principal position and 1 teacher per 7 students (including additional professional development days and substitute teachers). Additionally, the model provides per-pupil dollar resources in a similar fashion as the base model (i.e. supplies, equipment/technology, gifted and talented, professional development, formative assessments, and activities) as well as the cost of the census approach to special education. Resources for *Low Incidence Disability* students remains the same—a state fiscal responsibility to not unnecessarily burden schools with students who need great additional resources to meet proficiency.

REFERENCES

Alexander, Karl L., & Entwisle, Doris S. (1996). Schools and children at risk. In A. Booth & J.F. Dunn (Eds.), *Family-school links: How do they affect educational outcomes?* (pp. 67–89). Mahwah, NJ: Lawrence Erlbaum.

Allington, R. L., McGill-Franzen, A., Camilli, G., Williams, L., Graff, J., Zeig, J., . . . Nowak, R. (2010). Addressing summer reading setback among economically disadvantaged elementary students. Reading Psychology, 411-427.

Andrews, Matthew, Duncombe, William, & Yinger, John. (2002). Revisiting economies of size in American Education: Are we any closer to a consensus. *Economics of Education Review, 21*(3), 245–262.

APPA. (1998). *Custodial Staffing Guidelines for Educational Facilities (2nd Ed.).* Alexandria, VA: APPA.

APPA. (2001). *Operational Guidelines for Grounds Management*. Alexandria, VA: APPA National Recreation and Park Association, Professional Grounds Management Society.

APPA. (2002). *Maintenance Staffing Guidelines for Educational Facilities.* Alexandria, VA: APPA.

Archambault Jr., Francis X., Westberg, Karen L., Brown, Scott, Hallmark, Brian W., Zhang, Wanli, & Emmons, Christine. (1993). Regular classroom practices with gifted students: Findings from the classroom practices survey. *Journal for the Education of the Gifted, 16*, 103-119.

Aroostook Band of Micmacs.(n.d.).“Education. ”http://www.micmacnsn.gov/html/education.html

Baker, Bruce. (2005). *Development of an Hedonic Wage Index for the Wyoming School Funding Model*. Analysis prepared for the Wyoming Legislature under the auspices of Lawrence O. Picus and Associates.

Ballou, Dale & Michael Podgursky. (1997). *Teacher Pay and Teacher Quality*. Kalamazoo, MI: W.E. Upjohn Institute for Employment Research.

Barnett, W. Steven, & Masse, Leonard N. (2007). Comparative benefit–cost analysis of the Abecedarian program and its policy implications. *Economics of Education Review*, 26 (2) 113–125

Barnett, W. Steven. (2007). Benefits and Costs of Quality Early Childhood Education. *The Children’s Legal Rights Journal*, 27(10, 7-23.

Barnett, W. Steven. (2011). Effectiveness of early educational intervention. *Science, 333*(6045), 975–B.W. 978 .

Battaglino, Tamara Butler, Haldeman, Matt, & Laurans, Eleanor. (2012). *The costs of online learning*. Dayton, OH: Thomas Fordham Institute.

Black, Paul, & Wiliam, Dylan. (1998). Inside the Black Box: Raising standards through classroom assessments. *Phi Delta Kappan, 80*(2), 139-148.

Blankstein, Alan. (2010). *Failure is not an option* (2nd ed,*)*. Thousand Oaks: Corwin Press.

Blankstein, Alan. (2011). *The Answer is in the Room: How Effective Schools Scale Up Student Success*. Thousand Oaks: Corwin Press.

Bleske-Rechek, April, Lubinski, David, & Benbow, Camilla P. (2004). Meeting the educational needs of special populations: Advanced placement's role in developing exceptional human capital. *Psychological Science, 15*(4), 217 –224.

Borman, G., Goetz, M., & Dowling, M. (2009). Halting the summer achievement slide: A randomized evaluation of the *KindergARTen* Summer Camp. *Journal of Education for Students Placed At Risk, 14*(2), 133-147.

Borman, Geoffrey D. (2001). Summers are for learning. *Principal, 80*(3), 26-29.

Borman, Geoffrey D., & Boulay. Matthew. (Eds.). (2004). *Summer Learning: Research, policies and programs*. Mahwah, NJ: Lawrence Erlbaum Associates.

Borman, Geoffrey D., & Dowling, Maritza. (2006). The longitudinal achievement effects of multi-year summer school: Evidence from the Teach Baltimore randomized field trial. *Educational Evaluation and Policy Analysis, 28*, 25 –48.

Borman, Geoffrey, Rachuba, Laura, Hewes, Gina Boulay, Matthew, & Kaplan, Jody. (2001). Can a summer intervention program using trained volunteer teachers narrow the achievement gap? First-year results from a multi-year study. *ERS Spectrum, 19*(2), 19-30.

Boyd, Donald, Hamilton Lankford, Susanna Loeb and James Wyckoff. (2003). The Draw of Home: How Teachers' Preferences for Proximity Disadvantage Urban Schools. NBER Working Paper No. w9953.

Brabeck, Mary M., Walsh, M.E., & Latta, Rachel. (2003). *Meeting at the hyphen: Schools-universities-professions in collaboration for student achievement and well being. The one-hundred and second yearbook of the National Society for the Study of Education, Part II*. Chicago: National Society for the Study of Education.

Bransford, John, Brown, Ann, & Cocking, Rodney. (1999). *How people learn*. Washington, D.C.: National Academy Press.

Bui, S.A., Craig, S. G., Imberman, S. A. (2012). Is gifted education a bright idea? Assessing the impact of gifted and talented programs on students. Working Paper. Cambridge, MA: National Bureau of Economic Research.

Camilli, Gregory, Vargas, Sadako, Ryan, Sharon, & Barnett, W. Steven. (2010). Meta-analysis of the effects of early education interventions on cognitive and social development. *Teachers college record, 112*(3), 579-620.

Capizzano, Jeffrey, Adelman, Sarah, & Stagner, Matthew. (2002). *What happens when the school year is over? The use and costs of child care for school-age children during the summer months*. (Assessing the New Federalism, Occasional Paper, No. 58). Washington, D.C.: Urban Institute.

Carlson, Deven, Borman, Geoffrey D., & Robinson, Michelle. (2011). A multistate district-level cluster randomized trial of the impact of data-driven reform on reading and mathematics achievement. *Educational Evaluation and Policy Analysis, 33*(3), 378-398.

Catterall, J. S., Chapleau, R., & Iwanaga, J. (1999). Invilvement in the arts and human development: General involvement and intensive involvement in music and theater arts. In E. S. Fiske, Champions of change: The Impact of the arts on learning (pp. 1-18). Washington, D.C.: President's Committee on the Arts and the Humanities & Arts Education Partnership.

Cavin, Edward, Murnane, Richard, & Brown, Randall. (1985). School district response to enrollment changes: The direction of change matters. *Journal of Education Finance, 10*(4), 426–440.
Center on Education Compensation Reform. (2008). School-Based Performance Pay in Georgia. Nashville, TN: Vanderbilt University, Peabody College of Education.
Center on Education Compensation Reform. (2008). TAP: The System for Teacher and Student Advancement. Nashville, TN: Vanderbilt University, Peabody College of Education.
Centers for Disease Control. (2010). The Association between school-based physical activity, including physical education, on academic performance. Atlanta, GA: U.S. Department of Health and Human Services.
Chambers, Jay G. (1980). *The development of a cost of education index for the State of California final reports, Parts 1 and 2*. Prepared for the California State Department of Education.
Chambers, Jay G. (1981). Cost and price level adjustments to state aid for education: A theoretical and empirical view. In K. Forbis Jordan & Nelda Cambron-McCabe (Eds.), *Perspectives in state school support programs*. Cambridge, MA: Ballinger.
Chambers, Jay G. (1995). Public school teacher cost differences across the United States: Introduction to a Teacher Cost Index (TCI). In *Developments in School Finance*. Available online: www.ed.gov/NCES/pubs/96344cha.html.
Chambers, Jay G., Odden, Allan, & Vincent, Phillip E. (1976). *Cost of education indices among school districts*. Denver: Education Commission of the States.
Chenoweth, Karen, & Theokas, Christina. (2011). *Getting it done: Leading academic success in unexpected schools*. Cambridge, MA: Harvard Education Press.
Chenoweth, Karen. (2007). *It's being done: Academic success in unexpected schools.* Cambridge, MA: Harvard Education Press.
Chenoweth, Karen. (2009). *How it's being done: Urgent lessons from unexpected schools.* Cambridge, MA: Harvard Education Press.
Clark, Kevin. (2009). The case for structured English immersion. *Educational Leadership, 66*(7), 42–46.
Clotfelter, C. T., Ladd, H. F., & Vigdor, J. L. (2011). Teacher Mobility, School Segregation, and Pay-Based Policies to Level the Playing Field. Education Finance And Policy, 6(3), 399-438.
Clotfelter, Charles, Elizabeth Glennie, Helen Ladd & Jacob Vigdor. (2005). North Carolina Math/Science/Special Education (MSSE) $1,800 Teacher Bonus Program: An Initial Evaluation. Chapel Hill: Center for Child and Family Policy, Duke University.
Coeyman, Marjorie. (November 24, 1998). Small-town schools: Changing times and budgets put the squeeze on. *Christian Science Monitor, 90*(252), 15.
Cohen, Peter,, Kulik, James, & Kulik, Chen-Lin. (1982). Educational outcomes of tutoring: A meta-analysis of findings. *American Educational Research Journal, 19*(2), 237–248.
Committee on Increasing High School Students' Engagement and Motivation to Learn. (2004). *Engaging schools: Fostering high school students' motivation to learn*. Washington, DC: National Academies Press.
Cook, P.J., Dogde, K., Farkas, G., Fryer, Jr., R.G., Guryan, J, Ludwig, J. Mayer, S., Pollack, H., & Steinber, L. (2014). The (surprising) efficacy of academics and behavioral intervention

with disadvantaged youth: Results from a randomized experiment in Chicago. NBER Working Paper Series (Working Paper 19862). Cambridge, MA: National Bureau of Economic Research.
Cooper, Harris, Batts-Allen, Ashley, Patall, Erika A., & Dent, Any L. (2010). Effects of full-day kindergarten on academic achievement and social development. *Review of Educational Research, 80*(1), 34-70.
Cooper, Harris, Charlton, Kelly, Valentine, Jeff C., & Muhlenbruck, Laura. (2000). Making the most of summer school: A meta-analytic and narrative review. *Monographs of the Society for Research in Child Development, 65* (1, Serial No. 260).
Cooper, Harris, Nye, Barbara, Charlton, Kelly, Lindsay, James, & Greathouse, Scott. (1996). The effects of summer vacation on achievement test scores: A narrative and meta-analytic review. *Review of Educational Research, 66,* 227–268.
Cooper, Harris, Robinson, Jorgianne Civey, & Patall, Erika. (2006). Does homework improve academic achievement? A synthesis of research, 1987-2003. *Review of Educational Research, 76*(1), 1-62.
Crow, Tracy, (Ed.) (2011). Standards for professional learning. *Journal of Staff Development, 32*(4), Special Issue.
Danielson, Charlotte. (2007). Enhancing Professional Practice: A Framework for Teaching. (2nd Ed.). Alexandria, VA: Association for Supervision and Curriculum Development.
Denton, Kristin, West, Jerry, & Walston, Jill. (2003). *Reading—young children's achievement and classroom experiences: Findings from the condition of education 2003*. Washington, DC: National Center for Education Statistics.
Donovan, Suzanne, & Bransford, John. (2005b). *How students learn – mathematics in the classroom*. Washington, DC: National Research Council.
Donovan, Suzanne, & Bransford, John. (2005c). *How students learn – science in the classroom.* Washington, DC: National Research Council.
Donovan, Suzanne,& Bransford, John. (2005a). *How students learn – history in the classroom.* Washington, DC: National Research Council.
DuFour, Richard, DuFour, Rebecca, Eaker, Robert, & Many, Thomas. (2010). *Learning by doing: A handbook for professional communities at work.* Bloomington, IN: Solution Tree Press.
Duncombe, William D., & Yinger, John M. (2010). School district consolidation: The benefits and costs. *The School Administrator, 67*(5), 10-17.
Educational Research Service. (2009). *Staffing patterns in public school systems: Current status and trends, update 2009*. Alexandria, VA: Educational Research Service, www.ers.org. Downloaded September 3, 2010.
Elbaum, Batya, Vaughn, Sharon, Hughes, Marie T., & Moody, Sally W. (1999). Grouping practices and reading outcomes for students with disabilities. *Exceptional Children, 65,* 399–415.
Elicker, James & Sangeeta Mathur. (1997). What do they do all day? Comprehensive evaluation of a full day kindergarten. *Early Childhood research Quarterly*, 12(4), 459-480.
Farbman, D. A., Goldberg, D. J., Miller, T. J., (2014) Redesigning and expanding school time to support common core implementation. National Center on Time and Learning. Washington, D.C.: Center for American Progress.

Farkas, George. (1998). Reading one-to-one: An intensive program serving a great many students while still achieving. In Jonathan Crane, Ed. *Social programs that work*. New York: Russell Sage Foundation.

Feldman, Amy F., & Matjasko, Jennifer L.. (2005). The role of school-based extracurricular activities in adolescent development; A comprehensive review and future directions. *Review of Educational Research*, *75*(2), 159–210.

Field, Gara Brooke, (2007). The effect of using Renzulli Learning on student achievement: An investigation of internet technology on reading fluency and comprehension. Storrs, CT: University of Connecticut, Neag School of Education, National Research Center on the Gifted and Talented.

Finn, Jeremy D., & Achilles, Charles M. (1999). Tennessee's class size study: Findings, implications, misconceptions. *Educational Evaluation and Policy Analysis, 21*, 97–109.

Finn, Jeremy D., Gerger, Susan B., Achilles, Charles M., & Zaharias, Jane B. (2001). The enduring effects of small classes. *Teachers College Record, 103*(2), 145-183.

Finn, Jeremy. (2002). Small classes in America: Research, practice, and politics. *Phi Delta Kappan, 83*(7), 551–560.

Fowler , R. Clarke. (2008). The Heralded Rise and Neglected Fall of the Massachusetts Signing Bonus, *Phi Delta Kappan*, 89(5), 380-385.

Fowler, William Jr., & Monk, David. (2001). *A primer for making cost adjustments in education*. Washington, DC: U.S. Department of Education, National Center for Education Statistics.

Fox, William F. (1981). Reviewing economies of size in education. *Journal of Education Finance, 6*(3), 273–296.

Frede, Ellen, Jung, Kwanghee, Barnett, W. Steven , Lamy, Cynthia E., & Figueras, Alexandra. (2007). *The Abbott Preschool Program Longitudinal Effects Study (APPLES): Interim Report*. New Brunswick, NJ: National Institute for Early Education Research. http://nieer.org/resources/research/APPLES.pdf.

Fusaro, Joseph A. (1997). The effect of full-day kindergarten on student achievement: A meta-analysis, *Child Study Journal, 27*(4), 269-277.

Fuchs, D. & Fuchs, L. (2006). Introduction to intervention: What, why, and how valid is it? *Reading Research Quarterly*, v41(1), pp 93-99.

Gallagher, James, & Coleman, Mary R. (1992). *State policies on the identification of gifted students from special populations: Three states in profile.* Chapel Hill, NC: Gifted Education Policy Studies Program.

Gallagher, James. (1996). The strange case of acceleration. In C. Benbow & D. Lubinski (Eds.), *Intellectual talent* (pp. 83–92). Baltimore: Johns Hopkins Press.

Gallagher, James. (2002). *Society's role in educating gifted students: The role of public policy* (RM02162). Storrs, CT: The National Research Center on the Gifted and Talented, University of Connecticut.

Gallagher, Shelagh, & Stepien, William. (1996). Content acquisition in problem-based learning: Depth versus breadth in American studies. *Journal for the Education of the Gifted, 19*, 257 –275.

Gallagher, Shelagh, Stepien, William, & Rosenthal, Hilary. (1992). The effects of problem-based learning on problem solving. *Gifted Child Quarterly, 36*, 195-200.
Gamoran, A., & Long, D. A. (2006). Equality of Educational Opportunity: A 40-year retrospective(WCER Working Paper No. 2006-9). Madison: University of Wisconsin–Madison, Wisconsin Center for Education Research. Retrieved March 26, 2014 from http://www.wcer.wisc.edu/publications/workingPapers/papers.php
Gandara, Patricia, & Rumberger, Russell W. (2008). Defining an adequate education for English learners. *Education Finance and Policy*, 3(1), 130-148.
Gandara, Patricia, Rumberger, Russel, Maxwell-Jolly, Julie, & Callahan, Rebecca. (2003). English learners in California schools: Unequal resources, unequal outcomes. *Education Policy Analysis Archives, 11*(3).
Garet, Michael S., Birman, Beatrice, Porter, Andrew, Desimone, Laura, & Herman, Rebecca. (1999). *Designing effective professional development: Lessons from the Eisenhower Program*. Washington, DC: United States Department of Education.
Gerber, Susan, Finn, Jeremy, Achilles, Charles, & Boyd-Zaharias, Jane (2001). Teacher aides and students' academic achievement. *Educational Evaluation and Policy Analysis, 23*(2), 123–143.
Gersten, Russell, Ed. (2006). *Elementary School Journal*. Entire Issue.
Glazerman, S., Protik, A., Theh, B., Bruch, J., and Seftor, N. Moving High-Performing Teachers: Implementation of Transfer Incentives in Seven Districts (NCEE 2012-4051). Washington, DC: National Center for Education Evaluation and Regional Assistance, Institute of Education Sciences, U.S. Department of Education.
Goldhaber, Dan & Anthony, E. (2004). Can Teacher Quality be Effectively Assessed? Washington, D.C.: Urban Institute.
Gordon, Edwin E. (2009). 5 ways to improve tutoring programs. *Phi Delta Kappan,* 90(6), 440-445.
Gowanda Central School District. (2013). Academic Assistance Services Program/Johnson-O'Malley (AASP/JOM) Home Page. http://www.gowcsd.org/support.cfm?subpage=205356
Griffith, Michael and Emily Workman (2013), Education Commission of the States. *At-Risk Funding – A Fifty State Survey*. Unpublished manuscript.
Grissmer, David. (1999). Class size: Issues and new findings. *Educational Evaluation and Policy Analysis, 21*(2). (Entire issue.)
Gullo, Dominic. (2000). The long-term effects of full-school-day kindergarten on student achievement: A meta-analysis. *Early Child Development and Care, 160*(1), 17-24.
Guthrie, James W. (1979). Organizational scale and school success. *Educational Evaluation and Policy Analysis, 1*(1), 17–27.
Hakuta, Kenji. (2011). Educating language minority students and affirming their equal rights: Research and practical perspectives. *Educational Researcher, 40*(4), 163-174.
Hansen, Jan, & Feldhusen, John F. (1994). Comparison of trained and untrained teachers. *Gifted Child Quarterly*, *38*(3), 115–121.
Hansen, M.L., Lien, D. S., Cavaluzzo, L. C., & Wenger, J.W. (2004). Relative pay and teacher retention: An empirical analysis in a larger urban district. Alexandria, VA: The CNA Corporation.

Hanushek, E.A., Kain, J.F., & Rivkin, S.G. (2004). Why public schools lose teachers. The Journal of Human Resources, 39,2, 326-354.
Hanushek, Eric. (2002). Evidence, politics and the class size debate. In Lawrence Mishel & Richard Rothstein (Eds.), *The class size debate* (pp. 37–65). Washington, DC: Economic Policy Institute.
Harris, D.N., & Adams, S.J. (2007). Understanding the level and causes of teacher turnover: A comparison with other professions. Economics of Education Review, 26, 325-337.
Hendricks, M.D. (2012). Does it pay to pay teachers more? Evidence from Texas. Unpublished revision of conference paper provided by the author.
Heyns, Barbara. (1978). *Summer learning and the effects of schooling.* New York: Academic Press
Imazeki, J. J. (2005). Teacher Salaries and Teacher Attrition. Economics of Education Review, 24(4), 431-449.
Imazeki, Jennifer. (2006). *Regional adjustments for Washington state*. Paper prepared for the K–12 Advisory Committee of Washington Learns under the auspices of Lawrence O. Picus and Associates.
Impact aid revenue bonds. Ore. Gen. Laws ch. 328, § 316. http://www.oregonlaws.org/ors/328.316
Jacobson, Linda. (2003). State-financed pre-K shows positive effect, new research says. *Education Week*, November 19, 2003.
James-Burdumy, Susanne, Dynarski, Mark, Moore, Mary, Deke, John, Mansfield, Wendy & Pistorino, Carol. (2005). *When Schools Stay Open Late: The National Evaluation of the 21st Century Community Learning Centers Program: Final Report*. U.S. Department of Education, Institute of Education Sciences, National Center for Education Evaluation and Regional Assistance, 2005. Available at http://www.ed.gov/ies/ncee
Jerald, Craig. (2009). Aligned by Design: How Teacher Compensation Reform Can Support and Reinforce Other Educational Reforms. Washington, D.C.: Center for American Progress.
Jimenez-Castellanos, Oscar, &. Topper, Amelia M. (2012). The cost of providing an adequate education to English language learners: A review of the literature. *Review of Educational Research, 82*(2), 179-232.
Johnson, Henry, Elsie Leak, Gary Williamson, Eileen Kellor, Tony Milanowski, Allan Odden & Jason Hanna (1999). A Case Study of the State of North Carolina's School-Based Performance Award Program. Madison: University of Wisconsin, Wisconsin Center for Education Research, Consortium for Policy Research in Education.
Joyce, Bruce, & Calhoun, Emily. (1996). *Learning experiences in school renewal: An exploration of five successful programs*. Eugene, OR: ERIC Clearinghouse on Educational Management.
Joyce, Bruce, & Showers, Beverly. (2002). *Student achievement through staff development* (3rd Ed.). Alexandria, VA: Association for Supervision and Curriculum Development.
Karoly, Lynn, Greenwood, Peter, Everingham, Susan, Hoube, Jill, Kilburn, M. Rebecca, Rydell, C. Peter, Sanders, Matthew, & Chiesa, James. (1998). *Investing in our children: What we know and don't know about the costs and benefits of early childhood interventions.* Santa Monica, CA: The RAND Corporation.

Kauerz, Kristie. (2005). *Full day kindergarten: A study of state policies in the United States*. Denver, CO: Education Commission of the States.
Kelley, Carolyn, Herbert Heneman III, & Anthony Milanowski. 2002. Teacher Motivation and School-Based Performance Awards. Educational Administration Quarterly. 38 (3): 272–401.
Kentucky Board of Education (2008). The Kentucky school facilities planning manual, 702 KAR 4:180. Retrieved 5/25/2014 at http://education.ky.gov/districts/fac/Pages/Facility-Planning.aspx.
Kentucky Department of Education. (2013). Support Education Excellence in Kentucky (SEEK) Executive Summary for the 2012-13 school year. Retrieved 6/25/2014 from http://education.ky.gov/districts/SEEK/Pages/default.aspx
Kim, J. S., & Quinn, D. M. (2013). The Effects of summer reading on low-income children's literacy achievement from kindergarten to grade 8. Review of Educational Research, 386-431.
Kleiner, Brian, Nolin, Mary Jo, & Chapman, Chris. (2004). *Before and after school care programs, and activities through eighth grade: 2001*. Washington, DC: U.S. Department of Education, National Center for Education Statistics.
Konstantopulos, Spyros, & Chung, Vicki. (2009). What are the long term effects of small classes on the achievement gap? Evidence from the lasting benefits study. *American Journal of Education*, *116*(November), 125-154.
Krueger, Alan B., & Whitmore, Diane M. (2001). *Would smaller classes help close the black-white achievement gap? (*Working paper #451). Princeton, NJ: Princeton University. Available: http://www.irs.princeton.edu/pubs/pdfs/451.pdf.
Krueger, Alan. (2002). Understanding the magnitude and effect of class size on student achievement. In Lawrence Mishel & Richard Rothstein (Eds.), *The class size debate* (pp. 7–35). Washington, D.C.: Economic Policy Institute.
Kulik, James A., & Kulik, Chen-Lin . (1984). The effects of accelerated instruction. *Review of Educational Research, 54*(3), 409-425.
Lance, K. C., & Hofschire, L. (2012). Change in school librarian staffing linked to change in CSAP reading performance, 2005 to 2011. Denver, CO: Library Research Service.
Landry, Susan H. (1999). Issues in developing effective interventions for children with developmental disorders. In S. Broman & M. Fletcher, (Eds.), *The changing nervous system: Neurobehavioral consequences of early brain disorders (*pp. 341-364). New York, NY: Oxford University Press.
Lee, Valerie, & Smith, Julia. (1997). High school size: Which works best, and for whom? *Educational Evaluation and Policy Analysis, 19*(3), 205–228.
Levenson, Nathan. (2011). *Something has got to change: Rethinking special education, Working Paper 2011-01*. Washington, D.C.: American Enterprise Institute.
Levenson, Nathan. (2012). *Boosting the quality and efficiency of special education*. Dayton, OH: Thomas Fordham Institute.
Levesque, K., Wun, J., & Green, C. (2010). Science achievement and occupational career/technical education course taking in high school: The Class of 2005. Washington, D.C.: Institute of Education Statistics.

Liu, Edward, Susan Moore Johnson & Heather G. Peske. (2004). New Teachers and the Massachusetts Signing Bonus: The Limits of Inducements. *Educational Evaluation and Policy Analysis*, 26(3), 217-236.

Lockwood, J.R., McCombs, Jennifer Sloan, & Marsh, Julie. (2010). Linking reading coaches and student achievement: Evidence from Florida middle schools. *Educational Evaluation and Policy Analysis, 32*(3), 372–388.

Madden, Nancy A., Slavin, Robert, Karweit, Nancy, Dolan, Lawrence J., & Wasik, Barbara A. (1993). Success for all: Longitudinal effects of a restructuring program for inner-city elementary schools, *American Educational Research Journal*, 30: 123–148.

Marsh, Julie A., McCombs, Jennifer Sloan, & Martorell, Francisco. (2010). How instructional coaches support data-driven decision making. *Educational Policy, **24***(6), 872–907.

Measures of Effective Teaching Project. (2012). Gathering Feedback for Teaching. Seattle, WA: Bill and Melinda Gates Foundation.

Michie, Joan, & Holton, Barbara. (2005). *Fifty years of supporting children's learning: A history of public school libraries and federal legislation from 1953 to 2000* (NCES 2005-311). U.S. Department of Education. National Center for Education Statistics. Washington, DC: U.S. Government Printing Office.

Mid-Continent Comprehensive Center. (n.d.)."KnowledgeBases > Impact Aid" Program." http://www.mc3edsupport.org/community/knowledgebases/impact-aid-program-1321.html

Milanowski, Anthony, Kimball, Steve & Odden, Allan. (2005). Teacher Accountability Measures and Links to Learning. In L. Stiefel & A. E. Schwartz & R. Rubenstein & J. Zabel (Eds.). Measuring School Performance and Efficiency: Implications for Practice and Research (pp. 137-161). Larchmont, NY: Eye on Education.

Milanowski, Anthony. T. (2004). The relationship between teacher performance evaluation scores and student achievement: Evidence from Cincinnati. Peabody Journal of Education, 79(4), 33-53.

Miles, Karen H., Odden, Allan R., Fermanich, Mark, & Archibald, Sarah. (2004). Inside the black box of school district spending on professional development: Lessons from five urban districts. *Journal of Education Finance, 30*(1), 1–26.

Miller, Samuel D. (2003). Partners in reading: Using classroom assistants to provide tutorial assistance to struggling first-grade readers. *Journal of Education for Students Placed at Risk, 8*(3), 333–349.

Mishel, Lawrence, & Rothstein, Richard. (2002). *The class size debate*. Washington, DC: Economic Policy Institute.

Monk, David & Walker, Billy. (1991). The Texas Cost of Education Index. *Journal of Education Finance, 17*(2), 172–192.

Monk, David. (1990). *Educational finance: An economic approach*. New York: McGraw-Hill.

Montana Office of Public Instruction. (2011). Understanding Montana School Finance and School District Budgets. Helena, MT: Author. Downloaded February 21, 2013 from http://opi.mt.gov/pdf/schoolfinance/budget/UnderstSchlFin.pdf.

Mosteller, Frederick. (1995). The Tennessee study of class size in the early school grades. *The Future of Children: Critical Issues for Children and Youths 5*: 113-127.

National Center for Education Statistics' National Assessment of Education Progress web site. Retrieved November 21, 2011 from http://nces.ed.gov/nationsreportcard/faq.asp#ques3a
National Center for Education Statistics' Common Core of Data (2013). Retrieved March, 2014 from: http://nces.ed.gov/ccd/
National Education Association' Ranking of State & Estimates of School Statistics (2013). Retrieved February, 2014 from:http://www.nea.org/rankings-and-estimates

National Council on Teacher Quality. (2011). *State of the States: Trends and Early Lessons on Teacher Evaluation and Effectiveness Policies*. Washington, D.C.: Author. National Education Commission on Time and Learning. (1994). *Prisoners of time.* Washington, DC: Author.
National Johnson-O'Malley Association. (2009). JOM Program Handbook. Okmulgee, OK: Author. Downloaded February 20, 3013 from: http://www.aps.edu/indian-education/documents/JOM%20Handbook.pdf
Nelli, Robert. (2006, May). *Operations and maintenance adequacy in California public schools: An evidence-based approach*. Dissertation. Los Angeles, CA: Rossier School of Education, University of Southern California.
Nye, Barbara A., Hedges, Lawrence, V., & Konstantopulos, Spyros. (2001b). Are effects of small cumulative: Evidence from a Tennessee experiment, *Journal of Educational Research*, *94*(6), 336–345.
Nye, Barbara, Hedges, Lawrence, V., & Konstantopoulos, Spyros. (2002). Do Low-achieving Students Benefit More From Small Classes? Evidence From the Tennessee Class Size Experiment. *Educational Evaluation & Policy Analysis 24*(3), 201-217.
Odden, Allan, & Archibald, Sarah. (2009). *Doubling student performance and finding the resources to do it*. Thousand Oaks, CA: Corwin Press.
Odden, Allan, & Picus, Lawrence O. (2014). *School Finance: A Policy Perspective, 5th edition*. New York: McGraw-Hill.
Odden, Allan. (1997). How to rethink school budgets to support school transformation. *Getting better by design series*, Volume 3. Arlington, VA: New American Schools.
Odden, Allan. (2009). *Ten strategies for doubling student performance*. Thousand Oaks, CA: Corwin Press.
Odden, Allan. (2011a). *Strategic management of human capital in education*. New York: Routledge Press
Odden, Allan. (2011b). The dollars and sense of comprehensive professional learning. *Journal of Staff Development*, 32(4), 26-32.
Odden, Allan. (2012). *Improving student learning when budgets are tight*. Thousand Oaks, CA: Corwin Press.
Office of Research and Education Accountability. (2013). *Trends in Teacher Compensation: Focus on Alternative Salary Schedules.* Nashville: Tennessee Controller of the Treasury.
Ornstein, Allen C. (1990). How big should schools and districts be? *Education Digest, 56*(2), 44–48.
Orthner, D. K., Jones-Sanpei, H., Akos, P., & Rose, R. A. (2013). Improving middle school student engagement through career-relevant instruction in the core curriculum. The Journal of Educational Research, 23-30.

Patall, E. A., Cooper, H., & Allen, A. B. (2010). Extending the school day or school year: A systematic review of research (1985-2009). *Review of Educational Research* 80(3), pp. 401-436.

Phelps, L. Allen. (2006). *Career and technical education in Wisconsin's new economy: Challenges and investment imperatives*. Madison: University of Wisconsin, Wisconsin Center for Education Research, Consortium for Policy Research in Education**.**

Pianta, Robert, Allen, Joseph, & King, High. (2011). An interaction-based approach to enhancing secondary school instruction and student achievement, *Science,* 333 (6045), 1034-1037.

Picus, Lawrence O., Odden, Allan, Goetz, Michael, & Aportela, Anabel. (2012). *Estimating the cost of an adequate education for Texas school districts using the evidence-based approach.* North Hollywood, CA. SED Lawrence O. Picus and Associates.

Picus, Lawrence O. & Odden, Allan. (2010). *2010 Cost of Education Study: Submitted to the Select School Finance Committee of the Wyoming State Legislature*. Los Angeles, CA: Lawrence O. Picus and Associates. Available at: http://www.lpicus.com

Picus, L.., Odden, A., & Fermanich, M. (2004). Assessing the equity of Kentucky's SEEK formula: A 10-year analysis. *Journal of Education Finance* Vol. 29, No 4 (Spring 2004), pp. 315-335

Picus, Lawrence O., & Seder, Richard. (2010). Recalibration of maintenance and operation costs. In Lawrence O. Picus & Allan Odden. *2010 Cost of Education Study: Submitted to the Select School Finance Committee of the Wyoming State Legislature*. Los Angeles, CA: Lawrence O. Picus and Associates. Available at: http://www.lpicus.com

Posner, Jill, & Vandell, Deborah L. (1994). Low-income children's after-school care: Are there beneficial effects of after-school programs? *Child Development, 65,* 440-456.

Prince, Cynthia D., Julia Koppich, Tamara Morse Azar, Monia Bhatt & Peter J. Witham. (2008). Compensation for Teachers of Hard-to-Fill Subjects and Teachers in Hard-to-Staff Schools. Nashville: Vanderbilt University, Center for Educator Compensation Reform.

Boulder, CO: University of Colorado, School of Education and Human Development, The Evaluation Center.

Raudenbusch, Steve. (2009). The Brown Legacy and the O'Connor Challenge: Transforming schools in the images of children's potential. *Educational Researcher,38*(3), 169–180.

Ravitch, Diane. (2004). *The mad, mad world of textbook adoption*. Fordham Institute. Maryland: District Creative Printing. Also available at www.edexcellence.net.

Raywid, Mary A. (1997/1998). Synthesis of research: Small schools: A reform that works. *Educational Leadership, 55*(4), 34-39.

Reis, Sally, M., & Purcell, Jeanne H. (1993). An analysis of content elimination and strategies used by elementary classroom teachers in the curriculum compacting process. *Journal for the Education of the Gifted, 16*(2), 147-170.

Reynolds, Arthur J., Temple, Judy A., Ou, Suh-Ruu, Arteaga, Irma A., & White, Barry A.B. (2011). School-based early childhood education and age-28 well-being: Effects by timing, dosage and subgroups. *Sciencexpress.* Downloaded July 7, 2011 from www.sciencemag.org.

Reynolds, Arthur J., Temple, Judy A., Robertson, Dylan L., & Mann, Emily A. (2001). Long-term effects of an early childhood intervention on educational achievement and juvenile

arrest: A 15-year follow-up of low-income children in public schools. *JAMA*, 285, (18), 2339-46.
Rinne, L., Gregory, E., Yarmolinskaya, J., & Hardiman, M. (2011). Why arts integration improves retention of content. Mind, Brain and Education, 89-96.
Roberts, Greg (2000, September). *Technical evaluation report on the impact of Voyager summer programs*. Austin, TX: University of Texas.
Robinson, Ann, & Clinkenbeard, Pamela R. (1998). Giftedness: An exceptionality examined. *Annual Review of Psychology, 49*(1), 117-139.
Rodney, M. J., Lance, K. C., & Hamilton-Pennell, C. (2003). The Impact of Michigan school librarians on academic achievement: Kids who have libraries succeed. Lansing, MI: Library of Michigan.
Rowan, Brian, Correnti, Richard, & Miller, Robert J.(2002). What large-scale, survey research tells us about teacher effects on student achievement: Insights from the Prospects study of elementary schools. *Teachers College Record, 104*(8), 1525-1567.
Schweinhart, Lawrence J., Montie, J., Xiang, Z., Barnett, W. Steven, Belfield, Clyde R., & Nores, M. (2005). *Lifetime effects: The High/Scope Perry Preschool Study through Age 40.* Ypsilanti, MI: High/Scope Educational Research Foundation.
Scott, Leslie. (2004). *School library media centers: Selected results from the longitudinal study of 2002* (ELS:2002) (NCES 205-302). U.S. Department of Education. National Center for Education Statistics. Washington, DC: U.S. Government Printing Office.
Seal, Kenna R., & Harmon, Hobart L. (1995). Realities of rural school reform. *Phi Delta Kappan, 77*(2), 119–124.
Shanahan, Timothy. (1998). On the effectiveness and limitations of tutoring in reading. *Review of Research in Education, 23*, 217–234. Washington, DC: American Educational Research Association.
Sher, Jonathan & Tompkins, Rachel B.. (1977). Economy, efficiency and equality: The myths of rural school and district consolidation. In Jonathan P. Sher (Ed.), *Education in Rural America*. Boulder: Westview Press.
Slavin, Robert E., Madden, Nancy, Calderon, Margarita, Chamberlain, Anne, & Hennessy, Megan. (2011). Reading and language outcomes of a multi-year randomized evaluation of transitional bilingual education. *Educational Evaluation & Policy Analysis, 33*(3), 47–58.
Slavin, Robert, & Cheung, Alan. (2005). A synthesis of research on language of reading instruction for English language learners. *Review of Educational Research, 75*(2), 247–284.
Slavin, Robert, Karweit, Nancy, & Wasik, Barbara. (1994). *Preventing early school failure: Research policy and practice*. Boston: Allyn and Bacon.
Slavin, Robert. (1996). Neverstreaming: Preventing learning disabilities. *Educational Leadership, 53*(4), 4–7.
Southern, W.T., Jones, E.D., & Stanley, J.C. (1993). Acceleration and enrichment: The context and development of program options. In K.A. Heller, F.J. Monks, & A.H. Passow (Eds.), *International handbook of research and development of giftedness and talent* (pp. 387–410). Exeter, United Kingdom: Pergamon.
http://www.tea.state.tx.us/index4.aspx?id=2928&menu_id=949

Steinberg, Laurence. (1997). Standards outside the classroom. In D. Ravitch, (Ed)., *The state of student performance in American schools: Brookings papers on education policy, Volume 1*. Washington, DC: Brookings Institution.
Steiny, Julia. (2009). A work in progress: Formative assessments shape teaching and provide mutual professional development. *Journal of Staff Development, **30***(3), 32–37.
Stringfield, Samuel, Ross, Steven, & Smith, Lana. (1996). *Bold plans for school restructuring: The new American school designs*. Mahwah, NJ: Lawrence Erlbaum.
Struck, Jeanne. (2003, April). *A study of talent development in a predominantly low socioeconomic and/or African American population*. Paper presented at the annual meeting of the American Educational Research Association, Chicago, IL.
Swift, E. (2005). *Estimating the central office resources necessary for an adequate educational program.* Doctoral dissertation at the USC Rossier School of Education, August 2005.
Taylor, Lori L. (2010). *Putting teachers in context: A comparable wage analysis of Wyoming teacher salaries*. A report prepared for the Select Committee on School Finance Recalibration
Taylor, Lori L., & Fowler, William J. (2006). *A comparative wage approach to geographic cost adjustment*. Washington, DC: National Center for Education Statistics.
Taylor, Lori. (2004). *Adjusting for geographic variations in teacher compensation: Updating the Texas Cost-of-Education Index***.** A report prepared for the Texas Legislature Joint committee on Public School finance, The Texas School Finance Project. Austin. Available at www.capitol.state.tx.us/psf/reports.htm.
Tenopir, C. (2003). *Use and users of electronic media sources: An overview and analysis of recent research studies*. Washington DC: Council of Library and Information Resources. Also available at http://www.clir.org/pubs/reports/pub120/contents.html.
Torgeson, J. K. (2004). Avoiding the Devastating Downward Spiral. *American Educator 28*(3), 6-19, 45-47.
Tyler, John H., Eric S. Taylor, Thomas J., & Kane Amy L. Wooten. (2010). *Using Student Performance Data to Identify Effective Classroom Practices,* American Economic Review, 100(2), 256-260.
United States Department of Education (USDOE). (2004). "Elementary & Secondary Education Subpart 1 — Formula Grants to Local Educational Agencies, SEC. 7111 – 7119."
United States Department of Education (USDOE). (2008). "About Impact Aid: Impact Aid Programs." http://www2.ed.gov/about/offices/list/oese/impactaid/whatisia.html
United States Department of Education (USDOE). (2012). Department of Education IMPACT AID Fiscal Year 2013 Budget Request. Washington, DC: Author. Downloaded from http://www2.ed.gov/about/overview/budget/budget13/justifications/c-impactaid.pdf.
Vandell, Deborah L., Pierce, Kim M., & Dadisman, Kim. (2005). Out-of-school settings as a developmental context for children and youth. In R. Kail (Ed.) *Advances in child development and behavior*. Volume 33. Academic Press.
VanTassel-Baska, J., Bass, G., Ries, R., Poland, D., & Avery, L.D. (1998). A National Study of Science Curriculum Effectiveness with High Ability Students. *Gifted Child Quarterly, 42*(4), 200-211.

VanTassel-Baska, J., Johnson, D.T., & Avery, L.D. (2002). Using performance tasks in the identification of economically disadvantaged and minority gifted learners: Findings from Project STAR. *Gifted Child Quarterly, 46*, 110 –123.

VanTassel-Baska, J., Johnson, D.T., Hughes, C.E., & Boyce, L.N. (1996). A study of language arts curriculum effectiveness with gifted learners. *Journal for the Education of the Gifted 19*, 461–480.

VanTassel-Baska, J., Zuo, L., Avery, L.D., & Little, C.A. (2002). A curriculum study of gifted student learning in the language arts. *Gifted Child Quarterly, 46*, 30–44.

Verstegen, D. A. (2011). Public education finance systems in the United States and funding policies for populations with special educational needs. *Education Policy Analysis Archives*, 19 (21).

Wasik, Barbara, & Slavin, Robert E. (1993). Preventing early reading failure with one-to-one tutoring: A review of five programs. *Reading Research Quarterly, 28*, 178-200.

Wendling, Wayne. (1981b). The cost of education index: Measurement of price differences of education personnel among New York State school districts. *Journal of Education Finance*, *6*(4), 485–504.

Whitebrook, Marcy. (2004). *Bachelor's degrees are best: Higher qualifications for pre-kindergarten teachers lead to better learning environments for children*. Washington, DC: The Trust for Early Education.

Whitehurst, Grover J. "Russ," & Chingos, Matthew M. (2010). *Class size: What research says and what it means for state policy.* Washington, D.C.: The Brookings Institution.

Woolley, M. E., Rose, R. A., Orthner, D. K., Akos, P. T., & Jones-Sanpei, H. (2013). Advancing academic achievement through career relevance in the middle grades: A longitudinal evaluation of CareerStart. American Educational Research Journal, 1309-1335.

Word, Elizabeth, Johnston, John, Bain, Helen, Fulton, B. DeWaynbe, Boyd-Zaharias, Jane, Lintz, Maria Nan, Achilles, Charles M., Folger, John, & Breda, Carolyn. (1990). *Student/teacher achievement ratio (STAR): Tennessee's K-3 class-size study.* Nashville, TN: Tennessee State Department of Education.

Wright, P. Sander, Horn, Sharon P., & Sanders, William L. (1997). Teacher and classroom context effects on student achievement: Implications for teacher evaluation. *Journal of Personnel Evaluation in Education, 11*(1), 57–67.

Youngs, Peter, Odden, Allan, & Porter, Andrew. (2003). State policy related to teacher Licensure. *Educational Policy, 17*(2), 217-236.

Zureich, Mike (1998). *CASBO: Staffing formula hoax*. Pleasanton, CA: Research and Development Committee, California Association of School Business Officials. #0902.

APPENDIX A: ADDITIONAL INFORMATION ON COMPONENTS

CAREER AND TECHNICAL EDUCATION

Vocational education, or its modern term, Career and Technical Education (CTE), has been experiencing a shift in focus for the past several years. Traditional vocational education focused on practical, applied skills needed for wood and metal-working, automobile mechanics, typing and other office assistance careers, including home economics. Today, many argue that vo-tech is info-tech, nano-tech, bio-tech, and health-tech. The argument is that Career and Technical education should begin to incorporate courses that provide students with applied skills for new work positions in the growing and higher wage economy including information technologies (such as computer network management), engineering (such as computer-assisted design), a wide range of jobs in the expanding health portions of the economy and bio-technical positions – all of which can be entered directly from high school. The American College Testing Company and many policymakers have concluded that the knowledge, skills and competencies needed for college are quite similar to those needed for work in the higher-wage, growing jobs of the evolving economy.

One key issue is the cost of these programs. Many districts and states believe that these new career-technical programs cost more than the regular program and even more than traditional vocational classes. However, in a review conducted for a Wisconsin school finance adequacy task force, a national expert (Phelps, 2006) concluded that the best of the new career-technical programs did not cost more, according to a finance adequacy review, especially if the district and state made adequate provisions for professional development and computer technologies (Phelps, 2006). These conclusions generally were confirmed by a cost analysis (Odden & Picus, 2010) of Project Lead the Way (PLTW), one of the most highly rated and "expensive" career technical programs in the country.

PLTW (**www.pltw.org**) is a nationally recognized exemplar for secondary CTE education. Often implemented jointly with local postsecondary education institutions and employer advisory groups, these programs usually feature project- or problem-based learning experiences, career planning and guidance services, and technical and/or academic skills assessments. Through hands-on learning, the program is designed to develop the science, technology, engineering and mathematics skills essential for achievement in the classroom and success in college or jobs not requiring a four-year college education. As of 2010, PLTW was offered in more than 3,000 high schools in all 50 states and enrolled over 350,000 students.

The curriculum features rigorous, in-depth learning experiences delivered by certified teachers and end-of-course assessments. High-scoring students earn college credit recognized in more than 100 affiliated postsecondary institutions. Courses focus on engineering foundations (design, principles, and digital electronics) and specializations (e.g., architectural and civil engineering, bio-technical engineering) that provide students with career and college readiness competencies in engineering and science. Students need to take math through Algebra 2 in order to handle the courses in the program, which also meets many states' requirements for science and other mathematics classes.

PROFESSIONAL DEVELOPMENT

An ongoing, comprehensive and systemic professional development program is the way in which all the resources recommended in this report are transformed into high quality instruction that increases student learning. Further, though the key focus of professional development is for better instruction in the core subjects of mathematics, reading/language arts, history and science, the professional development resources by the EB model are adequate to address the instructional needs for gifted and talented and English language learning students, for embedding technology in the curriculum, and for specialist teachers as well. Finally, all beginning teachers need intensive professional development, first in classroom management, organization and student discipline, and then in instruction.

There is recent and substantial research on effective professional development and its costs (e.g., Crow, 2011; Odden, 2011b). Effective professional development is defined as professional development that produces change in teachers' classroom-based instructional practice that can be linked to improvements in student learning. The practices and principles researchers and professional development organizations use to characterize "high quality" or "effective" professional development draw upon a series of empirical research studies that linked program strategies to changes in teachers' instructional practice and subsequent increases in student achievement. Combined, these studies and recent reports from Learning Forward, the national organization focused on professional development (see Crow, 2011), identified six structural features of effective professional development: form, duration, collective participation, content focus, active learning, and coherence.

- The *form* of the activity – that is, whether the activity is organized as a study group, teacher network, mentoring collaborative, committee or curriculum development group. The above research suggests that effective professional development should be school-based, job-embedded and focused on the curriculum taught rather than a one-day workshop.
- The *duration* of the activity, including the total number of contact hours that participants are expected to spend in the activity, as well as the span of time over which the activity takes place. The above research has shown the importance of continuous, ongoing, long-term professional development that totals a substantial number of hours each year, at least 100 hours and closer to 200 hours.
- The degree to which the activity emphasizes the *collective participation* of teachers from the same school, department, or grade level. The above research suggests that effective professional development should be organized around groups of teachers from a school that over time includes the entire faculty
- The degree to which the activity has a *content focus* – that is, the degree to which the activity is focused on improving and deepening teachers' content knowledge as well as how students learn that content. The above research concludes that teachers need to know well the content they teach, need to know common student miscues or problems students typically have learning that content, and effective instructional strategies linking the two.
- The extent to which the activity offers opportunities for *active learning*, such as opportunities for teachers to become engaged in the meaningful analysis of teaching and learning; for

example, by scoring student work or developing, refining and implementing a standards-based curriculum unit. The above research has shown that professional development is most effective when it includes opportunities for teachers to work directly on incorporating the new techniques into their instructional practice (see also Joyce & Showers, 2002).

- The degree to which the activity promotes *coherence* in teachers' professional development, by aligning professional development to other key parts of the education system such as student content and performance standards, teacher evaluation, school and district goals, and the development of a professional community. The above research supports tying professional development to a comprehensive, inter-related change process focused on improving student learning.

Form, duration, and active learning together imply that effective professional development includes some initial learning (*e.g*. a two-week – 10 day – summer training institute) as well as considerable longer-term work in which teachers incorporate the new methodologies into their actual classroom practice. Active learning implies some degree of collaborative work and coaching during regular school hours to help the teacher incorporate new strategies in his/her normal instructional practices

It should be clear that the longer the duration, and the more the coaching, the more time is required of teachers as well as professional development trainers and coaches.
Content focus means that effective professional development focuses largely on subject matter knowledge, what is known about how students learn that subject, and the actual curriculum that is used in the school to teach this content. Collective participation implies that the best professional development includes groups of and at some point all teachers in a school, who then work together to implement the new strategies, engage in data-based decision making (Carlson, Borman & Robinson, 2011) and in the process, help build a professional school community
Coherence suggests that the professional development is more effective when the signals from the policy environment (federal, state, district, and school) reinforce rather than contradict one another or send multiple, confusing messages. Coherence also implies that professional development opportunities should be given as part of implementation of new curriculum and instructional approaches. Note that there is little support in this research for the development of individually oriented professional development plans; the research implies a much more systemic approach.

Form, duration, collective participation, and active learning require various amounts of both teacher and trainer/coach/mentor time, during the regular school day and year and, depending on the specific strategies, outside of the regular day and year as well. This time costs money. Further, all professional development strategies require some amount of administration, materials and supplies, and miscellaneous financial support for travel and fees. Both the above programmatic features and the specifics of their cost implications are helpful to comprehensively describe specific professional development programs and their related resource needs.

INSTRUCTIONAL MATERIALS

The need for up-to-date instructional materials is paramount. Newer materials contain more accurate information and incorporate the most contemporary pedagogical approaches. To ensure that materials are current, twenty states have instituted adoption cycles in which they specify or recommend texts that are aligned to state learning standards (Ratvitch, 2004). Up-to-date instructional materials are expensive, but vital to the learning process. Researchers estimate that up to 90 percent of classroom activities are driven by textbooks and textbook content (Ravitch, 2004). Adoption cycles with state funding attached allow districts to upgrade their texts on an ongoing basis instead of allowing these expenditures to be postponed indefinitely.

The type and cost of textbooks and other instructional materials differ across elementary, middle school, and high school levels. Textbooks are more complex and thus more expensive at the upper grades and less expensive at the elementary level. Elementary grades, on the other hand, use more workbooks, worksheets and other consumables than the upper grades. Both elementary and upper grades require extensive pedagogical aides such as math manipulatives and science supplies that help teachers to demonstrate or present concepts using different pedagogical approaches. As school budgets for instructional supplies have tightened in the past, consumables and pedagogical aides have typically been the first items to be cut as teachers have been forced to make due or to purchase materials out of their own pockets.

Short cycle, formative assessments. Data-based decision making has become an important element in school reform over the past decade. It began with the seminal work of Black and Wiliam (1998) on how ongoing data on student performance could be used by teachers to frame and reform instructional practice, and continued with current best practice on how professional learning communities use student data to improve teaching and learning (DuFour, et al., 2010; Steiny, 2009). The goal is to have teachers use data to inform their instructional practice, identify students who need interventions and improve student performance. As a result, data based decision making has become a central element of schools that are moving the student achievement needle (Odden, 2009, 2012).

There is some confusion in terminology when referring to these new assessment data. Generally, these data are student performance data different from those provided by state accountability testing, such as NECAP in Kentucky. The most generic term is “interim data,” meaning assessment data collected in the interim between the annual administrations of state tests, though some practitioners and writers refer to such data as “formative assessments.” There are at least two kind of such “interim” assessment data. Benchmark assessments, such as those provided by the Northwest Evaluation System called MAP (www.nwea.org), which are given 2-3 times a year, often at the beginning, middle and end of the year. They are meant to provide “benchmark” information so teachers can see during the year how students are progressing in their learning. Sometimes these benchmark assessments are given just twice, once in the fall and again in late spring, and function just as a pre- and post-test for the school year, even though some practitioners erroneously refer to tests used this way as “formative assessments.”

A second type of assessment data is collected at shorter time cycles within every quarter or nine weeks of instruction; often referred to as “short cycle” or “formative” assessments. These more “micro” student outcome data are meant to be used by teachers both to plan instructional strategies before a curriculum unit is taught and to track student performance for the two-to-three curriculum concepts that would normally be taught during a nine week or so instructional period. Sometimes “interim” assessment data are teacher created but it often is more efficient to start with commercially available packages, most of which are administered online and provide immediate results. Short cycle assessments provide the information a teacher needs to create a micro-map for how to teach specific curriculum units. Though analyses of the state tests provide a good beginning for schools to redesign their overall educational program, and benchmark assessments give feedback on each quarter of instruction and are often used to determine which students need interventions or extra help. Teachers also need the additional short cycle assessment and other screening data to design the details of, and daily lesson plans for, each specific curriculum unit in order to become more effective in getting all students to learn the main objectives in each curriculum unit to the level of proficiency.

When teachers have the detailed data from these interim assessments, they are able to design instructional activities that are more precisely matched to the exact learning status of the students in their own classrooms and school. In this way, their instruction can be much more efficient because they know the goals and objectives they want students to learn, and they know exactly what their students do and do not know with respect to those goals and objectives. With these

data they can design instructional activities specifically to help the students in their classrooms learn the goals and objectives for the particular curriculum unit.

REGIONAL COST ADJUSTMENTS

An issue that gained prominence in school finance beginning in the 1970s and remains relevant today is the difference in prices that school districts face in purchasing educational resources. Districts not only purchase a different market basket of educational goods (just as individuals purchase a different market basket of goods), but they also pay different prices for the goods they purchase. District expenditures determine quantity issues (numbers of different types of educational goods purchased, such as teachers, books, buildings, etc.), the level of quality of those goods, and the cost of or price paid for each good. The variety, number, quality, and price of all educational goods purchased determines school district (and/or school) expenditures. While “expenditures” are often referred to as “costs” in school finance parlance, there is a difference between these two economic terms. “Expenditure” refers to the money spent on school resources; “cost” refers to the money spent on school resources to receive a certain level of output or to provide a certain quality of service. So comparing just expenditures would not indicate differences in costs; the comparison would have to be for expenditures for the quality of service – or teacher.

Prices that school districts (and/or schools) face in purchasing educational resources differ across school districts and many states, like Kentucky, have taken an interest in trying to adjust school aid allocations to compensate for geographic cost or price differences. For example, a teacher of

a certain quality will probably cost more in an urban area, where general costs of living are higher, than in nonurban areas, where general costs of living are lower. But prices or cost variations that districts must pay for teachers of the same quality also differ among school districts because of variations in the nature of the work required, the quality of the working environment, and the characteristics of the local community. Teachers might accept marginally lower salaries if, for example, they teach four rather than five periods a day or have smaller classes, or if there are numerous opportunities for staff development, relative to other districts. Or teachers might want marginally higher salaries if there are few cultural opportunities in the surrounding community. The combination of differences in general cost of living, working conditions, and the amenities of the surrounding community produces differences in prices that districts must pay for teachers of a given quality.

APPENDIX B: COMPARING KENTUCKY'S EDUCATION SYSTEM TO HIGH ACHIEVING STATES

On February 24, 2014, the Kentucky School Finance Advisory Committee met to discuss the school funding study being conducted by Picus Odden & Associates. During this meeting the committee recommended that the state comparison section of the study contain information on how Kentucky's education system compares to states with high achieving education systems. The committee felt that this type of comparison could be used to help set future educational goals for the state of Kentucky.

IDENTIFYING WHICH STATES ARE HIGH ACHIEVING

The first step in the process was to identify states that have high achieving public education systems. To identify these states this study reviewed the following education outcome data from each of the fifty states:

1. Total student population scoring "at or above proficient" on the 2013 National Assessment of Educational Progress (NAEP) in the math & reading exams in 4^{th} and 8^{th} grades
2. Free and reduced price lunch population scoring "at or above proficient" on the 2013 NAEP math & reading exams in the 4^{th} and 8^{th} grades
3. English Language Learner population scoring "at or above proficient" on the 2013 NAEP math & reading exams in the 4^{th} and 8^{th} grades
4. Percent of students graduating high school in four-years in the 2009-10 school year

States were awarded one point each time they ranked in the top ten on each of the 12 different NAEP categories and 4 points for ranking in the top ten in high school graduation rates – for a total potential score of 16 point. Using this method the study found that the following six states had the highest scores:

1. Minnesota (12 points)
2. New Hampshire (12 points)
3. Vermont (12 points)
4. Massachusetts (11 points)
5. Kansas (10 points)
6. New Jersey (10 points)

This list of top performing states contains three New England states and one each from the Midwest, Great Plains and Mid-Atlantic regions.

EDUCATIONAL OUTCOMES

There are a limited number of educational outcomes that can be used to make state-to-state comparisons. Individual state exams can't be used for comparison purposes because they vary so greatly. National exams such as the ACT and SAT are not comparable state-to-state because there such a variation in the percentage of students in each state who take these exams. International exams such as Programme for International Student Assessment (PISA) and the Trends in International Mathematics and Science (TIMSS) are not given to enough students in each state to have comparable data. While there is educational achievement data by state (i.e. the percentage of the population with high school or college diplomas) – this information can be misleading when trying to judge a state's education system because some states are net importers, while others are net exporters, of individuals with high school or college degrees. Because of the various issues stated above this study limited its comparisons of educational outcomes to the National Assessment of Educational Progress (NAEP) math and reading exams for the 4th and 8th grades and to high school graduation rates.

NAEP Math and Reading Results

The number of students in Kentucky that scored at or above the proficient level on the NAEP math exam in both the 4th and 8th grades trailed that of all six high achieving states. On the reading exam Kentucky's 4th grade students trailed the students in all six high achieving states. Kentucky's 8th grade reading results were ahead of Kansas' but trailed the results of the other five high achieving states. Some key findings included:

- Math 4th grade: 41 percent of Kentucky's students scored at or above proficient – this trailed the high achieving states by between 7% (Kansas) and 18% (Minnesota and New Hampshire)
- Math 8th grade: 30 percent of Kentucky's students scored at or above proficient – this trailed the high achieving states by between 10% (Kansas) and 25% (Massachusetts)
- Reading 4th grade: 36 percent of Kentucky's students scored at or above proficient – this trailed the high achieving states by between 2% (Kansas) and 11% (Massachusetts)
- Reading 8th grade: 38 percent of Kentucky's students scored at or above proficient – this was 2% above Kansas but trailed Massachusetts by 10%

Table 1.A
Percentage of Student Population Scoring "At or Above Proficient" on 2013 NAEP Exams

State	Math		Reading	
	4th Grade	8th Grade	4th Grade	8th Grade
Kentucky	41%	30%	36%	38%
Kansas	48%	40%	38%	36%
Massachusetts	58%	55%	47%	48%
Minnesota	59%	47%	41%	41%
New Hampshire	59%	47%	45%	44%
New Jersey	49%	49%	42%	46%

Vermont	52%	47%	42%	45%

Source: U.S. Department of Education

Free & Reduced Price Lunch Students' NAEP Scores

In 2013, Kentucky's free/reduced priced lunch (F/R L) students generally finish behind the high achieving states in both the 4th and 8th grade math exams but finished with mixed results on the 4th and 8th grade reading exams.

- Math 4th grade: 28 percent of Kentucky's F/R PL students scored at or above proficient – this equaled the results for New Jersey but trailed the other high achieving states by between 5 percent (Kansas) and 10 percent (New Hampshire)
- Math 8th grade: 16 percent of Kentucky's F/R PL students scored at or above proficient – this trailed all of the high achieving states ranging from 8% (Kansas) and 15 percent (Massachusetts)
- Reading 4th grade: 23 percent of Kentucky's F/R PL students scored at or above proficient—this was equal to Minnesota and was 1 pecent above Kansas and New Jersey but trailed Massachusetts, New Hampshire and Vermont
- Reading 8th grade: 25 percent of Kentucky's F/R PL students scored at or above proficient—this was equal to New Hampshire and 3 percent ahead of Kansas and Minnesota but trailed Massachusetts, New Jersey and Vermont

Table 1.B
Percentage of Free and Reduced Lunch Students Scoring "At or Above Proficient" on 2013 NAEP Exams

State	Math		Reading	
	4th Grade	8th Grade	4th Grade	8th Grade
Kentucky	28%	16%	23%	25%
Kansas	33%	24%	22%	22%
Massachusetts	35%	31%	25%	28%
Minnesota	37%	25%	23%	22%
New Hampshire	38%	27%	24%	25%
New Jersey	28%	28%	22%	26%
Vermont	35%	27%	26%	28%

Source: U.S. Department of Education

English Language Learner NAEP Scores

Comparing NAEP results for English Language Learner (ELL) students can be difficult because some states had sample sizes that are insufficient for reliable results. Vermont had insufficient sample sizes for both math and reading in the 4th & 8th grades and New Hampshire and New Jersey had insufficient sample sizes for 8th grade reading and math. Kentucky had mixed results compared to the high achieving states that did have sufficient sample sizes.

- Math 4th grade: 19% of Kentucky's ELL students scored at or above proficient – this was a higher percentage than New Jersey and Minnesota but trailed Kansas, Massachusetts and New Hampshire
- Math 8th grade: Only 1 percent of Kentucky's ELL students scored at or above proficient on the 8th grade math exam—this trailed results in Kansas, Massachusetts and Minnesota
- Reading 4th grade: 11 percent of Kentucky's ELL students scored at or above proficient—this was above three high achieving states (Minnesota, New Hampshire and New Jersey) and below two others (Kansas and Massachusetts)
- Reading 8th grade: 5 percent of Kentucky's ELL students scored at or above proficient which was 1 percent above Massachusetts but trailed Minnesota by 1% and Kansas by 8 percent

Table 1.C
Percentage of ELL Students Scoring "At or Above Proficient" on 2013 NAEP Exams

State	Math		Reading	
	4th Grade	8th Grade	4th Grade	8th Grade
Kentucky	19%	1%	11%	5%
Kansas	28%	11%	17%	13%
Massachusetts	19%	8%	12%	4%
Minnesota	17%	9%	8%	6%
New Hampshire	20%	#	10%	#
New Jersey	12%	#	9%	#
Vermont	#	#	#	#

- Insufficient sample size
Source: U.S. Department of Education

High School Graduation Rates

There are multiple ways to calculate high school graduation rates – this study chose to use the National Center for Education Statistics' (NCES) four-year graduation rate numbers. NCES calculates four-year graduation rates by using the *"…aggregate student enrollment data to estimate the size of an incoming freshman class and aggregate counts of the number of diplomas awarded 4 years later*." In the 2009-10 school year, the most recent available, Kentucky's four-year graduation rate was 79.9 percent. Kentucky's graduation rate trailed all six of the high achieving states - ranging from 2.7 percent in Massachusetts to 21.5 percent in Vermont.

Table 1.F
Four-Year High School Graduation Rates

State	Graduation Rates (2009-10)
Kentucky	79.9%
Vermont	91.4%
Minnesota	88.2%
New Jersey	87.2%
New Hampshire	86.3%
Kansas	84.5%
Massachusetts	82.6%

Source: U.S. Department of Education

EDUCATIONAL EXPENDITURES

Five of the six high achieving states spend more on a per pupil basis than Kentucky. While Kentucky's per pupil spending is $344 (3.5 percent) above Kansas it trails the other high achieving states by between $1,599 (15.9 percent) in Minnesota to $9,861 (96.9 percent) in Vermont.

Table 1.G
Total Expenditures Per Pupil

State	Expenditures Per Pupil (2012-13)
Kentucky	$10,033
Vermont	$19,752
New Jersey	$19,291
Massachusetts	$15,881
New Hampshire	$15,394
Minnesota	$11,632
Kansas	$9,689

Source: National Education Association's *Rankings and Estimates* publication

There are multiple factors that can influence the growth, or reduction, of education spending in a state. These can include: changes in the size of the state's student population, increases in teacher/staff compensation, growth in the number of teachers/staff and increases in costs outside of the state/districts' power (i.e. fuel or energy costs). Data collected by the National Center for Education Statistics show that employee salaries and benefits account for just over 80% of all

public school expenditures. The majority of these salary and benefit expenses can be traced to teacher salaries. Consequently, increases in teacher pay can drive up total educational expenditures. Kentucky's average teacher salaries are $2,739 (5.8 percent) above salaries in Kansas but trail average teacher salaries in the other five high performing states – ranging from $2,323 (4.6 percent) in Vermont to $22,076 (44 percent) in Massachusetts.

This study also adjusted the average teacher salaries in Kentucky and the six high performing states by the Comparable Wage Index (CWI). The CWI was created by the National Center for Education Statistics (NCES) in an attempt to measure the systematic, regional variations in salaries of college graduates who are not educators. This means that the CWI attempts to adjust funding amounts based on a state's cost of doing business. When average teacher salaries are adjusted for CWI Kentucky continues to lead the average salary in Kansas and trail the average teacher salaries in the other five high achieving states.

Table 1.H
Average Teacher Salaries

State	Average Teacher Salaries	
	Unadjusted (2012-13)	Adjusted for CWI (2012-13)
Kentucky	$50,203	$54,037
Massachusetts	$72,279	$63,308
New Jersey	$68,797	$57,816
Minnesota	$56,268	$56,589
New Hampshire	$55,599	$56,244
Vermont	$52,526	$58,410
Kansas	$47,464	$52,643

Source: National Education Association's *Rankings and Estimates* publication

Household Income

The higher a state's total household income the greater its potential to raise state and local funding for public education. According to the U.S. Census, Kentucky's median household income in 2012 was $41,086. Kentucky's median income was lower than all six high performing states – ranging from $8,917 (21.7 percent) in Kansas to $26,733 (65.1 percent) in New Hampshire.

Table 1.I
Median Household Income – 2012

State	Median Household Income - 2012
Kentucky	$41,086
Kansas	$50,003
Massachusetts	$63,656
Minnesota	$61,795
New Hampshire	$67,819
New Jersey	$66,692
Vermont	$55,582

Source: U.S. Census

Relative Effort

One approach for estimating the level of a state's effort to fund education is to analyze its K-12 education expenditures per $1,000 of personal income. State and local spending for K-12 education in Kentucky during the 2009-10 school year (the most recent year for which data are

available) was $42 per $1,000 of personal income. Kentucky's spending was $1 higher per $1,000 of income than Minnesota but trailed the other five high achieving states by between $2 in Massachusetts and $19 in Vermont.

Table 1.J
State & Local Education Expenditures Per $1,000 of Income

State	2009-10
Kentucky	$42
Vermont	$61
New Jersey	$52
New Hampshire	$45
Kansas	$43
Massachusetts	$43
Minnesota	$41

Source: National Education Association's *Rankings & Estimates* publication.

Enrollment Information

Student enrollment in the six high performing states ranges from 85,635 in Vermont to 1,366,067 in New Jersey. Kentucky's student population is 658,328 - this places it right in between the enrollments of the six high performing states. The average student enrollment for these six states is 648,219, which is 1.5 percent smaller than Kentucky's enrollment number. In Kentucky, 56.6 percent of students qualify for free and reduced Price lunches – which is higher than all six of the high achieving states. Kentucky's F/R priced lunch population ranges from being 8.9 percent (Kansas) to 31.4 percent (New Hampshire) higher than the high achieving states. Kentucky's ELL population, at 2.4 percent, is higher than New Hampshire and Vermont but is smaller than the ELL populations of Kansas, Massachusetts, Minnesota and New Jersey. In fact, Kentucky's ELL population is less than 1/3 as large as Kansas's.

Table 1.K
Student Information by State

State	Student Enrollment (2010-11)	Free/Reduced Lunch Population (2010-11)	English Language Learners (2010-11)
Kentucky	658,328	56.6%	2.4%
Kansas	481,000	47.7%	8.1%
Massachusetts	953,223	34.2%	6.7%
Minnesota	810,123	36.5%	5.1%
New Hampshire	193,264	25.2%	2.0%
New Jersey	1,366,067	32.8%	3.8%
Vermont	85,635	36.8%	1.9%

Source: U.S. Department of Education