An Independent Review of Maine's Essential Programs and Services Funding Act: Part 1

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EXECUTIVE SUMMARY, PART 1[1]

This document reports the findings of Part 1 of *An Independent Review of Maine's Essential Programs and Services Funding Act* (EPS) conducted by Lawrence O. Picus and Associates under contract with the Maine Legislative Council, and submitted to the Joint Standing Committee on Education and Cultural Affairs. The study, in progress between October 1, 2012 and December 1, 2013 (with anticipated presentations to the Legislature during its 2014 session), examines multiple aspects of the EPS.

Part 1 of the study (conducted between October 2012 and March 2013) includes the following:

- A detailed description of the operation of the EPS
- Comparative analyses of school funding systems in other states
- An analysis of traditional school finance equity measures as applied to Maine
- A specific analysis of funding for Native American Tribal schools
- A comparison of resource capacity and use by school districts compared to our Evidence-Based model (EBM) of school finance – a model that relies on research based approaches to ensure schools have the capacity to improve student learning and reduce achievement gaps
- A discussion of alternative approaches to teacher compensation.

In this report we describe the operation of Maine's EPS funding system in detail and offer preliminary conclusions and recommendations about the operation of the system, with the understanding that our work in Part 2 of the study will further inform and refine our findings in Part 1.

Overall, we found that the Maine's per pupil expenditures for K-12 education are among the highest in the United States – although they are comparatively low among the six New England States. Moreover, the distribution of revenues to local districts (SAUs) meets accepted levels of equity based on current school finance literature. While expenditures have grown in recent years, student performance has been relatively flat. Test scores compared to the rest of the country are relatively strong but about average in comparison with the other states in New England. The system operates well, but we identified a number of issues the state may want to consider as it moves forward in its efforts to improve learning for all children in its public schools.

Part 2 of the study will include a professional judgment panel assessment of EPS and our EBM; an assessment of education strategies identified through case studies of improving schools; the development of a school finance model that will compute levels of adequacy for Maine using our EBM; and structured analyses of possible teacher compensation models based on interactive discussions with the Committee.

[1] This document is the first of two reports to be submitted to the Maine Legislature's Joint Standing Committee on Education and Cultural Affairs evaluating the state's Essential Programs and Services Funding Act.

OVERALL FUNDING SYSTEM

Maine's Essential Programs and Services Funding Act (EPS) controls the way school districts receive their revenues. The program is based on an adequacy model – that is one that identifies the resources needed to provide educational services that will enable students to meet Maine's educational proficiency standards (the *Learning Results*), and then through a combination of state and local tax sources provides revenue to purchase those resources. School districts are able to raise additional funds through property tax levies. The EPS has been used to distribute revenues to school districts since the 2005-06 fiscal year. Details regarding the operation of the EPS are provided in chapter 2 of this report.

As part of our study, we identified the following issues of concern to state policy makers and education stakeholders:

- Is the EPS Adequate and Accurate? Perhaps the primary question addressed by this study is whether the EPS computations accurately estimate adequate funding levels to provide a comprehensive education system in Maine, and do the *Learning Results* meet the requirements of such a comprehensive system.

- Are the adjustments to the EPS computations fair? These include: the complexity of the special education adjustment; the regional cost adjustment and the reduction of Federal Title I receipts in computing each School Administrative Unit's (SAU)[2] total allocation. In addition, several individuals indicated that there are concerns with the adjustments for small schools in the model.

- Do SAUs rely too heavily on local property taxes for revenues above the EPS funding level? A concern frequently expressed was the amount of total K-12 education expenditures that are outside of the EPS system and currently funded completely through local property taxes.

- Should the state fully fund its share of 55% of the EPS, and what is the appropriate split between state and local revenue sources in Maine? A voter-approved initiative requires the state to fund 55% of the costs of the EPS system. To date, state funding has not reached that goal, and to some extent the state share has declined in recent years. Regardless of whether the state share is fully funded, the relative share of state (generally sales and income tax funded) and local (generally property tax funded) contributions to education funding is of utmost importance. The question includes both the policy issue of appropriate shares, as well as the relative distribution – and hence funding equity – across individual SAUs. The analyses in Chapters 3 and 4 of this report provide national

[2] School Administrative Units (SAUs) are the district level unit of analysis in this document. Maine has six categories of school districts, the organization of which has much to do with the location and historical development of each district. However, for the purposes of funding the EPS, all can be identified into SAUs, so we have used that designation for the district level of analysis throughout this report.

and New England based comparisons showing how other states address this issue along with an analysis of the school finance equity of the current system.

- What is the appropriate measure of SAU fiscal capacity? A common concern across the state has been about areas of the state that are property wealthy but have low per capita incomes creating high property taxes for year round residents of these areas. To assess this issue we measure the fiscal neutrality and equity of the funding system through a school finance lens and consider alternative measures of fiscal capacity to address this issue.

We anticipate additional concerns will emerge as the study progresses. Our intent is to address them as appropriate – and as prioritized by the Committee – as our work continues.

COMPARISON WITH OTHER STATES

Maine's K-12 education system has witnessed a steady increase in spending over the past several years. However, this additional funding appears to have only resulted in modest improvements in the academic performance of the state's students. The findings from our interstate comparison can be summarized as follows:

Educational Expenditures

- From 1999-2000 to 2009-2010 state and local revenue for public K-12 education in Maine grew from $1.62 billion to $2.35 billion - an increase of just over $728.6 million or 45%. During the same time period, state and local revenue for K-12 education in all 50 states increased by 49.4% ($171.6 billion). (U.S. Census, 2012)
- Between 1999-2000 and 2009-2010 Maine's per pupil expenditures grew from $7,595 to $12,259 an increase of 61.4%. Average per pupil expenditures on a national level increased from $6,836 to $10,600, a 55.1% increase during this same time period. (U.S. Census, 2012)

Student Population

- Maine has experienced a decrease in student population of 20,533 (10%) over the past decade (2001-2002 to 2011-2012).
- Average school district size has declined to 808 students – making the state's school districts the 4th smallest in the nation with an average enrollment that is 25.4% the size of the average school district in the United States.

Staffing

- Maine has seen an increase in the number of new teachers and a slight reduction in the number of administrators in the past decade.
- When combined with the decline in student enrollments Maine has one of the lowest student to teacher ratios in the country.

- The reduced student to teacher ratios are a major cause of the state's increases in per pupil expenditures.

Student Achievement

- In 2011, Maine's student test results on the National Assessment of Educational Progress (NAEP) in math and reading were mixed when compared to other states.
- Maine has a four-year high school graduation rate of 79.9% which is 4.4% above the national average, but trails many comparable states.
- Maine's New England Common Assessment Program (NECAP) test results have been flat over the past two years and trail the scores of students in New Hampshire and Vermont in math and writing in all grades and reading in all but the 3rd grade.

EQUITY ANALYSIS

Overall, Maine has designed a school funding system that provides districts with an equitable resource distribution, as revenues are computed by the system. Within the EPS component our analysis shows Maine's equity to generally meet the strict equity standards established in the school finance literature. When all education funds are included, the system remains quite equitable compared to other states although it does not always meet the strict standards found in the literature. The funding disparities we identified appear to be based more on wealth than student need.

- We found no relationship between EPS per pupil funding and district property wealth. The Maine system, as designed, met (or very nearly) met all of the strict benchmarks established by Odden and Picus (2014) for fiscal neutrality and equity. In other words, the level of spending was not strongly related to the wealth of the SAU (measured in terms of property wealth per pupil and in terms of per-capita income), and overall per pupil spending levels were generally equitable across all students. When adjusted for student characteristics, per pupil spending remained equitable, providing roughly the same level of revenue for students with similar characteristics.

- When we included local revenue raised through property taxes above the level of EPS funding, we found that SAUs with greater wealth – measures on the basis of property wealth per pupil or per capita income – had a slightly higher level of per pupil expenditures than lower wealth SAUs. While of concern, overall equity statistics suggested greater equity than found in most other states.

- The equity of the system worsens slightly when student needs are taken into account. This implies that some of the funding disparities found are not attributable to meeting the special needs of at risk students. We recommend the state consider new ways of providing funds to school districts in order to help them meet the needs of their neediest students.

TRIBAL FUNDING

Our primary finding from an assessment of Tribal funding in Maine and across the United States is that each state has its own approach for funding schools for Native American children. These approaches rely on a combination of state and Federal sources and are hard to compare across states. If Maine wants to provide more funds for indigenous students, the state could encourage districts to take advantage of available Title VII funds, as a number of eligible SAUs do not.

Our specific findings related to tribal funding include:

- The three Maine Indian Education schools appear to receive total per pupil revenues that are substantially higher than the state average funding level.
- The mix of state and federal funding for the tribal schools in Maine is set by the Maine Indian Claims Settlement Act of 1980. It would require tribal and federal agreement to modify the Act.
- Most Maine school districts that are eligible for Title VII funds (districts serving 10 or more American Indian/Alaska Native students) do not receive the funds. Districts could apply for these moneys, generally about $300 per student, which are supplemental and can be used for a broad array of approaches to support indigenous students.
- The state of Maine should decide whether or not to provide a different set of options for secondary students exiting the tribal schools, depending on whether there is evidence about whether these students are succeeding in high school.
- The Committee may want to study spending patterns in the tribal school more closely to determine if there are more effective ways to use existing resources to improve student learning.

COMPARISON OF EPS WITH EBM

The report also provides a side-by-side comparison of the elements of Maine's EPS with the elements of the Evidence Based Model (EB) that we have developed for use in other states. We also provide the research basis surrounding each individual issue.[3]

The EB model uses a similar structure and approach to that used by the EPS in Maine. The EB model provides resources to meet all seven *Learning Results* categories and provides additional resources that, in our view, would establish a comprehensive education system as called for in the Resolve establishing this study. It is our view that the EB model provides sufficient resources for all schools to offer a full liberal arts curriculum that offers an education program designed to meet college and career-ready standards for all students. The EB approach is also sufficient to allow schools in Maine to dramatically increase student achievement on standardized performance tests such as the NECAP.

[3] Readers interested in more detail on the EB are referred to our textbook, *School Finance: A Policy Analysis, 5th Edition*. (Odden & Picus, 2014).

The comparisons between EPS and EB result in a number of differences in the specific staffing ratios for different grade levels, educational programs and support services, as well as differences in per pupil funding levels for certain resources. It appears that in some instances the cost of EPS exceeds the EB and in others the reverse is true. Once we have completed our EB model for Maine in Part 2 of the study, we will be able to quantify those differences by specific program area.

In Part 2 of the study we will work with the Committee to assess the similarities and differences between the EB and the EPS, including an assessment of the cost differences between the two models. We look forward to ongoing discussions with the Committee as it decides whether to modify the current EPS approach, shift to the EB model's ratios and formulas, or establishes a funding model that includes a combination of both approaches.

TEACHER COMPENSATION

In Part 1 of this study, we reviewed the current teacher compensation system in Maine and reviewed state and district level teacher compensation reforms focused on improving teacher effectiveness. Unfortunately, many of these initiatives have not been carefully studied so the strengths and weaknesses of each are hard to discern. With that in mind, we reached the following conclusions about teacher compensation issues in Maine:

- Maine's goal of providing regional adjustments for teacher salary differences is appropriate but the index currently in use does not correctly control for teacher quality. It provides more resources for districts that have chosen to pay higher salaries in the past and fewer resources to districts that paid lower salaries in the past. As a result, SAUs do not have an equal chance at recruiting and retaining effective teachers.

- Following a comprehensive review of other states' efforts to reform teacher compensation, based on the often disappointing findings from these efforts and based on Maine's own experiences, we offer the following recommendations:

    1. Maine should replace its approach to providing regional adjustments to teacher salary levels and shift to either a Comparable Wage Index or a Hedonic Wage Index.

    2. To determine if current teacher salaries are at the appropriate market level, Maine should benchmark teacher salaries to salaries in Maine for jobs that are comparable to teaching, not to other states or the national average.

    3. Maine should be more strategic in recruiting and retaining effective teachers by shifting its teacher salary structure from the current system based on years of experience and education – which is not strongly linked to effectiveness. The new structure should provide major salary increases when a teacher's instructional effectiveness improves.

    4. If, after making these changes, some SAUs continue to have difficulty staffing schools or subject areas, the state could consider provision of additional incentives for hard to staff subjects or hard to staff schools.

5. If Maine decides to create any of these compensation incentives, the key features should be developed at the state level. Nearly all other states that have devolved the design of performance pay incentives to local districts have not been satisfied with the results.

6. The state should fund ongoing analyses of the implementation and impact of the incentive programs to determine whether they are working to move effective teachers into hard to staff schools and subjects and to retain them at those sites.

We will present these findings and recommendations to the Joint Standing Committee on Education and Cultural Affairs on April 10, 2013, and participate in a public forum the following morning. Following that, we will meet with the committee to develop a strategy and work plan for our work on Part 2 of this study, which is due on December 1, 2013.

CHAPTER 1: INTRODUCTION

This document is the first of two reports to be submitted to the Maine Legislature's Joint Standing Committee on Education and Cultural Affairs (hereinafter the Committee) evaluating the state's Essential Programs and Services Funding Act (EPS). Prepared by Lawrence O. Picus and Associates under contract with the Maine Legislative Council, this study, which is being conducted between October 1, 2012 and December 1, 2013 (with anticipated presentations to the Legislature during its 2014 session), examines multiple aspects of the EPS. Part one of the study (this report) includes: a detailed description of the operation of the EPS; comparative analyses of school funding systems in other states; an analysis of traditional school finance equity measures as applied to Maine; a specific analysis of funding for Native American Tribal schools; a comparison of resource capacity and use by school districts compared to our Evidence-Based model (EBM) of school finance – a model that relies on research based approaches to ensure schools have the capacity to improve student learning and reduce achievement gaps; and a discussion of alternative approaches to teacher compensation. Future analyses (part 2 of the study) will include a professional judgment panel assessment of EPS and EBM; an assessment of education strategies identified through case studies of improving schools; the development of a school finance model that will compute levels of adequacy for Maine using our EBM; and structured analyses of possible teacher compensation models based on interactive discussions with the Committee.

This document represents the initial phase of the study. The work reported here describes the state's school finance system, provides comparisons with other states and identifies issues that will drive the work in part 2 of the study. Chapters 2-7 offer our findings to date, identify potential areas for further discussion, and provide initial recommendations for further study. This information was gathered through review of official documents, two data collection trips to Maine that included meetings with the Committee, Legislative staff, officials of the Maine Department of Education, representatives of education stakeholder groups and a public hearing (held under the auspices of the Committee). We have worked closely with all of these groups to gather the data reported here. As agreed upon with the Committee and staff, the second part of the study will be highly interactive wherein we will work with the Committee and other stakeholders at all levels of Maine's education system to identify solutions to the issues identified in this document. The balance of this chapter introduces the topics that follow.

In chapter 2, we present a detailed discussion on the operation of the EPS along with a list of issues and concerns that were generated during our research and site visits to Maine.
Chapter 3 presents a fifty state comparison of important educational statistics, along with a more in-depth comparison to the five other New England states as well as Iowa and Wisconsin – two states with enough similarities to warrant the same in-depth analysis. Our comparisons include measures of school district revenue and expenditures, including levels, growth and types of expenditures. We provide analyses of various measures of taxpayer effort for education spending along with the revenue and expenditure data. Our comparison also includes measures of accountability including test results from the National Assessment of Educational Progress (NAEP) and the New England Common Assessment Program (NECAP) along with data on

school completion, dropouts and college enrollment. The chapter also provides data on the relative share of education revenues provided to schools by the Federal, state and local school districts in each state.

Chapter 4 offers a traditional school finance equity analysis focused on ascertaining if there is a relationship between either property wealth or per capita income and per student educational revenues. One of the goals of EPS is an equitable distribution of funds across school districts, our analysis compares the findings for Maine with traditionally accepted standards of equity used by school finance researchers across the United States.

Chapter 5 provides an analysis of funding for Tribal schools in Maine. The analysis provides detailed revenue data for the three Tribal schools in the state along with information on the various approaches used in other states (in combination with Federal funding) to meet the needs of Native American education.

Chapter 6 offers a detailed comparison of the EPS with one alternative approach to determining school finance adequacy, the EBM. Using a series of explanatory tables, we compare the EPS to the EBM and then offer our assessment of what we know from current research about each topic. The EPS system was developed to provide funding adequacy (a sufficient level of funding to enable all – or most – students to meet Maine's proficiency standards). In this chapter we offer our knowledge base as to how to approach answering the question of what is an adequate level of education funding.

Teacher compensation is an important issue in today's education policy debates. In chapter 7 we offer a discussion of efforts in other states to change teacher compensation systems to employ and retain the highest quality teachers and to reward teachers for their performance. Our discussion shows what other states have done in the past on this important issue and offers a series of lessons learned for Maine as it begins discussions of alternative teacher compensation plans.

Chapter 8 summarizes our findings and outlines our recommendations for moving forward with the second part of this study. In the work that follows presentation of this report, we will develop an interactive program of studies and analyses, working with the Committee and seeking stakeholder input at regular and frequent intervals. The report for Part 2 of this study is due on December 1, 2013 and will contain our recommendations for Maine.

CHAPTER 2: DESCRIPTION OF MAINE'S ESSENTIAL PROGRAMS AND SERVICES FUNDING MODEL

This chapter provides a description of the Essential Programs and Services Funding Model (EPS). It describes how the level of revenue needed for each SAU is estimated and provides a general description of how revenues are allocated to each SAU. The EPS is an adequacy based funding model – that is its purpose is to estimate how much revenue each SAU needs so that there is a reasonable opportunity for each student to be able to achieve the state's *Learning Results*.

We start our discussion in this chapter with a general overview of school finance adequacy to place Maine's EPS system in context. A brief historical description of the EPS along with a discussion of how the components of the EPS are computed follows. This discussion complements the detailed discussion of the EPS that appears in Chapter 6 here we focus more on the conceptual development of the EPS model itself.

Estimation of an adequate funding level is only the first step in developing a state funding system. Once the need is understood, it is up to the state to find a combination of state and local tax revenues that will equitably fund SAUs. The second section of this chapter describes how each SAU's EPS allocation is computed and funded. It includes a description of how the Maine Department of Education (DOE) computes each district's total allocation and how that allocation is funded through state and local revenues. SAUs are then able to raise additional local revenues to fund additional services for children beyond that funded by the EPS.

In the third section of this chapter we describe a number of funding issues that were identified in our visits to Maine in October 2012 and February 2013. Our purpose at this time is to identify the concerns and issues brought forward. Once the information in the chapters that follow has been reviewed, we will work with the Committee to develop a plan to consider modifications to the computation of the adequacy level in the EPS and to understand the implications of alternative ways to provide SAUs with the levels of revenue estimated by the EPS model.

DETERMINING AN ADEQUATE LEVEL OF FUNDING FOR PRE-K THROUGH 12TH GRADE EDUCATION

For most of the 20th century school finance focused on providing equity in the funding of schools within a state. The goal was to ensure that school districts had roughly equal levels of revenue per pupil regardless of the wealth of the district (as measured by property value per pupil in most states). An equitable distribution of educational resources is still an important focus of state school finance systems, and Chapter 4 of this report provides estimates of the equity of Maine's funding system.

However simply considering equity does not answer the complex question of how much money a school or school district needs to ensure all students can perform at state standards. In fact until recently, school funding levels in most states were often a function of how much money was

available for appropriation at the state level and how much local taxpayers were willing to tax themselves to fund schools.

With the growth of the standards movement in the late 20th century, there has been increasing attention paid to how much money is needed to educate students adequately. Beginning with the Kentucky Supreme Court's *Rose*[4] decision in 1989, the issue of adequacy has risen in importance in school finance. Courts in a number of states have required their state to define what an adequate education would be and then to fund the resources necessary to ensure most, if not all, children can meet those standards.

Because not all children are alike, nor do they come to school with similar experiences or backgrounds, and because school district characteristics vary considerably as well, estimating how much money a school or district needs to ensure a student has the opportunity to meet his or her state standards for proficiency is a complex and uncertain task. To date four methods have emerged to estimate an adequate level of resources.[5]

Successful Districts/Schools

Under this approach, school districts (sometimes schools) that have successfully met a set of established criteria are identified. The per pupil costs of these schools/districts are used as the estimate of an adequate level of funding. Most models make adjustments for student characteristics such as low income and English language learners (ELL). This method was developed in the late 1990s in Ohio. Because successful districts are often suburban systems or small rural school districts, it has been hard to apply to large urban schools or to districts with high incidences of at risk students.

Cost Functions

This approach relies on econometric modeling to estimate the level of funds needed to achieve the desired level of student performance as measured by standardized testing while controlling for the characteristics of students, schools and school districts. This approach has been used in a number of states to estimate adequate levels of funding. The results of these models are frequently used in school finance litigation in the states.

The difficulty with using either the successful districts/schools or the cost function model is that neither approach provides guidance as to how the funds should be used by schools to produce student learning. Consequently, two other approaches – Professional Judgment and Evidence-Based – have emerged as ways to estimate adequate school funding levels.

Professional Judgment

This approach relies on the knowledge of education professionals to identify the components and resources needed at a school to ensure students are able to meet state proficiency standards. Pioneered in Wyoming in the late 1990s, professional judgment panels are used to recommend

[4] *Rose v. Council for Better Education*, 790 S.W. 2d 186 (Kent. 1989)
[5] More details on these models can be found in Odden and Picus (2014).

resource levels for prototype schools at the elementary, intermediate and high school level. Panel members make recommendations about average class size to estimate the number of teachers needed in a school along with other professional staff positions. They also provide their judgment as to the level of fiscal resources needed for instructional materials, and other school services. Panels can also be used to estimate resources for non-instructional services such as maintenance and operations. Once the resource needs are identified, the costs of each component are determined, summed for each school and aggregated to the district level where they are combined with district cost estimates to generate a total school district funding level.

Evidence-Based Model

This approach is similar to the professional judgment approach in that it uses prototypical schools to determine educational resource needs. The major difference is this approach starts by reviewing educational research literature to identify programs and strategies that have evidence of improving student learning if implemented appropriately, and then estimates the resources needed at each prototypical school to implement those strategies. The costs of those resources are then determined, aggregated to the district level and combined with estimates of district costs to compute each school district's funding level.

The Professional Judgment Panel (PJP) and Evidence-Based Model (EBM) methods are clearly similar in design and approach. In fact, as they are implemented, they often share methodologies – that is PJP panels often are provided information on educational research findings, and EBM estimates are frequently presented to panels of education professionals in individual states to assess the recommendations in light of actual education practices in those states.

According to Silvernail (2011), Maine's EPS was developed using a hybrid approach that included the first three models described above. Below we provide a brief history of the development of EPS based on Silvernail's account, and then offer an explanation of how the EPS is used to compute each SAU's funding allocation.

HISTORICAL CONTEXT

Maine was one of the first states to consider adequacy in the development of its funding system, and the current EPS approach grew out of legislation passed in 1996 and 1997 (LD958 and LD1137 respectively) directing the Maine State Board of Education to establish a plan for defining and funding what have become known as the *Learning Results,* a set of expected learning outcomes that were originally developed by a Task Force established in 1995 (Silvernail, 2011).

A seventeen-member committee, supported by the University of Southern Maine's Maine Education Policy Research Institute, developed the initial EPS model focusing on the resources it believed were needed to achieve the *Learning Results*. The committee recognized that the cost of the EPS as identified did not include all costs of education, but chose intentionally to focus on those resources needed to meet the *Learning Results*.

The committee identified eight essential programs that schools needed to offer to meet the *Learning Results* and then developed a set of Essential Services – the resources and services needed to ensure each Maine student had an equitable chance to achieve the *Learning Results*. Silvernail (2011) identifies the eight essential programs as:

- Career preparation
- English and Language Arts
- Health and Physical Education
- Mathematics
- Modern and Classical Languages
- Science and Technology
- Social Studies
- Visual and Performing Arts

The essential services identified as necessary to meet the goals established by the Learning Results were categorized as follows (Silvernail, 2011):

- School personnel
  - Regular classroom and special subject teachers
  - Education technicians
  - Counseling/guidance staff
  - Library staff
  - Health staff
  - Administrative staff
  - Support/clerical staff
  - Substitute teachers
- Supplies and Equipment
- Resources for specialized student populations
  - Special needs pupils
  - Limited English Proficiency (LEP) students
  - Disadvantaged youth
  - Primary (K-2) grade children
- Specialized services
  - Professional development
  - Instructional leadership support
  - Student assessment
  - Technology
  - Co-curricular student learning
- District services
  - System administration
  - Maintenance and operations
- School level adjustments
  - Vocational education
  - Teacher educational attainment
  - Transportation
  - Small schools

- Debt services

As is typical for adequacy models, the EPS was developed using prototypical schools to facilitate resource estimation. Maine used prototypical school sizes as follows:

- Elementary (K-5) – 250 students
- Middle (6-8) – 400 students
- Secondary School (9-12) – 500 students

These prototypical schools were used to establish resource levels. Actual distribution of funds to SAUs today is based on staff to student ratios and dollar per pupil allocations that do not specifically rely on the prototypical schools.

Relying on a process Silvernail (2011) identifies as a "hybrid approach," the committee developed a set of resource estimates and their associated costs. This original EPS model was presented to the Legislature in 1999 beginning a multi-year process of debate and modifications, as well as the development of an implementation plan, before the EPS was implemented for the 2005-06 fiscal year. As part of the implementation, various components of the EPS model are reviewed on a three year rotating basis and adjustments are made as needs are identified. Based on our discussions with DOE staff in Maine, relatively few adjustments have been made over time.[6]

The discussion that follows describes the current formulas for computing EPS allocations to school districts for the 2012-13 school year.

COMPUTING THE EPS FOR EACH SCHOOL ADMINISTRATIVE UNIT (SAU)

In this section we provide a general description of how the EPS is computed for SAUs. For fiscal year 2013, total EPS funding (including state contributions to the teacher retirement system) was over $2 billion. The next section describes in detail how these funds are raised and distributed. We show how that total is arrived at using the structure of the DOE's ED279 form as the basis for describing the process of determining each SAU's total funding allocation.
In general, the process begins by determining an EPS per pupil rate for each SAU. This rate is based on a count of attending pupils (described below); and separate estimates for elementary (K-8) and secondary (9-12) students are computed. This figure is then applied to the count of subsidizable or resident pupils (described below), adjusted on the basis of pupil and district characteristics and summed to determine each SAU's total EPS operating allocation. The individual steps are described below.

Before continuing it is important to provide a brief note on school district designations. Throughout this document, we refer to the administrative unit of analysis as a School Administrative Unit or SAU. In fact, Maine has six categories of school districts the organization of which has much to do with the location and historical development of the district.

[6] Silvernail (2011) provides an excellent description of the original proposal and the modifications to EPS that have occurred both since the 1999 Committee report and since initial implementation of the EPS in FY 2006.

However, for the purposes of funding the EPS, all can be identified a part of an SAU, so we have used that designation for the district level of analysis throughout this report.

Determination of the EPS Per Pupil Rate

Attending Pupils

The first step in the process is to determine the number of attending pupils. This figure is used as the enrollment figure for determining the EPS per pupil funding rate for each SAU. The funding rate is a per pupil revenue figure – determined separately for elementary (K-8) and secondary (9-12) grades and then applied in the actual distribution of funds to schools.

Attending pupils are computed as the average of the April and October pupil counts from the calendar year before the beginning of the funding school year. For example, funding rates for the 2012-13 fiscal year are based on the average of attending pupils calculated in April and October 2011. The average is computed separately for grades K-5, 6-8, and 9-12. The elementary and middle average is then summed to determine the K-8 attending pupil count. These attending pupil counts are used when the staffing ratios and per pupil funding levels are applied to estimate the EPS rate for each SAU.

Preschool children are included in the regular K-5 and K-8 pupil counts and included in the computations for elementary schools (K-5 or K-8 depending on the computation as described below). If enrolled, four-year-olds (4YO) and Pre-K (PK) students are included in this count as 1.0 attending pupil, even if enrolled less than full time.

Staff Positions

The attending pupil counts are used to generate EPS funded positions for teachers and other district staff. Beginning with the 2012-13 fiscal year, the ratios used to generate EPS position counts for positions other than teachers were decreased by 10% for SAUs with fewer than 1,200 attending pupils (generating 10% more staff in non-teaching positions). Table 2.1 summarizes the staff allocations for SAUs with 1,200 or more attending pupils and for SAUs with fewer than 1,200 attending pupils.

The number of EPS staffing positions generated are then multiplied by the EPS salary allowance for each position and summed to get total salaries for elementary (K-8) and secondary (9-12) staff.

Other Support Costs

Additional support costs are funded on a per pupil basis. This computation is also based on attending pupils and the amounts generated for K-8 and 9-12 students are summarized in Table 2.2. The amounts displayed in Table 2.2 are then multiplied by the corresponding enrollment counts for K-8 and 9-12. These figures are adjusted on an annual basis to account for inflation.

Table 2.1: Staff Allocation Ratios for EPS, FY 2013

		Pupils per Staff Position		
	Position	**K-5**	**6-8**	**9-12**
SAUs with 1,200 or more attending pupils	Teachers	17	16	15
	Guidance Counselors	350	350	250
	Librarians	800	800	800
	Health	800	800	800
	Education Technicians	100	100	250
	Library Technicians	500	500	500
	Clerical	200	200	200
	School Administration	305	305	315
SAUs with fewer than 1,200 attending pupils	Teachers	17	16	15
	Guidance Counselors	315	315	225
	Librarians	720	720	720
	Health	720	720	720
	Education Technicians	90	90	225
	Library Technicians	450	450	450
	Clerical	180	180	180
	School Administration	275	275	284

Table 2.2: EPS Per Pupil Allocations for Other Support Costs, FY 2013

	Dollar Amount per Attending Pupil ($)	
Support Cost Category	**K-8**	**9-12**
Substitute Teachers	37	37
Supplies and Equipment	346	478
Professional Development	59	59
Instructional Leadership Support	24	24
Co- and Extra- Curricular Student	34	114
System Administration/Support	220	220
Operations and Maintenance	1,013	1,204

Salary Benefits

Four different benefit rates are used depending on personnel category. The individual rates are applied to the salary totals for each category estimated in the first step of this process. The benefit rates used for teachers, guidance counselors, librarians, health professionals and school administrators are lower than for other staff categories because the state now contributes directly

to the retirement system for these credentialed positions. Table 2.3 summarizes the benefit rates used in the EPS rate computations for FY 2013.

Table 2.3: EPS Benefit Rates, FY 2013

Staff Category	Benefit Rate
Teachers, Guidance, Librarians, Health	19%
Education and Library Technicians	36%
Clerical	29%
School Administrators	14%

Regional Adjustment for Salaries, Benefits and Substitutes

In a state as large and diverse as Maine, it is not surprising that there are different regional cost factors that need to be accommodated in funding salaries in different parts of the state. The EPS includes a regional adjustment for salaries, benefits and substitutes computed in 2004-05 using teacher salaries as the basis for the regional adjustment. Specifically, the state was divided into 35 regional Labor Market Areas and the average salary – adjusted for teacher education and experience – was estimated for each area. This adjusted regional average was then divided by the state average teacher salary to determine the regional adjustment in each Labor Market Area. This adjustment, which ranges from a low of 0.84 to a high of 1.09 is then applied to each SAU's estimated total EPS salary, benefit and substitute computation based on the region in which the SAU is located (Silvernail, 2011).

Maine's regional adjustment differs from similar adjustments in other states in that it is based on variation in teacher salaries, not variation in the salaries of comparative occupations.

Adjustment for Title I Revenues

Before determining the EPS rate for an SAU, a portion of Title I revenues are subtracted from the total estimated allocation.

EPS Rate

The final EPS rate for each SAU is computed separately for elementary (K-8) and secondary (9-12) as the sum of the categories above minus the Title I revenues. This figure is divided by the attending pupil count for elementary (K-8) and secondary (9-12) resulting in each SAU's EPS rate. This figure is then used as the basis for another series of computations to determine the allocation of funds to each SAU and the relative shares of that total to be funded by the state and by the local SAU.

Determining the Total Allocation for Each SAU

This sub-section describes the computation of the adjustments made for student and SAU characteristics, and then describes allocations provided to SAUs for other subsidizable costs such as special education, vocational education, gifted and talented, transportation and debt service. It

should be noted that transportation and debt service, while part of the EPS computation are not specifically addressed in the balance of this document.

Subsidizable Pupils

The final allocation to each SAU uses a different pupil count than the attending pupil count described above. For the balance of the computations, the subsidizable pupil count is used. Subsidizable pupils are based on resident pupil counts rather than attending pupil counts; this means that students living in one SAU but attending another SAU are counted, for the purpose of funding allocations, in the SAU where they reside, not where they attend school. The subsidizable pupil count is based on the April and October pupil counts from the three years prior to the beginning of the fiscal year for which the EPS is being computed. For example, for fiscal year 2012-13, the subsidizable pupil count is the average of the pupil counts from April and October of 2011, 2010 and 2009. In addition, if the district has experienced a decline in enrollment, an adjustment factor is applied to provide a "soft landing" for districts. The subsidizable pupil count is estimated separately for K-8 and 9-12 students. It should be noted that pre-K students are counted in the K-8 pupil count.

The number of subsidizable pupils at each level is multiplied by the SAU's EPS funding rate to get an initial allocation. As described in the next sub-section, this amount is enhanced by further adjustments based on student and SAU characteristics. These include weighted counts, targeted funds and adjustments for isolated small schools.

Weighted Counts

Additional funding is provided for disadvantaged youth – children from low-income homes based on the free and reduced lunch count – and for children identified as Limited English Proficient.

For disadvantaged youth a weight of 0.15 is added to the number of students identified as disadvantaged. For K-8 the percentage of children who qualify for free and reduced price lunch is multiplied by the subsidizable pupil count and the weight of 0.15 times the elementary EPS rate applied to determine the allocation for K-8 students. The same process is used for 9-12 students except the K-8 percentage of free and reduced price lunch students is used rather than the actual percentage under the assumption that 9-12 free and reduced lunch participation frequently under-represents actual need. Of course, the secondary EPS rate is used for these students.

For LEP students weights are applied in a similar manner to both K-8 and 9-12 LEP counts. The weights that are used in these computations vary by the number of LEP students in each SAU and are displayed in Table 2.4.

Table 2.4: EPS Weights for LEP Students, FY 2013

SAU Enrollment	Weight for LEP Students
Less than 15	0.7
16 to 250	0.5
251 or more	0.525

Targeted Funds

The EPS provides funds on a per subsidizable pupil basis for both student assessment and technology, and establishes an additional student weight of 0.1 for subsidizable pupils in grades K-2.

For student assessment, the EPS provides $43 per subsidizable pupil for both elementary and secondary pupil counts. For technology resources EPS provides $98 per subsidizable pupil at the elementary (K-8) level and $296 per subsidizable pupil at the secondary (9-12) level. These amounts are multiplied by the appropriate subsidizable pupil count for each SAU and the total added to the SAU allocation.

The K-2 weight of 0.2 is applied to the count of subsidizable pupils in those grades and multiplied by the elementary EPS rate for the SAU. This figure is also added to the SAU's total allocation.

Isolated Small School Adjustment

Small school adjustments are provided for small elementary, secondary and island schools. Small elementary schools are those with fewer than 15 students per grade level with limited alternative school availability. SAU's with qualifying schools receive a 10% adjustment to the elementary EPS rate for the number of students in these schools.

Small secondary schools are those with fewer than 200 students per school, and are more than 10 miles from the nearest secondary school. For qualifying schools, the student teacher ratios are reduced to 11:1 for schools with fewer than 100 students and to 13:1 for schools with between 100 and 199 students.

For islands operating or transporting students to mainland schools the following adjustments are made to the SAU total allocation:

- For qualifying isolated small secondary schools the teacher adjustment described for secondary schools is provided
- For island elementary schools the 10% adjustment to the EPS rate is provided for the K-8 enrollment of these schools
- For Island schools operating on the island there is a 13-26% adjustment to EPS operating and maintenance costs based on the size and level of the school

- For island schools transporting students to mainland schools there is a transportation adjustment equal to approved transportation expenditures.

Before the programs described below are added to the total SAU allocation, the sum of EPS allocations described above is computed and multiplied by 97%. This new, and somewhat reduced figure is the adjusted operating allocation that is carried forward and added to the allocations determined by the balance of programs below.

Gifted and Talented

Gifted and talented programs are funded on an approved program cost basis. SAUs receive funding based on approved expenditures two years prior, adjusted for inflation to one-year prior. These funds are added to the total EPS allocation.

Special Education

Each SAU's allocation for special education is computed through a series of steps. First, a weight of 1.27 (for FY 2013) is applied to each special education student up to a maximum of 15% of an SAU's enrollment. For SAUs with special education counts above 15%, a weight of 0.38 is applied to the additional students.

Additional funds are provided for SAUs with fewer than 20 special needs students as well as for high cost in district pupils (3 times the state wide special education EPS rate), and high cost out of district pupils (4 times the statewide special education EPS rate).

Finally there is an adjustment to ensure the SAU meets maintenance of effort requirements of the Federal Government.

All of these funds are added to the EPS allocation for each SAU.

Vocational Education

Vocational, or Career and Technical Education is funded on the basis of allowable costs. These funds are then added to the SAU's total allocation.

Transportation and Debt Service

Transportation and debt service are not specifically analyzed for this study. However, EPS funding does include resources for both categories. Transportation is funded through a density or combined density and mileage model along with a series of adjustments for out of district special education transportation, vocational education transportation, transportation for homeless students, ferry costs and Island SAU costs. Funds are also provided to help districts purchase school busses. Transportation and debt service are subject to a set of minimums and maximums and then included in an SAU's EPS total allocation.

Debt service is funded as a program cost and added to the SAU total allocation.

All of the above categories are combined to determine an SAU's total combined EPS allocation for each fiscal year. This amount is used to determine the relative state and local funding shares as described in the next section of this chapter.

FUNDING THE EPS ALLOCATION

In the preceding section we described how an individual SAU's EPS allocation is determined. Once the DOE computes that figure, it must be funded through a combination of state and local resources. This section describes how total state and local funding is allocated across SAUs. Total EPS funding for FY 2013 is estimated at $1.995 billion without the state contribution to the teacher retirement system and at $2.171 billion with the state retirement contribution.

To fund the EPS total allocation, Maine uses a foundation strategy whereby each year a state appropriation is made and then a local tax rate established to fund the balance of the total. Each SAU's combination of state and local funds is related to its property wealth per pupil, with property poor SAUs receiving a higher percentage of state funding than more wealthy SAUs. Table 2.5 at the end of this chapter provides a state level summary of the annual funding allocations, relative percentages of state and local funding, and the minimum tax rate for the EPS since the inception of the EPS system in FY 2006.

In the sections that follow we describe the 55% state funding initiative, the computation of the state and local funding shares for individual SAUs, and the minimum state funding requirements for individual SAUs.

The 55% State Funding Initiative

A state initiative passed in 2004 established the state share of education funding at 55% as a property tax relief measure. LD 1, which among other things implemented the EPS funding system – established a goal of reaching the 55% state share by 2008-09, a process that began in 2005-06. While initial progress was made, state funding has yet to match the goal of 55%. As shown in Table 2.5, the state share of the EPS funding reached a total of 52.86% in 2008-09, but has generally declined since then. Computation of the percentage is somewhat confounded by the treatment of state payments for teacher retirement in recent years. If those payments are included in the state share of full EPS funding, then in FY 2012 and FY 2013, the state's share has increased to 49.47% and 50.00% respectively. Absent the retirement contribution the state's share is 45.05% in FY 2012 and 45.61% in FY 2013.

The state-funding share is important because it is a source of considerable discussion and some confusion across the state. It is important to all school officials and to local taxpayers because to the extent that the state does not meet the 55% funding level, local property taxes must make up the difference. It is confusing to many because the actual distribution of funds to SAUs provides state funding in an inverse relationship to local SAU property wealth, hence the actual percentage of state funds received by an individual SAU varies considerably – a subtlety often not understood by local taxpayers.

Because Maine has moved from an available resources driven funding system to one based on an estimate of an adequate level of resources needed for schools, total EPS funding is no longer simply based on what the state has available, but instead local property taxes are needed to make up the difference between the state appropriation and the total EPS allocation – and in many SAUs local taxes are increased more to fund additional services.

All of this factors into policy discussions about the funding system, however the way funds are allocated to SAUs remains the same regardless of the state share. The following section describes the interaction of the state and local funding allocations.

Operation of the Funding System

Once the EPS allocation for the entire state has been computed, it is funded through a combination of state and local revenues. The state share is appropriated by the Legislature through its budget process, while the local required contribution is collected on the basis of an established property tax rate designed to collect the balance of revenues needed to fund the EPS. Table 2.5 shows the tax rates for each year since SY 2006 when the EPS was first implemented. Each SAU's required local contribution is determined by applying the required tax rate to the property value of the SAU to determine the local share. The state effectively makes up the balance of funding – with a few caveats described below.

The process is slightly more complex than this as most SAUs are composed of multiple towns, and individual tax rates must be computed for each town based on the relative share of the SAU funding share allocated to that town. Within a multi-town SAU, the EPS total allocation is assigned to each member town based on the respective percent of the calendar year average resident pupils. This percentage is then used to generate the required local contribution of the town by multiplying the town's state certified valuation times the established mill expectation for the EPS. However, the total raised can not exceed the total town allocation which means that if a town is property wealthy, the tax rate may be reduced once the town's required local contribution has been met (Maine Dept. of Education, 2012).

The distribution is modified by providing a minimum state contribution to each SAU. This minimum is computed at the greater of five percent of the SAU's total allocation (state and local share), or 30% of the SAU's special education adjustment. Once these minimums are computed, the SAUs total state and local share are computed for the current fiscal year. Table 2.5 displays the state level implications of this system.

There are several issues of concern that were described to us in the course of our site visits to Maine in October 2012 and February 2013. These are the focus of the next section of this chapter.

ISSUES AND CONCERNS WITH THE EPS FUNDING SYSTEM

As indicated in Chapter 1, during our visits to Maine in October and February we identified a number of concerns with the current EPS funding system. These issues are outlined below for

the purpose of informing the Legislature of the issues with which we are aware. Since this part of the overall study is designed to be descriptive of Maine's EPS system, we do not offer suggestions for modifying the system in response to these concerns – that will come during the second part of our study where we will work with the Committee, education stakeholders and other interested parties to better understand these issues in the context of the analyses that follow herein. Our second report, due on December 1, 2013 will provide recommendations for changes to the system and rationales for those recommendations. Below we list the major concerns identified to date.

Is the EPS Adequate and Accurate?

Perhaps the primary question this study will address is whether the EPS computations accurately estimate adequate funding levels to enable Maine's school children to achieve the *Learning Results*. We begin to address this issue in Chapter 6 where we compare the EPS to our Evidence-Based model (EBM). Chapter 6 is a detailed comparison of the two models. During Part 2 of this study we will build a simulation model of the EBM, using Maine SAU enrollments and salary levels, to compare what each SAU receives through the EPS with an estimate of what it would receive under the EBM. We will then conduct professional judgment panels and stakeholder meetings to get input into the strengths and weaknesses of both approaches, and to provide alternative suggestions for ways to estimate adequacy.

Of particular concern to many individuals we met with are the adjustments that are part of the EPS calculations. Specific concerns were expressed about the complexity of the special education adjustment, the regional cost adjustment and the reduction of Federal Title I receipts in computing each SAU's total allocation. In addition, several individuals indicated that there are concerns with the adjustments for small schools in the model.

Another concern frequently expressed was the proportion of total K-12 education expenditures that are outside of the EPS system and currently funded completely through local property taxes. We will identify the extent to which this occurs and as part of our comparison of EPS with the EBM, be able to identify the parts of those outside expenditures that might be considered essential to adequate funding, and which are beyond the level of adequacy necessary to meet the *Learning Results*.

At the same time we have been working closely with the Maine DOE to collect the data needed for our analyses and future modeling. To date we have not identified any concerns with accuracy of the computations of the funding formulas, but should such emerge, we will share them with the DOE and work with them to help make any necessary adjustments.

State Share of 55%

As noted above, a voter-approved initiative requires the state to fund 55% of the costs of the EPS system. To date, state funding has not reached that goal, and to some extent the state share has declined in recent years (See Table 2.5). Regardless of whether the state share is fully funded, the relative share of state (generally sales and income tax funded) and local (generally property tax funded) contributions to education funding is of utmost importance. The question includes

both the policy issue of appropriate shares, but also the relative distribution – and hence funding equity – across individual SAUs. The analyses in Chapters 3 and 4 of this report provide national and New England based comparisons showing how other states address this issue along with an analysis of the school finance equity of the current system.

Fiscal Capacity Measure

Throughout our discussions with individuals in Maine, a common concern has been about areas of the state that are property wealthy but have low per capita incomes. Because of Maine's geographic features, it is popular vacation destination and a popular state for ownership of second homes. Thus in many areas of the state property values are quite high, but most year-round residents have relatively low incomes. As a result the residents feel they are unable to afford the high property tax share required of their towns to fully fund the EPS system. Our analysis in Chapter 4 considers this question in more depth, providing equity estimates based on household income as well as property wealth. Once the parameters of this concern are better known, we will work with appropriate officials to consider alternative measures of school district fiscal capacity – and their implications for the funding system – to present in our findings in Part 2 of this report. The minimum EPS allocation currently in place is one way to address the issue of high property wealth and low personal income, however an alternative would be to address the fiscal capacity measure itself. Another approach could be to create a Maine "circuit breaker" on the property tax burden. This could be done by providing income tax relief for high property tax payments, or limiting property taxes to a percent of income, as Vermont has done for many years.

We anticipate additional concerns will emerge as the study progresses. Our intent is to address them as appropriate – and as prioritized by the Committee – as our work continues.

SUMMARY

This chapter has provided a description of the way EPS computes an adequate funding level for each SAU in Maine and explained how tax resources are raised to fund the EPS system. Finally, this chapter described the important concerns and issues that have been identified through our discussions with the Committee, education stakeholders and other interested parties.

Table 2.5: EPS Funding Comparison, FY 2006 to FY 2013

Fiscal Year	Total EPS ($ Millions)	Total EPS w/o Retirement ($ Millions)[a]	Adjusted Operating EPS Allocation ($ Millions) (%)	Local Share ($ Millions)	Local Share Required Tax Rate (Mills)	State Share ($ Millions)	State Share (%)
2005-06	1,786		1,786 (84)	742	8.26	737	46.50
2006-07	1,829		1,830 (90)	783	7.60	914	50.00
2007-08	1,895		1,895 (95)	850	7.44	978	51.60
2008-09	1,860		1,860 (97)	864	6.79	983	52.86
2009-10	1,922		1,923 (97)	918	6.69	952	49.52
2010-11	1,945		1,945 (97)	972	6.98	873	47.80
2011-12	2,145	1,972	1,931 (97)	1,042	7.50	889	45.05b
2012-13	2,171	1,975	1,954 (97)	1,044	7.69	910	45.61b

[a]Only applies to FY 2012 and FY 2013
[b]Share of 100% EPS without retirement
Source: Maine DOE

CHAPTER 3: COMPARATIVE ANALYSIS OF MAINE'S EPS WITH OTHER STATES

As part of this study, a comparative assessment of state school finance systems was conducted. The interstate comparison reviewed data from all 50 states, with an emphasis on data from seven comparative states. The study compared school funding data from Maine 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 answer 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 provide information on Maine's status both to national averages as well as to a set of seven comparable states. Appendix 1 of this report contains related tables showing similar data for all 50 states. The RFP for this study stated that the other five New England states should be considered "comparable states." In addition, the following criteria (and the sources from which data were analyzed) were used to choose additional states for a detailed comparison:

1. State student enrollment (National Center for Education Statistics [NCES])
2. Number of districts (NCES)
3. Average number of students per district (NCES)
4. Median household income (U.S. Census)
5. Average expenditures per pupil (U.S. Census)
6. Relative tax effort (National Education Association)
7. State/Local/Federal education expenditure proportions (U.S. Census)
8. National Assessment of Educational Progress scores for reading and math in the 4th & 8th grades
9. Graduation rates (U.S. Department of Education)
10. College-going rates (CL Higher Education Center)

We analyzed all states outside of New England to identify those that were within plus or minus five percent of Maine in each of these categories. Two states were within these parameters for at least a third of the categories – they are Iowa and Wisconsin. Like Maine they are smaller mostly rural states that have a historical commitment to funding education. Following discussion with the Committee on February 6, 2013, we determined that Iowa and Wisconsin would be added to the list of states for which detailed comparative analyses would be conducted, for a total of seven states including the other five in New England (Connecticut, Massachusetts, New Hampshire, Rhode Island and Vermont.

EDUCATION FUNDING DISTRIBUTION SYSTEMS

General Funding Formulas

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, 2014). In some states this system is known as a base or guaranteed funding system.

2. *District power equalization* (3 States) – District power equalization, frequently called a guaranteed tax base, 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% 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.

It should be noted that it is difficult, if not impossible, to place each state's funding system into a single category - Maine's funding system is an example of this. This study defines the Maine system as using a foundation formula. However, components of the other approaches can be found in some of the distribution formulas used by the state to distribute funds to SAUs.

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 language learners. All fifty states provide some additional funding for

special education students. 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.

Common approaches for funding special student populations include:

- Categorical grants provided to meet the educational needs of these students
- Pupil weights for specific student groups
- Reimbursement of program expenditures

As detailed in Chapter 2, Maine's education funding system relies on a variation of a foundation formula that provides additional funding for special education, at-risk and ELL students. The approach used by Maine and each of the comparative states is summarized in Table 3.1. Important comparisons from this table include:

- Four of the comparative states use a variation of the foundation formula to distribute revenues to school districts - the other three states make use of a power equalization formula
- While their systems may vary, all seven comparative states provide additional funding for special education students
- All seven comparative states provide additional funding for at- risk students
- Of the seven comparative states only Rhode Island does not provide additional funding for English Language Learner (ELL) students
- New Hampshire provides additional funding for student transportation through their primary formula while Connecticut, Maine and Massachusetts provide transportation funding outside of the formula, and Rhode Island provides no additional funding for transportation
- All seven other states provide some form of capital funding to districts outside of their primary funding formula

Table 3.1: Summary of education funding systems across comparative states

State	Funding Formula	Special Education	At-Risk	English Language Learners
Maine	Foundation	Reimbursement based on costs	15% additional funding per student	50% to 70% additional funding based on student enrollment
Connecticut	Power Equalization	Additional funding only for high need students	33% additional funding per student	Grants to districts with 20 or more ELL students. All other ELL students – 15% additional funding.
Iowa	Foundation	Additional funding 80% to 340% per student based on student's disability. Also, cost reimbursement for high-cost students.	Identified students receive an additional weight of .00156. Students enrolled in grades 1-6 receive an additional weight of .0048	22% additional funding per student
Massachusetts	Foundation	Based on census and also for high need students	Identified students receive a set dollar amount that is updated annually for inflation. For FY 2013: Low-income elementary - $3,341.30 *Low-income secondary - $2,701.97*	ELL students receive a higher foundation amount based on previous expenditures.
New Hampshire	Foundation	53.8% additional funding per student	19.57% additional funding per identified student	50% additional funding per student
Rhode Island	Foundation	Additional funding only for high need students (5X above the base)	40% additional funding per identified student	No additional funding
Vermont	Power Equalization	Census and reimbursement based funding along with additional funding for high-cost students	25% additional funding per identified student	20% additional funding to each ELL student
Wisconsin	Power Equalization	Reimbursement based on costs	Eligible schools receive additional state aid of up to $2,250 for each identified low-income K-3 child. At risk funding for students in grades 5-12 was discontinued in 2011	Funded as a categorical program outside of the primary formula. Districgs are provided reimbursements for a percentage of allowable costs

Sources: Funding formulas: (Verstegen, 2011); At-risk funding: (Griffith, Workman &Workman, 2013); Special education and English language learner funding: State legislation.

TRANSPORTATION AND CAPITAL COSTS

Two programs that are generally funded outside of a state's primary funding formula are transportation and capital expenditures. The approaches used by Maine and the seven comparison states are displayed in Table 3.2.

General Education Transportation Funding

Maine funds the transportation of general education students by providing a per pupil allocation to districts based on previous expenditures determined by a formula outside of the primary EPS formula, and provides subsidies to help districts purchase new school busses.[7] Of the other 49

[7] Maine Statute: Other *Subsidizable Costs*: Article 20-A, section 15681-A(3).

states, 10 address transportation costs within the primary formula, while three provide no general education transportation funding to districts. The remaining 36 states address this issue outside of the primary formula because transportation needs vary so greatly across districts. Tennessee is the only state that funds transportation both in the primary formula and through a funding adjustment that is outside the formula. Some states provide no transportation funding for the general education population but provide other types of transportation funding. For example, Rhode Island provides transportation funding to districts for students educated in private education programs that are located outside of the district or for students educated in regional district programs. However, the state does not provide transportation funding for general education students educated within the district. The various systems that states use to allocate transportation costs outside of the primary formula include:

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

Transportation costs are generally reimbursed on the basis of mileage, hours of operation or a combination of the two.

Capital Costs

States typically address capital costs outside of the primary formula. In Maine, SAUs are reimbursed for allowable capital and lease costs based on their relative property wealth. Twelve states provide no funding for capital costs. Of the remaining 38 states – six states 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:

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

Table 3.2: General Education Transportation and capital expenditures across comparative states

State	Transportation	Capital Costs
Maine	Bus purchase costs along with a per pupil amount based on previous expenditures	Equalized reimbursements
Connecticut	Equalized reimbursements	Equalized project grants
Iowa	Through the primary formula	Debt service and capital grants to districts based on student enrollment and need
Massachusetts	Full-cost reimbursements	Approved project grants, state bond guarantees and equalized debt service grants
New Hampshire	Through the primary formula	Equalized project grants
Rhode Island	None	Equalized project grants
Vermont	Allowable reimbursement	All non-emergency capital funding has been suspended
Wisconsin	Funded on a per pupil basis	Through the primary formula

STATE FUNDING COMPARISONS

In this section of Chapter 3 we compare education funding in Maine to all 50 states along with a more in-depth analysis of how Maine compares to the seven other comparison states. Educational expenditure and demographic data for all 50 states for fiscal years 1999-2000 and 2009-10 are provided in the appendices while data for Maine and the seven comparison states are detailed below.

Educational Revenues and Expenditures

Total K-12 Revenues

A review of data from the United States Census Bureau (U.S. Census) shows that from fiscal year 1999-2000 to 2009-10 state and local revenue for public K-12 education in Maine grew from $1.62 billion to $2.35 billion - an increase of just over $728.6 million or 45%.[8] During this same time period, state and local revenue for K-12 education in all 50 states increased by 49.4% ($171.6 billion). In the seven comparative states, local and state revenue for education increased at the rate of 47.9% ($14.7 billion) or slightly faster than spending increased in Maine. Table 3.3 shows these changes for Maine and the seven comparative states. It is important to note that the rate of increase in revenues was lower in Iowa and Wisconsin than any of the New England states. The average rate of growth in the five other New England States during this time frame was 57.7%, substantially more than Maine's 45%. Data for all 50 states is in Appendix 3A

[8] Note that this figure includes all K-12 state and local education expenditures and thus is higher than the EPS funding data reported in Table 2.5 above.

Table 3.3: Growth in Local & State Revenue for K-12 Education

	State and Local K-12 Revenue		Change from FY 1999-2000 to FY 2009-10	
	FY 1999-2000	FY 2009-10	In Dollars	In Percentages
National	$347,289,182,000	$518,928,241,000	$171,639,059,000	49.42%
Comparative States	$30,733,354,000	$45,465,866,000	$14,732,512,000	47.94%
Maine	$1,619,065,000	$2,347,668,000	$728,603,000	45.00%
Connecticut	$5,552,489,000	$8,725,670,000	$3,173,181,000	57.15%
Iowa	$3,476,798,000	$4,805,126,000	$1,328,328,000	38.21%
Massachusetts	$8,911,326,000	$13,690,358,000	$4,779,032,000	53.63%
New Hampshire	$1,473,057,000	$2,618,266,000	$1,145,209,000	77.74%
Rhode Island	$1,376,037,000	$1,946,128,000	$570,091,000	41.43%
Vermont	$881,626,000	$1,398,604,000	$516,978,000	58.64%
Wisconsin	$7,442,956,000	$9,934,046,000	$2,491,090,000	33.47%

Source: United States Census Bureau. Annual Report: *Public Education Finances: 2002-2012*.

Per Student Expenditures

As shown in Table 3.4, in FY 1999-2000 Maine's average per pupil expenditure was $7,595, ranking 12th highest in the nation – $759 or 11.1% above the national average of $6,836 per pupil. In 2009-10 Maine's average per pupil expenditure grew to $12,259, which was $1,659 or 15.6% above the national average of $10,600. That year, Maine's per pupil spending ranked 12th nationally – just as it had in 1999-2000. In 2009-2010 in the other seven comparative states, spending ranged from $9,763 per pupil in Iowa to $15,274 in Vermont.

From fiscal year 1999-2000 to 2009-10 Maine's per pupil expenditures for public primary and secondary schools increased by $4,664 or 61.4%. Maine's percentage spending growth was the 21st highest in the nation. Nationally, average spending per pupil increased by $3,764 or 55.1%. If Maine's per pupil spending had grown at the national average, spending in 2009-2010 would have been $11,780 per pupil – or $479 less than the actual spending level. In the other seven comparative states per student expenditure increases ranged from 47.3% in Wisconsin to 92.4% in Vermont. Details of these changes are displayed in Table 3.4 for Maine and the comparison states and in Appendix 3.B for all 50 states.

Table 3.4: Growth in Per-Pupil Spending

	Per Pupil Expenditures *(National Rank)*		Growth in Expenditures *(National Rank)*	
	1999-2000	**2009-2010**	**In Dollars**	**In Percentages**
National	$6,836	$10,600	$3,764	55.10%
Maine	$7,595 (12)	$12,259 (12)	$4,664 (15)	61.4% (21)
Connecticut	$8,800 (3)	$14,906 (6)	$6,106 (7)	69.4% (10)
Iowa	$6,547 (23)	$9,763 (25)	$3,216 (31)	49.1% (36)
Massachusetts	$8,444 (5)	$13,590 (9)	$5,146 (13)	60.9% (22)
New Hampshire	$6,742 (22)	$12,383 (10)	$5,641 (8)	83.7% (6)
Rhode Island	$8,242 (6)	$13,699 (8)	$5,457 (9)	66.2% (14)
Vermont	$7,938 (8)	$15,274 (4)	$7,336 (3)	92.4% (2)
Wisconsin	$7,716 (10)	$11,364 (16)	$3,648 (24)	47.3% (40)

Source: United States Census Bureau. Annual Report: *Public Education Finances*: 2002 – 2012.

State Financial Commitment to Education

In comparing per pupil expenditures across states it is important to ask how "hard" a state works to reach its spending level. One approach for estimating the level of effort a state exerts to fund K-12 education is to analyze K-12 education expenditures per $1,000 of personal income. In Maine, state and local spending for K-12 education in 2009-10 (the most recent year for which data are available) was $50 per $1,000 of personal income, seventh highest in the nation. 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, effort ranged from $40 in Iowa to $61 in Vermont. Table 3.5 provides detailed findings for Maine and the seven comparison states. Data for all 50 states are in Appendix 3.C.

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 2010-11 fiscal year (the most recent year for which data are available) K-12 expenditures accounted for 13.7% of total state expenditures in Maine while the national average was 20.2%. Only five states had amounts that were lower than Maine (see Appendix 3.D). The percentage of Maine's budget going to K-12 education has varied considerably since 1999-2000, from a high of 20.4 % in 2000-01- to a low of 13.7% in 2002- 03 (National Association of State Budget Officers, 2012). Table 3.6 summarizes the share of each comparative state's budget devoted to K-12 education in 1999-2000 and 2010-2011. Similar data for all 50 states is in Appendix 3.D

Table 3.5: K-12 Spending Per $1,000 of Income

	K-12 Spending per $1,000 of (National Rank)		Change in Expenditures (National Rank)	
	1999-2000	2009-2010	In Dollars	In Percentages
National	$41	$41	$0	$0
Maine	$46 (9)	$50 (7)	$4 (12)	8.7% (15)
Connecticut	$42 (22)	$43 (20)	$1 (19)	2.4% (22)
Iowa	$44 (16)	$40 (31)	-$4 (42)	-9.1% (43)
Massachusetts	$36 (44)	$43 (20)	$7 (7)	19.4% (5)
New Hampshire	$37 (38)	$45 (14)	$8 (5)	21.6% (4)
Rhode Island	$41 (23)	$53 (4)	$12 (1)	29.3% (1)
Vermont	$53 (2)	$61 (3)	$8 (5)	15.1% (8)
Wisconsin	$48 (5)	$46 (10)	-$2 (33)	-4.2% (34)

Source: National Association of State Budget Officers. *Annual Report: State Expenditure Report*: *2002-2012*

Table 3.6: 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)
	1999-2000	2010-2011	
National	22.50%	20.20%	-2.30%
Maine	19.9% (26)	13.7% (45)	-6.2% (41)
Connecticut	13.9% (48)	14.2% (44)	0.3% (15)
Iowa	19.7% (27)	17.7% (28)	-2.0% (28)
Massachusetts	14.4% (47)	11.6% (46)	-2.8% (33)
New Hampshire	28.7% (5)	22.3% (16)	-6.4% (43)
Rhode Island	16.6% (46)	14.4% (43)	-2.2% (29)
Vermont	20.5% (25)	31.9% (2)	11.4% (1)
Wisconsin	19.5% (29)	17.3% (30)	-2.2% (30)

Source: National Association of State Budget Officers. *Annual Report:* State Expenditure Report: 2002-2012

Factors That Drive Educational Expenditures

There are multiple factors that can influence the change in the level of education spending in an individual state. These 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 that are outside of the state or districts' control (e.g. fuel and energy costs or health care). A number of these issues have impacted Maine.

Student Population

Over the past decade Maine has experienced a substantial decrease in its K-12 student population. Between 2001-2002 and 2011-12, Maine's K-12 public school population decreased 10% from 205,586 to 185,033 (NEA, 2012)– a decrease of 20,553 students. This was the 4th largest percentage decrease in state enrollment in the nation. During this same time period the national K-12 public school population increased by 3.9% while overall, the student population in New England shrank by 5.3%. Table 3.7 displays these changes and Appendix 3.E displays similar data for all 50 states.

While the state's student population was shrinking, the number of school districts remained relatively stable. As a result, Maine's average district size decreased by 78 students or 8.8%. For the 2010-11 fiscal year Maine had the 4th smallest average district size in the country at 808 students per district. Data on comparable states and the National Average school district size is displayed in Table 3.8 and in Appendix 3F.

Table 3.7: Student Population Changes

	Total Student Enrollment		**Change in Enrollment *(National Rank)***	
	2001-2002	**2011-2012**	**In Students**	**In Percentages**
National	47,301,299	49,137,726	1,836,427	3.90%
New England	2,213,938	2,096,983	-116,955	-5.30%
Comparative States	3,579,231	3,464,097	-115,134	-3.20%
Maine	205,586	185,033	-20,553 (43)	-10.0% (47)
Connecticut	569,540	554,398	-15,142 (41)	-2.7% (38)
Iowa	485,932	496,009	10,077 (27)	2.1% (23)
Massachusetts	973,142	952,370	-20,772 (44)	-2.1% (37)
New Hampshire	206,847	190,931	-15,916 (42)	-7.7% (43)
Rhode Island	157,956	137,175	-20,781 (45)	-13.2% (49)
Vermont	100,867	77,076	-23,791 (46)	-23.6% (50)
Wisconsin	879,361	871,105	-8,256 (37)	-0.9% (35)

Source: National Education Association. Annual Report: *Rankings and Estimates*, 2000 through 2012

Table 3.8: Average School District Sizes

	Average District Size (National Rank)	
	2001-2002	**2011-2012**
National	3,121	3,178
New England	1,731	1,584
Comparative States	1,724	1,650
Maine	886 (45)	808 (47)
Connecticut	2,951 (26)	2,786 (27)
Iowa	1,310 (42)	1,413 (42)
Massachusetts	2,609 (28)	2,381 (29)
New Hampshire	1,277 (43)	1,186 (45)
Rhode Island	4,388 (16)	2,799 (26)
Vermont	356 (49)	269 (50)
Wisconsin	2,064 (36)	2,054 (33)

Source: National Education Association. Annual Report: *Rankings and Estimates*, 2000 through 2012

Teacher Staffing

Data collected by the National Center for Education Statistics show that salaries and benefits of all employees account for just over 80% of all public school expenditures. The majority of these total compensation expenses can be traced to teaching positions. Consequently, increases in teacher pay or benefits and/or increases in the number of teachers employed in a state can drive up total educational expenditures.

In 2011-12, Maine's average teacher salary of $47,338 was 14.6% lower than the national average of $55,418. In 2001-2002 average teacher salaries in Maine were $37,300 or 16.4% lower than the national average of $44,632. Between 2001-2002 and 2011-12 Maine's teacher salaries grew by $10,038 or 26.9% while the national average teacher salary during that time grew by $10,786 for an increase of 24.2%%. These data are displayed in Table 3.9 and Appendix 3G.

Table 3.9: State Average Teacher Salaries

	Average Teacher Salaries (National Rank)		Salary Increases (National Rank)	
	2001-2002	**2011-2012**	**In Dollars**	**In Percentages**
National	$44,632	$55,418	$10,786	24.2%
Maine	$37,300 (37)	$47,338 (38)	$10,038 (27)	26.9% (20)
Connecticut	$53,551 (2)	$69,465 (3)	$15,914 (4)	29.7% (14)
Iowa	$38,230 (33)	$50,240 (25)	$12,010 (17)	31.4% (11)
Massachusetts	$49,242 (10)	$71,721 (2)	$22,479 (1)	45.7% (2)
New Hampshire	$40,002 (25)	$54,177 (18)	$14,175 (7)	35.4% (7)
Rhode Island	$49,758 (7)	$62,186 (8)	$12,428 (15)	25.0% (31)
Vermont	$39,158 (31)	$51,306 (23)	$12,148 (16)	31.0% (13)
Wisconsin	$42,232 (21)	$53,792 (20)	$11,560 (21)	27.4% (19)

Source: National Education Association. Annual Report: *Rankings and Estimates*, 2000 through 2012

In Maine from 2000-2001 to 2010-11 the number of full-time equivalent (FTE) teaching positions decreased by 1,175, or 7.1%. Nationally the number of teachers increased by 5.4% while in the comparison states they increased by 0.4%. The number of teaching positions in Maine did not decrease at the same rate as the decrease in the number of students (10%). This has led to a slight reduction in the student to teacher ratio from 12.5 to 1 in 2000-2001 to 12.3 to 1 in 2010-11 (NCES, 2012). Nationally, average student to teacher ratio in 2010-11 was 16 to 1 and the average in the comparative states was 13.8 to 1 in that same year.

Between 2000-01 and 2010-11 Maine also saw a decrease of 26 administrators. This is a decrease of 2.9%. For the same period, the national average increase was 16.4% and the increase for the comparative states was 8.5% (NCES, 2012). These data are displayed in Table 3.10 and in Appendix 3.J.

Table 3.10: Teacher & Administrator to Student Ratios

	Teacher to Student Ratios (National Rank)		Administrators to Student Ratios (National Rank)	
	2000-2001	2010-2011	2000-2001	2010-2011
National	16.0	16.0	332.9	299.8
New England	14.0	13.2	301.0	242.4
Comparative States	14.2	13.8	299.0	269.5
Maine	12.5 (2)	12.3 (3)	229.5 (4)	215.8 (5)
Connecticut	13.7 (8)	13.1 (9)	272.5 (12)	263.5 (14)
Iowa	14.3 (15)	14.3 (19)	233.6 (5)	284.9 (22)
Massachusetts	14.5 (17)	13.9 (15)	316.3 (27)	218.1 (6)
New Hampshire	14.5 (17)	12.7 (5)	384.6 (43)	384.8 (44)
Rhode Island	14.8 (20)	12.8 (7)	465.5 (48)	318.1 (35)
Vermont	12.1 (1)	11.6 (2)	242.4 (7)	198.5 (2)
Wisconsin	14.6 (19)	15.1 (29)	347.8 (35)	356.5 (40)

Sources: Teacher data and administrator data – National Center for Education Statistics, 2000 through 2012.

Federal Education Spending

From 1999-2000 to 2009-2010 federal funding for K-12 education in Maine grew from 6.1% to 12% of the total. Nationally during this time frame federal sources increased from 7.1% to 12.5% of total K-12 education spending. The increased reliance on federal funding for education 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 the same time most states decreased their own financial commitment to K-12 education. These two factors combined to more than double the percentage of funds that are derived from federal sources. For a state-by-state breakdown see Table 3.11 and Appendix 3.L.

The overwhelming majority of Maine's federal funding for K-12 education (77.3%) comes from two programs, the Individuals with Disability Act (IDEA) and Title I. For a detailed breakdown of K-12 federal funding in Maine during the 2012-2013 school year see Table 3.12.

Table 3.11: K-12 Funding From Federal Sources

	Percentage of K-12 Funding From Federal Sources (National Rank)	
	1999-2000	2009-2010
National	7.10%	12.50%
Maine	6.1% (36)	12.0% (30)
Connecticut	4.0% (48)	8.6% (42)
Iowa	5.9% (37)	13.2% (25)
Massachusetts	5.1% (43)	7.4% (46)
New Hampshire	3.6% (50)	6.6% (50)
Rhode Island	5.6% (39)	11.3% (33)
Vermont	6.9% (26)	11.0% (35)
Wisconsin	4.6% (47)	10.1% (41)

Table 3.12: A Breakdown of Maine's Federal K-12 Funding

Program	Total Funding 2012-2003	As a Percentage of Federal Funding
Total Federal Funding	$137,214,210	
IDEA – Special Ed. Grants to States	$54,641,460	39.80%
Title I – Grants to Local Education Agencies with Low-Wealth Students	$51,434,777	37.50%
Title II – Effective Teacher & Leaders State Grants	$8,590,184	6.30%
Career and Tech. Education State Grants	$5,020,515	3.70%
Assessing Achievements – Grants for improving state assessments	$3,815,260	2.80%
IDEA – Preschool Grants	$2,464,997	1.80%
IDEA – Grants for Infants & Families	$2,254,984	1.60%
Impact Aid – Aid to districts that have lost property tax revenue due to the presence of tax-exempt Federal property	$2,014,831	1.50%
School Improvement State Grants	$1,789,404	1.30%
Rural & Low-Income School Programs	$1,306,065	1.00%
Small, Rural School Achievement Program	$1,236,769	0.90%
Migrant Student State Grants	$1,211,044	0.90%
English Language Learner Grants	$720,005	0.50%
Neglected & Delinquent Children & Youth	$230,473	0.20%
Homeless Children & Youth	$226,815	0.20%
Indian Student Education – Grants to LEAs	$151,895	0.10%
Impact Aid for Children with Disabilities	$104,732	0.10%

Source: United States Department of Education

EDUCATIONAL OUTCOMES

Overall, Maine's students do well on standardized tests compared to students in the United States, although the state's performance is about average among the seven comparative states. Below we show how Maine compares on the National Assessment of Educational Progress (NAEP) and the New England Common Assessment Program (NECAP).

National Assessment of Educational Progress

The National Assessment of Educational Progress (NAEP*)* assessments have been administered periodically to students in reading, mathematics, science, writing, U.S. history, civics, geography, and other subjects since 1969 (NCES 2011). Federal law now requires all states that receive Title I funds – which currently includes all 50 states – to participate in NAEP reading and mathematics assessments at fourth and eighth grades (NAEP, 2011). As a result, comparable fourth and eighth grade math and reading NAEP results are available for all states for the 2003, 2005, 2007, 2009 and 2011 assessments.

NAEP - Scale Scores

Cross state comparisons using NAEP data can be made using average scale scores or student achievement levels. When reviewing Maine's average scale scores on the NAEP math and reading exams for the 4th and 8th grade there are some positive conclusions and some areas where the results suggest more can be done. Overall, a review of NAEP scores from 2003-2011 show:

Positives:

- In every year reviewed, Maine's math and reading scores were above the national average
- Maine's scores in reading and math never ranked lower than 20th nationally
- Maine's test scores for math in the 4th and 8th grades improved from 2003 to 2011
- 8th grade reading scores in Maine consistently ranked in the top ten nationally

Areas of Concern:

- Maine's average scale scores showed mixed results from 2003 to 2011:

	2003	2011
• Math 4th grade:	238	244
• Math 8th grade:	282	289
• Reading 4th grade:	224	222
• Reading 8th grade:	268	270

- 4th grade reading scores in Maine declined between 2003 to 2011 – from 224 to 222
- In 2011 Maine was ranked 5th out of the 8 comparison states in 4th and 8th grade math and 4th grade reading and ranked 6th out of 8 in 8th grade reading

NAEP – Student Achievement Levels

NAEP 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 3.13 shows the results for Maine's students between 2003 and 2011.

Table 3.13: Summary of Maine's Reading and Math NAEP results, 2003 to 2011 Percent of Students Who Scored At or Above Basic and Proficient

	Percent of Students Scoring At or Above Basic				
	2003	**2005**	**2007**	**2009**	**2011**
Math - 4th grade	83%	84%	85%	87%	87%
Math – 8th grade	75%	74%	78%	78%	78%
Reading – 4th grade	70%	71%	73%	70%	70%
Reading – 8th grade	79%	81%	83%	80%	80%

	Percent of Students Scoring At or Above Proficient				
	2003	**2005**	**2007**	**2009**	**2011**
Math - 4th grade	34%	39%	42%	45%	45%
Math – 8th grade	34%	39%	42%	45%	45%
Reading – 4th grade	36%	35%	36%	35%	32%
Reading – 8th grade	37%	38%	37%	35%	39%

In 2011 Maine had a higher percentage of students score at or above basic and proficient in 4th and 8th grade math and 8th grade reading than the national average. For the 2011 NBAEP exam, the only time that Maine did not finish above the national average was for students performing at or above proficient in 4th grade math. However, the percentage of students who scored at or above basic and proficient was consistently higher in Massachusetts, a state with a much higher at-risk population, than in Maine.

Table 3.14 Maine's Math and Reading NAEP Results Compared to Massachusetts and the National Average

	Percent of Students At or Above:	Maine	National	Massachusetts
Math 4th Grade	Basic	87%	82%	93%
	Proficient	45%	40%	58%
Math 8th grade	Basic	78%	72%	86%
	Proficient	45%	34%	58%
Reading 4th grade	Basic	70%	68%	83%
	Proficient	32%	32%	50%
Reading 8th grade	Basic	80%	75%	84%
	Proficient	39%	32%	46%

Table 3.15 provides more detail on how Maine students did on the NAEP and compares Maine's result to both the comparative states, and to national outcomes. It is important to point out that the percent of students at or above proficient on the NECAP in Maine is higher than the percent at or above proficient on NAEP which suggests that the cut off point on NECAP is at a lower level of proficiency, or that NAEP has established a higher bar for proficient.

Table 3.15: Maine NAEP results along with Comparative State and National Averages, Math and Reading NAEP Scale Scores 2003 to 2011

Math 4th Grade	Maine Scores			National Average Scores
Year	Average	National Ranking	Comparative State Ranking	
2003	238	15	6	234
2005	241	16	5	237
2007	242	19	7	239
2009	244	9	5	239
2011	244	14	5	240
Math 8th Grade	**Maine Scores**			**National Average**
Year	Average	National Ranking	Comparative State Ranking	
2003	282	15	5	276
2005	281	23	6	278
2007	286	12	4	280
2009	286	19	6	282
2011	289	13	5	283
Reading 4th Grade	**Maine Scores**			**National Average**
Year	Average	National Ranking	Comparative State Ranking	
2003	224	7	5	216
2005	225	9	5	217
2007	226	11	5	220
2009	224	18	5	220
2011	222	20	6	220
Reading 8th Grade	**Maine Scores**			**National Average**
Year	Average	National Ranking	Comparative State Ranking	
2003	268	7	4	261
2005	270	3	2	260
2007	270	5	3	261
2009	268	13	5	262
2011	270	11	5	264

New England Common Assessment Program

Maine, New Hampshire, Rhode Island and Vermont have worked together to develop grade level expectations (GLE) for students in math, reading, writing and science. To test how well students are achieving these GLEs – and to fulfill the requirements of the federal 'No Child Left Behind' legislation - the states developed the New England Common Assessment Program (NECAP).

There are currently NECAP exams for math (grades 3-8 & 11), reading (grades 3-8 & 11), writing (grades 5, 8 & 11) and science (grades 4, 8 & 11). Maine began to participate in NECAP in 2009, and now uses NECAP to test students in math (grades 3-8), reading (grades 3-8) and writing (grades 5 & 8). Student test results are placed into four different categories: Proficient with distinction, proficient, partially proficient and substantially below proficient. Reviewing the test results over the past five years some patterns emerge (See Tables 3.16 and 3.17):

- Maine's test scores have remained flat over the past three years with the exception of 8th grade writing which saw an increase in the percentage of students testing at or above proficient from 53% to 58%
- In 2012 students in New Hampshire and Vermont had a higher level of proficiency than Maine in Math, and Writing at all grade levels and Reading in all but the 3rd grade

Table 3.16: New England Common Assessment Program Results for Maine Students who scored at or above proficient

	Grade Level	2009	2010	2011	2012	Change in Scores From 2010 to 2012
Math	3rd	62%	61%	64%	62%	1%
	4th	62%	66%	66%	66%	0%
	5th	64%	60%	64%	62%	2%
	6th	63%	63%	65%	64%	1%
	7th	60%	58%	61%	59%	1%
	8th	58%	59%	60%	61%	2%
Reading	3rd	73%	69%	72%	68%	-1%
	4th	67%	68%	70%	69%	1%
	5th	72%	70%	68%	71%	1%
	6th	69%	72%	72%	71%	-1%
	7th	68%	66%	70%	69%	3%
	8th	69%	73%	77%	76%	3%
Writing	5th		43%	41%	45%	2%
	8th		53%	51%	58%	5%

Source: Maine Department of Education, Accessed on February 2013: http://www.maine.gov/education/necap/results.html

Table 3.17: 2012 NECAP Results for Math, Reading & Writing – Students Scoring At or Above Proficient

	Grade Level	Maine	New Hampshire	Rhode Island	Vermont
Math	3rd	62%	*74%*	**60%**	*65%*
	4th	66%	*77%*	**65%**	*68%*
	5th	62%	*74%*	62%	*65%*
	6th	64%	*74%*	**62%**	*68%*
	7th	59%	*69%*	59%	*61%*
	8th	61%	*68%*	*68%*	*64%*
Reading	3rd	68%	*78%*	*70%*	68%
	4th	69%	*78%*	69%	*70%*
	5th	71%	*77%*	*72%*	*72%*
	6th	71%	*79%*	*73%*	*73%*
	7th	69%	*77%*	*70%*	*74%*
	8th	76%	*82%*	*77%*	*80%*
Writing	5th	45%	*58%*	*59%*	*51%*
	8th	58%	*67%*	*65%*	*66%*

Numbers in italics represent results higher than Maine, bold results are lower than Maine and standard black equal to Maine.
Sources: State departments of education web sites.

Other Educational Measures

There are other ways to measure student achievement in addition to the use of student test scores. Comparisons of graduation rates, for example, show that the percentage of students who graduated from Maine high schools within four years in the 2008-09 school year (the most recent available) was 79.9% (NCES, 2011). Maine's 2008-2009 graduation rate was 4.4 percentage points higher than the national average and 17th highest in the country. Between 2001-02 and 2008-09 Maine's high school graduation rate improved by 4.3 percentage points. Table 3.18 shows the high school graduation rates for Maine and other comparable states. Data for all 50 states are in Appendix 3.M.

Another frequently used approach for measuring 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 measures the number of students who graduate from high school and begin college in the fall of the next school year. Maine's college going rate for 2007-08 was 57.1%, which was the 11th lowest in the country.[9] The national college going rate for that year was 63.3%. 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 high school dropouts are not part of the equation. For this reason Mississippi, which had the 3rd lowest high school graduation rate at 63.9%, had the highest college going rate in the country at 77.4%.

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

Table 3.18: High School Graduation Rates –
Average freshmen four-year graduation rates

	Graduation Rates (National Rank)		Changes in Rates (National Rank)
	2001-2002	2008-2009	
National	72.60%	75.50%	2.90%
Maine	75.6% (24)	79.9% (17)	4.3% (16)
Connecticut	79.7% (12)	75.4% (28)	-4.3% (49)
Iowa	84.1% (4)	85.7% (5)	1.6% (32)
Massachusetts	77.6% (16)	83.3% (8)	5.7% (13)
New Hampshire	77.8% (15)	84.3% (7)	6.5% (10)
Rhode Island	75.7% (23)	75.3% (30)	-0.4% (41)
Vermont	82.0% (7)	89.6% (2)	7.6% (6)
Wisconsin	84.8% (3)	90.7% (1)	5.9% (12)

Source: National Center for Education Statistics, 2000 through 2011.

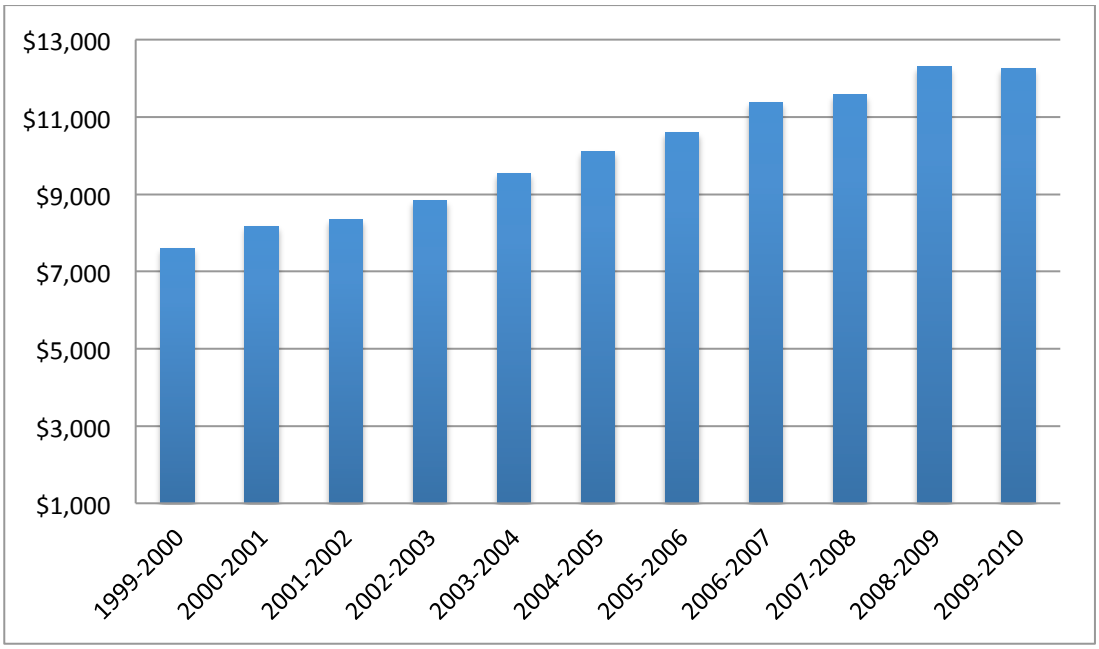
SUMMARY OF STATE COMPARATIVE FINDINGS

Maine's K-12 education system has witnessed a steady increase in spending over the past several years. However, this additional funding appears to have only resulted in modest improvements in the academic performance of the state's students.

Increased Spending

Between FY 1999-2000 and 2009-2010 Maine's state and local K-12 education revenue grew by $728.6 million (45%). The increase in state and local revenue combined with a decrease in the state's student population has resulted in an increase in per student spending from $7,595 to $12,259 (61.4%) during this time period. In both 1999-2000 and 2009-2010 Maine's per pupil spending amount was the 12th highest in the country. Figure 3.1 displays the change in per pupil spending over this time frame.

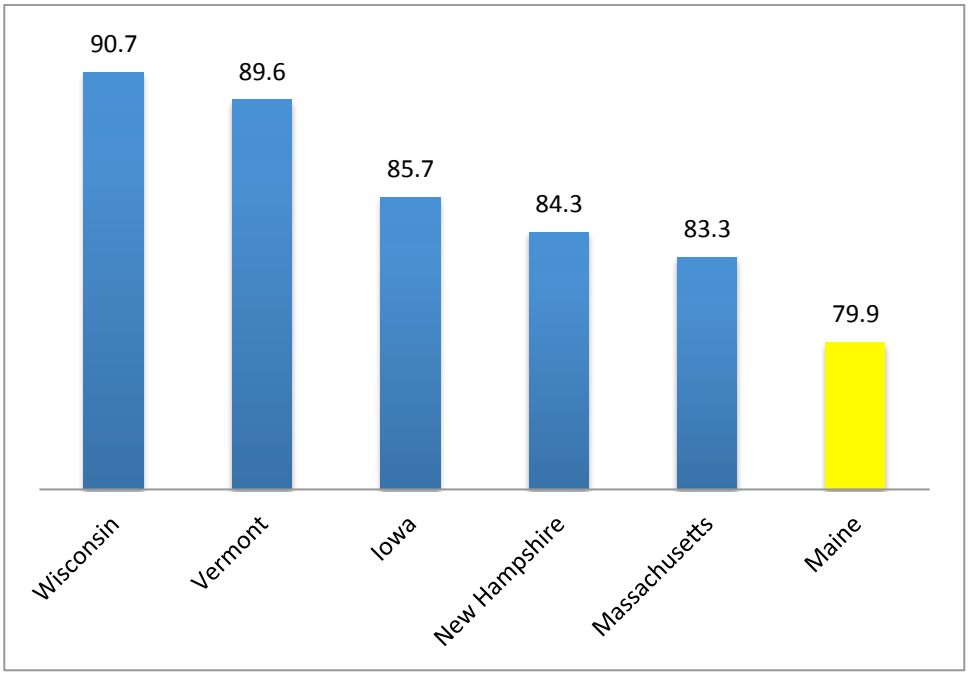
Figure 3.1: Per Pupil Spending for Maine K-12 Education: 1999-2000 to 2009-10



Mixed Performance

Between 2001-2002 and 2008-2009 Maine saw its high school graduation rate increase by 4.3% to 79.9%. While the state's graduation rate consistently ranks above the national average it trails five of its comparable states (See Figure 3.2). Maine's scores on the National Assessment of Educational Progress (NAEP) in math and reading were mixed during this time period. Between 2003 and 2011 student results in 4th and 8th grade math and 8th grade reading saw modest growth while scores in 4th grade reading decreased slightly. Maine's scores on the New England Common Assessment Program (NECAP) in math, reading and writing have remained flat over the past three years with the exception of 8th grade writing which saw a increase in the percentage of students testing at or above proficient from 53% to 58%.

Figure 3.2: 2008-09 Four Year High School Graduation Rate for Comparative States



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

Educational Expenditures

- From 1999-2000 to 2009-2010 state and local revenue for public K-12 education in Maine grew from $1.62 billion to $2.35 billion - an increase of just over $728.6 million or 45%. During the same time period, state and local revenue for K-12 education in all 50 states increased by 49.4% ($171.6 billion). (U.S. Census, 2012) – See appendix 3.A for a fifty-state summary
- Between 1999-2000 and 2009-2010 Maine's per pupil expenditures grew from $7,595 to $12,259 an increase of 61.4%. Average per pupil expenditures on a national level increased from $6,836 to $10,600 a 55.1% increase during this same time period. (U.S. Census, 2012) - See appendix 3.B for a fifty-state summary

Student Population

- Maine has experienced a decrease in student population of 20,533 (10%) over the past decade (2001-2002 to 2011-2012). See appendix 3.E for a fifty-state summary
- Average school district size has declined to 808 students – making the state's school districts the 4th smallest in the nation with an average enrollment that is 25.4% the size of the average school district in the United States. See appendix 3.F for a fifty-state summary

Staffing

- Maine has seen an increase in the number of new teachers and a slight reduction in the number of administrators in the past decade. See Appendix 3.H and 3.G for a fifty-state summary
- When combined with the decline in student enrollments Maine has one of the lowest student to teacher ratios in the country. See Appendix 3.I for a fifty-state summary
- The reduced student to teacher ratios are a major cause of the state's increases in per pupil expenditures

Student Achievement

- In 2011, Maine's student test results on the National Assessment of Educational Progress (NAEP) in math and reading were mixed when compared to other states
- Maine has a four-year high school graduation rate of 79.9% which is 4.4% above the national average but trails many comparable states. See Appendix 3.M for a fifty-state summary
- Maine's New England Common Assessment Program (NECAP) test results have been flat over the past two years and trail the scores of students in New Hampshire and Vermont in math and writing in all grades and reading in all but the 3rd grade

CHAPTER 4: EQUITY ANALYSIS OF MAINE'S EPS

INTRODUCTION

Reflecting the core requirements of the Legislature's request for an evaluation of the Maine school funding system, a cornerstone of our evaluation is an equity analysis of school district revenues using traditional school finance equity statistics to ascertain how well the system meets the equity goals of the EPS. The school finance literature identifies a number of statistics used to assess the equity of a state's school funding system. The statistics can be divided into two categories: those that measure the fiscal neutrality of the system and those that measure the equality (equity) of per pupil spending across school districts in the state. Odden and Picus (2014) describe the most common approaches for measuring fiscal neutrality and equal spending. We used those approaches to measure how well the Maine school funding system has met the goals of fiscal neutrality and equity. Appendices 4.A-4.G of this document contain tables that display all of the equity statistics we have calculated for Maine over the years included in this evaluation.

Data Issues

Fiscal neutrality examines the relationship between the fiscal capacity of a school district and its revenues (or expenditures). Traditionally, school finance scholars measured fiscal capacity using per pupil property values, since many states fund their schools primarily from property tax collections. Recently, however, scholars have recognized issues related to communities with high levels of property value, but low levels of income. This concern has led scholars to add the consideration of income level as a fiscal capacity measure to supplement the property value measure.

An equal spending analyses requires the consideration of two concepts. The first is simply equal spending per pupil, known as horizontal equity. The second considers differential student needs and attempts to assess the degree to which students with different needs receive different funding based on their needs – in other words, a system possesses vertical equity if funding differences between students relates to the different educational needs of students. Therefore, everything else being equal, a school district with more students from economically disadvantaged backgrounds, more students with limited English proficiency, and more students with special needs should receive more funding to compensate for the additional cost of educating these students to meet high standards.

Given the foregoing, the following data were needed to conduct the equity analysis: revenue measures, student counts, property wealth, and median income. The following paragraphs discuss the issues related to the data used in this equity analysis.

Revenue Measures

We used four revenue measures for the equity analysis. The first measure was each SAU's EPS funding level, without special education, limited English proficiency, gifted and talented, and

transportation. This measure enabled us to analyze the extent to which the base EPS rate provides equal funding among districts. The second measure added special education, limited English proficiency, and gifted and talented funding to the first measure because these items represent revenues directed toward students with additional needs. The third measure was the total EPS revenue, which equals all state revenue plus the required local revenue. The final measure was total revenue, which equals the state revenue plus the actual local revenue (which almost always exceeds total EPS revenue.

Student Counts

Student counts were provided by the Maine Department of Education (DOE) and consist of the official count used by the Department. The unweighted student count was used for the horizontal equity analysis. For the vertical equity analysis, we applied the weights used by Maine that involve additional educational needs of children (economically disadvantaged, limited English proficiency, and special education).

Maine applied a variety of weights to district pupil counts over the years of the study. The economically disadvantaged weight was 0.15 per economically disadvantaged student over the entire 8 years of the study. Maine used three sets of weights for students with limited English proficiency, based on the number of such students in the district. The weights changed in 2009, so one set was used for the years 2006-2008 and the other set for 2009-2013. These weights are summarized below in Table 4.1.

Table 4.1: LEP Weights Used in Computing EPS Vertical Equity Statistics

	Weight	
Number of LEP Students	**2006-2008**	**2009-2013**
1-16	0.5	0.7
1-250	0.3	0.5
250 or more	0.6	0.525

Maine has a six-step formula for calculating special education revenues. The first step involves applying a weight to the special education students in each district, with a student number cap set at 15% of the district's student count. If more than 15% of a district's students were identified as needing special education services, in the second step, a weight was applied to the "additional" special education students. The weights applied in step 1 varied annually over the 8 years of the study, with a low of 1.25 and a high of 1.38. The weight in step 2 remained constant at 0.38 across the study. To obtain a single weight for each year, we computed a pupil weighted average of the two Maine weights and generated a separate weight for each year. The special education weights we computed to use in this analysis are displayed in Table 4.2

Table 4.2: Special Education Weights Used in Equity Analysis

Year	Special Education Weight
2006	1.26
2007	1.15
2008	1.16
2009	1.17
2010	1.19
2011	1.20
2012	1.20
2013	1.20

By assessing equal spending on the basis of weighted pupil counts, we can establish a measure of the vertical equity of the system. We express no opinion in this equity analysis regarding whether the current Maine weights were appropriate for the services required by the students.

Fiscal Capacity Measures

Annual per pupil property wealth data were provided by the state. The state economist also provided the measure of per capita income. To obtain values that could be linked to SAUs, we received a five year aggregate income measure.

Finally, we computed per pupil revenue deciles[10] based on district property values. The decile analyses enabled us to track changes in spending by group over time. Equity and fiscal neutrality statistics were computed using Excel and JMP. The revenue deciles were computed using Excel spreadsheets.

FISCAL NEUTRALITY

Assessing the degree of fiscal neutrality entails analyzing the relationship between measure(s) of per pupil revenues and/or expenditures and measure(s) of fiscal capacity. As discussed above, property wealth per-pupil typically is used to measure fiscal capacity, but we also consider the relationship of income to district per pupil revenues. In conducting this analysis, the greater the relationship between measures of fiscal capacity and levels of revenue, the less fiscal neutrality and, therefore, the more inequity present in the system.

Fiscal neutrality is measured using the correlation coefficient and the elasticity computed from a simple one-variable regression. The correlation coefficient indicates the degree to which there is

[10] Student deciles are computed so that approximately 10% of the students in the state are in each decile. As a result the number of districts in each decile can vary substantially.

a linear relationship between two variables, i.e., whether as one variable increases the other increases (or decreases). The coefficient ranges in value between -1.0 and +1.0. A value of +1.0 or close to +1.0 indicates a strong positive relationship, for example, as property wealth increases so does revenue per-pupil. A correlation coefficient close to zero indicates that there is little or no linear relationship between the two variables. For fiscal neutrality, the ideal value of the correlation coefficient is zero, but the generally accepted standard for this statistic is +0.50 or less (Odden & Picus, 2008).[11]

While a correlation coefficient indicates whether a linear relationship exists between two variables, the elasticity indicates the magnitude (slope) or policy importance of that relationship. For example, revenues and wealth could be strongly related, but if a ten-fold increase in property wealth only resulted in a small increase in revenues, one could argue that the magnitude of the relationship was not significant and of little policy significance.

Technically, the elasticity indicates the percent change in the object variable, revenues per-pupil, relative to the same percent change in the measure of fiscal capacity, (e.g., property value per-pupil). The elasticity of a school funding system usually ranges in value from zero to any positive number, although the elasticity can also be negative. In school finance, an elasticity of 1.0 indicates that revenues increase at the same percentage rate as the wealth measure. Elasticities above 1.0 indicate that spending increases in percentage terms at a higher rate than property wealth. Finally, elasticities below 1.0 indicate that spending does not increase at the same percentage rate as local property wealth local property wealth.

When interpreting the elasticity values, it is important to keep in mind that the goal of horizontal equity is for each child in the state to be funded at the same level. However, one typically finds that schools located in areas with more wealth tend to receive greater funding per pupil. As with the correlation coefficient, complete horizontal equity would be achieved if the elasticity equaled 0.0, because that value would indicate that school spending did not rise as wealth rose. Along the same lines, a system with an elasticity of 1.0 or more would involve having per pupil spending rise very rapidly as wealth rises. The equity standard for the wealth elasticity is for it to be equal to or less than 0.10 (Odden & Picus, 2014), because such a value would show that per pupil spending, although rising with wealth, did so at a slow rate.[12]

The elasticity between a dollar object, such as revenues per-pupil, and property wealth per-pupil, can be calculated using the slope of the linear regression of revenues on wealth; the elasticity equals the slope (the regression coefficient for wealth) times the ratio of the mean value of property wealth per-pupil and the mean value of revenues per-pupil.

It is important to assess the correlation coefficient and elasticity jointly. If the correlation is high and the elasticity is low, a relationship exists between the two variables but the relationship is not of policy importance. On the other hand, if the correlation is low and the elasticity is high, even

[11] The +0.50 figure implies that a negative correlation would be acceptable at any value. Negative correlations between wealth and per pupil spending are rare in school finance because wealthier districts tend to receive more revenues per pupil than poorer districts (no negative correlations were found in this study). Therefore, for practical purposes, the range of acceptable correlations is 0.00 to 0.50.

[12] In theory, the elasticity could be negative, but this occurs very rarely.

the tenuous link between the two variables might have policy significance. If both the correlation coefficient and elasticity are high, then fiscal neutrality does not exist: the two variables are linked and the magnitude of the link is strong. Finally, fiscal neutrality is achieved if the value of each variable is below the benchmark.

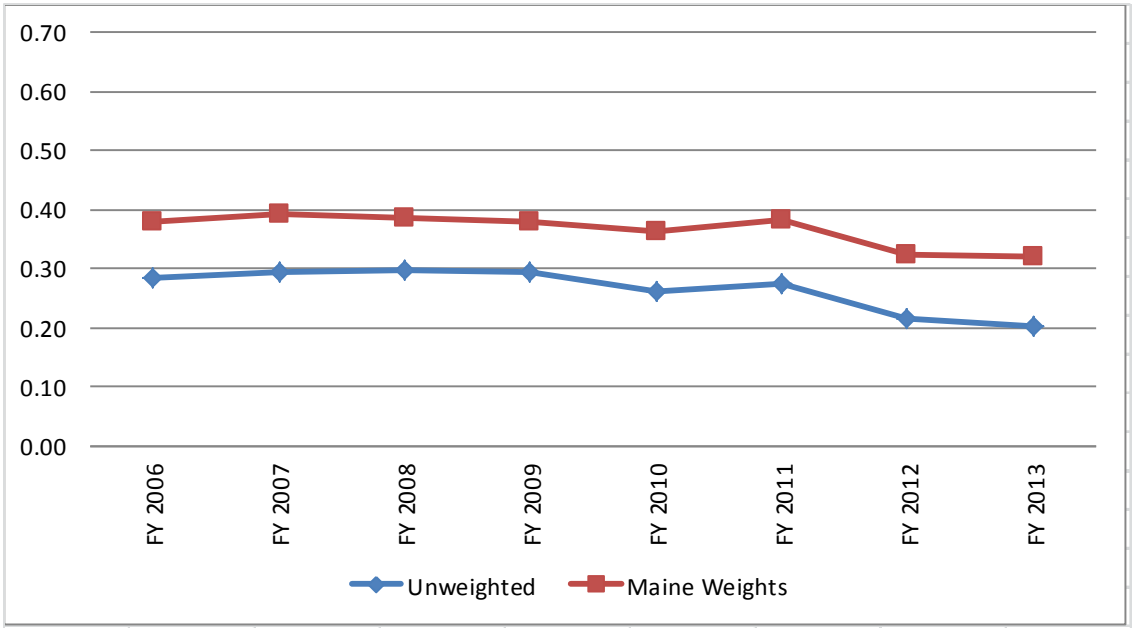
The benchmark standards established for this analysis are very strict measures that few states meet. Two important things to remember when reviewing the fiscal neutrality and equity statistics are how close the measures are to the standards and how the values have changed over time.

Correlation Between Revenues and Property Wealth

Maine school funding showed small, positive correlation between revenues and property wealth as long as raised local revenues were not considered. Each of the three revenue measures that did not include raised local revenues had similar correlations, as seen in Appendices 4.A to 4.D Figure 4.1 displays the correlation between per pupil EPS revenues (with special education, LEP, and GT included) and per pupil property wealth over time to illustrate an example of the relationship. Similar results were obtained whether using unweighted and weighted pupil counts.

All of the correlation coefficients computed for this analysis were below the correlation standard of 0.50, which suggests that revenues were not highly correlated with property wealth. Two important relationships can be seen in Figure 4.1. First, the correlation was slightly higher for weighted pupils than for unweighted pupils. Second, fiscal neutrality as measured by the correlation between property wealth and per pupil spending improved during the course of the study, particularly after FY 2011.

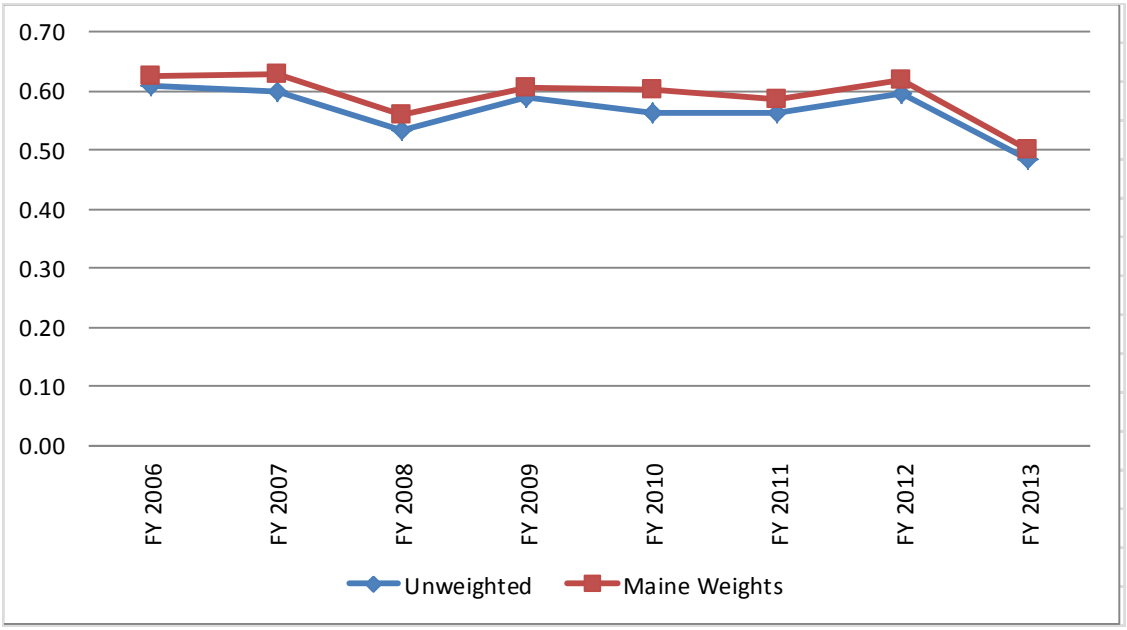
Figure 4.1: Correlation Between EPS Revenues (with Special Education, LEP, and GT) and Property Values: FY 2006 – FY 2013



The correlation coefficients were much higher when the revenue measure included the total revenues actually raised locally and state revenues as shown in Figure 4.2. The coefficients were uniformly higher than the standard of 0.50, other than for the 2013 projections. This result shows that the relationship between per pupil property wealth and per pupil revenues was stronger when the total amount of revenues raised by localities was included in the model. The greater ability of wealthier communities to raise local funds reduced the fiscal neutrality of the system.

Two other implications are apparent from the Figures 4.1 and 4.2. First, the impact of weighting the students had a negligible impact on the correlation coefficient. Second, the fiscal neutrality remained roughly constant during the years of the study, with the exception of the 2013 projections.

Figure 4.2: Correlation Between EPS Revenues (Raised Local and State) and Property Values: FY 2006 – FY 2013



In summary, the correlation between property wealth and revenues remained within the established guidelines throughout the course of the study, except when we took into account the revenues actually raised by localities – revenues which include funds raised by each SAU beyond of the EPS funding computation. The correlation values remained similar over the time period of the study, but a slight improvement over time was observed. The reduced fiscal neutrality when accounting for raised local revenues was due primarily to lower revenues in very property poor districts and greater revenues in very high wealth districts, as will be discussed below.

Elasticity Between Revenues and Property Wealth

Figures 4.3 and 4.4 display the property wealth elasticity of the Maine school finance system between FY 2006 and FY 2013. The annual data underlying this figure are displayed in Appendices 4.A- 4.G. Figure 4.3 shows the elasticity on an unweighted pupil count basis for all four measures of revenues. Figure 4.4 shows the same revenue data using weighted pupils.

Using the elasticity benchmark standard of 0.1, Figures 4.3 and 4.4 show that Maine school funding had an extremely low elasticity for all revenue measures that did not include the total amount raised by the localities. The values consistently were higher when the raised local revenues were included in the revenue measure, with the values edging above the standard of 0.10 in some years. These results suggest that the Maine school finance system is fiscally neutral with respect to property wealth when considering the amount of local revenues school districts are supposed to receive. However, the ability of localities to raise additional local revenues increases the elasticity of the system to the extent that in most years the value falls very close to or even above the standard for elasticity.

The results of the fiscal neutrality analysis were very similar for both correlation and elasticity. In order to better understand which districts were (or were not) benefitting from the introduction into the system of additional local revenues, for each year we divided the state's students into deciles ranked by the per pupil property value. Decile 1 contained the 10% of the student population (approximately) educated in the districts with the least property wealth; in contrast, Decile 10 contained students in the districts with the most property wealth. The mean per pupil locally raised and state revenue for each year was calculated for each decile. We then computed for each decile its percentage of the mean revenues each year. Figure 4.5 displays the results of these calculations.

As Figure 4.5 shows, the deciles can be classified into three groups. The mean per pupil revenues in Decile 1 consistently stayed below 90% of the mean for the entire time period of the study. Deciles 2-8 form the second group, which has values clustered near the mean value of revenues. Finally, Deciles 9 and 10 were 10% and 20% above the mean revenue value, respectively, throughout the study.

Figure 4.5 provides insight into why the correlations and elasticities were higher when we included all locally raised revenues along with state revenues. Districts in the decile with the least property wealth were able to raise less local funds, on average. In contrast, districts in the two deciles with the greatest property wealth were able to raise more local funds, on average. Maine has a large group of districts in the middle (comprising about 70% of the state's students) that raised local revenues at similar rates. In other words, districts at the property wealth extremes (in either direction) on average had revenues that differed from the mean, but the districts in the middle tended to have similar, roughly average revenue levels. This finding means that the system is fiscally neutral for districts with about 70% of the students, that is

districts with property values in the middle deciles. However, the revenue differences for the wealthiest and poorest district adversely affect fiscal neutrality of the system as a whole.

Figure 4.3: Elasticity Between Education Revenues Per Pupil (Unweighted) and Property Wealth: FY 2006 – FY 2013

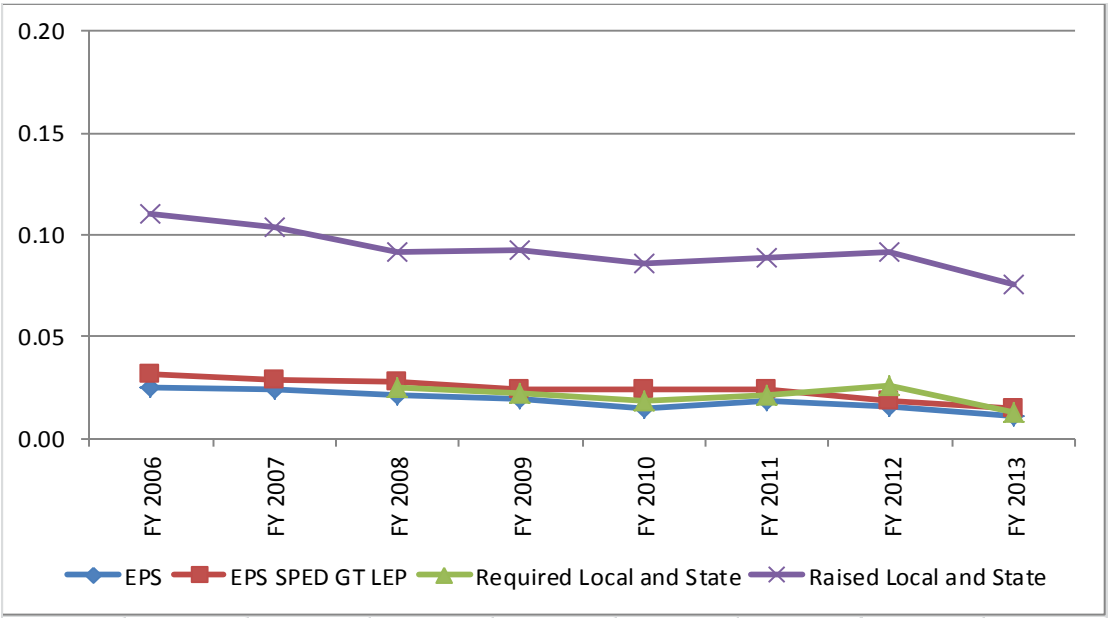


Figure 4.4: Elasticity Between Education Revenues Per Pupil (Maine Weighted) and Property Wealth: FY 2006 – FY 2013

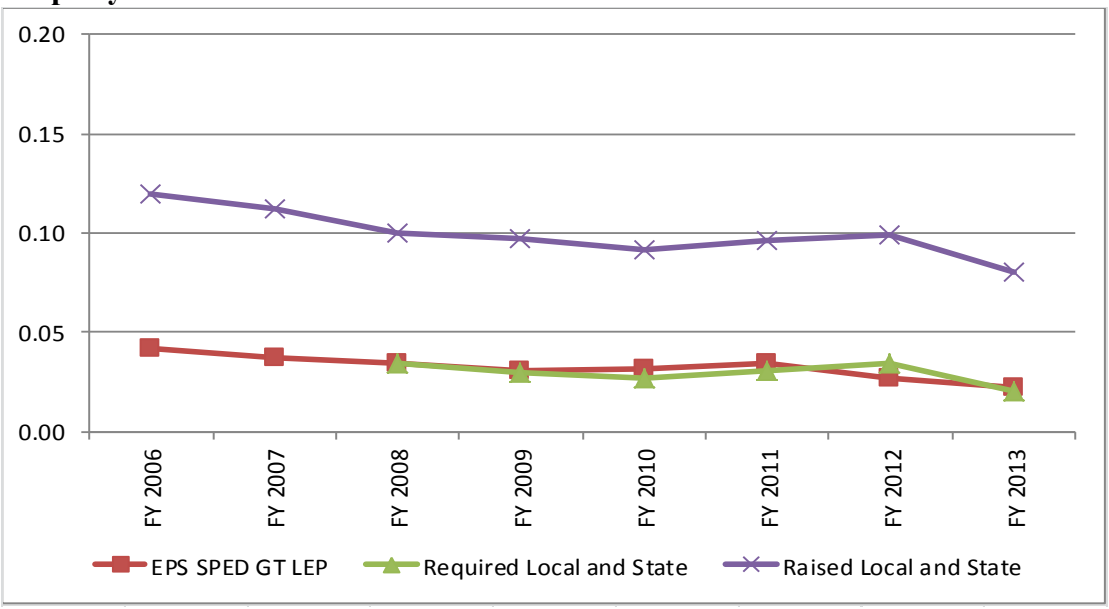
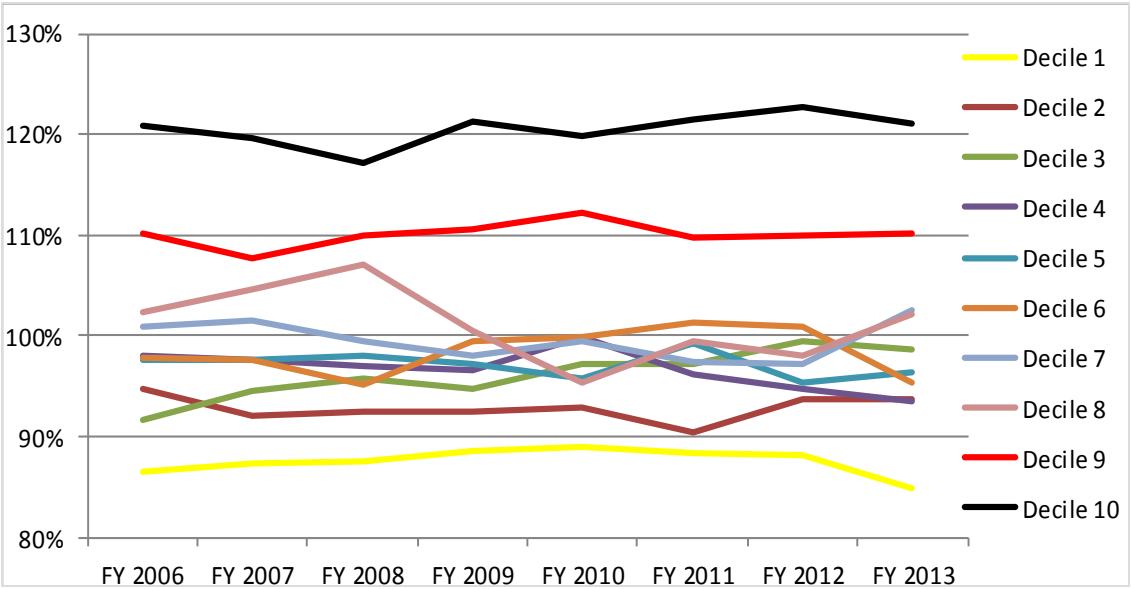


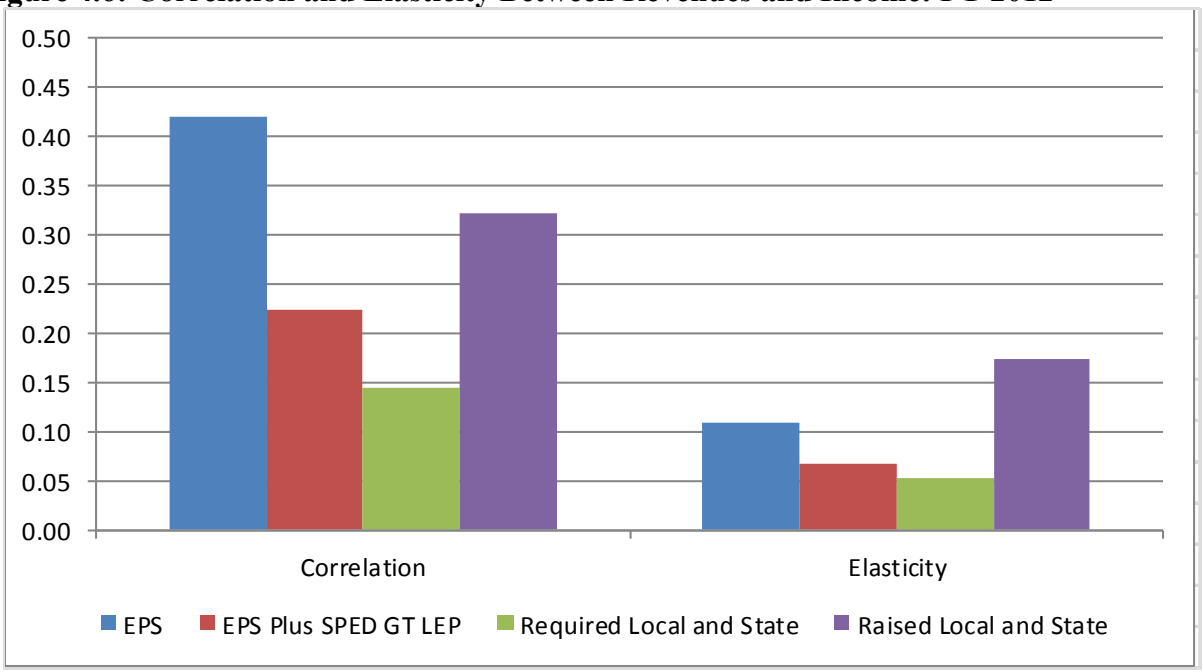
Figure 4.5: Percentage of the state's mean revenues (raised local and state) by decile: FY 2006 – FY 2013



Correlation and Elasticity Between Revenues and Income

Figure 4.6 and Appendices 4.A- 4.G display the results for the correlation between per pupil revenues and per capita income for the 2012 fiscal year using unweighted student counts. The figure shows that the values of the correlation coefficients were well below the benchmark value of 0.50 throughout the period of this analysis. Unlike our estimates for property value, the highest value of the correlation coefficient was for the base EPS value, not the revenue measure that included all raised local revenues. That said, the essential point from the correlation side of the figure is the correlation between revenues and income was comfortably below the 0.50 standard suggesting a high level of fiscal neutrality even when measured on the basis of per capita income.

Figure 4.6: Correlation and Elasticity Between Revenues and Income: FY 2012



The elasticity portion of Figure 4.6 (and Appendices 4.A- 4.G) tells a somewhat different story about the relationship between revenues and income. As can be seen in the figure, the elasticity of the system edged over the benchmark value of 0.10 for base EPS revenues and was above the benchmark when raised local revenues were included. As mentioned in the introduction to the fiscal neutrality section, the low correlation and high elasticity between these revenues and income can have policy implications. The policy implications may be indicated more strongly when considered in conjunction with the high correlations and elasticities between raised local and state revenues and property values. It appears that the inclusion of additional local revenues by relatively wealthy districts (in terms of income) and the corresponding inability of less wealthy to do the same, negatively impacted the fiscal neutrality of the system as a whole.

The similarity of the fiscal neutrality results whether the wealth measure was per pupil property value or per capita income led us to consider the relationship between those two variables. The student weighted correlation between the wealth variables (using 2012 data) was 0.333, which is a moderate correlation. This result suggests that areas with greater property wealth also tend to have greater per capita income, which reinforces the differential ability to raise funds between poor and wealthy districts.

Summary of Fiscal Neutrality Estimates

The Maine school funding system overall has succeeded in designing a fiscally neutral distribution of revenues. However, the addition to the system of local property tax funding above the level required to fund the EPS introduced inequities into the system. The essential fiscal neutrality finding is the Maine school funding system as planned would have achieved fiscal neutrality, but the differential abilities of districts with different levels of wealth (property and income) to raise local funds reduced the fiscal neutrality of the system somewhat.

SPENDING EQUALITY

A second important equity concept is measuring the equality of per pupil spending across the state's school districts. Appendices 4.A- 4.D and Appendices 4.E- 4.G display the annual equity statistics on a horizontal equity basis and a vertical equity basis, respectively. In this section, we describe our findings regarding the equality of spending across Maine school districts based on an analysis of horizontal and vertical equity as described above. Review of the tables shows that the equity statistics for spending equality have stayed rather consistent over time even though all of the spending measures increased substantially.

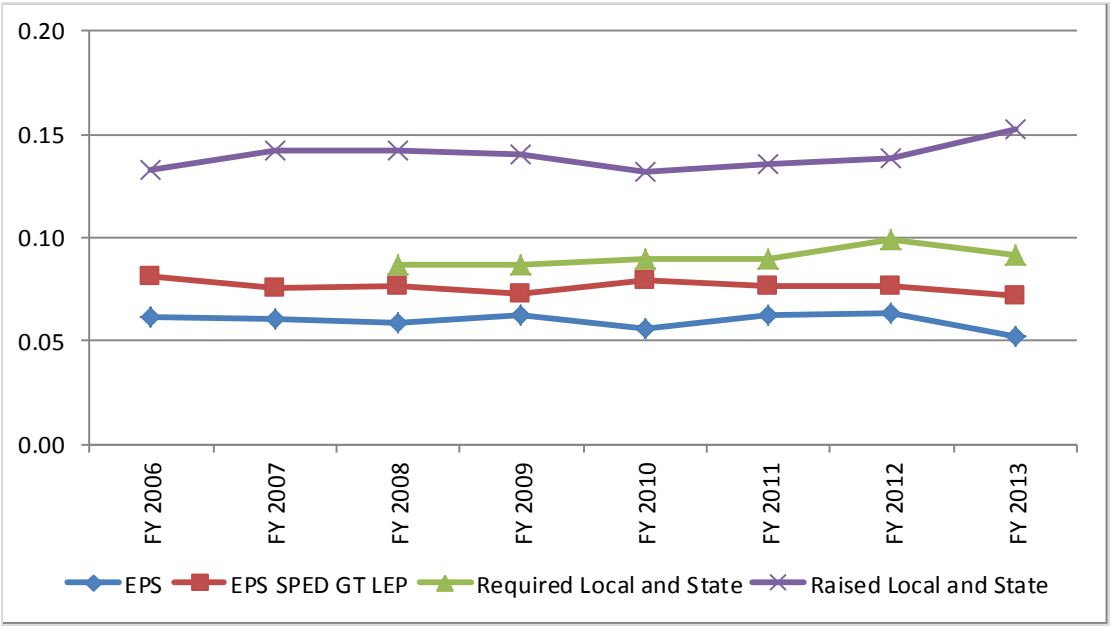
We assessed vertical equity by using weighted pupil counts. A comparison of Appendices 4.A- 4.D and Appendices 4.E- 4.G shows that weighted per student revenue figures were lower than unweighted per student revenue. This outcome results from the fact that pupil weights increase the student count, so the same revenue figures are divided by the higher pupil count. Despite this difference, review of the two tables shows that the equity estimates are similar over time and slightly worse when vertical equity is measured. This slight difference in the values of the equity statistics suggests that differences in funding across districts were based primarily on factors other than the differing educational needs of the students.

To facilitate the analysis of the equality of spending in of the Maine funding system, three of the statistics presented in Appendices 4.A- 4.G are displayed below in graphic form. The three statistics reviewed here are the coefficient of variation (CV), the McLoone Index, and Verstegen Index.

Coefficient of Variation

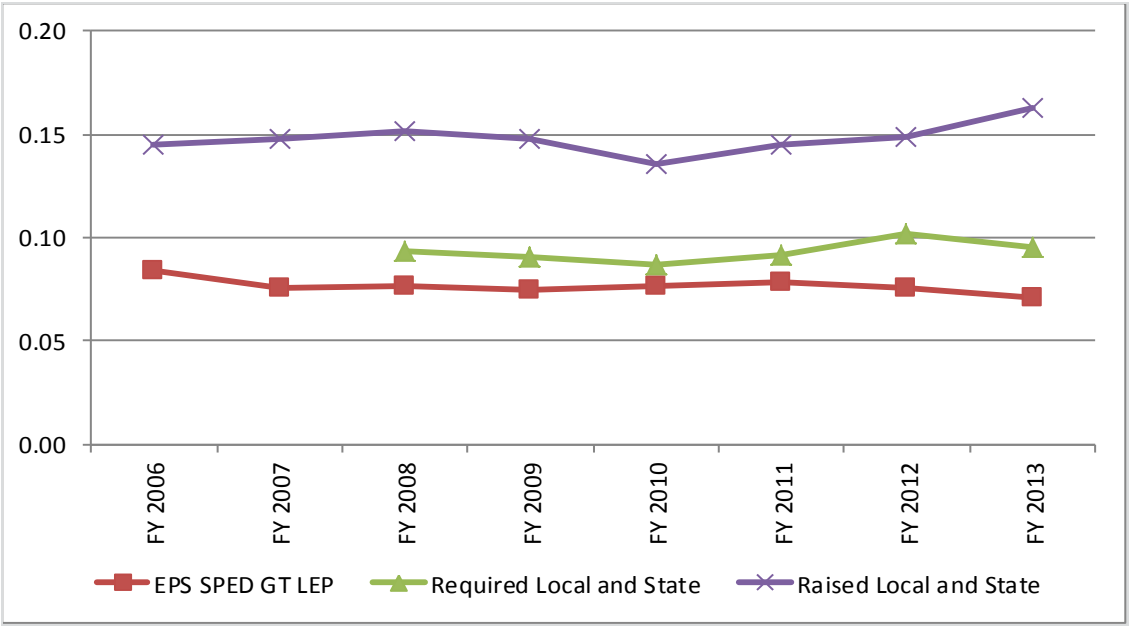
Figures 4.7 and 4.8 summarize the coefficient of variation for unweighted and weighted student counts from FY 2006 to FY 2013, respectively. Odden and Picus (2014) suggest using a value of 0.10 as the benchmark for assessing the revenue equality of a state's school finance system, with values of 0.10 or below indicating a high level of equity. Figures 4.7 and 4.8 show similar results. The CV in Maine generally met the 0.10 standard, except for the revenue measure that included raised local revenues. The values of the CV for the latter measure were above the standard each year.

Figure 4.7: Coefficient of Variation for unweighted students: FY 2006 – FY 2013



The values of the CV were slightly higher for weighted student counts than for unweighted student counts. One would expect the values to be lower for weighted students if the funding differences were a response to differing educational needs of students. This result suggests student needs do not appear to have been the primary consideration driving funding differences, especially since the slight differences are in the opposite direction of what was anticipated.

Figure 4.8: Coefficient of Variation for weighted students: FY 2006 – FY 2013



McLoone Index

Figures 4.9 and 4.10 display the values of the McLoone Index for FY 2006 through FY 2013. Odden and Picus (2014) suggest a benchmark of 0.95 (1.00 being ideal) for the McLoone Index; that value would indicate that substantial equity exists across districts in the bottom half of the revenue distribution. Figures 4.9 and 4.10 show that the Maine school finance system came close to the McLoone benchmark of 0.95 in all years. As with the CV, the McLoone figures showed the greatest inequity when the raised local revenues are included. We also note that the range between the McLoone with raised local revenues and the McLoone with just the EPS has grown over time, which suggests that the poor (however defined) are increasing local revenues slower than the other districts, a result consistent with our other findings.

Figure 4.9: McLoone Index unweighted students: FY 2006 – FY 2013

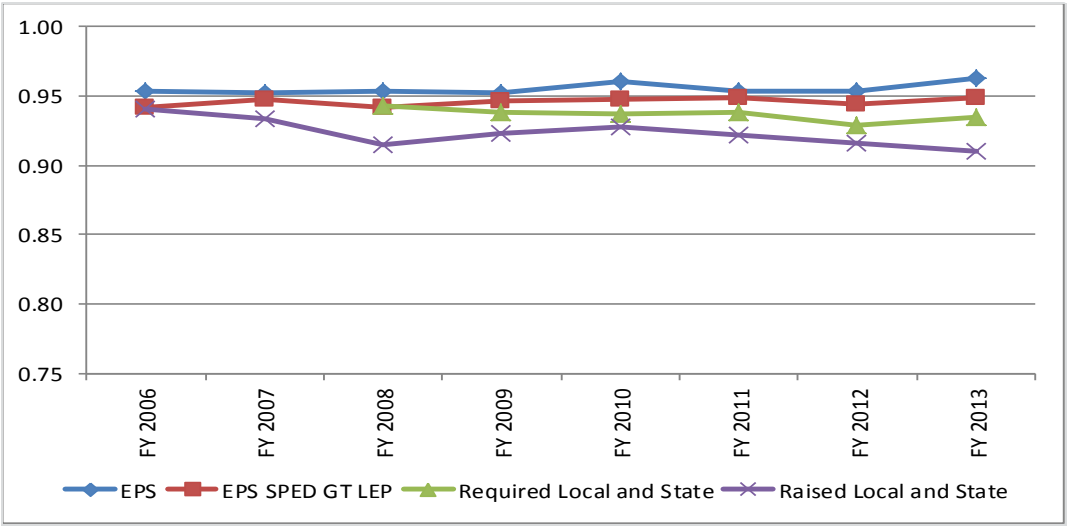
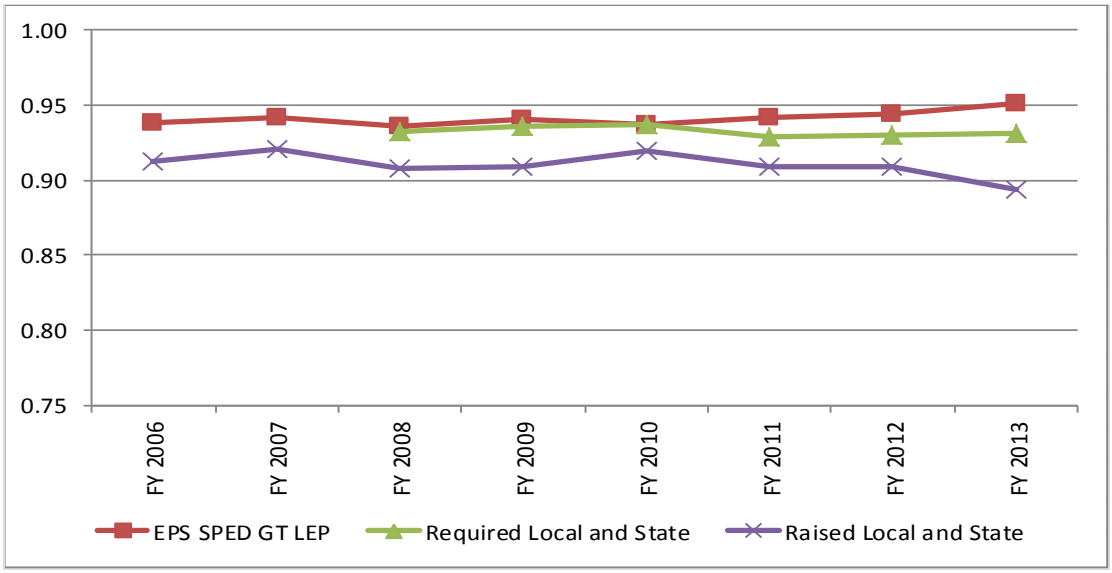


Figure 4.10: McLoone Index weighted students: FY 2006 – FY 2013



Verstegen Index

Figures 4.11 and 4.12 display the values of the Verstegen Index for each year of the analysis. Odden and Picus (2014) suggest a benchmark of 1.05 (1.00 being ideal) for the Verstegen Index; this value would indicate that there is substantial equity across districts in the top half of the revenue distribution. Figures 4.11 and 4.12 and Appendices 4.A- 4.G show that the Maine school finance system rarely met this benchmark each year and never got very close when locally raised revenue was included.

A comparison of Figures 4.9 through 4.12 shows that the inequities that exist in per pupil revenues are somewhat more pronounced in the top half of the distribution. The values for the Verstegen Index are slightly farther away from the benchmark, especially with regard to the revenue measure that includes raised local revenues. This comparison is consistent with the results of the decile analysis in the fiscal neutrality section, which showed that two deciles were funded well above the mean and one decile was funded well below the mean.

Figure 4.11: Verstegen Index unweighted students: FY 2006 – FY 2013

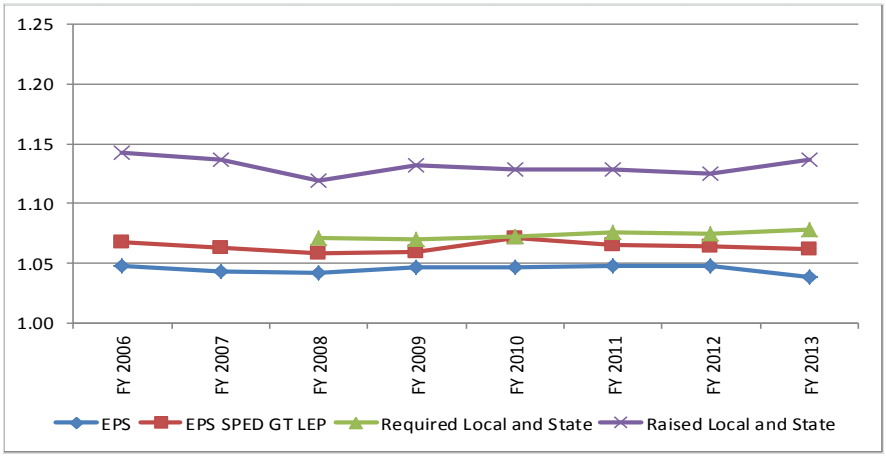
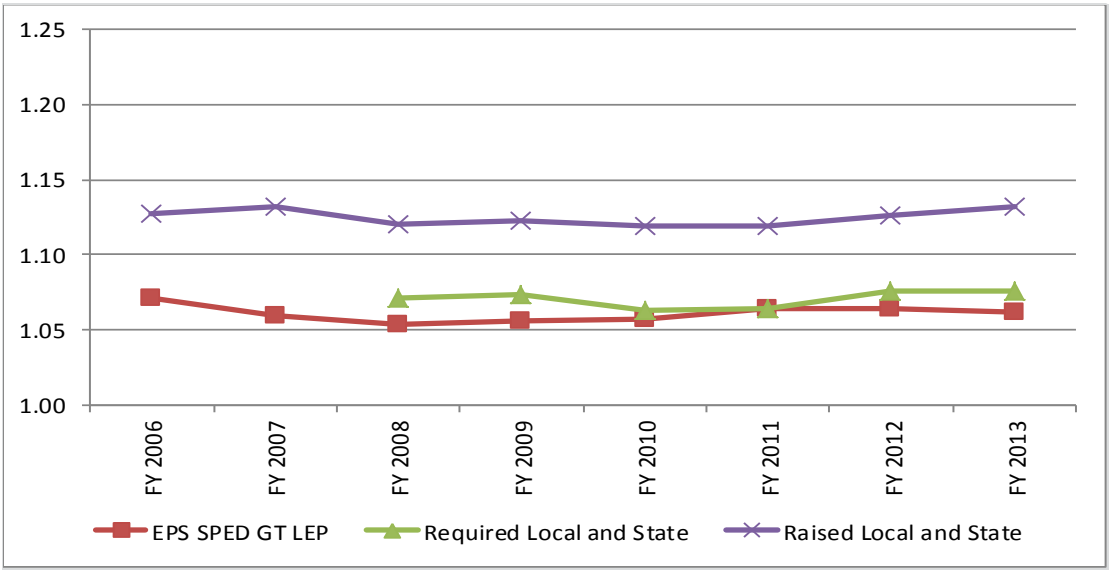


Figure 4.12: Verstegen Index weighted students: FY 2006 – FY 2013



Overall, Figures 4.7 to 4.12 suggest that the Maine school funding system came quite close to meeting the spending equality benchmarks suggested by Odden and Picus (2014), except when we accounted for the differential ability of districts to raise local funds. The inequities in the system seem to come largely from local resources.

Conclusions

Overall, two patterns consistently emerge from our equity analysis of the Maine school funding system. First, we found that the system, as designed, met (or very nearly) met all of the strict benchmarks established by Odden and Picus (2014) for fiscal neutrality and equity. This finding held when we used multiple measures of both property wealth per pupil and per capita income, and when we used both weighted and unweighted pupil counts in the analysis.

We did find that the equity and fiscal neutrality of the system changed slightly for the worse when we included local revenue raised through property taxes above the level of EPS funding. The revenue equality statistics indicate that the relatively small funding disparities in Maine arise to mostly from wealth disparities across SAUs whether measured on the basis of property wealth per pupil or median per capita income.

In our analysis of revenue equality, we compared how the districts in the bottom half of the revenue spectrum fared when compared to those at the median. Analysis of the McLoone Index values we computed shows they generally fell between 0.90 and our strict benchmark of 0.95. We also assessed spending differences for the top half of the distribution using the Verstegen Index and found that it generally fell between 1.10 and 1.15 when locally raised revenue was included, somewhat farther above our strict benchmark of 1.05. Taken together, these results suggest that minor revenue inequalities exist on both ends of the spectrum in Maine, with greater inequity at the top than at the bottom of the funding distribution. In other words, wealthier districts, whether measured by property wealth per pupil or per capital income tend to raise

somewhat more revenue per pupil than poor districts, although this disparity is relatively small compared to most other states.

If the state wants to mitigate the inequities caused by local revenue raising capacity, there are two options. The first issue revolves around increasing funding to the least wealthy districts and could be resolved by adding power equalization (also called a guaranteed tax base) on top of the state's foundation program, as is done in eight other states (see chapter 3 for details). This approach would involve providing state assistance to school districts choosing to levy taxes above the minimum required to fund their contribution to the EPS in inverse relationship to the measure of wealth. In other words, for each unit of tax raised, a district would be guaranteed a certain amount of revenue per pupil. The state would contribute the difference between the guarantee and what was raised locally. The state could also decide to cap this equalization at some level if it chose to do so, likely creating a disincentive to raise revenues beyond that point for poor districts. The determination of what level to stop funding the guarantee will have a substantial impact on the future equity of the funding system, with higher guarantees leading to greater equity. Power equalization can add more money to the system in order to increase the equity of school funding. This approach provides a disincentive to unlimited funding by tying the state's contribution to local decisions about how much localities should tax themselves.

The more difficult issue involves the inequities on the high end of the distribution. Essentially, a state has three options in terms of dealing with such inequities. First, a state can prohibit districts from raising funds beyond a certain limit. This approach would increase equity, but has the drawback of being extremely unpopular in wealthy districts and causing children in such districts to receive fewer resources than they would otherwise. The other option involves raising funding to all other districts to match funding in the wealthy districts. This also would achieve equity, but would be prohibitive in terms of the amount of funding required to achieve equality. The final option consists of leaving the inequity in place. The presence of the inequity is the obvious drawback to this approach. The benefits are it does not reduce resources to any district. In addition, higher funded districts sometimes drive additional funding for all districts, as what once was a "luxury" in wealthy districts eventually becomes a "necessity" in all districts.

We lay these options before the legislature, but make no recommendation regarding which should be followed. The legislature must decide which choice is in the best interests of the citizens of Maine. However, once the legislature decides which course to pursue, we can recommend the best possible alternative for achieving the legislature's goals and objectives.

These results are consistent with the findings of the decile analysis, which showed the two wealthiest deciles consistently raising revenues above the mean, the next seven deciles raising revenues close to the mean, and the least wealthy decile raising revenues below the mean. Therefore, the state would have to address two issues if it chooses to improve the fiscal neutrality and equity of the system. The first issue would involve increasing the revenues raised by the lowest decile to the level of the seven deciles immediately above it. This objective could be met by using state resource incentives to supplement additional revenues raised by poor school

districts. The second, and far more challenging, issue would be increasing all deciles to the level of the wealthier deciles. Achieving this objective would be far more expensive.[13]

Another important finding relates to the vertical equity of the system. The equity of the system changes very slightly for the worse when student counts were weighted by student needs, which implies that the funding disparities were not attributable to meeting the special needs of at risk students. This finding suggests that the state might want to consider new ways of providing funds to school districts in order to help them meet the needs of their neediest students.

In summary, Maine designed a school funding system that provides districts with an equitable resource distribution, as revenues are computed by the system. However, the differential ability of districts to raise funds above what the system requires has reduced the fiscal neutrality and the equity of the system. The funding disparities appear to be based more on fiscal capacity than student needs.

SUMMARY OF RESULTS

Our equity analysis focuses on three main issues: the extent to which education revenues are related to property and/or income wealth, the equality of education revenues across districts, and the extent to which differences in education funding relate to the needs of students. The analysis shows that EPS revenues in Maine have tended to be related to wealth very weakly (at an acceptable degree under standard school finance equity benchmarks), but that local revenues above the EPS amount strengthens the relationship between wealth and revenue somewhat. In technical language, we find that the base Maine school funding system was fiscally neutral, but the addition of local revenues made the system somewhat less neutral, although better than similar measures find for most other states.

The equality of revenues in Maine remained consistent over the years covered in the study. The EPS portion of the funding system consistently met the accepted benchmarks of equality, but the addition of local revenues above the EPS added a small degree of inequity to the system.

The inequities in the system did not appear to be related to student needs. The equality of funding in the Maine school funding system, accounting for student differences, was similar to the overall equality of funding. Again, the inclusion of local funding above the EPS decreased the equity of the system as considered in this manner.

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[13] It would be possible to achieve equity by lowering revenues to wealthy districts. However, doing so would violate the proposition that equity should be achieved by raising the quality of education provided to students, rather than lowering the quality of education.

CHAPTER 5: ANALYSIS OF MAINE'S TRIBAL FUNDING

INTRODUCTION

This chapter reports on funding for Maine's tribal schools, responding specifically to the portion of the RFP asking for analysis of:

> The various ways that other states provide for the funding of tribal schools, including but not limited to, the interaction of the state's school funding system with federal funding provisions for tribal schools and the advantages and disadvantages of those approaches

In addition to looking at other states' funding of tribal schools, this chapter addresses how federal funds for Indian students not in tribal schools are accessed and used in other states. First, we describe different federal tribal school and Indian education funding streams. Second, we look at how Maine's tribal schools are funded and what other federal Indian education funding is being spent on Indian students in Maine who are not in the tribal schools. We then describe how tribal schools are (or are not) included in other states' funding systems, and also how other states use federal Indian education funding for students not in tribal schools. Finally we look at how Maine compares with these other states and discuss what Maine might do differently.

FEDERAL INDIAN EDUCATION FUNDING SOURCES

There are several primary federal Indian education funding streams. These include U.S. Department of the Interior Bureau of Indian Education funds for tribal schools, U.S. Department of the Interior Bureau of Indian Affairs Johnson O'Malley funds, U.S. Department of Education Elementary and Secondary Education Act Title VII Indian Education funds, and federal Impact Aid.

Tribal Schools Funding

The Bureau of Indian Education (BIE) within the U.S. Department of the Interior administers Federal funding for tribal schools. Across the country, the BIE funds facilities on 64 reservations in 23 states, including 123 grant schools and 3 contract schools controlled by tribes, and 57 schools directly operated by the BIE. About 42,000 students are enrolled in these schools. The BIE-operated schools are generally outside of state public schools systems, though they may fall under state standards and assessment requirements (USDOI, 2013). BIE contract and grant schools are generally on or near reservations and are operated by tribes. All BIE contract and grant schools receive funding to implement a Title I School-wide Program. These schools also typically receive Title II-A professional development funding, 21st Century Community Learning Center funds, federal special education monies, Title X McKinney Vento-Homeless Assistance Act funding, and Family and Community Engagement (FACE) funding. Title VII Indian Education formula grants are also awarded to BIE-funded tribal schools (Steve Nelson, Education Northwest, personal communication, December 18, 2012; USDOE, 2007).

Johnson-O'Malley

Johnson-O'Malley (JOM) funds are distributed to tribes as part of the U.S. Department of the Interior Bureau of Indian Affairs Tribal Priority Allocation (TPA) block grant. JOM initially was the mechanism by which the Federal government funded programs for educating Indian students in public schools, providing academic and remedial services and other programs. After the development of the Impact Aid program (see below), JOM funding was reduced and redirected to special programs for Indian students, instead of general operating funds. JOM funding has not increased in over a decade and a half; funds are allocated based on student enrollment counts that have not been updated since 1995. However, per a U.S. House of Representatives Report accompanying the Department of the Interior FY 2012 appropriations, a count of JOM-eligible students is currently underway. Eligible students must be enrolled members of a Tribe or recognized as eligible for BIE services and have at least ¼ degree of Indian blood. Any state, district, tribal organization or Indian corporation is eligible to apply for a contract to provide supplemental or operational support programs. These funds can also be used to cover Indian students residing in Federal boarding facilities and attending public school in a state other than their home state (Bureau of Indian Education, 2012; Mid-Continent Comprehensive Center, n.d., National Johnson-O'Malley Association, 2009)

Title VII Indian Education Funds

Title VII Indian Education funds are formula grants from the U.S. Department of Education (DoE) provided to school districts and BIE-funded or operated schools based on the number of Indian students and the state's per pupil expenditures as part of the Elementary and Secondary Education Act of 1965. Districts must have at least ten identified Indian children, or at least 25% of the district's total enrollment must be indigenous (these children do not need to be enrolled in a tribe, only identified as being American Indian or Alaska Native). Title VII Demonstration Grants are awarded on a competitive basis to state education agencies, local educational agencies, Indian tribes and certain BIA schools, and can be used for a variety of activities including early childhood education, special health and nutrition services, career preparation partnerships and family literacy services. Postsecondary institutions can receive professional development grants in partnership with tribal organizations (USDOE 2007, USDOE 2004).

Impact Aid

The Federal Impact Aid program provides funds to local school districts whose boundaries encompass lands that are owned by the Federal Government or removed from local tax rolls, including Indian lands. The Impact Aid Law is now Title VIII of the No Child Left Behind Act of 2001, and the funds are administered by the U.S. Department of Education. Impact Aid is considered general funds which districts may use as they choose, though some Impact Aid funds must be used for specific purposes (USDOE, 2008).

Districts receiving funds for students living on Indian lands must consult with parents and tribes of the children about the education provided and to ensure these children receive equal educational opportunities. These students receive a higher weight in the federal Basic Support Payments formula for federally connected students, the mechanism by which the U.S. DoE

determines how to allocate this funding; school districts are eligible to receive Basic Support Payments if at least 400 of their students, or 3 percent of their enrollment, are federally connected. Federal Impact Aid has not been fully funded in recent years. (USDOE, 2012).

FEDERAL FUNDING OF INDIAN EDUCATION IN MAINE

Tribal School Funding

Maine has three tribal schools that receive funding from the Bureau of Indian Education, directly serving students in grades K-8:

- Pleasant Point (Beatrice Rafferty) School, a BIE Contract Day School
- Indian Island School, a BIE Grant Day School
- Indian Township School, a BIE Contract Day School

The three tribal schools fall under "Maine Indian Education," (MIE) which functions as a tribal school district serving the three federally recognized reservation communities in the state. Each school has its own principal and school board; all three are under the supervision of one Superintendent. Once students graduate from the tribal schools, they attend Maine high schools, fully funded by EPS through vouchers managed by MIE. No BIE funding follows those students to high school (Superintendent Ronald Jenkins, personal communication, January 25, 2013).

In FY 2012, Beatrice Rafferty School (aka Pleasant Point) enrolled 109 K-8 students and provided vouchers to 41 9-12 students. Indian Island served 120 K-8 pupils and supported 28 9-12 students, and Indian Township enrolled 132 K-8 students and managed vouchers for 53 9-12 pupils. Thus in total, for FY 2012 these schools were responsible for educating 483 students – 361 K-8 students and 122 9-12 students.

In addition to BIE funding for the K-8 programs, each of these schools receives Federal Impact Aid, Title VII Indian Education funds, Special Education and Title I funds from the BIE, and 21st Century Community Learning Center grants. The schools also receive State of Maine Essential Programs and Services Funding (EPS). Between 40 and 47% of the schools' funding is from the BIE, 28-37% of the schools' funding is from the State of Maine, and the remainder is mostly from the U.S. Department of Education, with a small reserve from prior years and in one case Head Start funding (see Table 5.1).

Table 5.2 shows that per pupil revenues for the three MIE schools in FY 2013 is substantially higher than the average per pupil revenue for Maine's SAUs. Specifically the three schools receive over $27,000 per pupil with one school, Pleasant Point receiving over $34,700 in per pupil revenues in FY 2013. Understanding of the revenues allocated to each student is complicated by the fact that high school students are educated in Maine high schools funded through vouchers that are part of the state EPS funding. If the receiving high school tuition more closely parallels the funding levels of other Maine high schools, funding for K-8 students may be substantially above the figures presented in Table 5.2. We suggest this detailed information be collected and analyzed in Part 2 of this study.

Table 5.1 Maine Indian Education Schools Budget Summaries & Budget Projections for 2013

		FY 2011 Actual	FY 2012 Budget	FY 2013 Projected	% of Projected
Pleasant Point School (Beatrice Rafferty School)					
Revenue Source	Bureau of Indian Affairs	$2,263,369	$2,168,720	$2,130,487	40.60%
	State of Maine	$1,655,780	$1,805,698	$1,806,646	34.40%
	US Department of Education	$498,593	$570,700	$578,300	11.00%
	Banks and others	$22,500	$22,000	$22,000	0.40%
	Head Start	$280,855	$259,800	$265,000	5.10%
	Left over from Last Year	$245,167	$262,361	$443,928	8.50%
	Total Revenues	**$4,966,265**	**$5,089,279**	**$5,246,361**	**100.00%**
Indian Township School					
Revenue Source	Bureau of Indian Affairs	$2,600,024	$2,367,645	$2,452,394	44.20%
	State of Maine	$1,910,951	$2,111,340	$2,049,610	37.00%
	US Department of Education	$677,810	$675,540	$698,193	12.60%
	Banks and Others	$72,874	$18,000	$21,500	0.40%
	Left Over from Last Year	$207,596	$150,006	$324,984	5.90%
	Total Revenues	**$5,469,255**	**$5,322,531**	**$5,546,681**	**100.00%**
Indian Island School					
Revenue Source	Bureau of Indian Affairs	$1,840,397	$2,036,438	$1,935,763	46.60%
	State of Maine	$1,066,862	$1,183,022	$1,177,322	28.30%
	US Department of Education	$492,631	$578,000	$503,200	12.10%
	Banks and others	$30,112	$19,100	$19,100	0.50%
	Carryover	$401,106	$366,056	$520,476	12.50%
	Total Revenues	**$3,831,108**	**$4,182,616**	**$4,155,861**	**100.00%**

Table 5.2 Per Pupil Revenue for Maine Indian Education Schools: FY 2013

	Resident (Subsidizable) Pupils			Total Revenues	Revenue Per
School	**K-8**	**9-12**	**Total**	**FY 2013**	**Resident K-12 Pupil**
Plesant Point	112	39	151	$5,246,361	$34,744
Indian Township	140	56	196	$5,546,681	$28,299
Indian Island	121	29	150	$4,155,861	$27,706

Note: Resident pupil count is based on October 2011 count per 279 forms

The mix of federal and state funding for the tribal schools is a result of the Maine Indian Claims Settlement Act of 1980, which states:

> Unless otherwise provided by federal law, in computing the extent to which the Passamaquoddy Tribe, the Penobscot Nation or the Houlton Band of Maliseet Indians is entitled to receive state funds for education under subsection 1, the state payment must be reduced by 15% of the amount of federal funds for school operations received by the respective tribe, nation or band within

> substantially the same period for which state funds are provided, and in excess of any local share ordinarily required by state law as a condition of state funding. A reduction in state funding for secondary education may not be made under this section except as a result of federal funds received within substantially the same period and allocated or allocable to secondary education. (Maine Indian Claims Settlement Act of 1980, p. 23)

Johnson O'Malley and Title VII funding outside of Maine Indian Education

There are two additional federally recognized tribes in the state that do not have reservations and are not served by Maine Indian Education. These are the Micmac and the Houlton Maliseet Band of Indians. The Houlton Band of Maliseet Indians are served by a Title VII program in Houlton run by SAD #29, while the Houlton Band's Education Department provides supplemental education services through Johnson O'Malley funding (Houlton Band of Maliseet Indians, n.d.). The Aroostook Band of Micmacs provides Title VII services in Presque Isle and Caribou, and also Johnson O'Malley supplemental education programs (Aroostook Band of Micmacs, n.d.).

INDIAN EDUCATION FUNDING IN OTHER STATES

There is no consistency in how states access, use and account for the funding they receive via the various federal Indian education funding streams. A survey of states around the nation, some of which have tribal schools, others of which serve their Indian students through Johnson O'Malley and Title VII funding, found most of the decisions around Indian education services and funding are made at the local district or tribal level, and there is almost no recognition in state budgets of the funds sent directly to tribal schools by the BIE. Below are several examples.

North Carolina

There are BIE-grant funded tribal day schools in North Carolina, collectively referred to as the Cherokee Central School, which includes an elementary, middle and high school. These schools are operated independently from the state. No BIE monies are exchanged or distributed to or through the state (Debora Williams, North Carolina Department of Public Instruction, personal communication, February 27, 2013).

Title VII federal funds to support Native American students are handled at the school or district level. Native American Advisory Boards are involved in determining which funds are applied for and how they are used to support Native American students in the public school system. Reporting on funds is portal controlled at the district level. Approximately 82% of the almost 21,000 students in North Carolina's public schools are in districts receiving Title VII-Indian Education funds (National Indian Education Association, 2011). However, these programs only serve students if parents opt for the services. Finally, there is one tribal charter school, the Haliwa Saponi Tribal School. As a public charter school it is state supported, and also receives Title VII funds.

New York State

There are no BIE-funded tribal schools in New York State. Schooling for American Indian students is fully funded by the State in the form of tuition, transportation and maintenance cost. Because Tribes are considered sovereign nations, New York State law mandates payment of a non-resident tuition rate. The State has tuition contracts with 13 public school districts, three reservation schools and four Boards of Cooperative Educational Services (BOCES) for students that live on nine Indian reservations; this includes transportation expenses. Districts receive supplemental services money to provide additional support for Native American students. Most districts in New York State receive school funds from local taxes. However, tribal lands cannot be taxed so the State pays the difference. Some tribes, such as the Oneida Indian Nation of New York, make voluntary contributions to local school districts in which they own land. (Adrian Cooke – Coordinator New York State Education Department Office of Native American Education, Personal Communication, February 26, 2013). Several tribes operate JOM-funded services; for example the Seneca Nation of Indians Department of Education works with the Gowanda Central School District to offer JOM Academic Assistance Services (Gowanda Central School District, 2013). As of 2011, Title VII programs in New York served over 4,600 students, approximately 35% of the state's K-12 indigenous population (National Indian Education Association, 2011).

Wisconsin

There are three BIE grant-funded schools operated by tribal entities in Wisconsin. BIE funds go directly to the schools and are entirely separate from the state budget; the state is not involved at all with tribal schools (Al Virnig, School Management Services, Wisconsin Department of Public Instruction, personal communication, February 27, 2013). Federal Impact aid in Wisconsin goes directly to schools and districts and does not appear in state budget reports (Bradley Adams, School Finance Services, Wisconsin Department of Public Instruction, personal communication, February 27, 2013). The level of impact aid is most significant in the Menominee Indian School District, a public school district located almost entirely on tribal lands. There are a number of JOM programs operated by tribes and districts throughout the state. The Menominee Indian Tribe operates a JOM program for its students in the district's public schools. The Ho-Chunk Nation serves students through JOM funds in sixteen Ho-Chunk communities. In 2011 Title VII Indian Education programs served almost 9,300 students in Wisconsin, over 70% of the state's K-12 American Indian population. Title VII funding was applied for by individual districts (National Indian Education Association, 2011).

Oregon

In Oregon there is one BIE-operated boarding school, and no tribal contract or grant schools. Twenty-nine of the 197 districts apply for Title VII funds. There is one Title VII competitive grant through Office of Indian Education, STEPS-State-Tribal Educational Partnership, which was applied for and received (Steve Woodcock, Education Specialist and Liaison to Oregon Tribes, personal communication, February 25, 2013).

There are tribal charter schools, but these are publicly funded and receive the same public funds as any other charter school in the state. Siletz Valley Charter School in Lincoln County School District is one of these. The school does receive supplemental funding direct from the Confederated Tribes of Siletz Indians, and also receives Title VII funds, which come through the District. Another charter school is the Nixyaawii Community School, which is located on the Confederated Tribes of the Umatilla Indian Reservation (Joe Novello, School Operations Administrator, Lincoln County School District, personal communication, March 1, 2013 and Sam Tupou, Principal Siletz Valley Charter Schools, personal communication, March 1, 2013).

The Confederated Tribes of Siletz Indians provide supplemental education programs in several districts through Johnson O'Malley funding, including the state's largest districts, Eugene, Portland and Salem.

Like Wisconsin, there are public schools located on tribal lands. Specifically, the Warm Springs Elementary School in Jefferson County School District is on Confederated Tribes of Warm Springs tribal land in a building that is owned by the Bureau of Indian Affairs. However, no funds are received from the BIE. The school is operated by the District, which pays for maintenance, upkeep and operations with state formula funding. Addition funding for the school comes from Impact Aid and Title VII. JOM services are provided via subcontract to the district from the Confederated Tribes. The district, BIA and tribe are negotiating a new agreement at this time with the Tribe and will be building a new school. This will be the third agreement over 30 or more years. Under the new agreement the Tribe and the District will lease the land from the BIA equally. The cost of building will be shared with the Tribe having 51% ownership (Martha Bewley, Chief Financial Officer, Jefferson County School District 509 J, personal communication, March 1, 2013).

Finally, Oregon has in place a statute enabling a school district to issue impact aid revenue bonds pursuant to an agreement between the school district board and the governing body of an Indian tribe whose reservation is located within the school district. The funds may be used to support capital improvements of the public school facilities on reservations, and for debt servicing (2011 Oregon Revised Statues, Vol. 9, Chapter 328).

Montana

In Montana, the BIE funds two tribal contract schools, and also operates one dormitory for students on the Blackfeet Reservation. The tribal schools are completely separate from the state schools in terms of funding, as are three Native language immersion schools (Montana Office of Public Instruction, 2013).

Montana funds Indian Education support services directly through the Indian Education for All program, and Indian Student Achievement Gap funding. Under Indian Education for All each district receives $20.40 per "Average Number Belonging" (ANB). As part of the American Indian Achievement Gap initiative school districts receive $200 extra for each American Indian student enrolled. (Montana Office of Public Instruction, 2011).

75 school districts receive over $38 million from Federal Impact Aid and the state has an extensive website to support districts interested in receiving this support. Title VII programs operate in most districts, serving over 13,500 students or over 80% of the state's K-12 Indian students in 2011. (National Indian Education Association, 2011). At least seven tribes across the state operate Johnson-O'Malley programs (Montana Office of Public Instruction, 2012).

HOW MAINE COMPARES AND RECOMMENDATIONS

With the exception perhaps of Montana, the tribal school and Indian education funding structures described above appear to be less a result of deliberate planning around the best way to address funding for Native American Children in each state, and more a result of individual tribal decisions, litigation outcomes, and federal funding requirements. None of the states we looked at closely had a funding structure similar to that of Maine, and in those with tribal schools, that funding was not at all reflected in state budget calculations or in any state budget documents. It is hard to assess advantages and disadvantages to the various approaches when there is little flexibility for the states in terms of the federal funding; they can only control their own state contributions if there are any (and few appear to be contributing to the tribal schools). It does not appear that any of the states see a reason to report federal funding for Indian schools when they have no control over the allocation and use of those funds.

It is important to note that the Maine Indian Claims Settlement Act of 1980 determines Maine's state funding structure for the Maine Indian Education tribal schools. This act mandated a particular relationship between the state and the federal funding for tribal schools. Other states also have unique fiscal relationships between state and tribal funding that are determined by other kinds of agreements; Oregon's agreement with the Confederated Tribes of Warm Springs is a distinct and particular arrangement. However, Maine's structure is codified in a legal agreement that would require federal as well as tribal agreement, to modify.

What Might Maine Do?

Aside from changing how tribal schools are funded, there are ways that districts in Maine could bring in more funds to support programs for indigenous students. First, the state could encourage districts to take advantage of available Title VII funds. As of 2010, there were 16 districts with between 10 and 20 American Indian students enrolled (not including those who identify as American Indian and another race under "two or more races"), only one of which we can confirm is receiving either Title VII or JOM funds. There are 13 districts with between 21 and 50 indigenous students (again, not including those who designate themselves as American Indian and another race), only 4 of which have JOM or Title VII-funded programs. Finally, of the five districts that enroll over 50 American Indian students, three are part of Maine Indian Education, while two, Calais and Bangor, are not. In particular, the growing number of Indian students in Bangor should be served, as well as those in Calais. Those districts could apply on their own or collaborate with one or more of the tribes in Maine; there is no requirement that the American Indians served under these funds be enrolled in any specific tribe.

Title VII Indian Education funding is supplemental funding from the U.S. Department of Education, and would not replace or diminish the funding the tribal schools receive from the

Bureau of Indian Education. Generally, schools receive about $300 per identified American Indian student, so it is not a large sum of money. However, in a district like Bangor, that could mean $20,000 toward support services for American Indian students (or more, depending on the race of the students self-identifying as mixed-race), which could be spent on a part-time counselor, or funding for cultural activities provided by tribal elders, a netbook for every student or any number of services that might improve student engagement, enhance student achievement or increase graduation rates. Districts with smaller numbers of Indian students could pool Title VII resources and share positions or jointly fund initiatives.

Likewise, districts could collaborate with tribes to extend services under Johnson-O'Malley funding, if the tribes were willing. These funds again are used for supplemental programs, and may not be used to supplant existing programs and services. There is not a requirement that students be enrolled in the tribe providing the services, just that they be eligible by the criteria described above. In Anchorage, Alaska, Cook Inlet Tribal Council serves any American Indian or Alaska Native student in their Johnson-O'Malley programs in Anchorage, regardless of their enrolled tribe, so long as they are eligible for the services. This may not be financially viable under the current JOM funding scheme, but it appears that the program may be revived and expanded. The state and its tribes should monitor the efforts to increase JOM funding at the national level and make sure that accurate counts of eligible children are provided to the Bureau of Indian Affairs.

The other decision the state needs to make is whether or not to do something different for those students that move from the tribal school system into the Maine public school system for high school. Has anyone tracked those students to see how they do in terms of achievement and graduation rates? Do some high schools appear to serve these students better than others? Would there be any value to developing targeted services for those students specifically or even to creating a secondary tribal school program, perhaps a school-within-a-school for some of these students. This is an area that needs further investigation.

In summary, our analysis of Tribal funding issues reaches the following conclusions:

- The three Maine Indian Education schools appear to receive total per pupil revenues that are substantially higher than the state average funding level.
- The mix of state and federal funding for the tribal schools in Maine is set by the Maine Indian Claims Settlement Act of 1980. It would require tribal and federal agreement to modify the Act.
- Most Maine school districts that are eligible for Title VII funds (districts serving 10 or more American Indian/Alaska Native students) do not receive the funds. Districts could apply for these moneys, generally about $300 per student, which are supplemental and can be used for a broad array of approaches to support indigenous students.
- The state of Maine should decide whether or not to provide a different set of options for secondary students exiting the tribal schools, depending on whether there is evidence about whether these students are succeeding in high school.
- The Committee may want to study spending patterns in the tribal schools more closely.

CHAPTER 6: COMPARATIVE ANALYSIS OF MAINE'S ESSENTIAL PROGRAMS AND SERVICES TO AN EVIDENCE-BASED ADEQUACY MODEL

In order to assess the core elements of the Essential Programs and Services (EPS)—the basis of the Maine school funding system—this comparative analysis views each core element through the lens of the Evidence-Based (EB) approach.[14] We have concluded that the formulas in the EB approach are adequate for schools to provide every student in Maine a comprehensive education program that covers the seven learning areas of English Language Arts, Mathematics, Science, Social Studies, the arts, world language, and health and physical education. To the extent that the EPS core elements are aligned to the EB formulas, ratios and numbers, state policymakers can be assured that schools have the resources necessary to provide this opportunity to all students. We also note that the EB approach includes such programs as career and technical education, gifted and talented services including Advanced Placement courses and co curricular activities, and programs not directly included in the EPS at the present time. As the following analyses show, in some areas the EB and EPS approaches are similar, but in others there are larger differences. Analysis of Maine's school funding system requires consideration of the voter-established goal of having the state fund 55% of the EPS computed funding level each year. Our framework is not designed to ascertain what the relative state/local share of overall funding should be because we view adequacy models like EPS and EB as estimates of the resources needed. Moreover, although both models include compensation costs such as educator retirement, social security, health care, how they are funded (by the state or by local districts) can impact the state share of total funding as well.

In the second phase of this study, we will develop a cost model to estimate the revenues needed to meet the components of the EB model and compare that to current EPS funding. A major part of that work will be interactive sessions with the Committee to ascertain their views as to whether the components we propose in the EB should be included in Maine's definition of a comprehensive education system as called for in the Resolve establishing this study. Once the funding level is determined, it will be possible to discuss the implications of different state/local distributions of total system funding.

THE EVIDENCE BASED APPROACH

A discussion of how the components of the EPS are computed is included in Chapter 2 of this report. Here we describe how the EB estimates adequate levels of resources for schools. The 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 their individual and collective 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 the needs of prototypical elementary, middle and high schools. School resources are added to the resources and staffing needs for the central office staff, including maintenance and operations. The final step involves aggregating the cost of all school- and district-level elements to a total statewide cost.

[14] This analysis draws heavily from Allan Odden and Lawrence O. Picus, *School Finance: A Policy Perspective, 5th Edition,* New York: McGraw Hill (2014).

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

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 meta-analyses of these kinds of research
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)

EB elements are organized into six (6) general categories:

A. Student counts, preschool, full-day kindergarten and school size
B. Staffing for the core programs
C. Additional staff for students with extra needs, such as special education, tutors, etc.
D. Additional staffing and resource needs, such as pupil support professionals, librarians, administrators, instructional materials, etc.
E. District resources, including central office staff, operations and maintenance[15]
F. Regional adjustments factors

Table 6.1 provides a summary of the comparison between Maine's EPS and the EB approach. Each element will be fully explained in the following sections. It is important to note that the EB approach relies on prototypical schools to allocate many resources. A prototypical elementary (K-5) school has 450 students (five classes of 15 students each in grades K-3 and 3 classes of 25 each in grades 4 and 5). A prototypical middle school has 450 students (150 students per grade) and a prototypical high school, 600 students (150 students per grade). For computing district level resources the EB uses a prototypical district of 4 elementary, 2 middle and 2 high schools with a total of 3,900 students. In general, resources allocated to actual schools are prorated based on the enrollment of each school if the formulas are used to resource each school in a state. An alternative approach is to use the EB formulas to determine a unique foundation level for each district, the approach Maine has been taken since adopting the EPS system.

[15] The report does not address transportation, food services, security or debt costs.

Table 6.1 Comparison of Maine EPS and Evidence-Based Model

	Element		Elementary		Middle School		High School	
			EB Model	Maine EPS	EB Model	Maine EPS	EB Model	Maine EPS
		School Configuration	K-5	K-5	6-8	6-8	9-12	9-12
Student Counts, Preschool, Kindergarten and School Size	A.2	Preschool	15:1 Ratio	Counted as full-day Kindergardent Students				
	A.3	Full Day Kindergarten	15:1 Ratio					
	A.4	School Size	450 pupils		450 pupils		600 pupils	
Adequate Staffing for the Core Programs	B.5	Class size for core teachers	Grades 1-3: 15 Grades 4-5: 25		25		25	NA
	B.6	Elective teachers	20% more than core		20% more than core		33% more than core	
	B.7	Instructional Coaches	1 per 200 pupils	$24 per pupil	1 per 200 pupils	$24 per pupil	1 per 200 pupils	$24 per pupil
		Core, elective and coach staffing ratio	1 to 13.45	1 to 17	1 to 18.87	1 to 16	1 to 17.1	1 to 15
Staffing for Extra Student Needs	C.8	Disadvantaged students		0.15 weight on SAU Per pupil		0.15 weight on SAU per pupil		0.15 weight on SAU per pupil
		Tutors	1 per 100 FRL pupils		1 per 100 FRL pupils		1 per 100 FRL pupils	
	C.9	Extended Day	1 per 120 FRL pupils times 0.25		1 per 120 FRL pupils times 0.25		1 per 120 FRL pupils times 0.25	
	C.10	Summer School	1 per 120 FRL pupils times 0.25		1 per 120 FRL pupils times 0.25		1 per 120 FRL pupils times 0.25	
	C.11	ELL(EB) or LEP(Maine)	1 per 100 LEP pupil	Weight Based on SAU Enrollment <15 = 0.7; 16-250 = 0.5; 251 or more = 0.525	1 per 100 LEP pupil	Weight Based on SAU Enrollment <15 = 0.7; 16-250 = 0.5; 251 or more = 0.525	1 per 100 LEP pupil	Weight Based on SAU Enrollment <15 = 0.7; 16-250 = 0.5; 251 or more = 0.525
	C.12	Special Ed: Mild & Moderate	1 teacher & 0.5 aide per 150 regular pupils	Weight of 1.27 plus adjustments for small districts	1 teacher & 0.5 aide per 150 regular pupils	Weight of 1.27 plus adjustments for small districts	1 teacher & 0.5 aide per 150 regular pupils	Weight of 1.27 plus adjustments for small districts
		Special Ed: Severe	100 % state funded minus Fed Title IVb		100 % state funded minus Fed Title IVb		100 % state funded minus Fed Title IVb	
	C.13	Gifted and Talented	$25 per regular pupil		$25 per regular pupil		$25 per regular pupil	
	C.14	Career and Technical	$9,000 per CTE teacher		$9,000 per CTE teacher		$9,000 per CTE teacher	
Additional Staffing and Resource Needs	D.15	Substitute Teachers	5% of all teachers	$36 per pupil	5% of all teachers	$36 per pupil	5% of all teachers	$36 per pupil
	D.16	Counselors	1 per 450	1 per 350	1 per 250	1 per 350	1 per 250	1 per 250
		Nurses	1 per 750		1 per 750		1 per 750	
		Additional Pupil support	1 per 100 FRL students		1 per 100 FRL students		1 per 100 FRL students	
	D.17	Instructional Aides		1 per 100 pupilsK-5 and 1 per 15 pupils for Pre-K classrooms		1 per 100 pupils	None	1 per 250 pupils
		Supervisory Aides	1 per 225 pupils		1 per 225 pupils		1 per 200 pupils	None
	D.18	Librarians	1 per 450 pupils	1 per 800 pupils	1 per 450 pupils	1 per 800 pupils	1 per 600 pupils	1 per 800 pupils
		Library Techs	None	1 per 500 pupils	None	1 per 500 pupils	None	1 per 600 pupils
	D.19	Principal	1 per 450 pupils	1 per 305 pupils	1 per 450 pupils	1 per 305 pupils	1 per 600 pupils	1 per 315 pupils
		Assistant Principal					1 per 600 students	None
	D.20	School Clerical	1 per 225 pupils	1 per 200 pupils	1 per 225 pupils	1 per 200 pupils	1 per 200 pupils	1 per 200 pupils
	D.21	Professional Development	a. Instructional Coaches		a. Instructional Coaches		a. Instructional Coaches	
			b. Collaboration time		b. Collaboration time		b. Collaboration time	
			c. 10 days of pupil free time for training		c. 10 days of pupil free time for training		c. 10 days of pupil free time for training	
			d. $100 / pupil for training	$57 / pupil	d. $100 / pupil for training	$57 / pupil	d. $100 / pupil for training	$57 / pupil
	D.22	Computer Technologies	$250 / pupil	$95 / pupil	$250 / pupil	$95 / pupil	$250 / pupil	$288 per pupil
	D.23	Instructional Materials & Assessments	$170 / pupil	$377 / pupil	$170 / pupil	$377 / pupil	$205 / pupil	$466 / pupil
	D.24	Student Activities	$250 / pupil	$33 / pupil	$250 / pupil	$33 / pupil	$250 / pupil	$111 / pupil
District Resources	E.25	Central Office		$215 / pupil		$215 / pupil		$215 / pupil
	E.26	Operations and Maintenance		$986 / pupil		$986 / pupil		$1,172 / pupil
Regional Adjustment Factor	F	Regional Adjustment Factor	Hedonic or Comparative Wage Index	Comparative Teacher Salaries	Hedonic or Comparative Wage Index	Comparative Teacher Salaries	Hedonic or Comparative Wage Index	Comparative Teacher Salaries

A. STUDENT COUNTS, PRESCHOOL, KINDERGARTEN AND SCHOOL SIZE

This section includes discussion of four elements: pupil counts for the state aid formula, preschool, full day kindergarten and school size. These elements serve to set the stage for the rest of the analysis 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 State Aid

Current Maine Policy	Evidence-Based Model
Maine's EPS calculations use two different pupil counts, *attending* pupil counts and *subsidizable* or resident pupil counts for each district.	The EB approach supports Maine's use of the enrollment count of attending pupil for the aid formula.

Attending pupil counts are used to determine the EPS funding rate for elementary and secondary students. • They are based on the average April and October attending counts for the previous calendar year (for example, attending pupils for the 2012-13 fiscal year are computed as the average of the April and October 2011 attending counts). • To compute the per pupil unit allocation, the attending pupil counts are disaggregated by K-5, 6-8, and 9-12 for calculation of EPS determined staffing ratios, which vary by position and grade-level grouping. The K-8 pupil count includes 4-year olds (4YO), pre-kindergarten (Pre-K) and kindergarten students, all counted as 1.0 regardless of whether they attend a full or half day program. For non-staff costs, ratios and resources are determined separately for K-8 (including 4YO and Pre-K) and 9-12. • They include: (1) students from the local school district attending schools in the local school district, plus (2) students from outside the school district who are tuitioned-in from other school districts. *Subsidizable* or resident pupil counts are used to determine the distribution of funds. • They are computed separately for K-8 and 9-12 students and as the average of the three previous years' April and October enrolled pupil counts or the total October count for the previous year, whichever is greater. For example, for 2012-13, the subsidizable pupil count is the average of the April and October counts for 2009, 2010 and 2011, or the subsidizable pupil count in October 2011. • When computing each district's EPS	In addition, the EB approach would use the greater of a rolling three-year average pupil count (e.g., from CY 9, 10 and 11 for FY12-13 aid) or the actual (CY 11) pupil count for SAUs, which addresses both declining, stable or rising student counts. The EB approach would use the same pupil count for all elements of the funding system – determining property wealth per pupil, calculating state aid, counting the number of students in a school and school district, and calculating other aid elements.

funding total, computations are based on K-8 and 9-12 student groupings.	

Analysis and Evidence

Most states count students on some type of Full Time Equivalency basis (FTE) as applied either to enrollment, average daily membership (ADM) or average daily attendance (ADA). The EB approach recommends an FTE enrollment (the current Maine approach) or ADM count so that the aid system provides funding for all students in the district, even if they have intermittent attendance, which often requires additional rather than fewer services.

There are two additional issues a state needs to address in determining the pupil count. The first is whether to use a resident or attendance count of students, and the second is whether to use a multiple-year average student count to cushion the loss of aid when enrollments decline. With regard to the first of these, the growing popularity of choice programs (both within and across school district boundaries), and in states like Maine where many districts have some of their students educated in other districts, using counts of resident students complicates state aid calculations, particularly if an additional administrative system is needed to transfer dollars among districts to cover the costs of students who choose to attend school in a district other than the one in which they reside. The easiest way to address this issue is to count each student in the school (and district) attended. This ensures the dollars follow each student and eliminates the need for a potentially expensive and complicated administrative system for tracking funds across districts to accommodate school choice.

The second issue has to do with the fiscal impact of declining student enrollments, something that has impacted many Maine school districts in recent years. Reduced enrollments lead to lower pupil-based revenues, reductions that are often hard to accommodate in the short term. To help districts deal with enrollment declines, a common approach is to use a three-year rolling average student count. This approach was recommended by Cavin, Murnane & Brown (1985) in a Michigan study. However, a rolling three-year average was generally not intended for use in all schools, especially those schools experiencing enrollment growth. Schools with rising enrollments should be able to use their actual student count so they have the resources to expand educational services as they grow in students.

We recognize that a system that provides a “soft landing” for districts with declining enrollment, but also recognizes new enrollments as they occur, has the potential for creating “phantom” students; students who leave the state or enroll in another Maine district will be counted as a portion of a student in the district they leave until the three year average cycles through and as one student in their new district if they remain in the state. But we believe this is the approach to recognize the fiscal challenges districts face with declining student counts.

A.2 Preschool

Current Maine Policy	Evidence-Based Model
Preschool children are included in the regular K-5 and K-8 pupil counts at a teacher staffing ratio of 1 to 17 and an aide (educational technician) ratio of 1 per 90 students. All other resources are provided at the same level as for all elementary school students. Maine also provides an additional weight of 0.1 for K-2 students, which include the 4-year-old and preschool counts. Enrolled, four-year-olds (4YO) and Pre-K (PK) students are included in this count as 1.0 attending pupil, even if enrolled less than full time.	1 FTE teacher and 1 FTE instructional aide (education technician) position for every 15 preschool students. These staff FTE are added to the core teacher counts (Element B.5) and then used to generate elective teacher positions, professional development, pupil support and other school wide resources, as discussed below. This allows elementary schools to fully integrate the preschool program into the school, and to create an early childhood teacher team of PK, K and grade 1 and 2 teachers.

Analysis and Evidence

Research shows that high quality preschool, particularly for students from lower income backgrounds, significantly affects future student academic achievement as well as other desired social and community outcomes (Barnett, 2011; Camilli, et. al., 2010; Reynolds, et al., 2001, 2011; Schweinhart et al., 2005). Longitudinal studies show that students from lower income backgrounds who experience a high quality, full-day preschool program perform better in learning 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. The research shows that 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 addition, a 2003 study of state-funded pre-school programs in six states – California, Georgia, Illinois, Kentucky, New York and Ohio – found, that children from lower income families start catching up to their middle income peers when they attend a pre-school program (Jacobson, 2003). A 2007 study showed that preschool programs in New Jersey's urban districts had not only significant short-term cognitive and social impacts, but also long term, positive impacts on students who enrolled in them, closing the achievement gap by 40 percent in second grade for a two year preschool program (Frede, Jung, Barnett et al., 2007).

High quality preschool, offered for a full day and taught by fully certified and trained teachers using a rigorous but appropriate early childhood curriculum can provide initial effects of 0.9 standard deviation that fall to 0.45 in later primary years. The impact falls in latter elementary years largely because of extra supports provided by compensatory education programs that enhance performance of children who did not have preschool experiences. By themselves, preschool programs can reduce achievement gaps linked to race and income by half. Furthermore, there is increasing recognition that preschool should be provided for all students.

Research shows that this strategy produces significant gains for children from middle class backgrounds and even larger impacts for students from lower income backgrounds (Barnett, Brown & Shore, 2004).

Preschool impact is linked to quality and quality is largely a function of staff (Camilli, et al., 2010; Whitebrook, 2004). Therefore, 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. 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.

Given these research findings, the EB model supports full-day preschool for 3 and 4-year-olds, at least for children from families with an income at or below 200 percent of the poverty level.

A.3 Full Day Kindergarten

Current Maine Policy	Evidence-Based Model
Kindergarten students are counted as 1.0 attending pupils, even if enrolled in a part day kindergarten program (something that is highly unusual in Maine today).	Kindergarten students are counted as 1.0 students for the state aid formula. The staff FTE these students generate are added to the core teacher counts (Element B.5) and then used to generate elective teacher positions, professional development, pupil support and other school wide resources, as discussed below.
Analysis and Evidence	
Research shows that full-day kindergarten, particularly for students from low-income backgrounds, has significant, positive effects on student learning in the early elementary grades (Gullo, 2000; Slavin, Karweit & Wasik, 1994). Fusaro's (1997) late 1990s meta-analysis of 23 studies comparing the achievement effect of full-day kindergarten to half-day kindergarten programs, found an average effect size of +0.77, which is quite substantial. Children participating in full-day kindergarten programs do better in learning the basic skills of 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).	

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 in the state aid formula.

A.4 School Size for Purpose of Estimating Resources

Current Maine Policy	Evidence-Based Model
Resources are allocated to SAUs on the basis of enrollment ratios and no prototypical school sizes are in current use. Note: The EPS system was initially developed using a set of prototypical school units of: • 250 student K-5 elementary schools • 400 student 6-8 middle schools • 500 student 9-12 high schools	To indicate the relative level of resources in schools, we recommend prototypical school units of: • 450 student K-5 elementary schools (If PK students are included, they are added to this total based on the number served) • 450 student 6-8 middle schools • 600 student 9-12 high schools Most resources are estimated at the school level and then aggregated up to the district level. A prototypical district size is also identified below (Element E.25) in order to estimate district resources.
Analysis and Evidence	
School sizes differ substantially within and across all states. No states have a specific school policy on school size, though some – including Maine (in the past), New Jersey and Wyoming – have prototypical schools sizes for developing and/or operating their funding formula, and many others include "ideal" size configurations for different levels of schools in their facility guidelines. Research on school size is clearer than research on class size. 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. The research generally shows that 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). 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.	

Related analyses, moreover, found that the expected cost savings from school and district consolidation programs that have been implemented have not been realized (Guthrie, 1979; Ornstein, 1990) and that consolidation might actually harm student performance in rural schools (Sher & Tompkins, 1977) as well as have broad negative effects on rural communities (Coeyman, 1998; Seal & Harmon, 1995).

In more recent reviews of scale economies and diseconomies and potential cost savings from consolidation, Andrews, Duncombe & Yinger (2002) and Duncombe and Yinger (2010) found that the optimum size for elementary schools was in the 300-500 pupil range, and for high schools was in the 600-900 range. Both 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.

The EB approach starts by identifying resources for prototypical elementary, middle and high schools with enrollments of 450, 450 and 600 respectively. It uses this approach and these prototypes to indicate the relative level of resources in schools. These prototypical school sizes reflect research on the most effective school sizes, although in reality few schools are exactly the size of the prototypes. As a result, the general formulas are designed, as is Maine's current EPS system, in a way that they can be proportionately reduced or increased based on how a school's enrollment compares to the prototypical models. The model also can be used to estimate a district level revenue 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 Maine needs to replace all school sites with smaller (or larger) buildings.

The EB model also makes adjustments for districts and schools with enrollments much smaller than the above prototypes, down to districts with 97 or fewer students (See Table 6.12).

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, elective teachers, and instructional coaches.

B.5 Core Teachers/Class Size

Current Maine Policy	Evidence-Based Model
Staffing ratios for teachers, which includes both core and elective subject teachers, are: • 17 to 1 for elementary schools* • 16 to 1 for middle schools	Staffing ratios for **core teachers** are: • 15 to 1 for grades K-3 • 25 to 1 for grades 4-12

• 15 to 1 for high schools Maine's staffing ratios do not explicitly address the issue of class size or the mix of core and elective teachers. *A weight of 0.1 for K-2 students has the effect of decreasing that ratio slightly depending on the number of K-2 students in a district.	Core teachers are defined as the grade-level classroom teachers in elementary schools and the core subject (e.g., mathematics, science, language arts, social studies and world language including such subjects taught as Advanced Placement in high schools) teachers in middle and high schools. Elective teachers are discussed in the next section (Element B.6). Additional teacher resources for specific student needs are also discussed below (Elements C8-C14).

Analysis and Evidence

In staffing schools and classrooms, the most expensive decision superintendents and principals make is on class sizes.

The gold standard of educational research is randomized controlled trials, which provide scientific evidence on the impact of a certain treatment (Mosteller, 1995). Thus, the primary evidence on the impact of small classes today is the Tennessee STAR study, which was a large scale, randomized experiment of class sizes of approximately 15 compared to a control group of classes with approximately 24 students in kindergarten through grade 3 (Finn and Achilles, 1999; Word, et al., 1990). The study found that students in the small classes achieved at a significantly higher level (effect size of about 0.25 standard deviations) than those in regular class sizes, and that the impacts were even larger (effect size of about 0.50) for low income and minority students (Finn, 2002; Grissmer, 1999; Krueger, 2002). 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).

Subsequent research showed that 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). 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).

Although some argue that the impact of the small class sizes is derived primarily from kindergarten and grade 1, Konstantopoulos and Chung (2009) found that 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. They concluded that the full treatment – small classes in all of the first four grades – had the greatest short and long term impacts.

While differences in analytic methods and conclusions characterize some of the debate over class size (see Hanushek, 2002 and Krueger, 2002), we side with those concluding that class size does make a difference, but only class sizes of approximately 15 students with one teacher (and not

class sizes of 30 with an aide or two teachers) and only for kindergarten through grade 3.

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. Thus, we look for evidence on the most appropriate secondary class size from typical and best practices to make a decision on class sizes for these grades. First, the national average class size in middle and high schools is about 25. Second, nearly all comprehensive school reform models are developed on the basis of a class size of 25 (Odden, 1997a; Stringfield, Ross & Smith, 1996), a conclusion on class size reached by the dozens of experts who created these whole-school design models. Although many professional judgment panels in other states have recommended secondary class sizes of 20, none cited research or best practices to support such a proposal.

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, there is other research today that produced more ambiguous conclusions. However, they also note that the other research includes class size reductions in grades above K-3 and "natural experiments" rather than randomized controlled trials. They also conclude that 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."

B.6 Elective Teachers and Preparation Time/Collaborative Professional Development

Current Maine Policy	Evidence-Based Model
Staffing ratios for teachers, which includes both core and elective subject teachers, are: • 17 to 1 for elementary schools • 16 to 1 for middle schools • 15 to 1 for high schools The Maine system does not address specific staffing ratios for elective versus core teachers. As a result, the amount of time that teachers have for planning and preparation are not overtly addressed in the current structure.	Resources for elective teachers are provided in addition to the number of core teachers, at the following rate: • 20 percent for elementary teachers • 20 percent middle school teachers • 33 percent high school teachers We define elective teachers as all teachers for subject areas not included in the core. For example, art, music, physical education, health, and career and technical education, etc. Core teachers are discussed in the previous section (Element B.5). Additional teacher resources for specific student needs are also discussed below (Elements C8-C14).
Analysis and Evidence	
In addition to the core subjects addressed above, schools need to provide a solid well rounded curriculum including art, music, library skills, career-technical and physical education.	

Teachers also need some time during the regular school day to work collaboratively and engage in job-embedded professional development. Providing every teacher one period a day for collaborative planning and focused professional development requires an additional 20 percent allocation for elective teachers. Using this elective staff allocation, every teacher – core and elective – would teach 5 of 6 periods during the day, and have one period for planning, preparation and collaborative work. One of the most important elements of effective collaborative work is team-focused data-based decision making, using student data to improve instructional practices, now shown to be effective by a recent randomized control trial (Carlson, Borman & Robinson, 2011).

The 20 percent additional staff is adequate for elementary and middle schools, but a different argument can be made for high schools. If the goal is to have more high school students take a core set of rigorous academic courses, and learn that material at a high level of thinking and problem solving, one could argue from cognitive research findings (Bransford, Brown and Cocking, 1999; Donovan & Bransford, 2005a, 2005b, 2005c) that a block schedule that allows for longer class periods is a better way to organize the instructional time of the school. Typical block scheduling for high schools would require elective teachers at a rate of 33 percent of the number of core teachers, so the school can create a schedule with four 90-minute blocks where teachers provide instruction for three of those 90-minute blocks and have one block – or 90 minutes – for planning, preparation and collaboration each day. This type of block schedule could be operated with students taking four courses each semester attending the same classes each day, or with students taking eight courses each semester while attending different classes every other day. Such a schedule could also entail a few "skinny" blocks (45 minute periods) for some classes. Each of these specific ways of structuring a block schedule, however, would require an additional 33 percent of the number of core teachers to serve in the role of elective teachers to provide the regular teacher with a "block" for planning, preparation and collaboration each day.

In totaling the core plus the elective teachers from the recommendations above, the total teaching staff is 31.2 for the prototypical 450 FTE elementary, 21.6 for the 450 FTE middle and 32 for the prototypical 600 FTE high school. This reflects an overall staffing ratio of 14.4 to 1 for elementary schools, 20.8 to 1 for middle schools, and 18.75 to 1 for high schools, thus producing a lower ratio for elementary schools (and thus more elementary teacher staff) and higher ratios for middle and high schools (and thus fewer middle and high school teacher staff).

B.7 Instructional Coaches/Technology Coordinators

Current Maine Policy	Evidence-Based Model
There is no provision for instructional coaches. Resources are provided at a rate of $24 per pupil for instructional leadership support.	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.

Analysis and Evidence
Only a Few states (e.g., Arkansas, New Jersey and Wyoming) explicitly provide resources for school and classroom-based instructional coaches, yet instructional coaches are key to making professional development work (see Element D.21 below). Most comprehensive school designs (see Odden, 1997; Stringfield, Ross & Smith, 1996), and EB studies conducted in other states – Arizona, Arkansas, Kentucky, North Dakota, 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. We expand on the rationale for these individuals in the section on professional development (D.21), 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. Early research found strong effect sizes (1.25-2.71) 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. This gold standard of research provides further support to this element as an effective strategy to boost student learning. In terms of numbers of coaches, several comprehensive school designs suggest that while one facilitator might be sufficient for the first year of implementation of a school-wide program, additional facilitators are needed in subsequent years. Moreover, the technology designs recommend a full-time facilitator who spends at least half-time as the site's technology expert. Thus, drawing from all programs, we conclude that 1.0 FTE instructional coaches/technology coordinators are needed for every 200 students in a school. This resourcing strategy works for elementary as well as middle and high schools. This translates into 2.25 FTE instructional coaches for the 450-student prototypical elementary school, 2.25 FTE instructional coaches for the 450-student middle school, and 3.0 FTE instructional coaches for the 600-student high school. Although instructional coaching positions are identified as FTE positions, schools could divide

the responsibilities across several individual teachers. For example, the 2.25 positions in elementary schools could be structured for 4 teacher/instructional coaches providing instruction 50 percent of the time, and functioning as a curriculum coaches in reading, mathematics, science and technology for 50 percent of the time. The same allocation of functions across individuals could work for the middle and high schools.

We also note that the above staff, combined with the additional elements of professional development discussed below, focus on making Tier 1 instruction (in the Response to Intervention frame) as effective as possible, thus providing a solid foundation of high quality instruction for everyone, including students who will struggle more to learn to proficiency.

C. STAFFING FOR EXTRA STUDENT NEEDS

Because not all students will learn to performance 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, extra-help 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 English Language Learning (ELL) students
- A new 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 for all students but vary the instructional time so all students can achieve to proficiency levels.

The EB elements for extra help are also embedded in the "response to intervention" 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, extended day and summer school, with the tutoring staff covering nearly all possible small group Tier 2 intervention programs.
- Tier 3 includes ELL and special education which provides the more intensive extra help services for these special populations.

For tutors, extended day and summer school, the EB model uses the number of students eligible for free and reduced-price lunch to estimate the number of students who might need extra help to achieve to standards in each school. However, because not all eligible high school students apply for the free and reduced price lunch program, suggesting this strategy might undercount eligible high school students, the EB model encourages states to adjust the high school figures to more accurately reflect the actual number of qualifying students in each school.

C.8 Tutoring

Current Maine Policy	Evidence-Based Model
Maine applies a student weight for economically disadvantaged students in order to provide additional resources for these students. The additional dollars are determined by the following Steps: 1. multiply the percentage of K-8 pupils eligible for free and reduced lunch by the subsidizable K-8 or 9-12 pupils 2. multiply the result of Step 1 by the EPS determined weight (0.15 in 2012-13) 3. multiply the result of Step 2 by the Elementary or Secondary EPS rate for the SAU. For example, at an EPS rate of $6,570 (elementary/middle) and $6,905 (high school), a weight of 0.15 produces an extra $985.50 per K-8 student qualifying for free or reduced price lunch (0.15 x $6570) and an extra $1,035.75 per (inferred) 9-12 student qualifying for free or reduced price lunch (0.15 x $6,905). Resources generated through this student weight do not have to be used for tutoring, but may be used for a variety of resources, including those discussed in Elements C.9 and C10 below.	One (1) fully licensed teacher-tutor position for every 100 attending pupils eligible for free and reduced price lunch as counted in the State's funding formula. Tutors are not the only resources in the EB model aimed at struggling students. See Elements C.9 and C.10 below for a discussion of extended day and summer school resources.
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 ELL, low income, or have minor disabilities) especially benefit from preventative tutoring (Cohen, Kulik, & Kulik, 1982). Tutoring program effect sizes vary by the components of the approach used, e.g. the nature and structure of the tutoring program, but effect sizes on student learning reported in meta-analyses range from 0.4 to 2.5 (Shanahan, 1998; Wasik & Slavin,1993; Cohen, Kulik & Kulik, 1982) with an average of about 0.75 (Wasik & Slavin, 1993). 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.

We note 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 400-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.

While this discussion focuses on *individual* tutoring, schools could also deploy these resources for small group tutoring. In a detailed review of the evidence on how to structure a variety of early intervention supports to prevent reading failure, Torgeson (2004) shows how one-to-one tutoring, one-to-three tutoring, and one-to-five small group sessions (all Tier 2 interventions) can be combined for different students to enhance their chances of learning to read successfully.

One-to-one tutoring would be reserved for the students with the most severe reading difficulties, scoring say, at or below the 20th or 25th percentile on a norm referenced test. Intensive instruction for groups of three-to-five students would then be provided for students above that level but below the proficiency level.

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.

Torgeson (2004) goes on to state that meta-analyses consistently show the positive effects of reducing reading group size (Elbaum, Vaughn, Hughes & Moody, 1999) and identifies experiments with both one-to-three and one-to-five teacher-student groupings. Though one- to-one tutoring works with 20 minutes of tutoring per student, a one-to-three or one-to-five grouping requires a longer instructional time for the small group – up to 45 minutes. 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.

An important issue is how many tutors to provide for schools with differing numbers of at-risk students. Drawing from the standard of many comprehensive school designs and the above discussion of service levels, the EB model provides one fully licensed teacher-tutor position for every 100 attending pupils eligible for free and reduced price lunch.

Using the prototypical schools, this standard would provide from one to four and a half professional teacher-tutor positions for the prototypical elementary and middle schools, and up to six for the prototypical high school, the maximum number being reached only if all students in a school are eligible for free and reduced lunch. Tutors also are provided the additional days for

professional development discussed below and as well as substitute days.

C.9 Extended-day programs

Current Maine Policy	Evidence-Based Model
There is nothing in the funding formula specifically providing extended-day resources, but districts can use the funds from the economically disadvantaged student weight discussed in Element C.8 for such instructional services	One (1) teacher position for every 30 attending free and reduced-price lunch students (or 3.33 FTE per 100 such students).. • 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. These positions are provided additional days for professional development (Element D.21) and substitute days (Element D.15) discussed below.
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 academic support as well as to provide a safe environment for children and adolescents to spend time after the school day ends. In a review of research, Vandell, Pierce and Dadisman (2005) found that well designed and administered after-school programs yield numerous improvements in academic and behavioral outcomes (see also Fashola, 1998; Posner & Vandell, 1994). On the other hand, the evaluation of the 21st Century Community Learning Centers (CCLC) Program (James-Burdumy et al., 2005), though hotly debated, indicated that for elementary students, extended day programs did not appear to produce measurable academic improvement. Critics of this study (Vandell, Pierce & Dadisman, 2005) argued that the control groups had higher pre-existing achievement, which reduced the potential for finding program impact. They also argued that the small impacts that were identified had more to do with lack of full program implementation during the initial years than with the strength of the program.	

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).

The resources recommend in the EB model would be used to provide struggling students in all elementary grades and in secondary schools with additional help during the school year but before or after the normal school day. Because not all low income students will need or will attend an after school program, the EB model assumes 50 percent of the free and reduced-price lunch eligible pupils will attend the program -- a need and participation figure identified by Kleiner, Nolin and Chapman (2004). As a result providing resources at a rate of 1 FTE teacher to 30 free and reduced price lunch students will result in class sizes of approximately 15 in extended day programs.

C.10 Summer School

Current Maine Policy	Evidence-Based Model
There is nothing in the funding formula specifically providing resources for summer school. However, SAUs can operate summer schools through local and tuition funding.	One (1) teacher position for every 30 attending free and reduced-price lunch students (or 3.33 FTE per 100 such students). • Position is paid at the rate of 25% of salary, which also provides time for planning and preparation and collaborative work. • This formula equates to 1 teacher position for every 120 free and reduced price lunch students. These positions are provided additional days for professional development (Element D.21) and substitute days (Element D.15) discussed below.

Analysis and Evidence
Many students need extra instructional time to achieve their state's high proficiency standards. Thus, summer school programs 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). Research dating back to 1906 shows that students, *on average*, 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 loss can reach as much as one-third of the learning during a regular nine-month school year (Cooper et al., 1996). A longitudinal study by Alexander and Entwisle (1996) showed that 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. As a result of this research, there is emerging consensus that what happens (or does not happen) during the summer can significantly impact the achievement of students from low-income and at-risk backgrounds, and help reduce (or increase) the poor and minority achievement gaps in the United States (see also Heyns, 1978). However, evidence on the effectiveness of summer programs in attaining either of these goals 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). A meta-analysis of 93 summer school programs (Cooper, Charlton, Valentine, & Muhlenbruck, 2000) found that the average student in summer programs outperformed about 56% to 60% of similar students not receiving the programs. However, the certainty of these conclusions is compromised because only a small number of studies (e.g., Borman, Rachuba, Hewes, Boulay & Kaplan, 2001) used random assignment, and program quality varied substantially. Other randomized trial research of summer school reached more positive conclusions about how such programs can positively impact student learning (Borman & Dowling, 2006), and Roberts (2000) found an effect size of 0.42 in reading achievement for a randomized sample of 325 students who participated in the Voyager summer school program. Researchers 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.

In sum, research generally suggests that summer school is needed and can be effective for at-risk students. Studies suggest that 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.

Because summer school can produce powerful impacts, the EB model provides resources for summer school for classes of 15 students, for 50 percent of all free and reduced price lunch students in all grades K-12, an estimate of the number of students still struggling to meet academic requirements (Capizzano, Adelman & Stagner, 2002). The model provides resources for a program of eight weeks in length, class sizes of 15 students, and a six-hour day, which allows for four hours of instruction in core subjects. A six-hour day would also allow for two hours of non-academic activities. The formula would be one FTE position for every 30 free and reduced price lunch students or 3.33 per 100 such students. Because not all low income students will need or will attend a summer school program, the EB model assumes 50 percent of the free and reduced-price lunch eligible pupils will attend the program -- a need and participation figure identified by Kleiner, Nolin and Chapman (2004). As a result providing resources at a rate of 1 FTE teacher to 30 free and reduced price lunch students will result in class sizes of approximately 15 in summer school programs. Although a summer school term of six 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. Simplified, the EB summer school formula equates to 1 teacher position for every 120 free and reduced price lunch students.

As the discussion to this point shows, the EB approach to overall staffing for most at-risk or disadvantaged students is a sequenced set of connected and structured programs that begin in the early elementary grades and continue through the upper elementary, middle and high school levels. For the most academically deficient educationally disadvantaged students, the EB model first provides one-to-one tutoring, and provides those who are not struggling as much intensive and explicit instruction in groups of three or five. For students who are still struggling to meet proficiency standards the EB model provides an extended day program that includes an academic focus, and that children needing even more help are then offered a summer school program that is structured and focused on academics – reading and mathematics for elementary and middle school students, and failed courses for high school students. Students who are both at-risk and ELL not only all receive these services but also receive ESL classes, which is discussed next.

C.11 English Language Learning (ELL) Students

Current Maine Policy	Evidence-Based Model
Maine currently provides additional resources for students for whom English is not their first language through a student weight for limited English proficient (LEP) students. The extra dollars are determined by multiplying the number of LEP pupils by a variable weight and then multiplying that figure by the Elementary or Secondary EPS rate for the SAU. The weight varies depending on the number of LEP students in a SAU as follows: • 0.7 for SAUs with 15 or fewer LEP students • 0.5 for SAUs with 16 to 250 LEP students • 0.525 for SAUs with more than 250 LEP students Assuming EPS rates of $6,570 for elementary students, the LEP weight would produce additional funding between $3,375 and $4,725 per subsidizable LEP pupil. Assuming a high school EPS rate of $6,950, the weights would produce additional funding of between $3,452 and $4,833 per subsidizable LEP pupil.	One (1) FTE teacher position for every 100 attending ELL students. • For students who are both ELL and eligible for free and reduced price lunch, the ELL resources are *in addition* to the resources in Elements C.8-C10 (tutoring, extended day, summer school) and additional pupil support (Element D.16). These positions are also provided additional days for professional development (Element D.21) and substitute days (Element D.15) discussed below.
Analysis and Evidence	
Research, best practices and experience show that English language learners (ELL) need assistance to learn English, in addition to instruction in the regular content classes. This can include some combination of small classes, English as a second language classes, professional development for teachers to help them teach "sheltered English classes, and "reception" centers for districts with large numbers of ELL students who arrive at the school throughout the year. Good ELL 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 ELL students 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 ELL students. 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 ELL students 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 ELL students 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 ELL students 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 ELL students need:

- Effective teachers – a core goal of all the staffing in this chapter and of the research on the importance of talent discussed in Chapter 7
- Adequate instructional materials (Element D.23) and good school conditions
- Good assessments of ELL students so teachers know in detail their English language reading and other academic skills (Element D.23)
- Less segregation of ELL students
- Rigorous and effective curriculum and courses for all ELL students, and affirmative counseling of such students to take those courses
- Professional development for all teachers, focusing on sheltered English teaching skills, (Element D.21)

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 ELL instructional strategies and extra help services if these are to be effective at ensuring that ELL students learn the subject matter, English generally, and academic English specifically.

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

Research shows that it is the Limited English proficient, or English language learners (ELL),

from lower income and generally less educated backgrounds who struggle most in school and need extra help to learn both academics and English. We address this need by providing ELL resources *in addition* to tutoring, extended day and summer school resources (Elements C.8-C.10), as well as the additional pupil support staff (Element D.16).

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 ELL students would receive 1.0 tutor position. But if the 100 low-income children were all ELL students, 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 ELL students as including both resources for students from lower income backgrounds and ESL specific resources (Jimenez-Castellanos & Topper, 2012).

C.12 Special Education

Current Maine Policy	Evidence-Based Model
Special education is funded through a pupil weight in the formula, set at 1.27 for the 2012-2013 fiscal year. The state uses a six-step model to estimate the number of students requiring special education. Once the number of special education students is determined, the number is multiplied by 1.27 to generate EPS special education funding. There are also adjustments for small schools as well as an additional adjustment for districts where more than 15% of the students are identified as requiring special education services. It should be noted that the weight of 1.27 has varied over time ranging from a low of 1.245 in 2008-09 to a high of 1.375 in 2005-06.	A census approach to funding special education services for disabled students in the high incidence/lower cost categories. • One (1.0) teacher and 0.5 aide positions for every 150 regular students. This results in three teachers and 1.5 aide positions for each of the 450-student prototypical elementary and middle school, and 4 teachers and 2.0 aide positions for the 600-student prototypical high school. The EB Model includes the state reimbursing districts for 100 percent of the costs for the severely disabled, minus Federal Title VIb funds for such students.
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 (Element C.8).	

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 1.5 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 ELL.

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 ED 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 ELL 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.13 Gifted and Talented Students[16]

Current Maine Policy	Evidence-Based Model
Gifted and Talented (GT) education is funded state wide at approximately $10 million for the 2012-13 fiscal year. SAUs receive funding based on submitted budget expenses for GT. Funding provided to each SAU is based on expenditures from two years prior, inflated to an estimate of current year values. These resources go into the EPS funding formula.	Resources for gifted and talented students are provided at a rate of $25 per regular pupil. For example, these resources are sufficient to purchase programs such as Renzulli Learning.

Analysis and Evidence

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,

[16] This section is based on an unpublished literature review written by Dr. Ann Robinson, Professor, University of Arkansas at Little Rock and included in abbreviated form in Odden & Picus, 2014.

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.

Overall, 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 studnets produce somewhat larger effectives sizes of +0.90 (Gallagher, 1996; Kulik & Kulik, 1984; Kulik & Kulik, 1992).

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 comprised of 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 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.

The University of Connecticut center also agreed with these conclusions and has developed a very powerful Internet-based platform, Renzulli Learning, which could provide for a wide range of programs and services for gifted and talented students. This system takes students through about a 25-30 minute detailed assessment of their interests and abilities, which produces an individual profile for the student. The student is then directed, via a search engine, to 14 different Internet data systems, including interactive web-sites and simulations that provide a wide range of opportunities to engage the student's interests. Renzulli stated that such an approach was undoubtedly the future for the very bright student and could be supported by a grant of $25 per student in a district. Field (2007) found that after 16 weeks, students given access to an internet based program, such as Renzulli Learning to read, research, investigate, and produce materials, significantly improved their overall achievement in reading comprehension, reading fluency and social studies.

C.14 Career and Technical Education

Current Maine Policy	Evidence-Based Model
Funding for Career and Technical Education is based on an expenditure reimbursement model that reimburses SAUs for approved expenditures.	The EB model includes $9,000 per CTE teacher for state of the art computer and other equipment.

Analysis and Evidence

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, especially if the district and state made adequate provisions for professional development (as teachers in these new programs needed training) and computer technologies (as computer technologies were heavily used). 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.

The major cost areas for the program are in class size, professional development and computer technologies. 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.

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 Maine Policy	Evidence-Based Model
The Maine EPS formula includes $37 per attending pupil for substitute teachers.	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 200 day teacher year).
Analysis and Evidence	
Traditionally, specific provisions for substitute teachers have not been included in any state's school finance formula. States with new, adequacy-based systems, however, such as Maine, have begun to explicitly include these resources. 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/Family Outreach

Current Maine Policy	Evidence-Based Model
The Maine EPS formula provides: • One (1) guidance counselor for every 350 K-8 students • One (1) guidance counselor for every	Staffing ratios are: • One (1) guidance counselor for every 450 elementary school students • One (1) guidance counselor for every

250 Grade 9-12 students • One (1) health professional for every 800 students across all grade levels. These figures are increased by 10% for SAUs with fewer than 1,200 attending students. (See Table 2.1 for details)	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.

Analysis and Evidence

Schools need a student support and family outreach strategy. 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). In terms of level of resources, the more disadvantaged the student body, the more comprehensive the strategy needs to be. 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.

Although there are many ways schools can provide outreach to parents, or involve parents in school activities – from fund raisers to governance – research shows that school sponsored activities that impact achievement address what parents can do at home to help their children learn. For example, if the education system has clear content and performance standards, helping parents and students to understand both what needs to be learned and what constitutes acceptable standards for academic performance is helpful. Put succinctly, parent outreach that explicitly and directly addresses what parents can do to help their children learn, and to understand the standards of performance that the school expects, are the types of school-sponsored parent activities that produce discernible impacts on student's academic learning (Steinberg, 1997).

At the secondary level, the goal of such activities is to have parents learn about what they should expect of their children in terms of their learning and academic performance in high school. If a district or a state requires a minimum number of courses for graduation, that requirement should be made clear. If there are similar or more extensive course requirements for admission into state colleges and universities, those requirements should be addressed. If either average scores on end-of-course examinations or a cut-score on a comprehensive high school test are required for graduation, they too should be discussed. Secondary schools need to help many parents understand how to more effectively assist their children to find an academic pathway through middle and high school, understand standards for acceptable performance, and at the high school, be aware of the course work necessary for college entrance.

At the elementary school level, the focus for parent outreach and involvement programs should concentrate on what parents can do at home to help their children learn academic work for school. Too often parent programs focus on fund raising through the parent-teacher

organization, involvement in decision making through school site councils, or other non-academically focused activities at the school site. Although these school-sponsored parent activities might impact other goals – such as making parents feel more comfortable being at school or involving parents more in some school policies – they have little effect on student academic achievement. Parent actions that impact learning would include: 1) reading to them at young ages, 2) discussing stories and their meanings, 3) engaging in open ended conversations, 4) setting aside a place where homework can be done, and 5) ensuring that their child completes homework assignments.

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 support help. 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 Aides/Education Technicians

Current Maine Policy	Evidence-Based Model
The Maine EPS formula provides: • One (1) educational technician or aide for every 100 K-8 students • One (1) educational technician or aide for every 250 Grade 9-12, students This figure is increased by 10% for SAUs with less than 1,200 attending students (see Table 2.1 above for details).	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.

Analysis and Evidence
Elementary, middle and high schools need staff for responsibilities that include lunch duty, before and after school playground supervision, bus duty, and others. Covering these duties generally requires an allocation of supervisory aides at about the rate of 2.0 FTE aide positions for a school of 400-500 students. However, research does not support the use of instructional aides for improving student performance. As noted above (Element B.5), the Tennessee STAR study, which produced solid evidence through field-based randomized trails that small classes work in elementary schools, also produced evidence that instructional aides in schools do not add value, *i.e.*, do not positively impact student academic achievement (Gerber, Finn, Achilles & Boyd-Zaharias, 2001). At the same time, districts may want to consider a possible use of instructional aides that is supported by research. There are two studies that show how instructional aides 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. Some districts have used Farkas-type tutors for students still struggling in reading in the upper elementary grades. 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. We should note that neither of these studies supports the typical use of instructional aides as teacher helpers. Evidence shows that instructional aides can have an impact but only if they are selected according to educational criteria, trained in a specific tutoring program, deployed to provide tutoring to struggling students, and closely supervised. The EB Model provides two (2) FTE supervisory aide positions for the prototypical elementary and middle school and three (3) FTE supervisory aide positions for the prototypical high school, to be used for relieving teachers from lunchroom, playground and other non-teaching responsibilities.

D.18 Librarians

Current Maine Policy	Evidence-Based Model
Maine's EPS system provides • One (1) librarian position for every 800 K-12 students • One (1) library technician/aide for every 500 K-12 students This figure is increased by 10% for SAUs with less than 1,200 attending students (see Table 2.1 above for details).	Staffing ratios are: • One (1) librarian for every 450 student elementary and middle school • One (1) librarian for every 600 student high school

Analysis and Evidence
Most schools have or should have a library, and the staff resources must be sufficient to operate the library and to incorporate appropriate technologies into the library system. Further, some elementary librarians could teach students for some of the day as part of special subject offerings. The EB Model recommendation for library staff is derived from best practices, practice in other states, as well as state statutes where they exist.

D.19 Principal

Current Maine Policy	Evidence-Based Model
Maine's EPS system provides: • One (1) administrative position for every 305 K-8 students • One (1) administrative position for every 315 Grade 9-12 students This figure is increased by 10% for SAUs with less than 1,200 attending students (see Table 2.1 above for details).	Staffing ratios are: • One (1) principal for every 450 student elementary and middle school • One (1) principal for every 600 student high school • One (1) assistant principal for every 600 student high school
Analysis and Evidence	
Every school unit needs a principal. 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 comprehensive school designs, and all prototypical school designs from all 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 School Site Secretarial Staff

Current Maine Policy	Evidence-Based Model
Maine's EPS system provides: • One (1) school based clerical support position for every 200 elementary, middle and high students This figure is increased by 10% for SAUs with less than 1,200 attending students (see Table 2.1 above for details).	Staffing ratios are: • Two (2) FTE school clerical positions for every 450 student elementary and middle school • Three (3) FTE school clerical positions for every 600 student high school

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. The EB Model provides resources for two (2) clerical positions for each prototypical elementary and middle school and three (3) clerical support positions for every prototypical high school.

D.21 Professional Development

Current Maine Policy	Evidence-Based Model
Maine's EPS program provides $59 per attending pupil for professional development.	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 (Element B.7) • Collaborative work with teachers in their schools during planning and collaborative time periods (Element B.7)
Analysis and Evidence	
All school faculties need ongoing professional development., 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 factor in student learning (Rowan, Correnti & Miller, 2002; Wright, Horn & Sanders, 1997) and more systemic deployment of effective instruction is key to improving learning and reducing achievement gaps (Odden, 2011a; Raudenbusch, 2009). 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 elective teachers as well. Finally, all beginning teachers need intensive professional development, first in classroom management, organization and student discipline, and then in instruction. Fortunately, 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:

- 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.

Each of these six structural features has cost implications. 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.

From this research on the features of effective professional development, the EB model includes the following for a systemic, ongoing, comprehensive professional development program:

- 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 (Element B.7)
- Collaborative work with teachers in their schools during planning and collaborative time periods (Element B.7)

D.22 Technology and Equipment

Current Maine Policy	Evidence-Based Model
The Maine EPS system provides: • $98 per K-8 attending student • $296 per grade 9-12 attending student	The EB model provides: • $250 per every PK-12 student
Analysis and Evidence	
Over time, schools need to embed technology in instructional programs and school management strategies. Today, more and more states are requiring students to not only be technologically proficient but also to take some courses online in order to graduate from high school. Further, there are many online education options, from state-run virtual schools such as those in Florida	

and Wisconsin, to those created by private sector companies who run many virtual charter schools, such as K12 Inc. and Connections Academy. "Blended instructional" models, such as Rocketship, have also emerged. These programs infuse technology and online teaching in regular schools, provide more 1-1 student assistance, and put the teacher into more of a coaching role (see Odden, 2012). Research also shows that these technology systems work very well for many students, and can work very effectively in schools with high concentrations of lower income and minority students. Moreover, they are often less costly than traditional public schools (Battaglino, Haldeman & Laurans, 2012; Odden, 2012).

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 *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 (D.22) identifies only direct technology costs, as the indirect costs, which are primarily training, are included in the overall professional development resources (Element D.21). Districts also need individuals to serve as technical support for technology embedded curriculum and management systems (Element E.25), though the bulk of that work can be covered by warranties purchased at the time computers are acquired.

In estimating the direct costs of purchasing, upgrading, and maintaining computer hardware, the software that helps these computers to function, and the networks on which they run, the EB approach recognizes the fact that today virtually no school is beginning at a baseline of zero. All schools have a variety of computers of varying ages, the large majority of which are connected to school networks and the Internet. Unlike the 1990's when expensive projects had to retrofit schools with data networks, the following cost estimates identifies resources needed to maintain and enhance the technology base that exists in schools. Moreover, as should be clear, these are ongoing and not one-off costs.

We also note that each district and school situation is unique, requiring that an individual technology plan be created at both district and school levels. Most districts and schools have technology plans because of the federal funding requirements in the E-Rate and EETT programs. These documents should be meaningful mechanisms used to allocate resources to the areas of most need within the school or district environment.

We refer readers to more detailed analysis of the costs of equipping schools with ongoing technology materials (Odden, 2012) that was spearheaded by Scott Price of the South Pasadena School District in California. That analysis 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. Fortunately, most states have developed a substantial technology infrastructure over the years, so nearly all schools in America are linked to the Internet and to district offices and/or a state network. This allocation would be sufficient for small schools as well, particularly today when schools begin with some technology.

Further as noted, we recommend districts 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. For example, for a very modest amount, one can purchase a maintenance agreement from a number of computer manufacturers that guarantees computer repair on a next business day basis. In terms of educator concerns that it would be difficult for a manufacturer's contractors to serve remote communities, the maintenance agreement makes meeting the service requirements the manufacturer's or contractor's problem and not the district's problem. Many of the private sector companies that offer such service often take a new computer with them, leave it, and take the broken computer to fix, which often turns out to be more cost effective than to send technicians all around to fix broken computers.

D.23 Instructional Materials

Current Maine Policy	Evidence-Based Model
The Maine EPS system provides: • $346 per attending K-8 student for instructional materials and supplies • $478 per attending 9-12 student for instructional materials and supplies • $42 per K-12 student for formative and other assessments	**Table 6.2: Instructional Materials in EB Model** (see table below) The EB model also includes $10 per pupil for supplemental instructional and other materials for each of the above tutoring, extended day, summer school, ESL and pupil support programs (Elements C.8-C.12).

	Elementary School	Middle School	High School
Library Texts and Electronic Services	$20	$20	$25
Textbooks and Consumables	$120	$120	$150
Formative, short cycle assessments	$30	$30	$30
Total Instructional Materials	**$170**	**$170**	**$205**

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 ban is notable at $120 per book (see Table 6.3). 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.

Table 6.3: 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 provides 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 (see Table 6.4). It also comes close to matching the content areas covered at the elementary level.

Table 6.4: 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 (see Table 6.5).

Table 6.5: 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

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).

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 trials – 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 testing, such as NECAP in Maine. 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.

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 , 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) use the Dynamic Indicators of Basic Early Literacy Skills (DIBELS) formative assessments (http://dibels.uoregon.edu).

The Wireless Generation (www.wirelessgeneration.com) 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. The cost is approximately $15 per student per year, plus approximtely $200 per teacher for the device, and somewhat more for training, though the company usually uses a trainer-of-trainers approach.

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.

The costs of these powerful assessments are modest; the EB model provides $25 per pupil, which is more than sufficient for a school to purchase access to the system, as well as some specific technological equipment and related professional development. The Renaissance Learning STAR assessments can function as both interim and benchmark assessments, include both math and reading Prek-12, and cost less than this figure.

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.24 Student Activities

Current Maine Policy	Evidence-Based Model
The Maine EPS formula includes: • $34 for student activities for every K-8 attending student • $114 per pupil for student activities for every 9-12 attending student	The EB provides: • $250 per pupil for student activities at all grade levels.
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 are 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 Maine Policy	Evidence-Based Model
Maine's EPS system provides: • $220 per attending pupil across all school levels for central office services.	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.

Table 6.6: Central Office Staffing

Central Office Staffing	
Prototypical District of 3,900 students	
Office and Position	**FTE**
Superintendent's Office	
Superintendent	1
Secretary	1
Business Office	
Business Manager	1
Director of Human Resources	1
Accounting Clerk	1
Accounts Payable	1
Secretary	1
Curriculum and Support	
Assistant Superintendent for Instruction	1
Director of Pupil Services	1
Director of Special Education	1
Director, Assessment and Evaluation	1
Secretary	3
Technology	
Director of Technology	1
Computer Technician	1
Secretary	1
Operations and Maintenance	
Director of M & O	1
Secretary	1
Other Expenses	
Miscellaneous (purchased services, supplies, legal, audit, association fees, elections, technology, etc.)	
Communication	

Analysis and Evidence

We have identified resources for these positions in other reports (see for example, Picus & Odden, 2010) drawing on a variety of research studies and professional standards for best practices. Over the past several years, we have developed central office staffing recommendations in five states, Washington, Wisconsin, North Dakota, New Jersey and Texas. In all states, we began our analysis with the research of Elizabeth Swift, who used professional judgment panels to determine staffing for a prototypical district. That research addressed the

issue of the appropriate staffing for a district of 3,500 students. Swift's work formed the basis of each states' analysis, where in three states (Washington, Wisconsin and North Dakota) we also conducted professional judgment panels to review the basic recommendations that emerged from Swift's research to estimate central office staffing requirements.

Through that work we were able to estimate the central office resources required for a district of 3,500 students. The initial studies provided for 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 (2009) 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. Our research based staffing formula of 8 FTE professional staff matches the ERS estimate of 8 FTE central office staff for a school district of 3,500 students nationally.

Because the 3,500 student district size did not readily incorporate our prototypical schools, parameters for which are needed to estimate maintenance and operations costs, over the past two years we increased our prototypical district size to 3,900 students so it would include, as noted above, four 450 student elementary schools, two 450 student middle schools, and two 600 student high schools. This larger size also helps us add the testing and evaluation, and computer technician staff, which districts have been arguing 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.

Table 6.6 summarizes these staffing proposals organized into departments into which a central office could be organized. 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.

Appropriate central office staffing levels would need to be adjusted for smaller as well as perhaps for larger districts. From our work in other states, the per pupil figure works until districts have about 390 students, ten percent of the size of the 3,900 student prototypical district. We show how the central office staffing has been adjusted for smaller districts in the section below on small district adjustments (see Section G and Table 6.12). Above 3,900 students, these central office staffing figures can be prorated up. We believe the EB approach works relatively well for Maine, as discussed below in the section on small district adjustments.

E.26 Operations and Maintenance

Current Maine Policy	Evidence-Based Model
The Maine EPS formula provides: • $1,013 per K-8 attending pupil and • $1,204 per grade 9-12 attending pupil for operations and maintenance costs.	Using the formulas described below, EB 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.

Analysis and Evidence

Drawing on professional standards in the field as well as research, we have conducted considerable analysis of the cost basis for maintenance and operations (e.g., Picus & Odden, 2010; Picus & Seder, 2010). The discussion below summarizes our research on operations and maintenance, identifying 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*:* Custodians are responsible for the daily cleaning of classrooms and hallways as well as for routine furniture set ups and takedowns. In addition, custodians often manage routine and simple repairs like minor faucet leaks, and are expected to clean cafeterias/multipurpose rooms, lockers and showers. Custodial workers' duties are time-sensitive, are 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.

To show how this formula translates into a per pupil cost for custodial services, we have used the 3,900 student prototypical school district. This district includes four 450-student prototypical elementary schools, two 450-student middle schools, and two 600-student high schools. Using the resource allocations identified above in Table 6.1, and assuming that teachers are the core, specialist, special education and coaches at each school, each of whom has a classroom,[17] we identify the resources each school would have and use those to estimate the number of custodians needed for each school and the district.

Table 6.7 summarizes the custodial computations for this prototypical school district. 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.[18] The number of custodians in each school is computed using the formulas above and displayed in Column 6. In addition, we recommend an additional half time custodian 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.

Table 6.7: 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

[17] While it could be argued that coaches do not need classrooms, this will accommodate potential classroom space for tutors as well.

[18] 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).

maintenance, routine maintenance and emergency response activities. Individual maintenance worker accomplishment associated with core tasks are: (a) HVAC systems, HVAC equipment, 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.

We use a figure of $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 our prototype district. This is shown in the Table 6.8.

Table 6.8: 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. A theoretic example of a work crew's responsibility at various school levels in acres and days per year is expressed in Table 6.9, which uses the prototypical school district as an example.

Table 6.9: 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:

Table 6.10: 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

Table 6.11 summarizes the number of custodians, maintenance workers and groundskeepers for this prototypical district.

Table 6.11: 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.

In the course of our research on maintenance and operations, we identified an alternative approach for estimating the costs of these services. 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. After careful review of APPA's web site and publications (APPA, 1998, 2001, 2002), which are considered industry standards for educational facilities, we found the APPA staffing ratios offered a strong research basis for establishing an appropriate benchmark for estimating the cost basis for O&M.

APPA standards offer a range of services levels. We estimated the costs associated with the staffing levels generated through APPA and compared them to the resources we identified above, using the Wyoming School Funding Model as the basis of comparison. Our baseline estimates suggest that using the APPA standards would generate resources comparable to those M&O resources currently provided for in the EB Model through a combination of the staffing ratios, funding for supplies and materials, and the resources for purchased services.

F. REGIONAL COST ADJUSTMENT FACTOR

A few states, including Maine, 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 Maine Policy	Evidence-Based Model
Maine currently uses a regional adjustment factor that was developed, using 2004-05 data, for 35 geographic regions in the state and compares the average teacher salary in the region to the state average. The index represents the differences in teacher salaries at the time that it was developed whether the differences were caused by different local choices on teacher salary levels, differences in the ability to raise educational revenues and pay teachers or differences in the purchasing power of the education dollar.	The EB approach suggests that Maine develop either an Hedonic wage index or a Comparable Wage Index, or use those indices that have been developed by the National Center for Education Statistics, instead of the current regional cost adjustment in the formula.
Analysis and Evidence	
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 Maine, 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.

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 the NCES has recently produced comparative wage indices that can be used for all districts and all states, including Maine (Taylor and Fowler, 2006) with updated figures for 2010 (at nces.ed.gov/efin/) with documentation and a users' guide.

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 AND DISTRICTS

Table 6.1 at the beginning of this chapter summarizes all of the EB formulas for prototypical elementary, middle and high schools and compares them to the elements of Maine's current EPS formula.

As we show next, we incorporate these prototypical school models into a prototypical school district with 3,900 pupils with about 300 students a grade in four 450 student elementary schools, two 450 student middle schools and two 600 student high schools. To create a per pupil figure that could be used in a foundation program, for example, one needs to put prices on all the

ingredients in Table 6.1 and add to the total a cost per pupil for the central office and for maintenance and operations.

The combined figures would then provide a cost per pupil for a prototypical school district of 3,900 students that could be used as a basis for many school finance formulas. But because many districts in Maine have a student population of less than 3,900 students, one question is whether the above formulas and staffing allocations "work" for districts with fewer than 3,900 students. We have run these numbers and find that the answer is yes for a district down to about 975 students, which is one-fourth the size of the 3,900-student prototypical district. A district with 975 students would have 75 students per grade and could have one 450 student elementary school with typical staffing, one 225 student middle school and one 300 student high school, each with typical, but prorated, staffing. Below 975 students we conclude that additional staff support is required for an adequate program.

Table 6.12 displays the current EB approach for PK-12 school district administrative units with 390 and fewer pupils. The "Element" column shows the various staffing categories. Column 2 shows what the regular formulas above would provide to the school, and columns 3, 4 and 5 show the staffing for school districts of smaller sizes. We have increased core and specialist teachers from the 23.2 positions the regular formula generates to an even 24 for a school district with 390 students, and 13 for a district with 195 students. For a district with 97.5 students or fewer, which is half of 195, we recommend staffing for one administrator position at the rate of an assistant principal and 1 FTE teacher position for every 7 students, which provides staffing the very small school can deploy in any way it wishes. We have used this approach in a number of states and it provides very small school districts with adequate staffing levels along with the flexibility to allocate the staff in a way that works best for the individual district. This formula produces the 13.93 positions shown in column 5.

In reviewing the numbers in Table 6.12 for the 390 student district, we generally have rounded up partial FTEs for the "regular" formula district (column 2) to a whole number for several positions (column 3) including instructional coaches, librarian, guidance counselor/nurse, secretaries and supervisory aides, and then taken half that number for the 195 student district. All small districts receive the same dollar per pupil numbers for professional development trainers, technology/equipment, instructional materials, assessments, student activities and gifted and talented programming.

Table 6.12: EB Staffing for Schools in SAUs with 390 or Fewer Pupils

	Element		School Configuration			
			(2) 390 Pupils Regular Formula	(3) K12 School: 390 Pupils	(4) K12 School: 195 Pupils	(5) K12 School: 97.5 Pupils
Adequate Staffing for the Core Programs	B.5	Class size for core teachers	23.2	24	13	13.93
	B.6	Elective teachers				
	B.7	Instructional Coaches	1.95	2	1	--
Staffing for Extra Student Needs	C.13	Gifted and Talented	$25 / pupil	$25 / pupil	$25 / pupil	$25 / pupil
Additional Staffing and Resource Needs	D.16	Counselors	1.76	2	1	--
		Nurses				
		Supervisory Aides	1.8	2	1	--
	D.18	Librarians	0.8	1	0.5	--
	D.19	Principal	0.8	1	1	--
		Assistant Principal	0.2	1	0	1
	D.20	School Clerical	1.8	2	1	--
	D.21	Professional Development	$100 / pupil	$100 / pupil	$100 / pupil	$100 / pupil
	D.22	Computer Technologies	$250 / pupil	$250 / pupil	$250 / pupil	$250 / pupil
	D.23	Instructional Materials & Assessments	$181 / pupil	$181 / pupil	$181 / pupil	$181 / pupil
	D.24	Student Activities	$250 / pupil	$250 / pupil	$250 / pupil	$250 / pupil

SUMMARY: COMPARING THE EPS TO THE EB MODEL

The EB model uses a similar structure and approach to that used by the EPS in Maine. The EB model provides resources to meet all seven *Learning Results* categories in Maine and provides additional resources that in our view would establish a comprehensive education system as called for in the Resolve. Resources that are included in the EB, but are not specifically included in the EPS include career and technical education, gifted and talented education and co curricular activities.

The comparisons provided above show a number of differences in the specific staffing ratios for different grade levels as well as educational programs and support services, as well as differences in per pupil funding levels for certain resources. It appears that in some instances the cost of EPS exceeds the EB and in others the reverse is true – EB costs exceed those of the EPS. Once we have completed our EB model for Maine, we will be able to quantify those differences by specific program area. Examples of areas where EB funding exceeds EPS include an ongoing, systemic and comprehensives professional development program and more extra help resources for at-risk students.

It is our view that the EB model provides sufficient resources for all schools to offer a full liberal arts curriculum that offers an education program designed to meet college and career standards for all students. The EB approach is also sufficient to allow schools in Maine – if they use the resources in the most effective manner and organize teachers into collaborative groups – to dramatically increase student achievement on standardized performance tests such as the NECAP.

We recommend that the Committee assess the differences and similarities between the EB and the EPS, as well as the cost differences between the two that will be identified in Phase 2 of this project, and we look forward to ongoing discussions with the committee, as it decides whether to modify the current EPS approach, shift to the EB ratios and formulas, or establishes a model that includes a combination of each.

CHAPTER 7: STATE APPROACHES TO REDESIGNING TEACHER SALARY SYSTEMS: ATTRACTING AND RETAINING EFFECTIVE TEACHERS

There are many factors that can impact a district's ability to recruit and retain high quality teachers. These include: the level of teacher salaries; beginning and average salary levels; pay raises over time; incentives for teaching in subject area shortages (e.g., math and science); incentives for teaching in high need (most often poverty and rural) schools; and, bonuses for improving student performance. Adjustments in state aid formulas for regional differences in teacher salaries may also impact the recruitment and retention of high quality teachers.

This part of the report provides an overview of the efforts states have launched to address teacher compensation issues. To the extent they are available, research findings on the impact of those efforts are also described. Separate discussions are provided for the following issues:

- Overall salary increases including adjustments for regional cost differences
- Massachusetts signing bonus experiment
- Incentives for teaching math and science
- Incentives for teaching in high need schools
- State-designed performance incentives
- State grants to local districts to design performance pay plans
- Career ladders
- The Odden/Picus Salary Structure

Table 7.1 shows where these programs have been tried and which states have experimented with each option. A summary of each program follows. We also note that most of the programs profiled were discontinued during the Great Recession that began in 2009.

Table 7.1: Examples of Salary Incentive Programs in the United States

Type of Salary Incentive	State Programs Profiled
Overall Salary Increases	Overall findings from a multiple state study
Signing Bonuses	Massachusetts
Subject Area Shortages	Georgia, Hawaii, New York, North Carolina
High Need Schools	Arkansas, Georgia, New York, Virginia
Performance Incentives	Kentucky, Florida, Georgia, Mississippi, North Carolina
Grants to Districts to Design Performance Pay Programs	Arizona, Florida, Minnesota, Texas
Career Ladders	Arizona, Teacher Advancement Program
State Programs Developed Under the Federal Teacher Incentive Fund (TIF)	
New Salary Schedules	Odden-Picus Schedule, Tennessee

OVERALL SALARY INCREASES

Milanowski (2008) argues that pay levels matter for teachers. The higher the pay, the greater the number of quality individuals attracted to teaching – or any other occupation. This is true for beginning and average pay. So paying attention to salary levels is important if Maine school districts are to compete successfully in the labor market for quality talent for teaching.

That said, the challenge for Maine is how to set beginning and average pay levels, as well as how to determine the way in which annual pay increases are earned. The goal is to create a system that makes it possible to recruit and retain top talent in Maine's schools and links both salary levels and annual increases to teacher effectiveness.

The first issue Maine faces, as do other states, is how to define the competitive teacher labor market. Often states compare their average teacher salaries to average teacher salaries in other states, or to the national average teacher salary. The problem with this approach is that teachers generally make employment decisions in a more localized labor market. Research shows that most teachers work in schools within 50 miles of where they grew up or went to college (Boyd, Lankford, Loeb & Wyckoff, 2004). Our view, therefore, is that the most appropriate teacher labor market for a state is its own labor market. A comparable wage index (CWI) (discussed in Chapter 6, Element F) does precisely that. The remainder of this section of Chapter 7 addresses salary issues with respect to statewide averages. However we assume the averages will be adjusted across the state's labor markets with a CWI.

Education competes in the broader labor market for talent, both in recruiting new individuals into the field and in retaining effective teachers once they have entered education. Thus, to set competitive salary benchmarks, the education system should benchmark to numbers in the comparable labor market, with comparable meaning other jobs that require skills and knowledge

similar to teaching. Appropriate beginning and average salaries are the beginning and average salaries for jobs comparable to teaching. To ensure that Maine is competitive in recruiting and retaining teachers, the state should look for salary benchmarks for teachers within Maine's various regional labor markets, and not to other states or to national averages.[19]

The first step is for Maine to identify a beginning salary benchmark and an average salary benchmark for teachers. Once the latter has been set, then Maine could determine whether current average salaries are at, above or below market.

In the past, many states concluded that their average teacher salaries were below market levels. Their challenge was to determine how to raise salaries so that average salaries were where they wanted them to be in the general labor market. The strategy many states tried was across the board salary increases for all teachers. An across the board pay increase policy provides every teacher in every district a salary increase, either the same percentage increase or the same dollar increase. The goal of these programs was to boost average teacher salaries so schools and districts could be more competitive in recruiting and retaining effective teachers.

Across-the-board salary increase policy initiatives were tried in the 1980s and 1990s by several states. Labor market economists Dale Ballou and Michael Podgursky (1997) studied their longitudinal impacts and found that such policies had negative impacts on recruiting and retaining effective teachers. Overall salary increases provided incentives to *all* teachers, effective or not, to stay in teaching. But since nearly all teachers continued to teach, there was a reduction in the number of new openings, which restricted the ability of districts to use the higher salaries to recruit more effective teachers and to retain only the most effective teachers.

Ballou and Podgursky (1997) recommended that if the goal is to recruit and retain more effective teachers, states and districts should target salary increases to the most effective teachers. This more targeted approach would work to incentivize effective individuals to stay in teaching, create disincentives for ineffective teachers to stay and produce more open slots to recruit new and more effective teachers into the system.

Ballou and Podgursky's findings are supported by studies that have shown that small increases in teacher pay have relatively small impacts on teacher retention. Using a national sample, Harris and Adams (2007) found that a 1% increase in pay was associated with a decrease in teachers' probability of leaving the profession of just 0.5%. This estimate is consistent with results from several other studies of the relationship between base pay and turnover from districts (Hendricks, 2012; Clotfelter, Ladd, and Vigdor, 2011; Hansen et al, 2004; Hanushek et al, 2004, and Imazeki, 2005). These studies suggest that a 1% higher pay rate would be associated with a decline in turnover of between 0.1 and 0.4 percentage points. As a result, they generally estimate that a 10% increase in pay would be needed to substantially reduce overall teacher turnover. If that same amount of money were targeted to the effective teachers the state wants to retain, a substantially greater impact on retaining effective teachers could result.

[19] The exception would be if Maine is losing teachers to neighboring states or recruiting a high percentage of teachers from other states, a phenomenon that would need to be studied and which at this time is outside the scope of this study.

What this means for Maine is that if increases in teacher salaries are warranted as part of a set of strategies to enhance districts' ability to recruit and retain effective teachers, the increases should be substantial and not be provided to all current teachers. Instead, a redesigned salary schedule operated with effectiveness metrics derived from a new teacher evaluation system would be more effective in both recruiting and retaining effective teachers.

MASSACHUSETTS SIGNING BONUS

In response to the negative findings on the effect of overall salary increases in recruiting and retaining effective teachers, along with high failure rates on the state's new teacher licensure test, Massachusetts created a $20,000 signing bonus in 1998. The goal was to "encourage high achieving candidates who would otherwise not consider a career in teaching to enter the profession. The bonus was paid in four installments, $8,000 for the first year of teaching and $4,000 for each of three subsequent years. Bonus recipients would be eligible for each years' bonus payment as long as they were certified to teach in the state and employed as a teacher by one of the state's public schools. Nearly 4,000 individuals from forty states and eight countries applied for the program in the subsequent four years, suggesting the program was successful.

But a qualitative study of a quarter of the candidates from the first year (15 of 59 individuals) showed that most of the individuals taking the bonus were already planning to enter the teaching profession anyway and that their attraction to Massachusetts was an alternative training program (part of the signing bonus program) that accelerated their ability to get a teaching license, not the salary bonus itself (Liu, Johnson & Peske, 2004). The latter meant individuals could avoid the tuition and other costs of a traditional teacher preparation program. Moreover, many of the individuals who took the bonus left education, or at least Massachusetts, and did not earn the full four years of the bonus. The individuals who left stated that the bonus played a very small role in their decision to stay in education or teaching, and that working conditions in their school were much more important than monetary awards in their decision of whether or not to stay in teaching. Surprisingly, although large numbers of individuals from outside Massachusetts applied for the program, very few were selected so most bonus candidates were from inside the state. In addition, although the program was initially designed to place successful candidates in high need schools, less then 50% of those participating in the first four years of the program were so placed. Finally several criticisms of the seven-week summer training program suggested that it may have been inadequate to fully prepare first year teachers for the challenges of the job (see Fowler, 2009).

What this suggests for Maine is:

- Large signing bonuses might not be the most powerful factor nor the most effective way to entice individuals to enter the teaching profession
- Recruitment within the state and possibly neighboring states might be sufficient to recruit individuals to teach in Maine.
- Working conditions in schools are more important for retaining individuals in teaching than are financial incentives
- If Maine desires a national approach for finding educator talent, it might consider working with Teacher For America, a national organization expert in recruiting top talent

into rural schools (for the rationale, see Odden, 2013)

INCENTIVES TO TEACH IN SUBJECT AREAS WITH SHORTAGES

Several states have launched policies to provide incentives for teachers in areas experiencing shortages – usually mathematics and science, and often special education and ELL or LEP teachers.

Georgia implemented a program that, after the State Board identified subjects with teacher shortages, provided a pay increase equal to one additional step on the state's minimum teacher salary schedule for teaching in those subject areas. The increase was provided for each of three years, with funding provided by the state. We could find no information on the results of this program or its ability to attract teachers to these hard to teach areas.

Hawaii adopted a program focused on recruiting special education teachers in specified regions of the state. New teachers with one year of satisfactory teaching were eligible, as well as dual licensed teachers who decided to return to a special education classroom. The incentive was $3,000 a year for a maximum of three years. We could find no information on results.

New York State initiated a program focused on teachers both in hard-to-staff subjects and hard-to-staff schools. The purpose of the program was to provide incentives to teachers employed for the first time in a public school district. Awards were provided annually and were renewable for three additional years. The awards were $3,400 a year for a maximum of four years, or a total maximum award of $13,600. The awards were in addition to, and not part of, the teacher's base pay. We could find no information on results.

In 2001, North Carolina introduced a salary bonus program that paid up to $1,800 to certified teachers of math, science and special education in eligible middle and high schools. To be eligible, schools had to meet one of the following criteria: more than 80 percent of its students had to receive free or reduced price lunches; or the failure rate on both Algebra 1 and Biology end-of-course tests had to exceed 50 percent. The goal of the bonus program was to use financial incentives to induce teachers of subjects in short supply to teach in schools serving educationally disadvantaged students. Funding for this initiative was provided for two years and then discontinued. Clotfelter, Glennie, Ladd and Vigdor (2005) evaluated the program and found that it had very modest success in recruiting teachers into the identified schools.

These programs are typical of the kinds of salary incentives states have created for subject area shortages. The incentives tend to be small and are generally provided as an annual bonus, although the bonus might be earned for each of 3-4 years. The incentive is usually given to individuals already teaching in these areas, limiting the program's ability to encourage more individuals to enter the designated subject areas. The programs rarely have an "effectiveness" screen. As long as the teacher has a license in the subject area where there is a shortage, the teacher gets the bonus, whether or not there is evidence the individual is an effective teacher. Funding is usually dropped after a few years, even though the shortages continue. Finally, states rarely launch studies to determine whether the programs have the desired impacts. From

research we have found, programs had modest impacts and most have been discontinued with little information on their effects.

If Maine decides to establish a program of incentives for hard to teach subject areas, it should consider larger incentives, ensure that the incentives are provided only to effective teachers, provide funding for the long term, and undertake research studies to determine program impact.

INCENTIVES TO TEACH IN HIGH NEED SCHOOLS

State programs for high need schools generally focused on high poverty schools in urban communities. Similar to programs for subject area shortages, these programs rarely had an effectiveness screen resulting in provision of the incentive to any teacher, effective or not, willing to stay at or move to, a high need school.

The Arkansas program provided, at the beginning of the year, a $4,000 signing bonus for new teachers, with an additional $3,000 for each of the next two years if the teacher stayed in the district. Teachers already working in a high need school received a retention bonus of $2,000 at the beginning of the year for each of a maximum three-years. For both incentives, if the teacher left the district during that time period, the teacher would need to pay back the bonus from the preceding year. There was no effectiveness screen for teachers to be eligible for the bonus. We are unaware of any evaluation information on impacts.

Georgia's program for subject area shortages was assumed to apply to high need schools, as those were the schools with the largest shortages of teachers in the designated subjects. The incentive was an additional step on the salary schedule and as stated in the previous section, we found no information on results.

New York's Teachers of Tomorrow program was established in 2000 to assist school districts in the recruitment, retention and certification activities necessary to increase the supply of qualified teachers in school districts experiencing a teacher or subject area shortage, especially Schools Under Registration Review (SURR) which was New York's definition of persistently low performing schools. The incentive was $3,400 annually over a total maximum of 4 years, for a total cumulative award of $13,600. We could find no information on impacts.

Virginia created the Model Incentive Program to attract and retain "highly qualified" teachers in Virginia's hard-to-staff schools. Begun as a pilot program in 2005, the program provided a one-time hiring incentive of $15,000 to teachers who met the eligibility criteria and who agreed to move to a hard-to-staff middle or high school in one of the two participating school divisions. The relocating teachers had to agree to teach in the hard-to-staff school for at least three years and participate in training during the first year of the pilot program and in a formal support network during year two. Highly qualified teachers already in the schools received a one time $3,000 retention bonus. All eligible qualified teachers also had priority funding to seek Board Certification from the National Board for Professional Teaching Standards. The state provided $500 stipends during both years of the pilot to cover expenses related to training and professional development. Eligible teachers had to satisfy three criteria: 1) documented evidence of average or better student performance in the teaching area consistent with significant improvement in

student achievement; 2) above average or better performance evaluations supported by outstanding classroom observation reports for the last three consecutive years; and 3) letters of outstanding recommendations. The program was initially funded in the first year with Federal Title II funds but state funding was insufficient to cover future costs and the program was dropped after a few years. We found no information on program impacts.

For over a decade, Florida has had both signing and retention bonuses of $850 for teachers entering, moving to or remaining in low performing schools, i.e., those schools earning a "D" or "F" on the state's school accountability system. We could find no information on program impact.

An important study of bonuses for teaching in low-performing schools, conducted by Mathematica Policy Research for the Institute of Education Sciences (Glazerman et al, 2012), is just concluding. This study suggests that compensation incentives alone may not be sufficient to staff low-performing schools with more effective teachers. Though a substantial bonus was available ($20,000 for moving to a low performing school for two years) only 24% of the eligible teachers (identified based on high value-added estimates of effectiveness) applied to transfer. Ultimately, only 6% of those eligible transferred to the target schools. The bonus program did not provide the low-performing schools with substantially larger numbers of applicants. The study also suggested that a substantial effort is required to recruit interested teachers and help match teachers to vacancies. Among the important findings from this study are that it may be necessary to use a combination of financial and non-financial incentives to increase the supply of effective teachers to low performing schools, and that active recruitment and placement efforts need to supplement higher pay. It is also possible that the short-term nature of the bonus program discouraged teacher interest. It may be necessary to commit to a substantial number of years of higher pay to overcome teachers' reluctance to leave schools where they are comfortable.

These programs follow a general trend in teacher incentive programs of providing modest bonuses, ending funding after a few years, collecting little if any data on impacts, engaging in little if any active recruiting, and except for Virginia, having weak criteria to insure that only effective teachers received the bonuses.

The conclusion for Maine is similar to what we noted for subject area shortages. If Maine adopts incentives for high need schools, including rural schools, the incentives should be sufficiently large to recruit and retain teachers, only effective teachers should be eligible to receive them, the state should launch efforts to recruit candidates, and the state should fund studies of program impact.

PERFORMANCE INCENTIVES

Several states have designed and implemented performance incentives; initially such programs were targeted to all teachers in schools that had boosted student performance, but more recent programs have targeted individual teachers.

The oldest state sponsored performance-based incentive programs were school-based, and provided all teachers and administrators in award schools with bonuses. For example, Kentucky's program operated during the 1990s and was based on school wide improvements in the performance of cohorts of students over time (this year's grade 4, 8, or 10 students versus last year's grade 4, 8, or 10 grade students). Awards were in the range of $2,000 per teacher.

Charlotte-Mecklenburg, an urban district within North Carolina (see the state's program below), began a bonus program on its own before the state acted, and then modified its program to conform to the state program. Using expectancy theory to study the effects of these programs over about three years, Kelley, Heneman and Milanowski (2002) found that the bonuses were provided only when schools boosted performance beyond historical trends, that teachers supported the goal clarification the programs provided and liked the monetary bonus. They further found that the programs worked best when principals supported the goals of the program (mainly increased student achievement in state tested subjects) and orchestrated the school around initiatives designed to help teachers attain the goals – no disruptions during math and reading periods, extensive and ongoing professional development, and collaboration with teachers on how to get the job done.

The Florida School Recognition Program provides public recognition and financial awards to schools that have sustained high student performance or schools that demonstrate substantial improvement in student performance. The Florida Legislature created the program in 1997 and appropriated funds for awards in 1998. The A-Plus Plan for Education standardized program criteria and awards in 1999. It provides about $100 per pupil to schools that have continued to earn an "A" designation, to schools that have shown significant improvements that include moving from one grade to a higher grade designation and to schools that move a grade and sustain that movement for at least another year. The faculty and local school councils decide use of the funds and the funds can be used for bonuses for staff in schools as well as for school improvement activities. In 2012, 1,696 of 3,629 Florida public schools received awards.

Georgia had two performance incentives. For the school-based program, which ran from 1993 to 2004, the State Board of Education set performance criteria to evaluate proposals submitted by local schools or systems for determining exemplary performance at the school site. The criteria related to the overall educational performance of the school in areas related to student outcomes and achievement. The criteria had to reflect the six national goals for education adopted under Georgia 2000 and socioeconomic or other demographic factors that may affect student achievement or other outcomes of education. The criteria further reflected school level improvement on identified performance criteria, such as the number of remedial and Chapter I students that achieved grade level performance. The size of the awards varied depending on state funding and the number of schools or school systems eligible, but the goal was to provide awards to schools that equaled $2,000 for each teacher in the school. Awards were provided to the school and the school's certificated personnel determined how the awards were used.

The award dollars could be given to faculty members in the form of bonuses or spent for the purpose of providing faculty sabbaticals, for instructional or other equipment, for staff development, for distribution to other school staff in the form of bonuses, or for any other expenditure deemed appropriate by the local school's certificated personnel. The Center on

Educator Compensation Reform (2008) found that the number of schools and districts participating grew from a small base to much larger numbers over time. It also found that about 60 percent of participating schools earned an award from the program, with the proportion ranging from 43 percent in the 1994–95 school year to 78 percent in the 1995–96 school year. As more schools applied to participate in the program and the approval rate increased over time, the number of schools earning an award grew each year, from 10 the first year to 116 in the seventh year, though the proportion of participating schools earning an award declined to about 50 percent during the last three years of the program.

For the program focused on individual teachers, Georgia provided teachers who acquired rights to continued employment (tenure) an increase in annual state compensation of five percent beginning the school year following any year in which the students taught by the teacher showed a significant increase in average scores on the criterion-referenced test or any other test selected by the state board of education. The state board was charged with defining "significant increase" and the increase earned was in addition to all other increases for which the teacher was eligible.

Mississippi's Performance Based Pay (MPBP) plan was designed to reward licensed education personnel at schools showing improvement in student test scores. The program was based on a standardized scores rating where all levels of schools can be judged in a statistically fair and reasonable way upon implementation. We could find no clear information on funding or impacts.

North Carolina had a performance-based pay bonus designed in the mid-1990s that operated for two decades (Johnson, et al., 1999). Individual schools received financial incentives based on student achievement growth and the proficiency rate within schools. Initially, the state used a value-added model, with no adjustments for student Socio-Economic Status (SES), to determine school growth rates. The program provided incentive awards to teachers, principals and other certified school-based staff, as well as teacher assistants. In schools that attained the High Growth standards, certified staff members each received up to $1,500 incentive awards and teacher assistants received up to $500. In schools attaining the Expected Growth standard (but less than High Growth), certified staff members each received up to $750 and teacher assistants received up to $375. The program was funded with about $100 million of state funds annually. In 2004-05, 69 percent of all schools made Expected Growth or High Growth, which was down from the 75 percent that met Expected Growth or High Growth in 2003-04.

The experience gained from these programs suggest several things to consider as Maine reviews its teacher compensation strategies:

- Performance incentive programs can be designed and operated over several years if properly funded
- These programs help to clarify for teachers and principals the most important goals of the education system
- Teachers and principals support such fiscal incentives
- The programs foster and do not detract from collaborative work in schools

To date there is no information on whether such programs *by themselves* increase student achievement. However, studies of two performance-based incentive programs operated by districts – Nashville and New York City – that randomly assigned schools and teachers to the program, found no evidence that the programs boosted student achievement (Marsh, et al., 2011; Springer, et al., 2010). Kelley, Heneman and Milanowski (2002) would argue that such programs should operate within a broader context in which the education system sets clear student performance goals, hires principals to lead schools around attaining those goals, provides teachers with multiple supports including ongoing professional development to produce the gains in student performance, and consider the performance bonus programs as reinforcing these other and broader system initiatives. Such programs do, however, target bonus incentives to schools or individuals that produce larger than historical gains in student performance.

EFFORTS TO HAVE LOCAL DISTRICTS DESIGN PERFORMANCE PAY STRUCTURES

Several states have provided funds to local districts to design their own performance pay programs including Arizona, Florida, Minnesota and Texas.

Over a decade ago, Arizona, via referendum, raised the sales tax for schools, a portion of which was set aside for locally designed performance pay programs. Though nearly all districts participated in the program, policymakers were disappointed with the programs that were developed as the locally designed programs usually made all or large portions of teachers eligible for the awards, with little distinction among teachers or schools in the allocation of the awards or award levels.

For several years, Florida required local districts to design performance pay structures, but with no additional funding. These efforts began in 1998 as part of then Governor Jeb Bush's A-Plus Education Plan. The requirement was for districts to evaluate teachers mainly on student performance, to identify those with "outstanding performance," and provide them a salary bonus equal to 5 percent of the statewide average teacher salary. However, no state money was provided and the bonus funds had to come from district salary budgets. Most districts and most teachers and their unions opposed these ideas. Many districts refused to develop programs, and most of those that did made eligibility so difficult that by design very few teachers ever earned a bonus. The program was modified over the years to identify the top 10% of teachers and then the top 25% of teachers, but never received specific state funding. In 2011, the current iteration of the program emerged. It requires every teacher to be evaluated with a system that is based 50% on a set of teaching standards (many districts use the system developed by Robert Marzano) and 50 percent based on student achievement. As a result, nearly all districts have created student tests in all subject areas that are not tested by the state. For 2011-2012, districts set cut scores for slotting teachers into 4-5 bands of effectiveness; and the Florida Department of Education reported that on average, 97+ percent of teachers were placed into categories of developing, effective, or highly effective, with less than 2.5 percent in the ineffective category.

The intent is to use the results from these evaluations to operate locally designed merit pay programs, though the 2011 evaluation results suggest that this could be very expensive as so many teachers were placed into effective or higher categories. During the 2012-13 school year,

the state will begin to set much more rigorous cut scores, hopefully making the new evaluation results more reflective of actual teacher effectiveness and more appropriate for use in a new salary schedule. At this time, districts are in the process of designing systems that would use the evaluation metrics from the 2013 evaluation standards, but only the future will tell how successful these efforts – both the new evaluation metrics and the new pay systems – will be.

Minnesota's QComp was enacted in 2005 to encourage local districts to redesign teacher salary schedules. To be eligible for the state support, the new programs required five components: 1) Career ladders for teachers; 2) job-embedded professional development; 3) instructional observations and standards-based assessments; 4) measures to determine student growth; and 5) alternative teacher compensation or performance pay. Close to 150 Minnesota districts participated but few included rigorous elements based on improved student performance and most made modest changes to the traditional salary schedule. See Heneman (2008) for an overview.

The Texas Educator Excellence Awards Program, began in 2006, provided grants to school districts for the purpose of providing incentive payments to employees under the terms of locally developed awards plans approved by the Commissioner. The goal of both programs was to reward teachers who had a positive impact on improving student achievement. Incentive payments and award payments for individual teachers were based on student learning gains and collaboration with other faculty and staff resulting in overall student achievement. Teachers serving in critical shortage areas and hard to staff schools could also be awarded incentives. State appropriations could not exceed $100 million for the 2006-2007 school year and state costs for fiscal year 2008 were estimated at $261 million in general revenue, increasing to $328 million by fiscal year 2011. An external evaluation of the impacts of this program (Springer et al., 2009) found that: most eligible schools participated; most of the awards were targeted to individual teachers; the award amounts varied around $3,000 (though the state had recommended lower minimums and maximums to $10,000); most teachers and administrators supported performance pay and claimed the program did not deter collaboration among teachers; and that the program did not reduce teacher turnover and had no discernable impact on student achievement.

We conclude that deferring the design of new compensation systems to local districts, without clear guidance or limitations on the structure of the elements of the systems, has not been very successful. Few districts have the will or inclination to make distinctions among teachers either in their level of performance or awards for improved performance. While there is hope that the current fervor in restructuring teacher evaluation systems, which in the past have typically found 95+% of teachers satisfactory even when student performance is dismal, the early results from those efforts have dimmed that hope. New evaluation systems in Florida, Georgia and Michigan, where local districts made decisions on cut scores for different performance categories, found that 95+% of all teachers in each state were developing, effective or accomplished, just like the older systems.

Our conclusion from this is that states need to take lead roles in designing new salary schedules for teachers, allowing collective bargaining to determine details but on basic and more rigorous

structures specified by the state. Specifically, if new salary schedules based on new metrics of teacher effectiveness are to work, states need to be more involved in setting cut scores.

CAREER LADDER PROGRAMS

State experiences with career ladder programs have fallen short of success. Career ladder programs were most popular in the 1990s and early 2000s. As a way to identify and retain the best teachers, the concept was to identify three or so career ladder levels and use performance metrics to make teachers eligible for entrance into the various career levels. Most plans deferred to districts to design the programs, as well as to designate the work tasks and reward levels for teachers in the different career levels. Disappointment with the programs led to the demise of nearly all programs, with the longest lasting one in Arizona, though it was never expanded from the 28 districts that initially participated.

Today, the program most closely aligned with a career ladder is the Teacher Advancement Program (TAP), originally created by the Milken Family Foundation (Center on Education Compensation Reform, 2010). This program uses rigorous teacher evaluation methods – a measure of teaching practice adopted from the Danielson Framework (2007) and value-added metrics of teacher impact on student achievement – to slot individuals into career positions of lead teacher and master teacher. To use those individuals, the program organizes schools into teams, each coordinated by a team leader, and provides extensive ongoing professional development supported by "master teachers," what most today would call instructional coaches. The TAP program has substantial potential for both improving teachers' instructional practice as the school is organized to do, and as an effective new way to structure how teachers are paid (see for example, Jerald, 2009).

STATE PROGRAMS DEVELOPED UNDER THE FEDERAL TEACHER INCENTIVE FUND (TIF)

Several states have participated in the US Department of Education's Teacher Incentive Fund (TIF) program, which provided incentives for developing performance-based compensation for teachers and principals. Of the 62 Round three and 35 Round four grants currently in operation, states sponsored eight of the Round three and four of the Round four programs. Maine sponsored a program covering six districts for TIF 4, following up on a TIF 3 grant in which four districts participated under the auspices of the National Board for Professional Teaching Standards. The TIF program targets high–need schools; thus state–sponsored TIF programs do not include all of the state's districts. However, TIF provides a way for states to try out performance-based compensation at the local level before implementing it statewide.

In the first three rounds of the TIF program, almost all grantees used one-time bonuses to recognize high performance at the school or teacher level. Only one grantee (Harrison County, Colorado) revised the traditional pay structure to include performance as a determinant of pay progression. In the fourth round, the Federal government put more emphasis on rewards based on individual teacher performance (as opposed to school-wide or grade-level performance) and required rewards to be based substantially on measures of student achievement growth. TIF 4

also requires that grantees use teacher and principal evaluation systems that include student growth as a component. Meeting these requirements has required grantees to develop the tools needed to implement reforms in pay schedules. While TIF 4 also did not require changing the traditional pay schedule, some grantees received extra points in the grant competition for proposing to do so. Five Round 4 grantees are using TIF as an opportunity to develop new base pay schedules that would use metrics from a performance evaluation to determine pay progression all or in part. State grantees taking this approach include Tennessee (planning and piloting) and the District of Columbia (in limited use).

NEW SALARY SCHEDULES

There are a few emerging efforts to redesign the entire salary schedule, using results of effectiveness from new teacher evaluation efforts. We profile two such efforts: a generic approach Odden and Picus have developed, and the pilot program currently operating in Tennessee.

The Odden-Picus Salary Schedule Approach to Recruiting and Retaining Effective Teachers[20]

Odden and Picus have designed a salary schedule that draws on the fact that the education system has the ability to measure a teacher's instructional practice in ways that categorize teachers by their effectiveness in producing student learning gains (e.g., Milanowski, 2004; Measures of Effective Teaching Project, 2012; Milanowski, Kimball, and Odden, 2005; Tyler, et al., 2010). Using measures of practice, student data and student surveys, the education system can produce valid and reliable metrics of teachers' effectiveness. In most education systems developing these systems, the metrics produced result in four or five effectiveness categories. As indicated above, when establishing these effectiveness categories, states need to be involved to ensure the cut scores between categories are rigorous. Although there are many ways that such effectiveness measures could be used to redesign a teacher salary schedule, the following example assumes a well developed four level metric of teacher effectiveness exists[21] and provides the long-term vision for how an effectiveness-based salary schedule could work (see also Heneman & Kimball, 2008; Milanowski, 2003; Odden and Wallace, 2007).

Before describing this model, we note that such effectiveness metrics can be a central part of overall changes in human capital management systems with all programs – recruitment, placement, distribution, promotion/tenure, performance management, compensation and dismissal – informed by measures of effectiveness. Such programs have been labeled "strategic human capital management" systems (see Odden, 2011). Further, the 2012 federal TIF regulations require states and districts that apply for this round of TIF grants to first develop

[20] This section is an edited version of a part of Chapter 11 in our forthcoming school finance text: *School Finance: A Policy Perspective, 5th Edition*. New York: McGraw Hill.

[21] We note again that the systems now being developed across the country have not been rigorous in setting cut points that determine different performance levels, thus categorizing 95+% of all teachers as effective or better. Such systems would not be useful in running the salary schedule we propose as it would move nearly all teachers into the top categories, allegedly on the basis of effectiveness.

"human capital management systems" to operate *all* their human resource management programs, with measures of effectiveness a central feature of each program. The regulations, correctly from our perspective, argue that this is the systemic approach for developing compensation systems that use effectiveness metrics, thus making new effectiveness-based compensation systems part of an overall human capital management system that signals that teacher effectiveness is the prime goal and the route to higher levels of student achievement.

A framework for an ambitious effectiveness-based teacher salary schedule is displayed in Table 7.2.[22] The three-lane model shown provides financial incentives for some degrees. The schedule has four effectiveness categories, and while it retains the structure of the current single salary schedule, as there are several rows and three columns, it represents substantial change. For most states and districts, including Maine if it were to adopt such a system, this schedule would replace a 20 plus step and 6 plus lane traditional schedule. The smaller number of columns sends the signal that miscellaneous units will no longer be rewarded. The units must earn a master's degree, and then a doctorate or specialist certificate, and only in the area in which a teacher is licensed and works. Though the number of rows is reduced, the key aspect of this schedule is that it includes four effectiveness and pay categories that are determined by a teacher's performance on a newly designed performance-based evaluation system, such as is being developed in Maine. The schedule could be augmented with a fifth level of effectiveness if the Maine system produces that number of performance categories.

[22] All the specific salary numbers and percentages are placeholder numbers and can be set at appropriate levels by any state or local school district.

Table 7.2 Proposed Teacher Salary Schedule Based on Multiple Measures of Teacher Effectiveness

		Step Within Level	BA	MA	MA 60/ Doctorate
Entry	Level 1 Effectiveness	1	$40,000	$41,600	$43,264
		2	$40,600	$42,224	$43,913
		3	$41,209	$42,857	$44,572
Emerging Professional	Level 2 Effectiveness	1	$45,330	$47,143	$49,029
		2	$46,010	$47,850	$49,764
		3	$46,700	$48,568	$50,511
		4	$47,400	$49,297	$51,268
		5	$48,112	$50,036	$52,037
		6	$48,833	$50,787	$52,818
Professional	Level 3 Effectiveness	1	$56,158	$58,405	$60,741
		2	$57,000	$59,281	$61,652
		3	$57,855	$60,170	$62,577
		4	$58,723	$61,073	$63,515
		5	$59,604	$61,989	$64,468
		6	$60,498	$62,919	$65,435
Master	Level 4 Effectiveness	1	$72,598	$75,503	$78,522
		2	$73,687	$76,635	$79,700
		3	$74,792	$77,785	$80,895
		4	$75,914	$78,951	$82,109
		5	$77,053	$80,136	$83,340
		6	$78,209	$81,338	$84,590

Notes:

Percent increase for effectiveness level:	Level 2: 10%; Level 3: 15%; Level 4: 20%
Percent increase for step:	1.5%
Math and science incentive:	10 %
MA, MA60/Doctorate in license field	4 %
National Board Certification	10 %

The schedule works the following way. Pay increases would be large for movement across effectiveness categories and much smaller for step movements within categories. In the example given, the step increases within effectiveness categories are just 1.5 percent while the effectiveness category increases are 10 percent for moving from category 1 to 2, 15 percent for moving from category 2 to 3, and 20 percent for moving from category 3 to 4. The salary increases become larger as the teacher's effectiveness reaches higher levels. The message is that teacher instructional performance – effectiveness – is the main way to earn salary increases.

Initially, teachers would be screened for "Entry"; this is most likely the preliminary license provided through a postsecondary training program, or perhaps some type of alternative training

program. During the time in "Entry," teachers would be involved in intense and focused new-teacher induction/mentoring programs.

Next, teachers go through a performance evaluation at the end of year three. Full, comprehensive evaluations with measures of teaching practices and multiple measures of student data are time consuming and should only be conducted every three or so years. Teachers who meet the effectiveness standards would move into the "Emerging Professional" level. If their performance did not rise to that level by the end of year three, the teacher would lose his or her job in the district. Thus the entry level includes an "up-or-out" element based on individual performance.

In many states that have a two-tiered licensing system (National Council on Teacher Quality, 2011; Youngs, Odden, and Porter, 2003), moving into "Emerging Professional" could coincide with earning the professional license, which is usually done through a performance assessment of the individual's instructional practice.

After earning the standard license and being in the "Emerging Professional" category, teachers would continue with ongoing professional development and undergo a periodic performance assessment. Toward the end of the third year in that category, teachers could request an assessment, and if their performance met the standards for the next category, they could jump to "Professional" step one. If they were unable to meet the performance standards of the Professional category, they would continue to receive step increases in Level two but their salary would be capped at "Emerging Professional" step six.

The system could require that teachers meet the "Professional" standard in order to stay in the system—potentially a new tenure standard. If the professional license is granted after a teacher has been working for two to four years and meets the standard for "Emerging Professional" (the time period can vary), it might make sense to postpone the tenure decision until a later time (see Odden, 2011 for a more comprehensive discussion of this issue).

Finally, once in "Professional" teachers would undergo a periodic performance assessment. Toward the end of year three in that category, teachers could request such an assessment and if their performance met the standards for the next category, they could jump to "Master," step one. However, the standards for "Master" need to be rigorous, and not all teachers would be expected to perform at this level. We would hope a large percentage would reach that level, and there should be no quota for the number of teachers who reach that advanced level of performance. As outlined, this schedule provides a fast track to the top for teachers who enhance their instructional practice and caps the salaries of those who do not.

To make operational a salary schedule like the one proposed here, Maine needs a performance evaluation system that produces at least four levels of effectiveness, with rigorous standards for movement into all effectiveness categories. (The system could be augmented with a fifth level if the evaluation system produced five effectiveness categories.) It is difficult for districts to design a salary and evaluation system from scratch so it is wise for states to be centrally involved in such efforts. Today, moreover, nearly two-thirds of states, including Maine, are creating performance-based evaluation systems, in part as a response to the federal Race to the Top program, and in part as a condition for receiving an NCLB waiver (see National Center on

Teacher Quality, 2011). By 2015 or so, Maine should have evaluation systems that include effectiveness metrics for teachers, and if sufficiently rigorous, these metrics could be used to operate a salary schedule like that depicted in Table 7.2.

To address issues like incentives for teaching in hard to staff schools – including rural schools – or hard to staff subjects, the basic salary schedule described above can be retained and incentives added.

The salary structure in Table 7.2 can be enhanced with additional incentives for the following:

- Incentive payments for teaching subject areas where there are teacher shortages, such as mathematics and science. We would advise Maine to consider incentives of at least $5,000 a year for such hard to staff subject areas if they find it difficult to employ quality teachers in those positions.
- Incentive payments of at least $5,000 per year for hard-to-staff, high-need schools, which could include rural schools.
- Incentives for certification by the National Board for Professional Teaching Standards: incentives in the 10–20 percent range ($4,000–$8,000 annually), rather than just a one-time bonus, will motivate teachers to enhance their practices to the high and rigorous standards set by the National Board. Though many policymakers have raised questions about the efficacy of National Board Certifications, research shows that only the best teachers try to earn National Board Certification, and of those who try, those who earn the certificate produce higher learning gains than those that do not earn certification (Goldhaber & Anthony,2004).

A new structure like that depicted in Table 7.2 represents a strategic way to redesign the teacher salary structure. It pays teachers largely on the basis of their instructional expertise and effectiveness. It signals that enhancing one's knowledge and skills is the way to higher pay levels, and it links the highest pay to the most effective teachers. Long term, a structure that resembles that in Table 7.2 should be a strategic goal for many states and local districts and would be an effective way to recruit and retain highly effective teachers, assuming the salary levels were appropriately benchmarked to Maine's labor markets for teachers and other comparable jobs.

Because a schedule such as that depicted in Table 7.2 is a dramatic change from current teacher salary schedules, Maine could transition into it over time. A first step would be to create a performance evaluation system, as the state currently is doing. The prime challenge will be for the state to set rigorous requirements for entry into effective or higher performance categories.

In the first several years, the score on the evaluation system could be used to trigger a salary incentive on top of the state or district's single-salary structure. This would entail grafting a new element onto the old structure. After the performance evaluation system is up and running, and really differentiates teachers by their effectiveness, more dollars could be directed to the incentive element of the system. At some point, all new dollars could be put into the incentive element based on the evaluation score. Then a transition to the structure depicted in Table 7.2 could occur. In this way, some portion of pay would initially be contingent on the level of a teacher's instructional expertise and effectiveness, over time the evaluation system could shift so

the level of a teacher's effectiveness on the performance assessment/evaluation would be the major determinant of the teacher's pay.

For such a salary schedule, Maine would need to determine the actual benchmark figures for the beginning salary with a BA, the salary where the bulk of teachers might be placed (e.g., Professional, step six), and the various percentage increases within and across effectiveness categories. We note also that such a schedule could be used as a minimum for the "average" district with all numbers adjusted by the CWI regional index.

Tennessee

Tennessee is beginning to develop salary structures like the Odden-Picus schedule discussed above, i.e., using the results of its new performance evaluation of teachers, based 50 percent on instructional practice and 50 percent on student growth as measured by a value-added model, to drive increases in salary. Tennessee is urging local districts to design new and more strategic structures that use the metrics of effectiveness from the new evaluation systems to trigger salary increases. Four districts designed new structures in 2012, to be implemented in 2013. All four districts will award increases in base pay to those teachers evaluated as meeting or exceeding expectations, with larger increases for teachers with higher evaluation scores. Teachers evaluated as not meeting expectations will not receive raises. These districts also will provide bonuses for improved student achievement and for teachers taking on leadership positions in schools. These new schedules not only provide increases based on teacher performance but also are designed so that the most effective individuals can reach the top of the schedule more quickly. Tennessee also argues that these new salary structures are more sustainable because they use the funds currently in salary budgets to finance the programs, thus restructuring current salary dollars rather than just adding elements on top. Only time will tell how these initial initiatives are expanded and what the impacts and costs are over time.

SUMMARY: CONCLUSIONS AND RECOMMENDATIONS

Based on the analyses in this chapter, we offer the following conclusions:

- Maine's goal of providing regional adjustments for teacher salary differences is appropriate but the index currently in use does not appropriately control for teacher quality. It provides more resources for districts that have chosen to pay higher salaries in the past and fewer resources to districts that pay lower salaries in the past. As a result, SAU's do not have an equal chance at recruiting and retaining effective teachers.

- State efforts, including signing bonuses, to provide incentives for hard to staff subjects and hard to staff schools, have been largely ineffective. Reasons for this appear to be:

    - The incentives are often too low
    - The incentives are seldom accompanied by aggressive recruitment efforts
    - Frequently missing is an "effectiveness" screen, resulting in both effective and in effective teachers receiving the incentives

- States have not conducted studies to assess implementation and impact of the incentive programs. Consequently policy makers don't know whether or not the program was successful.

- Most state efforts to decentralize design of teacher pay incentives as well as the more ambitious performance pay systems have produced disappointing results.

- Recently adopted teacher evaluation systems that allow local districts to set "cut points' for determining different teacher effectiveness categories have not yet been shown to be effective.

- The current teacher salary structure in Maine, which like most salary structures provides pay increases based on years of experience and education, are not linked to teacher effectiveness, with the possible exception of the first two to four years of a teacher's career.

As a result of these findings from the experiences of Maine and other states, we offer the following recommendations:

1. Maine should replace its approach to providing regional adjustments to teacher salary levels and shift to either a Comparable Wage Index or a Hedonic Wage Index. The goal of these regional adjustments is to modify resource levels so each SAU has access to purchase educators of the same quality. In contrast, the current approach essentially reinforces prior salary level decisions by SAUs. Districts that pay higher salaries are provided more funds and districts that pay lower salaries are provided fewer funds, reinforcing those differences rather than adjusting for them. Both the CWI and the hedonic index provide regional adjustments for salaries but those adjustments are calibrated to allow each SAU to hire educators of the same quality.

2. To determine if current teacher salaries are at the appropriate market level, Maine should benchmark teacher salaries to salaries in Maine for jobs that are comparable to teaching, not to other states or the national average.

3. Maine should be more strategic in recruiting and retaining effective teachers by, shifting its teacher salary structure from the current system based on years of experience and education – which is not strongly linked to effectiveness – to an alternative approach such as the Odden-Picus structure. The new structure should provide major salary increases when a teacher's instructional effectiveness improves. Maine could use the results from its current efforts to change how teachers are evaluated to operate such a structure but we would further recommend that the state, not local districts, set the cut-points for the various effectiveness levels, with the recommendation that the lower bound for the effective category be set no lower than the 35th-40th percentile.

4. If, even with these changes, some SAUs continue to have difficulty staffing some schools or subject areas, Maine could provide additional incentives for hard to staff subjects or hard to staff schools. We recommend initial incentives in the $5-6,000 range for teachers moving to new hard to staff schools or districts. We also recommend that teachers who have more than

five years of experience be eligible for the incentive only if they had a performance rating of "effective" or better. Once in the new school or district, we recommend ongoing retention incentives of $4,000 per year, paid as a bonus at the beginning of the year. A comprehensive recruitment program making aggressive recruitment an integral part component of the program should accompany an incentive program like this. Finally, we recommend that the state fund ongoing analyses of the implementation and impact of the incentive programs to determine whether they are working to move effective teachers into hard to staff schools and subjects and to retain them at those sites.

5. If Maine decides to create any of these compensation incentives, the key features should be developed at the state level. Nearly all other states that have devolved the design of performance pay incentives to local districts have not been satisfied with the results.

CHAPTER 8: CONCLUSIONS AND RECOMMENDATIONS

The material presented in Chapters 2-7 offer a comprehensive description of Maine's education funding system, particularly the EPS. This chapter first summarizes what was reported above, and then outlines our recommendations for next steps. The final decision as to what will be included in the second part of the study is, as planned, subject to our discussions with the Committee once they have reviewed this document.

SUMMARY OF STUDY FINDINGS (PART 1)

Overall, we found that the Maine's per pupil expenditures for K-12 education are among the highest in the United States – although they are comparatively low among the six New England States. Moreover, the distribution of revenues to local districts (SAUs) meets accepted levels of equity based on current school finance literature. While expenditures have grown in recent years, student performance has been relatively flat. Test scores compared to the rest of the country are relatively strong but about average in comparison with the other states in New England. The system operates well, but we identified a number of issues the state may want to consider as it moves forward in its efforts to improve learning for all children in its public schools.

Comparison with Other States

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

Educational Expenditures

- From 1999-2000 to 2009-2010, state and local revenue for public K-12 education in Maine grew from $1.62 billion to $2.35 billion - an increase of just over $728.6 million or 45%. During the same time period, state and local revenue for K-12 education in all 50 states increased by 49.4% ($171.6 billion). (U.S. Census, 2012) – See Appendix 3.A for a fifty-state summary.
- Between 1999-2000 and 2009-2010, Maine's per pupil expenditures grew from $7,595 to $12,259-an increase of 61.4%. Average per pupil expenditures on a national level increased from $6,836 to $10,600- a 55.1% increase during this same time period. (U.S. Census, 2012) - See Appendix 3.B for a fifty-state summary.

Student Population

- Maine has experienced a decrease in student population of 20,533 (10%) over the past decade (2001-2002 to 2011-2012). See Appendix 3.E for a fifty-state summary.
- Average school district size has declined to 808 students – making the state's school districts the 4th smallest in the nation with an average enrollment that is 25.4% the size of the average school district in the United States. See Appendix 3.F for a fifty-state summary.

Staffing

- Maine has seen an increase in the number of new teachers and a slight reduction in the number of administrators in the past decade. See Appendices 3.H and 3.G for a fifty-state summary.
- When combined with the decline in student enrollments, Maine has one of the lowest student to teacher ratios in the country. See Appendix 3.I for a fifty-state summary.
- The reduced student-to-teacher ratios are a major cause of the state's increases in per pupil expenditures.

Student Achievement

- In 2011, Maine's student test results on the National Assessment of Educational Progress (NAEP) in math and reading were mixed when compared to other states
- Maine has a four-year high school graduation rate of 79.9% which is 4.4% above the national average but trails many comparable states. See Appendix 3.M for a fifty-state summary.
- Maine's New England Common Assessment Program (NECAP) test results have been flat over the past two years and trail the scores of students in New Hampshire and Vermont in math, reading and writing in all grades.

Equity Analysis

Maine has designed a school funding system that provides districts with an equitable distribution of resources. However, the differential ability of districts to raise funds above what the system requires somewhat reduces the fiscal neutrality and the equity of the system. The funding disparities appear to be based more on fiscal capacity than variation in student needs.

Overall, two patterns consistently emerge from our equity analysis of the Maine school funding system. First, we found that the system, as designed, met (or very nearly) met all of the strict benchmarks established by Odden and Picus (2014) for fiscal neutrality and equity. This finding held when we used multiple measures of both property wealth per pupil and per capita income, and when we used both weighted and unweighted pupil counts in the analysis.

The second important pattern relates to reductions in the equity and fiscal neutrality of the system when we included local revenue raised through property taxes above the level of EPS funding. The revenue equality statistics indicate that funding disparities in Maine arise to a large degree from wealth disparities across SAUs whether measured on the basis of property wealth per pupil or median per capita income. One approach for mitigating this reduction in equity is to add a second equalized tier to the school funding formula, by providing percentage power equalization or a guaranteed tax base to equalize property taxes above the required rate to fund

the required local contribution to the EPS. This would provide aid in inverse relation to a district's wealth for decisions to increase taxes to fund expenditures above the EPS level.

Another important finding relates to the vertical equity of the system. The equity of the system changes very slightly for the worse when student counts were weighted by student needs, which implies that the funding disparities were not attributable to meeting the special needs of at risk students. This finding suggests that the state might want to consider new ways of providing funds to school districts in order to help them meet the needs of their neediest students.

Tribal Funding

Our primary finding from an assessment of Tribal funding in Maine and across the United States is that each state has its own approach for funding schools for Native American children. These approaches rely on a combination of state and Federal sources and are hard to compare across states. If Maine wants to provide more funds for indigenous students, the state could encourage districts to take advantage of available Title VII funds. As of 2010, there were 16 districts with between 10 and 20 American Indian students enrolled (not including those who identify as American Indian and another race under "two or more races"), only one of which we can confirm is receiving either Title VII or Johnson -O'Malley (JOM) funds. There are 13 districts with between 21 and 50 indigenous students (again, not including those who designate themselves as American Indian and another race), only 4 of which have JOM or Title VII-funded programs. Finally, of the five districts that enroll over 50 American Indian students, three are part of Maine Indian Education, while two, Calais and Bangor, are not. In particular, the growing number of Indian students in Bangor should be served, as well as those in Calais. Those districts could apply on their own or collaborate with one or more of the tribes in Maine; there is no requirement that the American Indians served under these funds be enrolled in any specific tribe.

Likewise, districts could collaborate with tribes to extend services under Johnson-O'Malley funding, if the tribes were willing. There is not a requirement that students be enrolled in the tribe providing the services, just that they be eligible by the criteria described above. In Anchorage, Alaska, Cook Inlet Tribal Council serves any American Indian or Alaska Native student in their Johnson-O'Malley programs in Anchorage, regardless of their enrolled tribe, so long as they are eligible for the services. This may not be financially viable under the current JOM funding scheme, but it appears that the program may be revived and expanded. The state and its tribes should monitor the efforts to increase JOM funding at the national level and make sure that accurate counts of eligible children are provided to the Bureau of Indian Affairs.

Our specific findings related to tribal funding include:

- The three Maine Indian Education schools appear to receive per pupil revenues that are substantially higher than the state average funding level.

- The mix of state and federal funding for the tribal schools in Maine is set by the Maine Indian Claims Settlement Act of 1980. It would require tribal and federal agreement to modify the Act.
- Most Maine school districts that are eligible for Title VII funds (districts serving 10 or more American Indian/Alaska Native students) do not receive the funds. Districts could apply for these moneys, generally about $300 per student, which are supplemental and can be used for a broad array of approaches to support indigenous students.
- The state of Maine should decide whether or not to provide a different set of options for secondary students exiting the tribal schools, depending on whether there is evidence about whether these students are succeeding in high school.
- The Committee may want to study spending patterns in the tribal school more closely.

Comparison of EPS with EBM

In Chapter 6 we provided a side-by-side comparison of the elements of Maine's EPS with the elements of the Evidence Based Model (EB) that we have developed for use in other states. We also provide the research basis surrounding each individual issue[23].

The EB model uses a similar structure and approach to that used by the EPS in Maine. The EB model provides resources to meet all seven Learning Results categories in Maine and provides additional resources that in our view establish a comprehensive education system as called for in the Resolve. The EB model provides sufficient resources for all schools to offer a full liberal arts curriculum that offers an education program designed to meet college and career standards for all students. The EB approach is also sufficient to allow schools in Maine – if they use the resources in the most effective manner and organize teachers into collaborative groups – to dramatically increase student achievement on standardized performance tests such as the NECAP. Examples of resources that are included in the EB, but are not specifically included in the EPS include career and technical education, gifted and talented education and co-curricular activities.

The comparisons provided in Chapter 6 show a number of differences in the specific staffing ratios for different grade levels, educational programs and support services, and differences in per pupil funding levels for certain resources. It appears that in some instances the cost of EPS exceeds the EB and in others the reverse is true – EB costs exceed those of the EBM. Once we have completed our EB model for Maine during Part 2 of the study, we will be able to quantify those differences by specific program area. Examples of areas where EB funding exceeds EPS include an ongoing, systemic and comprehensives professional development program and more extra help resources for at-risk students.

We recommend that the Committee assess the differences and similarities between the EB and the EPS, as well as the cost differences between the two that will be identified in Part 2 of this

[23] Readers interested in more detail on the EB should review our textbook, *School Finance: A Policy Analysis, 5th Edition*. (Odden & Picus, 2014).

project, and we look forward to ongoing discussions with the Committee as it decides whether to modify the current EPS approach, shift to the EB ratios and formulas, or establishes a model that includes a combination of both.

In the second part of this study, we will develop a Microsoft Excel based simulation model that generates estimates of per pupil costs for general education as well as specialized programs for at risk students. The model will also estimate site leadership costs, district office costs and the costs of operations and maintenance. We will use this model to estimate a district-by-district (SAU) comparison of how our model compares both to the EBM, and to variations of the EBM suggested during our meetings with the Committee and with stakeholders and professional judgment panels in Maine.

Teacher Compensation

In Chapter 7 of this study, we reviewed the current teacher compensation system in Maine and reviewed other state and district level teacher compensation reforms focused on improving teacher effectiveness. Unfortunately, many of these initiatives have not been carefully studied so the strengths and weaknesses of each are hard to discern. With that context in mind, we reached the following conclusions about teacher compensation issues in Maine:

- Maine's goal of providing regional adjustments for teacher salary differences is appropriate but the index currently in use does not appropriately control for teacher quality. As a result, it provides more resources for districts that have chosen to pay higher salaries in the past and fewer resources to districts that paid lower salaries in the past. As a result, all SAUs do not have an equal opportunity to recruit and retain effective teachers.

- State efforts to provide incentives for hard to staff subjects and hard to staff schools, including signing bonuses, have been largely ineffective. Reasons for this appear to be:

    - The incentives are often too low.
    - The incentives are seldom accompanied by aggressive recruitment efforts.
    - An "effectiveness" screen, is frequently missing, resulting in both effective and in effective teachers receiving the incentives.
    - States have not conducted studies to assess implementation and impact of the incentive programs. Consequently policy makers don't know whether or not the program was successful.

- Most state efforts to decentralize the design of teacher pay incentives as well as the more ambitious performance pay systems have produced disappointing results.

- Recently adopted teacher evaluation systems that allow local districts to set "cut points' for determining different teacher effectiveness categories have not yet been shown to be effective.

- The current teacher salary structure in Maine, which like most salary structures provides pay increases based on years of experience and education, is not linked to teacher effectiveness, with the possible exception of the first two to four years of a teacher's career.

As a result of these findings, we offer the following recommendations:

1. Maine should replace its approach to providing regional adjustments to teacher salary levels and shift to either a Comparable Wage Index or a Hedonic Wage Index. The goal of these regional adjustments is to modify resource levels so each SAU has access to purchase educators of the same quality. In contrast, the current approach essentially reinforces prior salary level decisions by SAUs by using actual salaries. As a result, districts that pay higher salaries are provided more funds and districts that pay lower salaries are provided fewer funds, reinforcing those differences rather than adjusting for them. Both the CWI and the Hedonic Wage Index provide regional adjustments for salaries but those adjustments are calibrated to allow each SAU to hire educators of the same quality.

2. To determine if current teacher salaries are at the appropriate market level, Maine should benchmark teacher salaries to salaries in Maine for jobs that are comparable to teaching, not to other states or the national average.

3. Maine should be more strategic in recruiting and retaining effective teachers by shifting its teacher salary structure from the current system based on years of experience and education – which is not strongly linked to effectiveness – to an alternative approach such as the Odden-Picus Salary Schedule. The new structure should provide major salary increases when a teacher's instructional effectiveness improves. Maine could use the results from its current efforts to change how teachers are evaluated to operate such a structure but we would further recommend that the state, not local districts, set the cut-points for the various effectiveness levels, with the recommendation that the lower bound for the effective category be set no lower than the 35th-40th percentile.

4. If, even with these changes, some SAUs continue to have difficulty staffing some schools or subject areas, Maine could provide additional incentives for hard to staff subjects or hard to staff schools. We recommend initial incentives in the $5,000-6,000 range for teachers moving to new schools or districts. We also recommend that teachers who have more than five years of experience would be eligible for the incentive only if they had a performance rating of "effective" or better. Once in the new school or district, we recommend ongoing retention incentives of $4,000 per year, paid as a bonus at the beginning of the year. An incentive program like this should be accompanied by a comprehensive recruitment program making aggressive recruitment an integral component of the program. Finally, we recommend that the state fund ongoing analyses of the implementation and impact of the incentive programs to determine whether they are working to move effective teachers into hard to staff schools and subjects and to retain them at those sites.

5. If Maine decides to create any of these compensation incentives, the key features should be developed at the state level. Nearly all other states that have devolved the design of performance pay incentives to local districts have not been satisfied with the results.

FUTURE STUDIES (PART 2)

The study design we submitted to OPEGA in November 2012 suggested four specific analyses for Part 2 of this study. Each is listed below followed (in italics) by our suggestion regarding how to proceed on this topic. As shown in the material that follows, our goal is to ensure the process moving forward is highly interactive and incorporates the concerns of the Committee and all education stakeholders.

Teacher Compensation Study, Part B

Our basic recommendation for using the teacher salary schedule as a tool to strengthen recruitment and retention of teachers was discussed above. Based on the recommendations and on discussions with the Committee we will assess our recommendations as well as alternatives suggested by the Committee in the context of the overall EPS funding system. We will emphasize the need to change the overall teacher salary structure, not just add bonus incentives to the current structure, with a focus on how these approaches impact incentives for teacher recruitment and retention.

> *We will work closely with the Committee during Part 2 to understand the alternative compensation programs they would like to consider and help develop models for how they could be designed within the rubric of the EPS or any system designed to replace or revise EPS. Included in this work will be consideration of how a new regional cost adjustment would be developed.*

Stakeholder Input

An important component of Part 2 of the independent review will be seeking feedback from the Committee and from stakeholders into the direction of our recommendations and to ensure the recommendations we make are responsive to Maine's policy makers and education stakeholders. We will coordinate our efforts through the Committee and plan to meet with the Committee at the following approximate times (subject to the Committee's schedule):

1. In late January or early February 2013 following the organization of the Legislative session to discuss the parameters of the study.

   Note: This meeting took place on February 6 along with a Committee hearing to seek stakeholder input.

2. In April 2013 to discuss the findings of the studies completed as Part 1 of the independent review

   We are scheduled to make a public presentation of this report on April 10, 2012 and to listen to public comment on the report either that day or the next.

3. Up to three more times between June and October 2013 to solicit their views on our recommendations

   At this time we anticipate a visit to Maine where we will conduct Professional Judgment Panels to review our EBM model and its comparison to the EPS. We anticipate holding these panels in three locations across the state, each to be followed by an opportunity to meet with stakeholders in public hearings. We anticipate these will take place in early September after school starts to ensure teachers can participate in the professional judgment panel meetings.

4. In December 2013 to discuss the findings of the studies completed as Part 2 of the independent review

   We will present the findings from Part 2 of the report at that time.

5. In January or Early February 2014 to describe our findings during the 2014 session of the Maine Legislature

Case Studies of Improving Schools

As described in our proposal, we will conduct in-depth case studies in a sample of 10 schools that have shown strong improvements in student achievement in recent years. Although not specifically called for in the RFP, we have included these important case studies in our proposal because it is critical to determine the degree to which the strategies for improvement deployed by these institutions align with the Theory of Action built into the Evidence-Based model on which our resource distribution recommendations will initially be based, and the degree to which our model should be adjusted to reflect practices that are more effective in Maine. In identifying the sample of schools, we will work with the Committee, its staff and others as appropriate to help identify those schools that are making the most progress in improving student performance – not those with the highest test scores, but those with the largest consistent *gains* in student outcomes.

Recommendations for Recalibration of EPS based on EB model

This component of the study will produce an estimate of adequate educational resources for Maine's SAUs based on our Evidence-Based model as modified by feedback from the Committee and from stakeholder groups as identified by and in consultation with the Committee. We will develop an Excel-based simulation model that estimates educational resources at the SAU level for all SAUs in the state for the 2012-13 school year. We will provide a working

copy of the model to the Office of Program Evaluation and Governmental Accountability (OPEGA) and to the Maine DOE.

Final Report

Based on the findings from the ten deliverables described above, we will provide a final report to the Committee and OPEGA. This document will include an executive summary of our findings and recommendations as well as the full reports. We will deliver this report by December 1, 2013, and as indicated above will be available at that time to meet with the Committee as appropriate.

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.

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.micmac-nsn.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. (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 .

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

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, 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.

Bureau of Indian Education, (2012). "Updating the BIE Count of Students Eligible for Johnson-O'Malley Program Funding 2012. Washington, DC: Author. Downloaded from http://www.bia.gov/cs/groups/public/documents/text/idc-017404.pdf

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.

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.

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. (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.

Chenoweth, Karen, & Theokas, Christina. (2011). *Getting it done: Leading academic success in unexpected schools*. Cambridge, MA: Harvard Education Press.

Clark, Kevin. (2009). The case for structured English immersion. *Educational Leadership, 66*(7), 42-46.

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.

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.

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.

Coeyman, Marjorie. (November 24, 1998). Small-town schools: Changing times and budgets put the squeeze on. *Christian Science Monitor, 90*(252), 15.

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.

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. (2005a). *How students learn – history in the classroom*. Washington, DC: National Research Council.

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.

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.

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

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.

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.

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

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.

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, 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, 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.

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, 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.

Hanushek, E.A., Kain, J.F., & Rivkin, S.G. (2004). Why public schools lose teachers. The Journal of Human Resources, 39,2, 326-354.

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.

Heneman, Herbert G. III. (2008). Strategic Management of Human Capital in Minnesota: Quality Compensation for Teachers (Q COMP). Madison: University of Wisconsin, Wisconsin Center for Education Research, Consortium for Policy Research in Education, Strategic Management of Human Capital.

Heneman, Herbert G., III & Steve Kimball. (2008). How to Design New Teacher Salary Structures. Madison: University of Wisconsin, Wisconsin Center for Education Research, Consortium for Policy Research in Education, Strategic Management of Human Capital.

Heyns, Barbara. (1978). *Summer learning and the effects of schooling.* New York: Academic Press

Houlton Band of Maliseet Indians. (n.d.). "Education Department." http://www.maliseets.com/education.htm

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.

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. (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.

Krueger, Alan B., & Whitmore, Diane M. (2001). *Would smaller classes help close the black-white achievement gap? (*Working paper #451). Princeton, NJ: Princeton University. [On-line]. Available: http://www.irs.princeton.edu/pubs/pdfs/451.pdf.

Kulik, James A., & Kulik, Chen-Lin . (1984). The effects of accelerated instruction. *Review of Educational Research, 54*(3), 409-425.

Kulik, James A., & Kulik, Chen-Lin . (1984). The effects of accelerated instruction. *Review of Educational Research, 54*(3), 409-425.

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.

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.

Maine Department of Education. (2012). Essential Programs & Services Cost Component Calculations (ED279). http://www.maine.gov/education/data/eps/ED279linebyline.pdf. Retrieved March 22, 2013.

Maine Indian Claims Settlement Act of 1980. 25 USC 1721-1735. Downloaded from http://www.wabanaki.com/Federal%20Settlement%20Act%20-%20MICSA.pdf

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

Marsh, Julie A., Matthew G. Springer, Daniel F. McCaffrey, Kun Yuan, Scott Epstein, Julia Koppich, Nidhi Kalra, Catherine DiMartino and Art (Xiao) Peng. (2011). A Big Apple for Educators: New York City's Experiment with Schoolwide Performance Bonuses: Final Evaluation Report. Santa Monica, CA: RAND Corporation. http://www.rand.org/pubs/monographs/MG1114. Also available in print form.

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. (2003a). An exploration of the pay levels needed to attract mathematics, science and technology majors to a career in K-12 teaching. Education Policy Analysis Archives, 11(50).

Milanowski, Anthony T. (2003b). The varieties of knowledge and skill-based pay design: A comparison of seven new pay systems for K-12 teachers. Education Policy Analysis Archives. Retrieved, from the World Wide Web: http://epaa.asu.edu/epaa/v11n4/

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.

Milanowski, Anthony. (2008). Do Teacher Pay Levels Matter? Madison: University of Wisconsin, Wisconsin Center for Education Research, Consortium for Policy Research in Education, Strategic Management of Human Capital.

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.

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

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

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.

Montana Office of Public Instruction. (2012). Directory of Indian Education Programs in Montana. Helena, MT: Author. Downloaded February 21, 2013 from http://www.opi.mt.gov/pdf/indianed/resources/dirindianed.pdf.

Montana Office of Public Instruction. (2013). Finance and Grants: School Finance. http://opi.mt.gov/Finance&Grants/SchoolFinance/Index.html#gpm1_1

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 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 Indian Education Association. (2011). "Success Stories from Title VII Funded Programs." Washington, DC: Author. Downloaded February 21, 2013 from http://www.uteed.net/files/t7sh.pdf

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. (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.

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, forthcoming). *School Finance: A Policy Perspective, 5th edition*. New York: McGraw-Hill.

Odden, Allan & Marc Wallace. (2007). How to Achieve World Class Teacher Compensation. St. Paul: Freeload Press. Available for free download at: www.freeloadpress.com.

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.

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. (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, 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., & 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.

Proctor, Diane, Bonnie Walters, Robert Reichardt, Dan Goldhaber & Joe Walch. (2011). Making a Difference in Education Reform: ProComp External Evaluation Report 2006-2010. 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.

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.

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.

Silvernail, D.L. (2011). The History and Development of Maine's Essential Programs and Services Program. Portland, ME: Maine Education Policy Research Institute, University of Southern Maine. (January)

Slavin, Robert. (1996). Neverstreaming: Preventing learning disabilities. *Educational Leadership, 53*(4), 4–7.

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 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.

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.

Springer, Matthew, Ed. (2009). Performance Incentives: Their growing impact on American K12 education. Washington D.C.: Brookings Institution Press, 149-170.

Springer, Matthew, Jessica Lewis, Michael Podgursky, Mark Ehlert, Timothy Gronberg, Laura Hamilton, Dennis Jansen, Brian Stecher, Lori Taylor, Omar Lopez & Art Peng. (2009).

Texas Excellence Educator Grant Program: Third Year Evaluation Report. Downloaded on February 20, 2013 from http://www.tea.state.tx.us/index4.aspx?id=2928&menu_id=949

Springer, Matthew G., Dale Ballou, Laura S. Hamilton, Vi-Nhuan Le, J. R. Lockwood, Daniel F. McCaffrey, Matthew Pepper, & Brian M. Stecher. (2010). Teacher Pay for Performance: Experimental Evidence from the Project on Incentives in Teaching. Nashville, TN: Vanderbilt University, Peabody College, National Center on Performance Incentives.

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.

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.

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 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.

Taylor, Lori L., & Fowler, William J. (2006). *A comparative wage approach to geographic cost adjustment*. Washington, DC: National Center for Education Statistics.

United States Department of Education (USDOE). (2004). "Elementary & Secondary Education Subpart 1 — Formula Grants to Local Educational Agencies, SEC. 7111 – 7119." http://www2.ed.gov/policy/elsec/leg/esea02/pg99.html

United States Department of Education (USDOE). (2007). "Title VII--Indian, Native Hawaiian, And Alaska Native Education. Indian Education (VII-A)." No Child Left Behind: A

desktop reference:
http://www2.ed.gov/admins/lead/account/nclbreference/page_pg61.html

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.

United States Department of the Interior Indian Affairs (USDOI). (2013). "The Bureau of Indian Education (BIE)." http://www.bia.gov/WhatWeDo/ServiceOverview/IndianEducation/index.htm

Torgeson, J. K. (2004). Avoiding the Devastating Downward Spiral. *American Educator 28*(3), 6-19, 45-47.

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.

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.

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.

Torgeson, Joe 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.

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.

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.

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

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

APPENDICES

Appendix 3.A
State and Local Revenue for K-12 Education
(Numbers in 1,000)
(Source: United States Census Bureau)

	1999-2000	2009-2010	Change from 1999-2000 to 2009-2010	
			Dollars	Percentages
United States	$347,289,182	$518,928,241	$171,639,059	49.4%
Comparative States	$30,733,354	$45,465,866	$14,732,512	47.9%
Alabama	$4,457,758	$6,145,640	$1,687,882	37.9%
Alaska	$1,113,913	$1,863,170	$749,257	67.3%
Arizona	$4,919,052	$7,153,698	$2,234,646	45.4%
Arkansas	$2,580,056	$4,261,686	$1,681,630	65.2%
California	$41,322,786	$55,265,651	$13,942,865	33.7%
Colorado	$4,763,695	$8,027,220	$3,263,525	68.5%
Connecticut	$5,552,489	$8,725,670	$3,173,181	57.1%
Delaware	$1,003,966	$1,514,972	$511,006	50.9%
District of Columbia	$696,598	$1,115,349	$418,751	60.1%
Florida	$16,159,912	$22,023,775	$5,863,863	36.3%
Georgia	$10,483,199	$15,237,334	$4,754,135	45.4%
Hawaii	$1,277,853	$2,182,456	$904,603	70.8%
Idaho	$1,341,306	$1,733,044	$391,738	29.2%
Illinois	$15,866,900	$23,720,561	$7,853,661	49.5%
Indiana	$7,992,293	$12,245,187	$4,252,894	53.2%
Iowa	$3,476,798	$4,805,126	$1,328,328	38.2%
Kansas	$3,273,671	$4,778,568	$1,504,897	46.0%
Kentucky	$3,901,295	$5,820,701	$1,919,406	49.2%
Louisiana	$4,227,341	$6,489,406	$2,262,065	53.5%
Maine	$1,619,065	$2,347,668	$728,603	45.0%
Maryland	$7,004,583	$12,317,318	$5,312,735	75.8%
Massachusetts	$8,911,326	$13,690,358	$4,779,032	53.6%
Michigan	$14,334,907	$16,024,762	$1,689,855	11.8%
Minnesota	$6,792,981	$8,979,361	$2,186,380	32.2%
Mississippi	$2,371,080	$3,508,942	$1,137,862	48.0%
Missouri	$6,186,093	$8,077,526	$1,891,433	30.6%
Montana	$967,182	$1,353,390	$386,208	39.9%
Nebraska	$2,056,104	$3,177,864	$1,121,760	54.6%
Nevada	$2,138,515	$3,902,895	$1,764,380	82.5%
New Hampshire	$1,473,057	$2,618,266	$1,145,209	77.7%

New Jersey	$14,559,059	$23,398,228	$8,839,169	60.7%
New Mexico	$1,894,941	$2,884,776	$989,835	52.2%
New York	$29,804,565	$51,550,059	$21,745,494	73.0%
North Carolina	$8,440,873	$14,693,425	$6,252,552	74.1%
North Dakota	$676,116	$982,902	$306,786	45.4%
Ohio	$14,350,254	$20,282,369	$5,932,115	41.3%
Oklahoma	$3,523,533	$5,009,450	$1,485,917	42.2%
Oregon	$4,065,114	$5,358,836	$1,293,722	31.8%
Pennsylvania	$15,244,247	$23,455,539	$8,213,292	53.9%
Rhode Island	$1,376,037	$1,946,128	$570,091	41.4%
South Carolina	$4,314,811	$6,683,862	$2,369,051	54.9%
South Dakota	$757,483	$1,038,974	$281,491	37.2%
Tennessee	$4,853,553	$7,277,015	$2,423,462	49.9%
Texas	$26,422,335	$42,406,439	$15,984,104	60.5%
Utah	$2,355,964	$3,675,705	$1,319,741	56.0%
Vermont	$881,626	$1,398,604	$516,978	58.6%
Virginia	$8,284,526	$13,161,041	$4,876,515	58.9%
Washington	$7,023,827	$10,429,781	$3,405,954	48.5%
West Virginia	$2,031,885	$2,662,245	$630,360	31.0%
Wisconsin	$7,442,956	$9,934,046	$2,491,090	33.5%
Wyoming	$719,703	$1,591,253	$871,550	121.1%

Appendix 3.B
K-12 Per Pupil Expenditures
(Source: United States Census Bureau)

	1999-2000	2009-2010	Change from 1999-2000 to 2009-2010	
			Dollars	Percentages
United States	$6,836	$10,600	$3,764	55.1%
Alabama	$5,601	$8,881	$3,280	58.6%
Alaska	$8,743	$15,783	$7,040	80.5%
Arizona	$5,033	$7,848	$2,815	55.9%
Arkansas	$5,470	$9,143	$3,673	67.2%
California	$6,298	$9,375	$3,077	48.9%
Colorado	$6,165	$8,853	$2,688	43.6%
Connecticut	$8,800	$14,906	$6,106	69.4%
Delaware	$8,030	$12,383	$4,353	54.2%
District of Columbia	$10,836	$18,667	$7,831	72.3%
Florida	$5,691	$8,741	$3,050	53.6%
Georgia	$6,417	$9,394	$2,977	46.4%
Hawaii	$6,487	$11,754	$5,267	81.2%
Idaho	$5,218	$7,106	$1,888	36.2%
Illinois	$7,185	$11,634	$4,449	61.9%
Indiana	$6,871	$9,611	$2,740	39.9%
Iowa	$6,547	$9,763	$3,216	49.1%
Kansas	$6,211	$9,715	$3,504	56.4%
Kentucky	$5,922	$8,948	$3,026	51.1%
Louisiana	$5,652	$10,638	$4,986	88.2%
Maine	$7,595	$12,259	$4,664	61.4%
Maryland	$7,496	$13,738	$6,242	83.3%
Massachusetts	$8,444	$13,590	$5,146	60.9%
Michigan	$7,662	$10,644	$2,982	38.9%
Minnesota	$7,051	$10,685	$3,634	51.5%
Mississippi	$5,014	$8,119	$3,105	61.9%
Missouri	$6,143	$9,634	$3,491	56.8%
Montana	$6,214	$10,497	$4,283	68.9%
Nebraska	$6,422	$10,734	$4,312	67.1%
Nevada	$5,736	$8,483	$2,747	47.9%
New Hampshire	$6,742	$12,383	$5,641	83.7%
New Jersey	$10,283	$16,841	$6,558	63.8%
New Mexico	$5,748	$9,384	$3,636	63.2%
New York	$10,039	$18,618	$8,579	85.5%

North Carolina	$5,990	$8,409	$2,419	40.4%
North Dakota	$5,830	$10,991	$5,161	88.5%
Ohio	$6,999	$11,030	$4,031	57.6%
Oklahoma	$5,394	$7,896	$2,502	46.4%
Oregon	$7,027	$9,624	$2,597	37.0%
Pennsylvania	$7,824	$12,995	$5,171	66.1%
Rhode Island	$8,242	$13,699	$5,457	66.2%
South Carolina	$6,114	$9,143	$3,029	49.5%
South Dakota	$5,521	$8,858	$3,337	60.4%
Tennessee	$5,343	$8,065	$2,722	50.9%
Texas	$6,145	$8,746	$2,601	42.3%
Utah	$4,331	$6,064	$1,733	40.0%
Vermont	$7,938	$15,274	$7,336	92.4%
Virginia	$6,839	$10,597	$3,758	54.9%
Washington	$6,394	$9,452	$3,058	47.8%
West Virginia	$7,093	$11,527	$4,434	62.5%
Wisconsin	$7,716	$11,364	$3,648	47.3%
Wyoming	$7,421	$15,169	$7,748	104.4%

Appendix 3.C
K-12 Education Spending Per $1,000 of Personal Income
(Source: National Education Association's Rankings & Estimates publication)

	1999-2000	2009-2010	Change from 1999-2000 to 2009-2010	
			Dollars	Percentages
United States	$41	$41	$0	0.0%
Alabama	$35	$37	$2	5.7%
Alaska	$56	$63	$7	12.5%
Arizona	$37	$42	$5	13.5%
Arkansas	$40	$44	$4	10.0%
California	$39	$36	-$3	-7.7%
Colorado	$34	$38	$4	11.8%
Connecticut	$42	$43	$1	2.4%
Delaware	$41	$51	$10	24.4%
Florida	$34	$30	-$4	-11.8%
Georgia	$46	$46	$0	0.0%
Hawaii	$37	$41	$4	10.8%
Idaho	$43	$43	$0	0.0%
Illinois	$39	$40	$1	2.6%
Indiana	$48	$46	-$2	-4.2%
Iowa	$44	$40	-$4	-9.1%
Kansas	$43	$43	$0	0.0%
Kentucky	$40	$42	$2	5.0%
Louisiana	$41	$39	-$2	-4.9%
Maine	$46	$50	$4	8.7%
Maryland	$39	$44	$5	12.8%
Massachusetts	$36	$43	$7	19.4%
Michigan	$40	$38	-$2	-5.0%
Minnesota	$43	$41	-$2	-4.7%
Mississippi	$41	$37	-$4	-9.8%
Missouri	$40	$43	$3	7.5%
Montana	$47	$38	-$9	-19.1%
Nebraska	$37	$38	$1	2.7%
Nevada	$36	$33	-$3	-8.3%
New Hampshire	$37	$45	$8	21.6%
New Jersey	$42	$52	$10	23.8%
New Mexico	$48	$43	-$5	-10.4%
New York	$45	$46	$1	2.2%
North Carolina	$35	$32	-$3	-8.6%
North Dakota	$37	$31	-$6	-16.2%

Ohio	$45	$41	-$4	-8.9%
Oklahoma	$39	$35	-$4	-10.3%
Oregon	$41	$40	-$1	-2.4%
Pennsylvania	$43	$50	$7	16.3%
Rhode Island	$41	$53	$12	29.3%
South Carolina	$46	$45	-$1	-2.2%
South Dakota	$39	$32	-$7	-17.9%
Tennessee	$31	$32	$1	3.2%
Texas	$45	$44	-$1	-2.2%
Utah	$45	$44	-$1	-2.2%
Vermont	$53	$61	$8	15.1%
Virginia	$38	$38	$0	0.0%
Washington	$37	$36	-$1	-2.7%
West Virginia	$52	$49	-$3	-5.8%
Wisconsin	$48	$46	-$2	-4.2%
Wyoming	$53	$62	$9	17.0%

Appendix 3.D
K-12 Expenditures as a Percentage of Total State Expenditures
(Source: National Association of State Budget Officers)

	1999-2000	2010-2011	Change from 1999-2000 to 2010-2011
United States	22.5%	20.2%	-2.3%
Alabama	25.0%	24.9%	-0.1%
Alaska	17.8%	11.0%	-6.8%
Arizona	19.6%	20.0%	0.4%
Arkansas	19.5%	17.2%	-2.3%
California	27.4%	19.8%	-7.6%
Colorado	19.0%	23.9%	4.9%
Connecticut	13.9%	14.2%	0.3%
Delaware	22.3%	24.5%	2.2%
Florida	18.7%	21.8%	3.1%
Georgia	24.7%	25.2%	0.5%
Hawaii	17.1%	15.3%	-1.8%
Idaho	19.0%	25.5%	6.5%
Illinois	20.9%	18.9%	-2.0%
Indiana	25.6%	32.2%	6.6%
Iowa	19.7%	17.7%	-2.0%
Kansas	29.5%	26.0%	-3.5%
Kentucky	26.3%	19.7%	-6.6%
Louisiana	19.5%	16.6%	-2.9%
Maine	19.9%	13.7%	-6.2%
Maryland	17.5%	21.0%	3.5%
Massachusetts	14.4%	11.6%	-2.8%
Michigan	31.6%	27.6%	-4.0%
Minnesota	24.9%	22.9%	-2.0%
Mississippi	21.1%	14.8%	-6.3%
Missouri	24.1%	23.1%	-1.0%
Montana	20.6%	15.1%	-5.5%
Nebraska	16.7%	16.3%	-0.4%
Nevada	17.0%	21.5%	4.5%
New Hampshire	28.7%	22.3%	-6.4%
New Jersey	22.5%	24.4%	1.9%
New Mexico	24.1%	18.9%	-5.2%
New York	20.7%	20.7%	0.0%
North Carolina	23.6%	18.3%	-5.3%
North Dakota	17.3%	15.8%	-1.5%
Ohio	18.2%	17.7%	-0.5%

Oklahoma	24.3%	14.6%	-9.7%
Oregon	29.5%	11.0%	-18.5%
Pennsylvania	18.8%	19.5%	0.7%
Rhode Island	16.6%	14.4%	-2.2%
South Carolina	16.9%	17.3%	0.4%
South Dakota	13.7%	16.3%	2.6%
Tennessee	18.6%	17.3%	-1.3%
Texas	30.3%	30.0%	-0.3%
Utah	27.2%	23.2%	-4.0%
Vermont	20.5%	31.9%	11.4%
Virginia	18.1%	15.8%	-2.3%
Washington	23.9%	23.3%	-0.6%
West Virginia	26.0%	10.4%	-15.6%
Wisconsin	19.5%	17.3%	-2.2%
Wyoming	NA	3.8%	NA

Appendix 3.E
Total Student Enrollment
Based on Fall Enrollment Numbers
(Source: National Education Association's Rankings & Estimates publication)

	2001-2002	2011-2012	Change from 2001-2002 to 2011-2012	
			Enrollment	Percentages
United States	47,301,299	49,137,726	1,836,427	3.9%
New England States	2,213,938	2,096,983	-116,955	-5.3%
Comparative States	3,579,231	3,464,097	-115,134	-3.2%
Alabama	726,367	736,339	9,972	1.4%
Alaska	134,358	127,699	-6,659	-5.0%
Arizona	915,656	1,072,826	157,170	17.2%
Arkansas	448,246	468,190	19,944	4.4%
California	6,141,363	6,204,065	62,702	1.0%
Colorado	742,145	854,234	112,089	15.1%
Connecticut	569,540	554,398	-15,142	-2.7%
Delaware	115,484	129,917	14,433	12.5%
Florida	2,495,969	2,661,945	165,976	6.6%
Georgia	1,470,634	1,684,430	213,796	14.5%
Hawaii	184,546	177,734	-6,812	-3.7%
Idaho	246,415	289,486	43,071	17.5%
Illinois	2,066,775	2,087,628	20,853	1.0%
Indiana	996,006	1,040,313	44,307	4.4%
Iowa	485,932	496,009	10,077	2.1%
Kansas	470,205	482,796	12,591	2.7%
Kentucky	631,117	659,089	27,972	4.4%
Louisiana	730,252	703,390	-26,862	-3.7%
Maine	205,586	185,033	-20,553	-10.0%
Maryland	860,640	854,086	-6,554	-0.8%
Massachusetts	973,142	952,370	-20,772	-2.1%
Michigan	1,720,570	1,543,573	-176,997	-10.3%
Minnesota	851,368	839,738	-11,630	-1.4%
Mississippi	492,198	490,037	-2,161	-0.4%
Missouri	890,195	905,755	15,560	1.7%
Montana	151,947	139,650	-12,297	-8.1%
Nebraska	283,791	300,996	17,205	6.1%
Nevada	356,814	470,068	113,254	31.7%
New Hampshire	206,847	190,931	-15,916	-7.7%

New Jersey	1,341,504	1,361,813	20,309	1.5%
New Mexico	320,044	333,643	13,599	4.2%
New York	2,839,536	2,617,556	-221,980	-7.8%
North Carolina	1,321,630	1,430,007	108,377	8.2%
North Dakota	105,217	95,858	-9,359	-8.9%
Ohio	1,804,585	1,875,491	70,906	3.9%
Oklahoma	622,154	665,841	43,687	7.0%
Oregon	551,522	560,950	9,428	1.7%
Pennsylvania	1,821,627	1,750,104	-71,523	-3.9%
Rhode Island	157,956	137,175	-20,781	-13.2%
South Carolina	669,701	721,398	51,697	7.7%
South Dakota	125,612	124,739	-873	-0.7%
Tennessee	907,774	959,322	51,548	5.7%
Texas	4,146,653	4,978,120	831,467	20.1%
Utah	477,801	597,397	119,596	25.0%
Vermont	100,867	77,076	-23,791	-23.6%
Virginia	1,163,094	1,260,334	97,240	8.4%
Washington	1,010,424	1,045,987	35,563	3.5%
West Virginia	282,232	282,091	-141	0.0%
Wisconsin	879,361	871,105	-8,256	-0.9%
Wyoming	87,897	88,994	1,097	1.2%

Appendix 3.F
Average Student Enrollment Per School District
(Source: Education Commission of the States calculations based on data from the National Education Association)

	2001-2002	2011-2012	Change from 2001-2002 to 2011-2012	
			Average Size	Percentages
United States	3,121	3,178	57	1.8%
New England States	1,731	1,584	-147	-8.5%
Comparative States	1,724	1,650	-74	-4.3%
Alabama	5,675	5,578	-96	-1.7%
Alaska	2,535	2,365	-170	-6.7%
Arizona	1,458	1,711	253	17.4%
Arkansas	1,446	1,829	383	26.5%
California	6,210	5,954	-256	-4.1%
Colorado	4,169	4,799	630	15.1%
Connecticut	2,951	2,786	-165	-5.6%
Delaware	4,442	3,511	-930	-20.9%
Florida	37,253	39,731	2,477	6.6%
Georgia	8,170	8,594	424	5.2%
Hawaii	184,546	177,734	-6,812	-3.7%
Idaho	2,162	2,113	-48	-2.2%
Illinois	2,317	2,413	96	4.2%
Indiana	3,411	2,930	-481	-14.1%
Iowa	1,310	1,413	103	7.9%
Kansas	1,547	1,688	141	9.1%
Kentucky	3,586	3,788	202	5.6%
Louisiana	8,394	5,582	-2,811	-33.5%
Maine	886	808	-78	-8.8%
Maryland	35,860	35,587	-273	-0.8%
Massachusetts	2,609	2,381	-228	-8.7%
Michigan	2,197	1,805	-392	-17.8%
Minnesota	2,511	1,618	-893	-35.6%
Mississippi	3,238	3,224	-14	-0.4%
Missouri	1,699	1,729	30	1.7%
Montana	341	335	-6	-1.7%
Nebraska	540	1,209	669	124.1%
Nevada	20,989	27,651	6,662	31.7%
New Hampshire	1,277	1,186	-91	-7.1%

New Jersey	2,266	2,304	38	1.7%
New Mexico	3,596	3,749	153	4.2%
New York	4,051	3,766	-284	-7.0%
North Carolina	11,296	12,435	1,139	10.1%
North Dakota	483	536	53	11.0%
Ohio	2,589	1,846	-743	-28.7%
Oklahoma	1,146	1,276	130	11.3%
Oregon	2,800	2,862	62	2.2%
Pennsylvania	3,643	3,507	-136	-3.7%
Rhode Island	4,388	2,799	-1,588	-36.2%
South Carolina	7,698	8,292	594	7.7%
South Dakota	726	821	95	13.0%
Tennessee	6,578	7,106	528	8.0%
Texas	3,399	4,057	658	19.4%
Utah	11,945	14,571	2,626	22.0%
Vermont	356	269	-87	-24.4%
Virginia	8,811	9,548	737	8.4%
Washington	3,414	3,546	132	3.9%
West Virginia	5,131	5,129	-3	0.0%
Wisconsin	2,064	2,054	-10	-0.5%
Wyoming	1,831	1,854	23	1.2%

Appendix 3.G
Average Teacher Salaries
(Source: National Education Association's Rankings & Estimates publication)

	2001-2002	2011-2012	Change from 2001-2002 to 2011-2012	
			Dollar	Percentages
United States	**$44,632**	**$55,418**	$10,786	24.2%
Alabama	$37,194	$48,003	$10,809	29.1%
Alaska	$49,418	$62,425	$13,007	26.3%
Arizona	$39,973	$48,691	$8,718	21.8%
Arkansas	$36,962	$46,314	$9,352	25.3%
California	$54,348	$68,531	$14,183	26.1%
Colorado	$40,659	$49,049	$8,390	20.6%
Connecticut	$53,551	$69,465	$15,914	29.7%
Delaware	$48,363	$58,800	$10,437	21.6%
Florida	$39,275	$46,479	$7,204	18.3%
Georgia	$44,073	$52,938	$8,865	20.1%
Hawaii	$42,615	$54,070	$11,455	26.9%
Idaho	$39,591	$48,551	$8,960	22.6%
Illinois	$49,435	$57,636	$8,201	16.6%
Indiana	$44,030	$50,516	$6,486	14.7%
Iowa	$38,230	$50,240	$12,010	31.4%
Kansas	$37,093	$46,718	$9,625	25.9%
Kentucky	$37,951	$49,730	$11,779	31.0%
Louisiana	$36,328	$50,179	$13,851	38.1%
Maine	$37,300	$47,338	$10,038	26.9%
Maryland	$48,251	$63,634	$15,383	31.9%
Massachusetts	$49,242	$71,721	$22,479	45.7%
Michigan	$52,477	$61,560	$9,083	17.3%
Minnesota	$43,330	$54,959	$11,629	26.8%
Mississippi	$33,295	$41,646	$8,351	25.1%
Missouri	$36,420	$46,406	$9,986	27.4%
Montana	$34,379	$48,546	$14,167	41.2%
Nebraska	$36,236	$48,154	$11,918	32.9%
Nevada	$40,764	$54,559	$13,795	33.8%
New Hampshire	$40,002	$54,177	$14,175	35.4%
New Jersey	$53,192	$67,078	$13,886	26.1%
New Mexico	$36,440	$45,622	$9,182	25.2%
New York	$52,000	$73,398	$21,398	41.2%
North Carolina	$42,680	$45,622	$2,942	6.9%
North Dakota	$32,253	$46,058	$13,805	42.8%

Ohio	$44,019	$56,715	$12,696	28.8%
Oklahoma	$34,738	$44,391	$9,653	27.8%
Oregon	$46,081	$57,348	$11,267	24.5%
Pennsylvania	$50,599	$61,934	$11,335	22.4%
Rhode Island	$49,758	$62,186	$12,428	25.0%
South Carolina	$39,923	$47,428	$7,505	18.8%
South Dakota	$31,295	$38,804	$7,509	24.0%
Tennessee	$38,515	$47,082	$8,567	22.2%
Texas	$39,232	$48,373	$9,141	23.3%
Utah	$38,139	$48,159	$10,020	26.3%
Vermont	$39,158	$51,306	$12,148	31.0%
Virginia	$41,239	$48,703	$7,464	18.1%
Washington	$43,464	$52,232	$8,768	20.2%
West Virginia	$36,751	$45,320	$8,569	23.3%
Wisconsin	$42,232	$53,792	$11,560	27.4%
Wyoming	$37,853	$57,222	$19,369	51.2%

Appendix 3.H
Full-Time Equivalent Teachers
(Source: U.S. Department of Education's National Center for Education Statistics)

	2000-2001	2010-2011	Change from 2000-2001 to 2010-2011	
			Total FTE	Percentages
United States	**2,941,455**	**3,099,592**	**158,137**	**5.4%**
New England States	**158,435**	**162,048**	**3,613**	**2.3%**
Comparative States	**253,236**	**254,315**	**1,079**	**0.4%**
Alabama	48,194	49,363	1,169	2.4%
Alaska	7,880	8,171	291	3.7%
Arizona	44,438	50,031	5,593	12.6%
Arkansas	31,947	34,773	2,826	8.8%
California	298,021	260,806	-37,215	-12.5%
Colorado	41,983	48,543	6,560	15.6%
Connecticut	41,044	42,951	1,907	4.6%
Delaware	7,469	8,933	1,464	19.6%
District of Columbia	4,949	5,925	976	19.7%
Florida	132,030	175,609	43,579	33.0%
Georgia	91,043	112,460	21,417	23.5%
Hawaii	10,927	11,396	469	4.3%
Idaho	13,714	15,673	1,959	14.3%
Illinois	127,620	132,983	5,363	4.2%
Indiana	59,226	58,121	-1,105	-1.9%
Iowa	34,636	34,642	6	0.0%
Kansas	32,742	34,644	1,902	5.8%
Kentucky	39,589	42,042	2,453	6.2%
Louisiana	49,915	48,655	-1,260	-2.5%
Maine	16,559	15,384	-1,175	-7.1%
Maryland	52,433	58,428	5,995	11.4%
Massachusetts	67,432	68,754	1,322	2.0%
Michigan	97,031	88,615	-8,416	-8.7%
Minnesota	53,457	52,672	-785	-1.5%
Mississippi	31,006	32,255	1,249	4.0%
Missouri	64,735	66,735	2,000	3.1%
Montana	10,411	10,361	-50	-0.5%
Nebraska	20,983	22,345	1,362	6.5%

Nevada	18,293	21,839	3,546	19.4%
New Hampshire	14,341	15,365	1,024	7.1%
New Jersey	99,061	110,202	11,141	11.2%
New Mexico	21,042	22,437	1,395	6.6%
New York	206,961	211,606	4,645	2.2%
North Carolina	83,680	98,357	14,677	17.5%
North Dakota	8,141	8,417	276	3.4%
Ohio	118,361	109,282	-9,079	-7.7%
Oklahoma	41,318	41,278	-40	-0.1%
Oregon	28,094	28,109	15	0.1%
Pennsylvania	116,963	129,911	12,948	11.1%
Rhode Island	10,645	11,212	567	5.3%
South Carolina	45,380	45,210	-170	-0.4%
South Dakota	9,396	9,512	116	1.2%
Tennessee	57,164	66,558	9,394	16.4%
Texas	274,826	334,997	60,171	21.9%
Utah	22,008	25,677	3,669	16.7%
Vermont	8,414	8,382	-32	-0.4%
Virginia	86,977	70,947	-16,030	-18.4%
Washington	51,098	53,934	2,836	5.6%
West Virginia	20,930	20,338	-592	-2.8%
Wisconsin	60,165	57,625	-2,540	-4.2%
Wyoming	6,783	7,127	344	5.1%

Appendix 3.I
Student to Teacher Ratios
(Source: Education Commission of the States calculations based on data from The U.S. Department of Education's National Center for Education Statistics)

	2000-2001	2010-2011	Change from 2000-2001 to 2010-2011	
			Ratios	Percentages
United States	**16.0**	**16.0**	**0.0%**	**0.0%**
New England States	**14.0**	**13.2**	**-0.8**	**-5.4%**
Comparative States	**14.2**	**13.8**	**-0.4**	**-2.6%**
Alabama	15.4	15.3	-0.1	-0.6%
Alaska	16.9	16.2	-0.7	-4.3%
Arizona	19.8	21.4	1.6	8.2%
Arkansas	14.1	16.2	2.1	14.7%
California	20.6	24.1	3.5	17.1%
Colorado	17.3	17.4	0.1	0.4%
Connecticut	13.7	13.1	-0.6	-4.7%
Delaware	15.4	14.5	-0.9	-5.9%
District of Columbia	13.9	12.0	-1.9	-13.5%
Florida	18.4	15.1	-3.4	-18.2%
Georgia	15.9	14.9	-1.0	-6.2%
Hawaii	16.9	15.8	-1.1	-6.7%
Idaho	17.9	17.6	-0.3	-1.7%
Illinois	16.1	15.7	-0.4	-2.3%
Indiana	16.7	18.0	1.3	7.9%
Iowa	14.3	14.3	0.0	0.0%
Kansas	14.4	14.0	-0.4	-3.1%
Kentucky	16.8	16.0	-0.8	-4.7%
Louisiana	14.9	14.3	-0.6	-3.9%
Maine	12.5	12.3	-0.2	-1.7%
Maryland	16.3	14.6	-1.7	-10.5%
Massachusetts	14.5	13.9	-0.6	-4.1%
Michigan	17.7	17.9	0.2	1.2%
Minnesota	16.0	15.9	-0.1	-0.6%
Mississippi	16.1	15.2	-0.9	-5.5%
Missouri	14.1	13.8	-0.3	-2.3%
Montana	14.9	13.7	-1.2	-8.2%

Nebraska	13.6	13.4	-0.2	-1.8%
Nevada	18.6	20.0	1.4	7.6%
New Hampshire	14.5	12.7	-1.8	-12.6%
New Jersey	13.3	12.7	-0.6	-4.3%
New Mexico	15.2	15.1	-0.1	-0.9%
New York	13.9	12.9	-1.0	-7.1%
North Carolina	15.5	15.2	-0.4	-2.3%
North Dakota	13.4	11.4	-2.0	-14.6%
Ohio	15.5	16.1	0.6	3.5%
Oklahoma	15.1	16.0	0.9	5.9%
Oregon	19.4	20.3	0.9	4.6%
Pennsylvania	15.5	13.8	-1.7	-11.0%
Rhode Island	14.8	12.8	-2.0	-13.3%
South Carolina	14.9	16.1	1.2	7.7%
South Dakota	13.7	13.3	-0.4	-3.2%
Tennessee	15.9	14.8	-1.1	-6.7%
Texas	14.8	14.7	-0.1	-0.5%
Utah	21.9	22.8	0.9	4.1%
Vermont	12.1	11.6	-0.5	-4.5%
Virginia	13.2	17.6	4.4	33.6%
Washington	19.7	19.4	-0.3	-1.8%
West Virginia	13.7	13.9	0.2	1.5%
Wisconsin	14.6	15.1	0.5	3.7%
Wyoming	13.3	12.5	-0.8	-6.1%

Appendix 3.J
School/District K-12 Administrators
(Source: U.S. Department of Education's National Center for Education Statistics)

	2000-2001	2010-2011	Change from 1999-2000 to 2010-2011	
			Total FTE	Percentages
United States	**141,792**	**165,045**	**23,253**	**16.4%**
New England States	**7,349**	**8,831**	**1,482**	**20.2%**
Comparative States	**11,997**	**13,018**	**1,021**	**8.5%**
Alabama	3,294	2,606	-688	-20.9%
Alaska	739	683	-56	-7.6%
Arizona	2,008	2,471	463	23.1%
Arkansas	1,617	1,767	150	9.3%
California	13,009	15,267	2,258	17.4%
Colorado	2,200	2,777	577	26.2%
Connecticut	2,063	2,127	64	3.1%
Delaware	349	413	64	18.3%
District of Columbia	267	491	224	83.9%
Florida	6,332	7,957	1,625	25.7%
Georgia	4,573	6,157	1,584	34.6%
Hawaii	475	571	96	20.2%
Idaho	715	701	-14	-2.0%
Illinois	5,812	7,362	1,550	26.7%
Indiana	2,946	2,903	-43	-1.5%
Iowa	2,119	1,740	-379	-17.9%
Kansas	1,755	1,807	52	3.0%
Kentucky	1,856	3,147	1,291	69.6%
Louisiana	2,611	2,880	269	10.3%
Maine	902	876	-26	-2.9%
Maryland	3,058	3,635	577	18.9%
Massachusetts	3,083	4,382	1,299	42.1%
Michigan	5,394	4,751	-643	-11.9%
Minnesota	1,871	2,103	232	12.4%
Mississippi	1,686	1,912	226	13.4%
Missouri	2,967	3,136	169	5.7%
Montana	502	534	32	6.4%
Nebraska	972	1,029	57	5.9%

Nevada	908	993	85	9.4%
New Hampshire	542	506	-36	-6.6%
New Jersey	4,603	4,651	48	1.0%
New Mexico	984	1,309	325	33.0%
New York	7,668	9,282	1,614	21.0%
North Carolina	4,551	5,101	550	12.1%
North Dakota	406	447	41	10.1%
Ohio	5,112	5,053	-59	-1.2%
Oklahoma	2,023	2,147	124	6.1%
Oregon	1,631	1,584	-47	-2.9%
Pennsylvania	4,392	5,531	1,139	25.9%
Rhode Island	338	452	114	33.7%
South Carolina	2,862	2,554	-308	-10.8%
South Dakota	426	430	4	0.9%
Tennessee	4,696	3,360	-1,336	-28.4%
Texas	13,550	22,360	8,810	65.0%
Utah	956	1,300	344	36.0%
Vermont	421	488	67	15.9%
Virginia	3,910	4,606	696	17.8%
Washington	2,692	2,800	108	4.0%
West Virginia	1,077	1,105	28	2.6%
Wisconsin	2,529	2,447	-82	-3.2%
Wyoming	340	354	14	4.1%

Appendix 3.K
Student to Administrator Ratios
(Source: Education Commission of the States calculations based on data from the U.S. Department of Education's National Center for Education Statistics)

	2000-2001	2010-2011	Change from 2000-2001 to 2010-2011	
			Ratios	Percentages
United States	**332.9**	**299.8**	**-33.1**	**-9.9%**
New England States	**301.0**	**242.4**	**-58.6**	**-19.5%**
Comparative States	**299.0**	**269.5**	**-29.5**	**-9.9%**
Alabama	224.6	289.9	65.3	29.1%
Alaska	180.5	193.4	13.0	7.2%
Arizona	437.1	433.7	-3.4	-0.8%
Arkansas	278.3	272.8	-5.4	-1.9%
California	472.0	412.0	-60.1	-12.7%
Colorado	329.3	303.7	-25.6	-7.8%
Connecticut	272.5	263.5	-9.0	-3.3%
Delaware	328.6	313.3	-15.3	-4.6%
District of Columbia	258.1	145.2	-113.0	-43.8%
Florida	384.5	332.2	-52.3	-13.6%
Georgia	316.0	272.4	-43.6	-13.8%
Hawaii	388.1	314.5	-73.6	-19.0%
Idaho	342.8	393.5	50.7	14.8%
Illinois	352.5	284.1	-68.4	-19.4%
Indiana	335.8	360.7	24.9	7.4%
Iowa	233.6	284.9	51.3	22.0%
Kansas	268.2	267.7	-0.5	-0.2%
Kentucky	358.8	213.9	-144.9	-40.4%
Louisiana	284.6	241.9	-42.7	-15.0%
Maine	229.5	215.8	-13.7	-6.0%
Maryland	278.9	234.4	-44.5	-15.9%
Massachusetts	316.3	218.1	-98.2	-31.1%
Michigan	319.0	334.0	15.1	4.7%
Minnesota	456.6	398.5	-58.1	-12.7%
Mississippi	295.3	256.6	-38.7	-13.1%
Missouri	307.6	293.0	-14.7	-4.8%

Montana	308.5	265.3	-43.2	-14.0%
Nebraska	294.4	290.1	-4.4	-1.5%
Nevada	375.2	440.2	65.0	17.3%
New Hampshire	384.6	384.8	0.2	0.0%
New Jersey	285.3	301.6	16.2	5.7%
New Mexico	325.5	258.3	-67.2	-20.6%
New York	375.9	294.7	-81.2	-21.6%
North Carolina	284.3	292.2	8.0	2.8%
North Dakota	269.0	215.5	-53.5	-19.9%
Ohio	359.0	347.2	-11.8	-3.3%
Oklahoma	308.0	307.4	-0.6	-0.2%
Oregon	334.9	360.3	25.4	7.6%
Pennsylvania	413.1	324.2	-88.9	-21.5%
Rhode Island	465.5	318.1	-147.4	-31.7%
South Carolina	236.7	284.2	47.5	20.1%
South Dakota	301.9	293.3	-8.6	-2.8%
Tennessee	193.6	293.9	100.3	51.8%
Texas	299.6	220.7	-78.9	-26.3%
Utah	503.6	450.4	-53.2	-10.6%
Vermont	242.4	198.5	-43.9	-18.1%
Virginia	292.8	271.7	-21.1	-7.2%
Washington	373.2	372.8	-0.5	-0.1%
West Virginia	265.9	256.0	-9.9	-3.7%
Wisconsin	347.8	356.5	8.7	2.5%
Wyoming	264.5	251.4	-13.1	-4.9%

Appendix 3.L
Federal Spending as a Percentage of K-12 Education Spending
(Source: United States Census Bureau)

	1999-2000	2009-2010
United States	7.1%	12.5%
Alabama	8.7%	15.6%
Alaska	15.2%	16.5%
Arizona	9.8%	18.1%
Arkansas	9.0%	15.6%
California	8.9%	15.0%
Colorado	5.3%	8.2%
Connecticut	4.0%	8.6%
Delaware	6.5%	10.7%
District of Columbia	21.0%	6.7%
Florida	8.0%	16.0%
Georgia	6.3%	14.6%
Hawaii	9.0%	14.9%
Idaho	7.6%	20.4%
Illinois	7.5%	13.8%
Indiana	5.1%	10.8%
Iowa	5.9%	13.2%
Kansas	6.3%	12.4%
Kentucky	9.9%	15.4%
Louisiana	11.6%	19.3%
Maine	6.1%	12.0%
Maryland	5.5%	7.5%
Massachusetts	5.1%	7.4%
Michigan	6.7%	12.9%
Minnesota	4.6%	12.2%
Mississippi	13.5%	21.2%
Missouri	6.6%	15.0%
Montana	11.9%	15.9%
Nebraska	6.9%	12.8%
Nevada	4.9%	8.4%
New Hampshire	3.6%	6.6%
New Jersey	3.8%	9.3%
New Mexico	13.5%	20.7%
New York	6.1%	6.7%
North Carolina	6.9%	11.6%
North Dakota	12.5%	22.0%

Ohio	5.6%	10.2%
Oklahoma	9.7%	13.3%
Oregon	6.2%	13.2%
Pennsylvania	6.3%	11.3%
Rhode Island	5.6%	11.3%
South Carolina	7.8%	13.7%
South Dakota	12.3%	19.4%
Tennessee	8.7%	13.1%
Texas	8.3%	15.8%
Utah	7.4%	13.4%
Vermont	6.9%	11.0%
Virginia	5.6%	10.4%
Washington	7.2%	11.8%
West Virginia	9.4%	16.2%
Wisconsin	4.6%	10.1%
Wyoming	8.4%	7.2%

Appendix 3.M
High School Graduation Rates
Graduation Rates Based on Four Years of Attendance
(Source: National Center for Education Statistics)

	2001-2002	2008-2009	Change in Rates
United States	72.6%	75.5%	2.9%
Alabama	62.1%	69.9%	7.8%
Alaska	65.9%	72.6%	6.7%
Arizona	74.7%	72.5%	-2.2%
Arkansas	74.8%	74.0%	-0.8%
California	72.7%	71.0%	-1.7%
Colorado	74.7%	77.6%	2.9%
Connecticut	79.7%	75.4%	-4.3%
Delaware	69.5%	73.7%	4.2%
Florida	63.4%	68.9%	5.5%
Georgia	61.1%	67.8%	6.7%
Hawaii	72.1%	75.3%	3.2%
Idaho	79.3%	80.6%	1.3%
Illinois	77.1%	77.7%	0.6%
Indiana	73.1%	75.2%	2.1%
Iowa	84.1%	85.7%	1.6%
Kansas	77.1%	80.2%	3.1%
Kentucky	69.8%	77.6%	7.8%
Louisiana	64.4%	67.3%	2.9%
Maine	75.6%	79.9%	4.3%
Maryland	79.7%	80.1%	0.4%
Massachusetts	77.6%	83.3%	5.7%
Michigan	72.9%	75.3%	2.4%
Minnesota	83.9%	87.4%	3.5%
Mississippi	61.2%	62.0%	0.8%
Missouri	76.8%	83.1%	6.3%
Montana	79.8%	82.0%	2.2%
Nebraska	83.9%	82.9%	-1.0%
Nevada	71.9%	56.3%	-15.6%
New Hampshire	77.8%	84.3%	6.5%
New Jersey	85.8%	85.3%	-0.5%
New Mexico	67.4%	64.8%	-2.6%
New York	60.5%	73.5%	13.0%
North Carolina	68.2%	75.1%	6.9%
North Dakota	85.0%	87.4%	2.4%

Ohio	77.5%	79.6%	2.1%
Oklahoma	76.0%	77.3%	1.3%
Oregon	71.0%	76.5%	5.5%
Pennsylvania	80.2%	80.5%	0.3%
Rhode Island	75.7%	75.3%	-0.4%
South Carolina	57.9%	66.0%	8.1%
South Dakota	79.0%	81.7%	2.7%
Tennessee	59.6%	77.4%	17.8%
Texas	73.5%	75.4%	1.9%
Utah	80.5%	79.4%	-1.1%
Vermont	82.0%	89.6%	7.6%
Virginia	76.7%	78.4%	1.7%
Washington	72.2%	73.7%	1.5%
West Virginia	74.2%	77.0%	2.8%
Wisconsin	84.8%	90.7%	5.9%
Wyoming	74.4%	75.2%	0.8%

Appendix 3.N
College Going Rates
Percentage of Student Attending College One Year After Graduation
(Source: Calculated by the CL Higher Education Center
Based on Data from the U.S. Department of Education)

	2007-2008
United States	**63.3%**
Alabama	66.7%
Alaska	45.7%
Arizona	51.4%
Arkansas	62.5%
California	65.4%
Colorado	62.6%
Connecticut	68.0%
Delaware	66.1%
District of Columbia	53.5%
Florida	58.8%
Georgia	69.6%
Hawaii	62.3%
Idaho	49.1%
Illinois	57.4%
Indiana	65.7%
Iowa	64.3%
Kansas	65.4%
Kentucky	60.9%
Louisiana	65.3%
Maine	57.1%
Maryland	62.9%
Massachusetts	74.7%
Michigan	59.9%
Minnesota	69.2%
Mississippi	77.4%
Missouri	60.0%
Montana	51.9%
Nebraska	65.5%
Nevada	55.6%
New Hampshire	63.9%
New Jersey	71.1%
New Mexico	67.7%
New York	74.2%

North Carolina	66.0%
North Dakota	67.6%
Ohio	62.7%
Oklahoma	56.0%
Oregon	46.5%
Pennsylvania	63.9%
Rhode Island	67.4%
South Carolina	70.4%
South Dakota	72.1%
Tennessee	61.6%
Texas	56.9%
Utah	58.5%
Vermont	48.3%
Virginia	68.7%
Washington	50.7%
West Virginia	59.1%
Wisconsin	59.1%
Wyoming	59.4%

Appendix 4.A: Equity Statistics: Maine Unweighted Students and EPS Revenues

	FY 2006	FY 2007	FY 2008	FY 2009	FY2010	FY 2011	FY 2012	FY 2013
Mean Per Pupil Expenditures	$5,336	$5,939	$6,472	$6,603	$6,862	$7,075	$7,211	$7,310
Standard Deviation	$330	$361	$378	$412	$381	$444	$456	$382
Coefficient of Variation	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.05
Range	$2,853	$3,085	$4,691	$5,663	$3,447	$3,734	$5,880	$7,089
Restricted Range	$1,041	$1,135	$1,224	$1,343	$1,446	$1,409	$1,650	$1,160
Federal Range Ratio	0.22	0.21	0.21	0.23	0.24	0.22	0.26	0.17
McLoone Index	0.95	0.95	0.95	0.95	0.96	0.95	0.95	0.96
Verstegen Index	1.05	1.04	1.04	1.05	1.05	1.05	1.05	1.04
Correlation EPS	0.297	0.307	0.304	0.275	0.224	0.252	0.226	0.21
Elasticity EPS	0.025	0.024	0.021	0.019	0.014	0.018	0.016	0.011
Correlation Income (Income per return)							0.421	
Elasticity Income (per return)							0.108	

Appendix 4.B: Equity Statistics: Maine Unweighted Students and EPS Revenues Including SPED, GT, and LEP

	FY 2006	FY 2007	FY 2008	FY 2009	FY2010	FY 2011	FY 2012	FY 2013
Mean Per Pupil Expenditures	$6,583	$7,249	$7,878	$8,019	$8,383	$8,631	$8,831	$9,040
Standard Deviation	$537	$548	$600	$585	$661	$658	$673	$650
Coefficient of Variation	0.08	0.08	0.08	0.07	0.08	0.08	0.08	0.07
Range	$7,192	$4,803	$9,285	$8,790	$6,334	$8,925	$8,156	$7,089
Restricted Range	$1,802	$1,836	$2,072	$1,838	$2,186	$2,274	$2,148	$2,089
Federal Range Ratio	0.31	0.29	0.3	0.26	0.3	0.3	0.27	0.26
McLoone Index	0.94	0.95	0.94	0.95	0.95	0.95	0.94	0.95
Verstegen Index	1.07	1.06	1.06	1.06	1.07	1.07	1.06	1.06
Correlation EPS	0.283	0.293	0.298	0.293	0.26	0.275	0.215	0.203
Elasticity EPS	0.031	0.029	0.027	0.024	0.024	0.024	0.018	0.015
Correlation Income (Income per return)							0.223	
Elasticity Income (per return)							0.068	

Appendix 4.C: Equity Statistics: Maine Unweighted Students and State and Required Local Revenues

	FY 2006	FY 2007	FY 2008	FY 2009	FY2010	FY 2011	FY 2012	FY 2013
Mean Per Pupil Expenditures	N/A	N/A	$8,805	$8,944	$9,421	$9,692	$9,998	$10,174
Standard Deviation	N/A	N/A	$763	$779	$845	$873	$991	$930
Coefficient of Variation	N/A	N/A	0.09	0.09	0.09	0.09	0.1	0.09
Range	N/A	N/A	$8,329	$12,564	$20,037	$16,126	$29,780	$18,618
Restricted Range	N/A	N/A	$2,383	$2,342	$2,437	$2,332	$2,763	$2,847
Federal Range Ratio	N/A	N/A	0.31	0.3	0.3	0.28	0.33	0.32
McLoone Index	N/A	N/A	0.94	0.94	0.94	0.94	0.93	0.93
Verstegen Index	N/A	N/A	1.07	1.07	1.07	1.08	1.07	1.08
Correlation EPS	N/A	N/A	0.31	0.3	0.274	0.296	0.31	0.221
Elasticity EPS	N/A	N/A	0.034	0.029	0.026	0.031	0.034	0.021
Correlation Income (Income per return)	N/A	N/A					0.145	
Elasticity Income (per return)	N/A	N/A					0.053	

Appendix 4.D Equity Statistics: Maine Unweighted Students and State and Raised Local Revenues

	FY 2006	FY 2007	FY 2008	FY 2009	FY2010	FY 2011	FY 2012	FY 2013
Mean Per Pupil Expenditures	$8,724	$9,424	$9,909	$10,274	$10,498	$10,642	$10,704	$11,128
Standard Deviation	$1,161	$1,337	$1,413	$1,444	$1,385	$1,447	$1,486	$1,694
Coefficient of Variation	0.13	0.14	0.14	0.14	0.13	0.14	0.14	0.15
Range	$22,574	$19,126	$38,367	$44,605	$38,910	$42,834	$48,900	$50,742
Restricted Range	$3,124	$3,771	$3,824	$3,988	$4,146	$3,903	$3,949	$4,161
Federal Range Ratio	0.44	0.48	0.47	0.47	0.49	0.44	0.45	0.46
McLoone Index	0.94	0.93	0.91	0.92	0.93	0.92	0.92	0.91
Verstegen Index	1.14	1.14	1.12	1.13	1.13	1.13	1.12	1.14
Correlation EPS	0.608	0.6	0.532	0.59	0.563	0.562	0.595	0.486
Elasticity EPS	0.11	0.104	0.091	0.092	0.086	0.088	0.091	0.076
Correlation Income (Income per return)							0.323	
Elasticity Income (per return)							0.174	

Appendix 4.E Equity Statistics: Maine Weighted Students and EPS Revenue Including SPED, GT, and LEP

	FY 2006	FY 2007	FY 2008	FY 2009	FY2010	FY 2011	FY 2012	FY 2013
Mean Per Pupil Expenditures	$5,196	$5,802	$6,276	$6,419	$6,665	$6,840	$6,989	$7,136
Standard Deviation	$438	$436	$478	$480	$512	$538	$529	$503
Coefficient of Variation	0.08	0.08	0.08	0.07	0.08	0.08	0.08	0.07
Range	$4,987	$4,468	$4,923	$5,542	$3,474	$14,146	$6,152	$7,799
Restricted Range	$1,417	$1,511	$1,685	$1,661	$1,689	$1,668	$1,652	$1,622
Federal Range Ratio	0.32	0.3	0.31	0.3	0.29	0.28	0.27	0.26
McLoone Index	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.95
Verstegen Index	1.07	1.06	1.05	1.06	1.06	1.06	1.06	1.06
Correlation EPS	0.378	0.391	0.387	0.378	0.364	0.382	0.325	0.321
Elasticity EPS	0.042	0.037	0.035	0.03	0.031	0.034	0.027	0.022

Appendix 4.F: Equity Statistics: Maine Weighted Students and State and Required Local Revenues

	FY 2006	FY 2007	FY 2008	FY 2009	FY2010	FY 2011	FY 2012	FY 2013
Mean Per Pupil Expenditures	N/A	N/A	$7,015	$7,160	$7,490	$7,681	$7,913	$8,031
Standard Deviation	N/A	N/A	$656	$649	$649	$705	$803	$762
Coefficient of Variation	N/A	N/A	0.09	0.09	0.09	0.09	0.1	0.09
Range	N/A	N/A	$9,747	$13,350	$20,764	$22,114	$3,787	$4,226
Restricted Range	N/A	N/A	$2,142	$2,139	$2,143	$2,301	$2,350	$2,392
Federal Range Ratio	N/A	N/A	0.36	0.35	0.33	0.35	0.36	0.35
McLoone Index	N/A	N/A	0.93	0.94	0.94	0.93	0.93	0.93
Verstegen Index	N/A	N/A	1.07	1.07	1.06	1.06	1.08	1.08
Correlation EPS	N/A	N/A	0.243	0.229	0.173	0.208	0.235	0.139
Elasticity EPS	N/A	N/A	0.025	0.022	0.018	0.022	0.026	0.013

Appendix 4.G: Equity Statistics: Maine Weighted Students and State and Raised Local Revenues

	FY 2006	FY 2007	FY 2008	FY 2009	FY2010	FY 2011	FY 2012	FY 2013
Mean Per Pupil Expenditures	$6,886	$7,542	$7,895	$8,225	$8,346	$8,433	$8,472	$8,784
Standard Deviation	$999	$1,115	$1,197	$1,218	$1,133	$1,224	$1,261	$1,433
Coefficient of Variation	0.15	0.15	0.15	0.15	0.14	0.15	0.15	0.16
Range	$22,574	$18,327	$38,410	$44,605	$33,825	$37,320	$42,515	$50,742
Restricted Range	$3,152	$3,298	$3,375	$3,537	$3,491	$3,863	$3,792	$4,312
Federal Range Ratio	0.56	0.53	0.53	0.53	0.53	0.57	0.55	0.62
McLoone Index	0.91	0.92	0.91	0.91	0.92	0.91	0.91	0.89
Verstegen Index	1.13	1.13	1.12	1.12	1.12	1.12	1.13	1.13
Correlation EPS	0.627	0.628	0.56	0.607	0.604	0.585	0.618	0.502
Elasticity EPS	0.12	0.112	0.1	0.097	0.092	0.096	0.099	0.08

Notes: 2007 does not include Dennistown or West Point, for which the DOE lacks raised local data