AN EVIDENCE-BASED APPROACH TO THE BASIC STUDENT ALLOCATION IN ALASKA

Prepared for the
Anchorage Public Schools

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Introduction and Overview

INTRODUCTION

Using the Evidence-Based (EB) Model, this document provides a set of recommendations Alaska can use to determine an adequate Basic Student Allocation for the state's school funding formula. This figure would allow each "normal" size school to offer students an equal opportunity to achieve to the state's curriculum and performance standards. Accompanying this report is a Microsoft EXCEL-based computer simulation that shows how all the EB recommendations can be combined to estimate a new Basic Student Allocation figure, as well as additional dollar per pupil figures and/or weights for students from low income backgrounds, students classified as English Language Learning (ELL), and students with mild/moderate disabilities. The simulation also allows users to modify any of the specific EB elements to produce alternative estimates of these per pupil cost figures.

For the past 25 years, Lawrence O. Picus and Allan Odden have worked across the country, primarily with state legislatures, helping states determine how to fund schools adequately. Adequate has been defined as providing a level of resources (with appropriate adjustments for size and geographic cost differences) that would enable schools to provide every student with an equal opportunity to learn to high performance standards. Over time, as both curriculum and performance standards have been increased and as states have adopted college and career ready standards for reading/language arts, mathematics, and science, the EB model has been updated to meet the changing expectations of K-12 schools.

ORGANIZATION OF THE REPORT

Two chapters follow this introductory chapter. Chapter 2 describes the school improvement model that undergirds the EB funding model. This chapter draws from research we and others have conducted on schools that have dramatically moved the student achievement needle. Such schools exist across the country and vary by location – urban, suburban, and rural – and by school size – large, medium, and small.

Chapter 3 "unpacks" the elements of a high performance school and includes specific recommendations for every element of the model. The table in this chapter that lists all the EB elements and their values represents the core EB model as of 2022. These elements include class size, extra help for struggling students, professional development, student support services (including guidance counselors and nurses), and ways that instruction and teachers can be organized to bolster their effectiveness to increase student performance and reduce achievement gaps linked to student demographics.

Chapter 4 Chapter 4 (to be written) will summarize the Educator Review Panels.

Chapter 5 provides the estimated EB determined Basic Student Allocation figure using the accompanying EXCEL-based computer simulation.

Please note that this EB report does not include transportation, food services, or capital construction (facilities) costs.

In terms of cost, a national study we conducted using 2008 data showed that the EB model at that time cost just above the average of what was spent on schools across the country in that year (Odden, Picus & Goetz, 2010); the school cases that we studied then and which deployed strategies aligned with the EB model (e.g., Odden, 2009, 2012; Odden &Picus, 2020), generally produced significantly more student achievement. We do not know how the cost of the EB model would compare to average school spending today, but we expect it would be higher in low spending and/or high salary states. Nevertheless, it is our professional position that if Alaska provided school funding at the level of the EB model and if Alaska's schools used the resources in the model as indicated in Chapter 2, then student achievement in Alaska would dramatically rise. The following chapter describes the high performance EB school funding model.

Chapter 2
The Evidence Based School Improvement Model

Although the intent of this report is to identify the array of educational goods that would allow Alaska's schools to provide each student an equal opportunity to meet the state's student performance standards, i.e., to identify an adequate Basic Student Allocation, this chapter provides the details of the school improvement strategy that is embedded within the EB funding model. Although we cannot claim a direct linkage between funding and student performance, the Evidence-Based (EB) model is designed to identify the array of resources a high performance school would need to provide every student with robust opportunities to meet college and career ready standards, which should dramatically move the student achievement needle.

No matter what course of studies a high school student completes – college prep or career tech – Alaska's students are expected to achieve to college and career-ready standards in order to be competitive – after high school or college – in today's global, knowledge-based economy. This includes children from low-income homes, students of color, English language learners (ELL) and students with mild and moderate disabilities. The basket of educational goods and services and a cost-based funding model to support that basket must be sufficiently robust to allow students in all school districts in the state to have sufficient opportunities to attain these rigorous standards.

Before presenting an overview of each component of the Evidence-Based approach to school finance adequacy in Chapter 3, this chapter provides a more general description of the school improvement strategies that undergird the EB Model and describes how the key resource elements are used to increase student performance.

THE HIGH-PERFORMANCE SCHOOL MODEL EMBEDDED IN THE EVIDENCE-BASED APPROACH TO SCHOOL FINANCE ADEQUACY

The evidence-based (EB) approach was developed by Odden and Picus to link strategies and resources in high performance schools to state school funding formulas. They have used the EB Model to conduct adequacy studies in over 20 states over the last 2 decades. The EB model relies on a school improvement model that allocates resources for educational strategies that current educational research finds linked to improvements in student learning; more detail on the EB model can be found in the sixth edition of our school finance text,[1] and in the State Studies tab of the Resource section of our Website (picusodden.com). The model relies on two major types of research:

1. Reviews of research evidence on the student achievement effects of educational strategies used in the EB model. In recent years this evidence has been strengthened by the growing number of randomized controlled trials (RCTs) that have been conducted on educational strategies included in the EB Model.

[1] Allan Odden & Lawrence O. Picus. (2020). *School Finance: A Policy Perspective, 6th edition*. New York: McGraw Hill.

2. Case reports of schools and districts that have dramatically improved student performance over a 4–6-year period –sometimes actually “doubling” student performance on state tests.

The evidence-based school improvement model includes multiple improvement strategies that, if adopted by districts, can be expected to lead to large improvements in academic achievement for all students, and substantial reductions in student achievement gaps linked to demographic variables (Blankstein, 2010, 2011; Chenoweth, 2007, 2009; Hoyer, 2020; Odden, 2009, 2012; Petrilli et al., 2022). The 10 school improvement strategies underpinning the approach include:

1. Analyzing student data to become deeply knowledgeable about performance issues and to understand the nature of the achievement gap. The test score analysis first includes analysis of state test results and then the use over time of benchmark and short cycle assessments to help tailor instruction to precise student needs and to identify and monitor interventions for struggling students.

2. Setting higher goals, including aiming to educate 95 percent of the students in the school to proficiency or higher on state exams; seeing that a significant portion of the school’s students reach advanced achievement levels; and making significant progress in closing the achievement gaps linked to demographics.

3. Reviewing evidence on good instruction and effective curriculum. Successful schools sunset their previous curriculum, replace it with a different and more rigorous curriculum, and over time, create their own specific view of the effective instructional strategies needed is to deliver that curriculum.

4. Investing heavily in teacher training that includes intensive summer institutes and longer teacher work years. Provide resources for trainers and, most importantly, fund instructional coaches in all schools. Time during the regular school day and week is provided for teacher collaborative work groups to use student data to improve instruction.

5. Providing extra help for struggling students and, with a combination of local, state and federal Title 1 funds, provide some combination of tutoring in 1:1, 1:3 or 1:5 tutor-student ratio formats. Over time this also includes extended days, summer school and English language development for all English Language Learning (ELL) students.

6. Creating smaller classes in early elementary years, often lowering class sizes in grades kindergarten through three to 15 students, citing research from randomized trials. Sometimes this includes small overall school size as well.

7. Restructuring the school day to provide more effective ways to deliver instruction. This includes multi-age classrooms in elementary schools and block schedules, double periods of mathematics and reading in secondary schools, and intervention blocks of time in elementary schools. Schools also protect instructional time for core subjects, especially reading and mathematics.

8. Providing strong leadership support by the superintendent, the principal and teacher leaders around data-based decision making and improving the instructional program.

9. Fostering professional school cultures characterized by ongoing discussion of good instruction and by teachers taking responsibility for the student performance.

10. Bringing external professional knowledge into the school. For example, hiring experts to provide training, adopting research-based new curricula, discussing research on good instruction and working with regional education service agencies, as well as the state department of education.

Our review of the evidence on school improvement is often supplemented with case studies of schools and districts that are dramatically improving student achievement (see Cases of Improving Schools in the Resource section of our website picusodden.com). Combined, our analysis of current research and our cases produce a set of resources that we have concluded are adequate for schools and districts to produce substantial progress towards the student achievement goals of most states, including those in Alaska.

In sum, the schools that have boosted student performance that we and others have studied, deployed strategies strongly aligned with those embedded in the EB Model. These practices bolster our claim that if such funds are provided *and* used to implement these effective and research-based strategies, then significant student performance gains should follow.

Three Tier Approach

It should be clear that the design of the EB Model reflects the Response to Intervention (RTI) model. RTI is a three-tier approach to meeting student needs. Tier 1 refers to core instruction for all students. The EB Model seeks to make core instruction as effective as possible with its modest class sizes, provisions for collaborative time, and robust professional development resources. Effective core instruction is the foundation on which the effectiveness of all other educational strategies depend. Tier 2 services are provided to students struggling to achieve to standards before being given an individualized education program (IEP) and labeled as a student with a disability. The EB Model's current Tier 2 resources include one core tutor for every prototypical school and additional resources, triggered by poverty and ELL student counts, for tutoring, extended day, summer school, additional pupil support and ESL services. We further argue that the robust levels of Tier 2 resources allow schools to provide a range of extra help services, that often are funded only by special education programs, that get many modestly struggling students back "on track," and thus reduce the levels of special education students. Tier 3 includes all special education services.

Chapter 3
Using the EB Model to Identify an Adequate Basic Student Allocation Figure

INTRODUCTION

This chapter provides the formulas and funding levels of every element in the EB Funding Model. The elements of the EB Funding Model are divided into five sections:

1. Staffing for core programs, which include full-day kindergarten, core teachers, elective/specialist teachers, substitute teachers, instructional facilitators/coaches, core tutors, core guidance counselors and nurses, supervisory aides, librarians, principals/assistant principals, and school secretarial staff.
2. Dollar per student resources for gifted and talented students, professional development, instructional materials and supplies, benchmark and short cycle assessments, computers and other technology, and extra duty/student activities.
3. Central functions, which include maintenance and operations, central office personnel including school computer technicians, and non-personnel resources.
4. Resources for struggling students including at-risk tutors, at-risk pupil support, extended day personnel, summer school personnel, ELL personnel, special education, career and technical education and alternative schools.
5. Personnel compensation resources including salary levels, health insurance, benefits for workers' compensation, unemployment insurance, retirement and social security.

Before providing the summary of the EB formulas and elements, we discuss two more general issues necessary to understand how we proceed from school and district level resources to per pupil funding figures: student counts and prototypical schools and districts.

Student Counts

The EB model recommends that states use an ADM student count to distribute general aid. Alaska follows this practice and also enhances the ADM count in its size and scale adjustments. This report just addresses the basic ADM count.

The model also needs a measure of the number of students from poverty backgrounds to trigger specific resources. In the past, this usually has been the number of students eligible for the federal free and reduced-price lunch program. Since districts can now provide free lunches to all students if they have a large number of students from poverty, the count of free and reduced lunch students may not be available in some districts. This leaves the question of whether or not to use an alternative indicator. One state, Illinois, provides a good alternative example using the non-duplicated count of children receiving services through the programs of Medicaid, the Supplemental Nutrition Assistance Program, the Children's Health Insurance Program, or Temporary Assistance for Needy Families). We defer to Alaska in how to count students from low income families.

The EB model also include a count of English Language Learning (ELL) students and students with mild and moderate disabilities. This study uses counts of these students as they are currently defined by the state. To ensure that all ELL students receive the extra help resources of the EB model, we would encourage Alaska to not only collect an ELL student count, but also the number of non-ELL poverty students; all ELL students trigger tutoring, extended day, summer school, ESL, and additional pupil support resources in the EB Model. In addition, all non-ELL poverty students would trigger only the tutoring, extended day, summer school and additional pupil support resources. The goal is for the extra help resources to be provided to all ELL and poverty students, but using unduplicated counts of those students.

Prototypical Schools and Districts

A key component of the EB model – the way it will be used in Alaska and the way it is used in other states to estimate a foundation expenditure per pupil level – is the use of prototypical schools and districts. The EB model identifies resources for prototypical elementary, middle, and high schools, as well as a prototypical district. The model needs to use specific sizes in order for the prototypes to indicate the relative level of resources in the schools. Although our modeling is based on these prototypes, this does not imply Alaska or any other state should adopt new policies on school or district size.

Research on School Size

School sizes differ substantially within and across all states. No state has a specific policy on school size, though some – including New Jersey, North Dakota, and Wyoming – use prototypical school sizes to develop and/or operate their funding formula. A number of other states include "ideal" size configurations for different levels of schools in their facility guidelines – something that clearly creates incentives for specific school sizes.

Research on school size is quite consistent in its conclusions. Most of the research on school size addresses the question of whether large schools – those significantly over 1,000 students – are 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; Ready & Lee, 2004).

In reviews of scale economies and diseconomies, Andrews, Duncombe & Yinger (2002) and Duncombe and Yinger (2007, 2010) found that the optimum size for elementary schools was in the 300-500 student range, and for high schools was in the 600-900 range. 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 Evidence Based Model's Prototypical School Sizes

The EB approach follow this research to identify resources for prototypical elementary, middle, and high schools with ADM of 450, 450 and 600 respectively. It uses this approach and these prototypes to indicate the relative level of resources in schools, as well as to calculate a base per pupil cost – the Basic Student Allocation in Alaska. These prototypical school sizes reflect research on the most effective school sizes, although few schools are exactly the size of the prototypes. Although many schools in Alaska and other states are smaller (and even larger) than these prototypical school sizes, these prototypical sizes can still be used to determine a new base per pupil figure, as the new base per pupil figure would be provided for all students in a school or district, whatever the actual size. States such as Arkansas, New Jersey, North Dakota and Washington have taken this approach.

We are aware of the substantial role very small rural schools play in educating Alaska's school children and the fiscal challenges of providing adequate resources for these schools. This study focuses on identifying an adequacy figure based on "normal size" schools in Alaska's larger districts and assumes further adjustments for size, distance, and geographic location will be made through the existing structure, or through a new one that may be developed by others.

Additionally, as is shown in Element 20 (see Table 3.1 below), the EB model begins with a prototypical district size of 3,900, which includes four 450-student elementary schools, two 450-student middle schools, and two 600-student high schools. This configuration is then used to estimate a district-level central office cost per student. The EB prototypes should not be construed to imply Alaska needs to replace all school sites with smaller or larger buildings or break school districts into smaller units; they are used as heuristics to determine the estimated Basic Student Allocation figure.

Effect Sizes

In reviewing the evidence supporting each EB recommendation the report discusses the impact of studies in terms of "effect sizes." Effect size is the amount of a standard deviation (SD) in higher performance that the program produces for students who participate in the program versus students who do not. An effect size of 1.0 indicates that the average student's performance would move one standard deviation or from the 50^{th} to the 83^{rd} percentile.

A major issue in education is how to interpret the effect size – is it low, medium or high? Decades ago, when this issue was raised, treatments tended to be small scale interventions in a controlled context – several students in a laboratory environment. At that time estimated effects were often substantial, sometimes greater than 1.0 standard deviation. Benchmarks for understanding effect size were established in 1969 (Cohen, 1969). Cohen posited an effect size of 0.2 as Small, 0.5 as Medium, and 0.8 as Large.

During the past two decades, however, when education treatments have been conducted on a much larger scale and in natural settings – often using thousands of students across scores of schools and dozens of districts – effect sizes have been smaller (Kraft, 2020). Moreover, such studies today compare a new program treatment to an existing program treatment, whereas in the past the new program treatment was compared to no treatment at all; the result predictably has been smaller effect sizes. Hundreds of randomized controlled trials (RCT) in education have been conducted in recent years with effect sizes almost always below 1.0. Kraft argues that new benchmarks are needed to assess the importance of the effect produced. Kraft proposes the following benchmarks for effect sizes from causal studies of PreK–12 education interventions evaluating effects on student achievement: less than 0.05 is Small, 0.05 to less than 0.20 is Medium, and 0.20 or greater is Large. These proposed benchmarks were based on the distribution of 1,942 effect sizes from 747 RCTs evaluating education interventions with standardized test outcomes. Readers of this document are encouraged to consider these benchmarks in assessing the various research impacts reported on the elements of the EB Model.

2023 CORE EB ALASKA RECOMMENDATIONS

Table 3.1 provides a detailed summary of the core 2023 EB Alaska Basic Student Allocation model resources:

Table 3.1 Summary of 2023 Alaska Evidence-Based Model Recommendations

Model Element	2022 Evidence-Based Recommendation
Staffing for Core Programs	
1. Full-Day Kindergarten	Full-day kindergarten program. Each K student counts as 1.0 pupil in the funding system.
2. Elementary Core Teachers/ Class Size	Grades K-3: 15 Grades 4-5/6: 25 (Average K-5 elementary class size of 17.3)
3. Secondary Core Teachers/ Class Size	Grades 6-12: 25. Average class size of 25
4. Elective/ Specialist Teachers	Elementary Schools: 20% of core elementary teachers Middle Schools: 20% of core middle school teachers High Schools: 33 1/3% of core high school teachers
5. Instructional Facilitators/ Coaches	1.0 Instructional coach position for every 200 students
6. Core Tutors/ Tier 2 Intervention	One tutor position in each prototypical school (Additional tutors are enabled through poverty and ELL pupil counts in Element 21)
7. Substitute Teachers	5% of core and elective teachers, instructional coaches, tutors (and teacher positions in additional tutoring, extended day, summer school, ELL, and special education)
8. Core Pupil Support Staff, Core Guidance Counselors, and Nurses	1 guidance counselor for every 450 grade K-5 students 1 guidance counselor for every 250 grade 6-12 students 1 nurse for every 450 K-8 students and 1 nurse position for every 600 9-12 students. (Additional student support resources are provided on the basis of poverty and ELL students in Element 22)
9. Supervisory and Instructional Aides	2 for each prototypical 450-student elementary and middle school 3 for each prototypical 600-student high school
10. Library Media Specialist	1.0 library media specialist position for each prototypical school
11. Principals and Assistant Principals	1.0 principal for the 450-student prototypical elementary school 1.0 principal for the 450-student prototypical middle school 1.0 principal and 1.0 assistant principal for the 600-student prototypical high school
12. School Site Secretarial and Clerical Staff	2.0 secretary positions for the 450-student prototypical elementary school 2.0 secretary positions for the 450-student prototypical middle school 3.0 secretary positions for the 600-student prototypical high school

Model Element	2022 Evidence-Based Recommendation
Dollar Per Student Resources	
13. Gifted and Talented Students	$40 per pupil
14. Intensive Professional Development	10 days of student-free time for training built into teacher contract year, by adding five days to the average teacher salary $130 per pupil for trainers (In addition, PD resources include instructional coaches [Element 5] and time for collaborative work [Element 4])
15. Instructional Materials	$210 per pupil for instructional and library materials $50 per pupil for each extra help program triggered by poverty and ELL students as well as special education
16. Short Cycle/ Interim Assessments	$25 per pupil for short cycle, interim and benchmark assessments
17. Technology and Equipment	$250 per pupil for school computer and technology equipment
18. Extra Duty Funds/Student Activities	$300 per student for co-curricular activities including sports and clubs for grades K-12
Central Office Functions	
19. Operations and Maintenance	Separate computations for custodians, maintenance workers and groundskeepers, $1 per gross square footage (GSF) for materials and supplies, and $350 per pupil for utilities
20. Central Office Personnel/ Non-Personnel Resources	8 professional and 17 classified positions for a prototypical 3,900 student Central office. Additionally $400 per pupil is provided for misc. items such as Board support, insurance, legal services, etc.
Resources for Struggling Students	
22. Tutors	1.0 tutor position for every 100 ELL students and one tutor position for every 100 non-ELL poverty students.
23. Additional Pupil Support Staff	1.0 pupil support position for every 100 ELL students and one pupil support position for every 100 non-ELL poverty students.
24. Extended Day	1.0 teacher position for every 120 ELL and for every 120 non-ELL poverty students.
25. Summer School	1.0 teacher position for every 120 ELL and for every 120 non-ELL poverty students.
26. ESL staff for English Language Learner (ELL) Students	In addition to tutors, extra pupil support, extended day and summer school, noted above, 1.0 ESL teacher position for every 100 ELL students.

Model Element	2022 Evidence-Based Recommendation
27. Special Education	8.1 teacher positions per 1,000 students, which includes: 7.0 teacher positions per 1,000 students for services for students with mild and moderate disabilities and 1.1 teacher position for the related services of speech/hearing pathologies and/or OT PT. This allocation equals approximately 1 position for every 141 students. **Plus** 1.0 psychologist per 1,000 students to oversee IEP development and ongoing review (included in Central Office Staffing). **In addition** Full state funding for students with severe disabilities, and state-placed students, and Federal Title VIB, with a cap on the number covered at 2% of all students.
28. Career-Technical Education (CTE)	$10,000 per CTE teacher for specialized equipment
Staff Compensation Resources	
29. Staff Compensation	For salaries, Anchorage average for all EB staff positions For benefits: Retirement or pension costs: 22% per classified employee Retirement or pension costs: 12.56% for certified employee Health Insurance: $22,000per employee Social Security: 0 % for certified Social Security: 6.2% up to $147,000 for classified Medicare: 1.45% Workers' Compensation: 1.06 % for certified employees Workers' Compensation: 3.0% for classified employees Unemployment Insurance: 0.1%

2023 CORE EB ALASKA STAFF RECOMMENDATIONS

This section addresses staffing for core programs, which include full-day kindergarten, core teachers, elective/specialist teachers, substitute teachers, instructional facilitators/coaches, core tutors, core guidance counselors and nurses, supervisory aides, librarians, principals/assistant principals, and school secretarial and clerical staff.

1. Full-Day Kindergarten

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 (Cooper et al., 2000, 2010; Fusaro, 1997; Gullo, 2000; Slavin, Karweit & Wasik, 1994). In a late 1990s meta-analysis of 23 studies comparing the achievement effect of full-day kindergarten to half-day kindergarten programs, Fusaro (1997) found an average effect size of +0.77. That same year a randomized controlled trial study (Elicker & Mathur, 1997) found the effect of full-day versus half-day kindergarten to be about +0.75 standard deviations. 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.

Research in the past several years has reinforced these findings. Hahn, et al's (2014) research review concluded that that full-day kindergarten improved academic achievement by an average of 0.35 standard deviations over students receiving only a half day program, with the effect being 0.46 for verbal achievement and 0.24 for math. Gibbs (2017) studied a natural experiment in Indiana that randomly assigned students to full-day kindergarten. The results showed significant gains in literacy skills associated with students placed in full-day kindergarten, with the impacts being even greater for "Hispanic" students. Thompson and Sonnenschein (2016) concluded that full-day kindergarten students (as compared to half-day students) had a higher chance of having early word reading skills by the end of kindergarten, which also predicted their higher reading scores in elementary schools. Early word attainment also helped to decrease the demographic related reading gaps. In a 2018 cost benefit study, Ramon, Barnett and Hahn (2018) calculated that, accounting for both the program costs and calculated economic returns, full-day kindergarten programs had a higher net benefit than half day programs, with net benefits being decreased childcare costs, reduced grade retention and remedial education, and increased maternal employment and income.

As a result of these consistently positive research findings on the impacts of full-day versus half day kindergarten, the EB Model supports a full-day kindergarten program for all students.

2023 EB Recommendation: Fund full-day kindergarten programs by counting kindergarten students as 1.0 ADM.

2. Elementary Core Teachers/Class Size

In staffing schools and classrooms, the most expensive decision superintendents and principals make is on class sizes for core teachers. Core teachers are defined as the grade-level classroom teachers in elementary schools. In middle and high schools, core teachers are those who teach the core subjects of mathematics, science, language arts, social studies and world languages. Advanced Placement (AP) or International Baccalaureate (IB) classes in these subjects are considered core classes.

The gold standard of educational research is controlled randomized trials (CRTs), which provide scientific evidence on the impact of a certain treatment (Mosteller, 1995). The primary evidence on the impact of small classes today is the Tennessee STAR study, which was a large scale, randomized controlled experiment of class sizes of approximately 15 students 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 students in the small classes of 15 (not a class of 30 with an instructional aide or two teachers) achieved at a significantly higher level (effect size of about 0.25 standard deviations) than those in regular class sizes, and the impacts were even larger (effect size of about 0.50) for low income and minority students (Gerber, Finn, Achilles, & Boyd-Zaharias, 2001; Finn, 2002; Grissmer, 1999; Krueger, 2002; Nye, Hedges, & Konstantopoulous, 2002). The same research also showed a regular class of 24-25 students with a teacher and an instructional aide *did not* produce a discernible positive impact on student achievement (Gerber, Finn, Achilles, & Boyd-Zaharias, 2001, a finding that undercuts proposals and widespread practices that place instructional aides in elementary classrooms).

Subsequent research showed the positive impacts of the small classes in the Tennessee study persisted into middle and high school years, and the years beyond high school (Finn, Gerber, Achilles & J.B. Zaharias, 2001; Konstantopoulos & Chung, 2009; Krueger, 2002; Nye, Hedges & Konstantopoulos, 2001a, 2001b). Related longitudinal research on the Tennessee class size reduction program also found the lasting benefits of small classes included a reduction in the achievement gap in reading and mathematics in later grades (Krueger & Whitmore, 2001).

Although some argue the impact of the small class sizes was derived primarily from kindergarten and grade 1, Konstantopoulos and Chung (2009) found that the longer students were in the 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.

Though differences in analytic methods and conclusions characterize some of the debate over class size (see Hanushek, 2002 and Krueger, 2002), we concur with those concluding class size makes 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.

2023 EB Recommendation: The EB Model provides for class sizes of 15 in grades K-3, and 25 in grades 4-5. These elementary core class sizes produce elementary schoolwide average class sizes of 17.3 for the prototypical K-5 school.

3. Secondary Core Teachers/Class Size

In middle and high schools, core teachers are those who teach core subjects such as mathematics, science, language arts, social studies and world languages. Advanced Placement (AP) and International Baccalaureate (IB) classes in these subjects are considered core classes.

Evidence on the most effective class sizes in grades 4–12 is harder to find than is evidence for the early elementary grades, because most of the research on the effects of class size has been conducted at the early elementary level. As a result, in developing the EB Model, we seek evidence on the most appropriate secondary class size from typical and best practices to identify the most appropriate class size for these grades. The national average class size in middle and high schools is roughly 25 students. Nearly all comprehensive school reform models were developed on the basis of a class size of 25 students (Odden, 1997; 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 many states have recommended secondary class sizes of 20, no individual in a panel we have coordinated cited research or best practices to support proposals at seconday class sizes that small.

Citing a few studies, Whitehurst and Chingos (2011) argued there might be a modest linear relationship in improving student performance when class size drops from between 25 and 30 students to 15, but our view of the evidence and impact is that the gains identified are modest at best, and insufficient to alter the EB Model class size recommendations.

2023 EB Recommendation: Secondary core class sizes, grades 6-12 of 25.

The difference between class size and staffing ratios

The issue of class size and staffing ratios is critical to understanding how the EB model allocates resources to schools and has a substantial impact on the total cost of the EB model. In many states and school districts “staffing ratios” are computed by dividing the number of pupils by the number of core *and* elective teachers. The result is that a school may report a staffing ratio of 15, but average class sizes will be higher because the number of pupils was separated into two groups: core and elective teachers. In other states and school districts, there can be even more confusion. These states report “pupil teacher ratios” that are computed by dividing the number of pupils by the number of all certified staff – core and elective teachers as well as other certificated staff such as instructional coaches, tutors, nurses and counselors. The result is that a school may report a “pupil teacher ratio” of 12, but average class sizes will be higher because the number of pupils was divided by all certified staff, not just core teachers. These figures are often confusing because staffing ratios, pupil/teacher ratios and class size are frequently conflated when in fact, they have different meanings.

The EB Model is clear that it provides resources for actual class size of 15 or 25, with other instructional and certified staff resourced above that level. To show the difference imagine an elementary school with 300 students. If the school has 20 certified staff members, the pupil teacher (or more accurately pupil/staff) ratio is 15:1. But if five of the instructional staff members are not core teachers, but rather teach electives, are instructional coaches or have other responsibilities, there are only 15 core teachers and the average class size actually would be 20, not the 15 that was reported.

For this reason, the EB model makes a clear distinction between staffing ratio, pupil/teacher ratios and class size. The intent is to provide positions for actual class sizes of 15 in grades K-3 and 25 in higher grades. In the example above, assuming the class size goal is 15, there would be 20 core teachers and the school would receive additional resources for elective teachers, instructional coaches, and other certificated staff.

4. Elective/Specialist Teachers

In addition to core classroom teachers, the EB Model provides elective or specialist teachers to complement and support core teachers. Generally, non-core or elective teachers, also called specialist teachers, offer courses in subjects such as music, band, art, physical education, health, career-technical education, typing, business, etc. A combination of core and elective teachers has two purposes. The first is to allow schools to offer a full, liberal arts curriculum program with adequate courses outside the core, all of which are needed to cover the broad range of topics. The second is to provide time during the school day for *all* – core and elective – teachers to collaborate on instructional plans, participate in professional development activities and otherwise plan for class instruction.

The April 2017 issue of *Phi Delta Kappan* discusses many issues related to the importance of art and music for our public schools. Teachers also need some pupil-free time during the regular school day to work collaboratively and engage in job-embedded professional development.

Assuming a day is divided into six one-hour periods, providing every teacher with one period a day for collaborative planning and focused professional development requires an additional 20% allocation for elective teachers over core teachers. Using this elective staff allocation, every teacher – core and elective – would teach five of six 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 *randomized controlled trial* (Carlson, Borman & Robinson, 2011).

When teachers work in collaborative teams, they review student data to design standards-based lesson plans and curriculum units, identify interventions for struggling students, and monitor all student progress toward meeting performance standards (DeFour, 2015). Collaborative teams have been identified as keys to improving student performance by teachers in several of our school case studies, as well as such studies by others (Chenoweth, 2007, 2009).

Labeling teacher collaboration “peer learning,” economists Jackson and Bruegmann (2009) found that such teacher collaborative activities were related to student learning gains. In a *randomized controlled trial*, Carlson, Borman & Robinson (2011) found that when collaborative teacher teams engaged in data-based decision making by analyzing student data to improve instruction the result was often higher student achievement. Ronfeldt et al. (2015) found that teachers working in collaborative groups boosted student learning over a two-year period in the Miami-Dade school district. Johnson, Reinhorn & Simon (2016) found that the six high-poverty schools in one urban district that had achieved the highest state rating, made teacher teams the central component of its schoolwide improvement strategies and that a key condition was ensuring that the school schedule provided regular, reliable meeting times for teams.

Using a data base similar to the Miami-Dade data base, Sun, Loeb and Grissom (2017) found that when a more effective teacher becomes part of a teaching team, the performance of other teachers improves, and the performance of the more effective teacher does not drop. This finding suggests that teacher collaboration can be enhanced when the system strategically ensures that each teacher team has at least one highly effective teacher as a member. Finally, studying school improvement strategies across hundreds of low performing schools in Washington, Sun, Shu and LeClair (2019) found that teachers using student data to improve instruction and target interventions, produce substantial achievement gains.

In sum, there is wide ranging research from scholars across the country documenting how teacher collaborative teams can work to improve instructional strategies that boost student learning. Making time during the regular school week and day requires a combination of core and elective teachers. With this combination of teachers, Boudett and Steele (2007) provide several examples of how data-based decision-making teachers can be organized and scheduled in schools. Thus, the EB model includes both core and elective teachers, making it possible for schools to offer a full liberal arts curriculum and to enable all teachers to engage in collaborative work with their peers during the regular school day and week.

The 20% additional staff is adequate for elementary and middle schools, but the EB Model establishes a different argument for high schools. If the goal is to have more high school students take a core set of rigorous academic courses, and learn the course material at a high level of thinking and problem solving, cognitive research findings suggest that use of longer class periods, such as those made available through the use of a block schedule, is an effective way to organize the instructional time of a high school. Typical block scheduling for high schools includes four 90-minute blocks a day where teachers provide instruction for three of those 90-minute blocks and have one block – or 90 minutes – for planning, preparation and collaboration. This schedule requires elective teachers at a rate of 33 1/3% of the number of core teachers. This block schedule would operate 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 1/3% of the number of core teachers to serve as elective teachers to provide the regular teacher with a "90-minute block" for planning, preparation and collaboration each day.

It should be noted that staffing recommendation for high schools would be sufficient for high schools to provide all students with a rigorous set of courses throughout grades 9-12, and an appropriate number of credits required for high school graduation and to be admitted into any post-secondary institution in the country.

Many school districts today require a 7.5-hour workday for teachers. Instruction usually comprises six hours of this time, and lunch 30 minutes, leaving 60 minutes for student arrival and departure and possible teacher collaborative time. A 7.5-hour teacher day and the core and elective provisions of the EB model provide ample resources for districts and schools to provide time for teacher collaborative teams to meet regularly (daily) during the regular school day.

Number of elective teachers

The current EB model provides an additional 20 percent of the number of core teachers as elective teachers for the prototypical elementary and middle school. At the high school level, the

EB model provides an additional 33 1/3 percent of the number of core teachers.

Under the EB model, the 20 percent formula provides an additional 5.2 FTE positions for the prototypical 450 grade K-5 student elementary school, 3.6 FTE positions for the prototypical 450 grade 6-8 student middle school, and the 33 1/3 percent formula provides an additional 8.0 positions for the prototypical 630 grade 9-12 student high school.

In totaling the core plus the specialist teachers from the recommendations above, the total *teaching* staff for prototypical schools is 31.2 FTE for a prototypical 450 student elementary, 21.6 FTE for a prototypical middle school, and 32 FTE for a prototypical high school.

We note that the recommendations in other elements of the model provide a variety of additional staff for all schools. Core and specialist/elective teachers are not the only teaching staff in each school.

2023 EB Recommendation: Provide 33 1/3 percent elective/specialist teachers over core for high schools and 20 percent for elementary and middle schools.

5. Instructional Facilitators/Coaches

Instructional coaches, or instructional facilitators (IF), coordinate the instructional program but most importantly provide the critical ongoing instructional coaching and mentoring the professional development literature shows is necessary for teachers to improve their instructional practice (Cornett & Knight, 2008; Crow, 2011; Garet, Porter, Desimone, Birman, & Yoon, 2001; Joyce & Calhoun, 1996; Joyce & Showers, 2002). This means instructional facilitators spend the bulk of their time with teachers, modeling lessons, giving feedback to teachers, working with teacher collaborative teams, and generally helping to improve the instructional program.

Some instructional coaches may also function as school technology coordinators. In that role they provide the technological expertise to: fix small problems with personal computer systems, connect computer equipment so it can be used for both instructional and management purposes, and provide professional development to embed computer technologies into a school's curriculum.

This report expands on the rationale for instructional coaches in the section on professional development (Element 14), but includes them here as they represent teacher positions.
A few states (i.e., Arkansas, New Jersey, Washington, Wyoming and to a modest degree North Dakota) explicitly provide resources for school-based instructional coaches. Most comprehensive school designs (see Odden, 1997; Stringfield, Ross & Smith, 1996), and EB studies conducted in other states – Arizona, Arkansas, Illinois, Kentucky, Maine, Maryland, Michigan, North Dakota, Vermont, Washington, Wisconsin and Wyoming – call for school-based instructional facilitators or instructional coaches (sometimes called *mentors, site coaches, curriculum specialists,* or *lead teachers*). Further, several comprehensive school designs suggest that while one instructional facilitator might be sufficient for the first year of implementation of a schoolwide comprehensive improvement program, in subsequent years an additional 0.5 to 1.0 FTE facilitator is needed. Moreover, new technology designs recommend a full-time facilitator who spends at least half-

time as the site's technology expert (for example, see Stringfield, Ross, & Smith, 1996). Drawing from this research, the EB model provides one instructional facilitator/coach position for every 200 students.

Early research found strong effect sizes (1.25-2.71) for instructional coaches as part of professional development (Joyce & Calhoun, 1996; Joyce & Showers, 2002). Several years later, Sailors and Price (2010) found that professional development combined with coaching increased the deployment of comprehensive instructional practices by between 0.64 and 0.78 standard deviations. Newman and Cunningham (2009) found a similar impact on teachers' instructional impact as well as improved reading achievement by about 0.2 standard deviations. A 2010 evaluation of a Florida program that provided reading coaches for middle schools found that teachers who had the benefit of a coach implemented more instructional methods that were linked to improved 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). A study published two years later reached the same conclusions about coaching as part of a program to improve reading (Coburn & Woulfin, (2012).

Positive impacts of coaching are not limited to reading instruction and achievement, however. Indeed, a randomized controlled trial of coaching (Pianta, Allen & King, 2011) found significant, positive impacts in the form of student achievement gains across all four core subject areas – mathematics, science, history, and language arts. Finally, a 2018 meta-analysis of 60 studies of the causal effects of instructional coaches, found the impact of instructional coaching on instruction was 0.49 SD and 0.18 on student achievement, with the largest number of studies on coaching programs for PreK-5 elementary reading programs (Kraft, Blazar & Hogan, 2018). Moreover, the bulk of the 60 studies were conducted within the past 10-15 years, many with experimental designs that allowed for causal implications. Kraft, Blazar & Hogan also describe various kinds of instructional coaching and discuss how coaching fits into the core elements of overall professional development.

These research findings (see also Cohen, et al., 2021) provide rigorous support for this element as an effective strategy to boost student learning. Moreover, educators across the country have relied in part on this research to hire increasing numbers of instructional coaches as part of more rigorous school improvement strategies. Domina et al. (2015) found that the number of instructional specialists per 1,000 students doubled from 1998 to 2013 (from about 0.7 to 1.4) and that the percent of districts with no such staff declined from 20% to 7%.

Although instructional coaching positions are identified as full-time equivalent positions, schools could divide the responsibilities across several individual teachers. For example, the 3.0 positions in a 600-student high school could be structured with six individuals who were half-time teachers and half-time instructional coaches. In this example, each teacher/coach would work 50% time as a coach – perhaps in one curriculum area such as reading, math, science, social studies and technology – and 50% time as a classroom teacher or tutor.

We note that the level of staffing for instructional coaches recommended in the EB Model, combined with the additional elements of professional development discussed below, is the best way to focus on making Tier 1 instruction (in the RTI framework) as effective as possible, providing a solid foundation of high quality instruction for everyone, including students who struggle more to learn to proficiency.

2023 Evidence-Based recommendation: Provide funding for instructional coaches/facilitators at the rate of 1.0 position for every 200 students.

6. Core Tutors/Tier 2 Interventions

The most powerful and effective approach for helping students struggling to meet state standards is individual one-to-one or small group (1:3 or 1:5 maximum) tutoring provided by licensed teachers (Cook, et al., 2015; Elbaum, Vaughn, Hughes & Moody, 2000; Nickow, Oreopoulos, & Quan, 2020; Shanahan, 1998; Wasik & Slavin, 1993). Prior to 2015, we recommended allocating tutors to schools solely on the basis of the number of at-risk students, with a minimum of one tutor position for each prototypical sized school. Since then and especially with more rigorous curriculum and student performance standards, we have recognized that all schools, even those with no at-risk students (as measured by ELL and free and reduced lunch eligibility) have struggling students that need Tier 2 resources. Thus, in 2015 we augmented the EB Model to provide one *core* tutor position for each prototypical school **as well as** additional tutors based on ELL and poverty student counts (Element 21).

The most powerful and effective extra help strategy to enable struggling students to meet state college and career ready standards is individual one-to-one or small group (1:3 or 1:5 maximum) tutoring provided by licensed teachers (Elbaum, Vaughn, Hughes & Moody, 2000; May et al., 2013, Wasik & Slavin, 1993). Students who must work harder and need more assistance to achieve to proficiency levels 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 (Cohen, Kulik & Kulik, 1982; Nickow, Oreopoulos, & Quan, 2020; Shanahan, 1998; Shanahan & Barr, 1995; Wasik & Slavin, 1993) with an average of about 0.75. A 2016 meta-analysis of the impact of intelligent, or computer-based, tutoring found that the average effect size was 0.66 across multiple subjects, which increases student performance from the 50^{th} to the 75^{th} percentile (Kulik & Fletcher, 2016), though the effect varied by type of tutoring. A 2017 meta-analysis of the impact of tutoring found similarly high effects (Dietrichson, Bog, Filges, & Jorgensen, 2017). A July 2020 meta-analysis of tutoring effects also concluded that tutoring had impressive effects on student learning (Nickow, Oreopoulos, & Quan, 2020).

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, and
- Highly structured programming, both substantively and organizationally.

We note several specific structural features of effective one-to-one tutoring programs:

1. Each tutor works with one student every 20 minutes, or three students per hour. This allows one tutor position to serve 18 students a day. (Since tutoring is such an intensive activity, individual teachers might spend only half of 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.
2. Most students do not require tutoring all year long; tutoring programs generally assess students quarterly and change tutoring arrangements. With modest changes, just under half the student body of a 450-student, all at-risk school could receive individual tutoring during the year.
3. Although low-income background and ELL are general indicators of the possible need for tutoring, any student that is struggling to reach standards, regardless of background, should be provided tutoring. This is the main rationale for providing one tutor for each prototypical school, regardless of the number of at-risk students.

Though this discussion focuses on *individual* tutoring, schools can 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 [see also Elbaum, Vaughn, Hughes & Moody (1999) for a meta-analysis of the impacts of small group tutoring].

One-to-one tutoring could be reserved for the students with the most severe reading difficulties, scoring at or below the 20^{th} or 25^{th} percentile on a norm referenced test, or at the below basic level on state assessments. Intensive instruction for groups of three-to-five students would then be provided for students above those levels but below the proficiency level. We expand on a recent manifestation of this approach – called High Dosage Tutoring – in Section 21.

Though most studies of tutoring focused on elementary reading, in the past decade several effective secondary reading interventions have been developed (Scammacca, Roberts, Vaughn & Stuebing, 2015) and should be considered by schools as the resources to deploy them are included in the EB funding model. Further, a 2014 randomized control study, (Cook et al., 2014), found similarly positive impacts of a tutoring program for adolescents in high poverty schools if it was combined with counseling as well. This dual approach is made possible in the EB Model as it includes the additional non-academic pupil support resources (see Element 22 discussion).

With the advent of college and career ready standards and more rigorous curriculum programs around 2015, educators have argued that more students need extra help. In 2015 we increased the tutor resources in the EB Model to provide one *core* tutor/Tier 2 intervention position for each prototypical school. The additional support beyond the first tutor per prototypical school is discussed again in Element 21 below.

2023 Evidence-Based recommendation: Provide 1.0 core tutor position for each prototypical elementary, middle and high school.

7. Substitute Teachers

Schools need resources for substitute teachers to cover classrooms when teachers are sick for short periods of time, absent for other reasons, or on long-term leave. A common practice across the country is to budget about 10 days of substitute teachers per teacher. Assuming a 200 work year for teachers, the EB Model provides an additional 5% of all teachers (about 10 days) as resources for substitute teachers. This approach does not mean each teacher is provided 10 substitute days a year; it means the model provides a "pot" of money approximately equal to 10 substitute days per year for all teachers, in order to cover classrooms when teachers are absent for reasons other than professional development. Professional development recommendations and resources are fully developed in a separate section below (Element 14).

All teachers includes: all core and elective teachers, tutors, ELL teachers, instructional facilitators or coaches, teachers for extended day and summer school programs and special education teachers as resources for all schools. In other words, the EB Model adds up all the above teacher positions and then provides an additional 5 percent of those teacher positions for substitute teacher resources; those additional substitute teacher positions are priced at the same level as all teachers on average, or the salary for long term substitute teachers.

2023 Evidence-Based Recommendation: Provide for 10 days of core teachers, elective teachers, minimum teacher positions, tutors, ELL teachers, instructional coaches and teacher positions for summer school, extended day and special education. Resource substitute teacher positions at the same rate as all teacher positions or the salary for long term substitute teachers.

8. Core Counselors and Nurses

To address the wide range of non-academic needs of students, schools need school counselors and nurses, as well as other pupil support staff including social workers, psychologists, family liaison persons, etc. This section address just school counselors and nurses. Additional pupil support staff provided on the basis of counts of struggling students (ELL and poverty students) are described in Element 22 in the section on struggling students.

The need for counselors and nurses today is especially urgent given the changing social, health, emotional and mental conditions of children in America and Alaska. Sparks (2019a) reported that there were nearly 1.36 million homeless children attending schools in 2017, a rapid rise over previous decade. Keierleber (2019) estimated that in school year 2016-17, 2.9 percent of Alaska's school children experienced homelessness. Many homeless children live independently, some live with other families, while others live in shelters and tents. Homelessness reflects not only a lack of housing and living in poverty, but also a life full of uncertainty and various forms of trauma.

Homeless students need more academic as well as non-academic (counselor) help. In 2016-17 only 30 percent of children who experienced homelessness were proficient in reading and just 25 percent were proficient in math (Keierleber, 2019). Homeless students graduate from high school at lower rates than students from low income households who are not homeless. Keierleber also identified a graduation rate of 64 percent for homeless students compared to an average of 77.6 percent graduation rate among other low-income students and a national average of 84.1 percent for all students.

Beyond homelessness, Blad (2019) reported a rise in depression among American students, an increase in suicide efforts and a general uptick in variety of mental illnesses. To be sure, some of these maladies are a result of social media bullying, but the bulk is due to dysfunctional families, poverty, lack of health services, homelessness, and recent immigration status that in many instances include traumas as well. Blad reports that there has been a significant increase in episodes of deep depression since 2005, with the incidence for school-aged children significantly above the general population. These trends also hold in Alaska.[2]

Burstein, Agostino and Greenfield (2019) document the doubling of suicide attempts by American teenagers over the last decade. Using data from the National Hospital Ambulatory Medical Care Survey, administered annually by the US Centers for Disease Control and Prevention, the study found that the number of children and teens in the United States who visited emergency rooms for suicidal thoughts and suicide attempts doubled between 2007 and 2015. The findings came as no surprise to child psychiatrists, with most saying they knew that suicide and depression had been rising significantly. The findings sadly showed that for America's teens, emotional distress and propensity toward self-harm grew more than for any other age group of Americans over this time period. Alaska's situation is bleaker. In 2019, the suicide rate for Alaska young people aged 15-24 was one of the highest in the country at 56 per 100,000 population, more than three times the national rate of 15.[3]

Finally, the physical and medical needs of students also have changed dramatically in recent decades. Rising numbers of students need medications administered during the school day, requiring staff to administer the medications. Our Professional Judgment Panel meetings with educators in multiple stets over the past decade confirmed the presence of all the above issues.

The implication of these declining conditions of school children are that schools need more counselors, nurses, psychologists and perhaps even mental health providers. Indeed, Peterson (2022) reports that since COVID more students are being screened for anxiety, depression and other mental issues, but with insufficient follow through treatment. Unfortunately, only three states provide counselors at the rates recommended by the American School Counselor Association of one counselor for every 250 students. Only three states meet the standard of one school psychologist for every 750 students. And few if any states meet the standard of one nurse for every school or one nurse for every 750 students, promulgated by the National Association of School Nurses (2020).[4]

[2] https://www.americashealthrankings.org/explore/annual/measure/Depression_a/state/AK
[3] https://www.americashealthrankings.org/explore/annual/measure/Suicide/state/AK
[4] https://www.nasn.org/

Counselors

Research shows that well designed and implemented counseling programs can have significant and positive impacts on student learning; progress through elementary, middle, and high school; graduation from high school; and postsecondary enrollment. Studies in Connecticut, Indiana and New York found that school counselor programs that reflected the 1:250 ratio of the American School Counselor Association had significant, positive correlations with lower high school student absenteeism and higher SAT math, verbal and writing scores (Parzych, Donohue, Gaesser, Chiu, 2019). Lapan, Gysbers, Bragg, & Pierce (2012) found that Missouri high schools that had lower student-to-counselor ratios had higher student graduation rates, a finding that was strongest for schools with concentrations of Title I eligible students. Wilkerson, Perusse, & Hughes (2013) showed that elementary school counselor programs in Indiana that used the model of school counselors developed by the American School Counselors Association produced significantly higher elementary student proficiency rates in math and English/language arts than schools that did not. Other studies have found that well designed and implemented group counseling programs, especially for African American and ELL students, can increase those students' achievement scores as well as reduce demographic related achievement gaps (Bruce, Getch, & Ziomek-Daigle, 2009; Leon, Villares, Brigman, Webb, & Peluso, 2011). In sum, schools that have counselor ratios at or better than the 1:250 figure can produce multiple and positive impacts on students, including increased achievement on state and local assessments.

Mulhern (2022) studied the causal effects of counselors on Massachusetts high school students. She found counselors have varying impacts on students in terms of graduation rates, college selection and persistence. But overall she found that counselors have significant impacts on these variables.

In terms of the specifics of the job itself, school counselors provide multiple functions in schools. School counselors help all students:

- Apply academic achievement strategies
- Manage emotions and apply interpersonal skills
- Plan for postsecondary options (higher education, military, work force).

Appropriate duties for school counselors include providing:

- Individual student academic planning and goal setting
- School counseling classroom lessons based on student success standards
- Short-term counseling to students
- Referrals for long-term support
- Collaboration with families/teachers/ administrators/community for student success
- Advocacy for students at individual education plan meetings and other student-focused meetings
- Data analysis to identify student issues, needs and challenges.

The EB Model uses the standards from the American School Counselor Association[5] that recommend one counselor for every 250 secondary (middle and high school) students. This produces 1.8 counselor positions for a 450-student prototypical middle school and 2.4 counselor positions for a 600-student prototypical high school.

Today many states require counselors in elementary schools as well. Even in states that do not require counselors at the elementary level, a growing number of elementary schools have begun to employ them. Further, research also shows that counselors in elementary schools can positively impact student performance. Consequently, the EB Model today includes one school counselor for the 450-student prototypical elementary school.

Social emotional learning

Counselors can also take the lead in developing a school's approach to social and emotional learning, a set of strategies to strengthen students' emotional health, relationship building, behavioral practices and mental health. Though social emotional learning should be thought of more as a schoolwide issue and a characteristic of a school's culture (Mehta, 2020), there are multiple programs and strategies that are known to be effective in improving students social-behavioral competence and mental health (Durlak, et al., 2011; Sheridan, et al., 2019). Levenson (2017) identifies 10 best practices in designing social emotional learning programs. With the robust overall school staffing provided by the EB Model, including core school counselors and additional pupil support staff triggered by at-risk pupil counts in Element 22, schools have the resources to mount comprehensive strategies addressed to enhancing students' social and emotional learning and competencies.

Nurses

School nurses are also critical elements of the variety of pupil support staff today's schools need to address the rising incidence of health, physical, emotional and mental health needs of students. Consequently, the EB Model provides nurses as core positions. Drawing from the staffing standard of the National Association of School Nurses,[6] the EB Model initially provided core school nurses at the rate of one nurse position for every 750 students. But after working in multiple states and interreacting with dozens of educator panels, we have increased the nurse allocation to 1 school nurse for every prototypical elementary, middle and high school, with additional pupil support staff provided by ELL and poverty student counts as a way for the EB model to provide even more resources for the social, emotional, health and mental health needs of today's students. Provide 1 school nurse position for each prototypical school.

2023 EB Recommendation: Provide 1.0 school counselor position for each prototypical elementary school and 1.0 school counselor position for every 250 middle and high school student. Provide 1.0 school nurse position for every prototypical elementary, middle and high school.

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[5] https://www.schoolcounselor.org/
[6] https://www.nasn.org/

9. Supervisory Aides

The EB Model has consistently provided two supervisory aides positions for each prototypical elementary and middle school, and three supervisory aide positions for each prototypical high school.

Elementary, middle and high schools need staff for non-instructional responsibilities that include lunch duty, hallway monitoring, before and after school playground supervision, and other non-instructional tasks. Covering these duties generally requires an allocation of supervisory aides at about the rate of two supervisory 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 2), the Tennessee STAR study, which produced solid evidence through field-based randomized controlled trials that small classes work in elementary schools, also produced evidence that instructional aides in a regular-sized classroom do not add instructional value, i.e., do not positively impact student 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. Two studies 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 instructional aides could also have an impact on reading achievement if used to provide individual tutoring to struggling students in the first grade. Neither study supports the typical use of instructional aides as general teacher helpers. And both find that aides have a smaller impact than a licensed teacher.

2023 Evidence-Based recommendation: Provide funding at an amount equal to two supervisory aide positions for each prototypical elementary and middle school and three supervisory aide positions for each prototypical high school.

10. Librarians and Librarian Media/School Computer Technicians

Most schools have a library, and staff resources must be sufficient to operate the library and to incorporate appropriate technologies into the library system.

The following discusses library staffing in a manner that distinguishes library staff – librarians and library aides– from computer technicians who provide computer technical help to schools. This analysis clarifies how computer technicians evolved from individuals who set up audio-visual equipment for teachers, to individuals who became the first line computer technical helpers and should be considered a separate staff category. These computer technicians typically operate out of the district’s technology office and not the library, though they are often supervised when on campus by school principals in schools large enough to generate a full position or more.

Librarians

The importance of the school library as a resource-rich learning center has developed and evolved with the addition of technology. In libraries, students can explore and individualize their learning experience, using all modalities of learning, through access to both electronic and print materials that enhance the curriculum. Both electronic and print materials were previously located primarily in the library, but that has changed. The majority of digital library resources have moved from being available only over school and library networks to being available anytime and anywhere through the internet. This allows students to access the "library" from any place if they have a computer and an internet connection. With this shift, the value of the library as a physical location that provides access to electronic resources has declined, yet this same change enhances the librarian's role as a guide to digital resources, a teacher of digital media literacy, and an important member of the school's instructional literacy teams. The library experience becomes more valuable to students and staff when libraries are staffed with certificated librarians and library aides that help students effectively search, cull, and synthesize information found in books, magazines, and myriad internet resources.

Although the methodology and rigor used in school library research varies, an increased number of library staff and operating hours are generally associated with higher academic outcomes. There is considerable anecdotal data about how librarians may enhance student learning and achievement; however, until recently there have been few empirical studies. Some studies demonstrate positive benefits; yet many of these benefits could be attributed to other sources or resources; it is difficult to establish direct causality (American Association of School Librarians, 2014). Despite these challenges, various research sources report that libraries and librarians can play a role in increasing student achievement.

In 2003, six states conducted studies of the impacts of librarians on student achievement: Florida, Minnesota, Michigan, Missouri, New Mexico and North Carolina. The general finding was, regardless of family income, children with access to endorsed librarians working full time performed better on state reading assessments (Rodney, Lance & Hamilton-Rennell, 2003; Lance & Hofschire 2012). The Michigan study found that regardless of whether the librarian was certified, student achievement was better for low-income children, but having an endorsed librarian was associated with higher achievement than having an unendorsed librarian (Rodney, Lance, & Hamilton-Rennell, 2003). Each state examined the issue differently, but library staffing and the number of operating hours were generally associated with higher academic outcomes.

More recent statewide studies also suggest that school libraries and librarians have an impact on student achievement including increasing standardized test scores and student mastery of academic performance standards regardless of school funding levels or demographics (Curry & Kachel, 2018; Scholastic, 2016; Coker, 2015). National longitudinal research utilizing data from the years 2005 and 2011 indicated that states that increased the number of librarians over time had greater gains in fourth grade reading scores on the National Assessment of Educational Progress (NAEP) than states that lost librarians (Lance & Hofschire, 2012). Related research, emphasizes that the role that the school librarian plays within the school can be more impactful when the librarian is an integral part of the school faculty and acts as a member of the "literacy instruction team" [grade or subject collaborative teams] or as a technology coach (Lewis, 2016; Reed, 2018; U.S. Department of Education, 2017).

Libraries must be adequately staffed and be open to students or groups of students. Research is silent on the number of staff members required to provide adequate service to school staff and students. Because of the lack of literature on library staffing numbers, it is appropriate to examine general practices across states to understand library staffing across America.

The EB Model recommendations for library staff are derived from staffing practices and statutes in other states and from general practice. In 2011-12, through an extensive survey of school libraries, the National Center for Educational Statistics (NCES) calculated average library staff in school libraries at both the elementary and secondary levels (NCES, 2013). In the 2011-12 data, NCES categorized and counted library personnel into three categories; librarians/media (aide) specialists, other professional staff, and other paid staff. Two years later, NCES (2015) again studied library staffing; unfortunately, the data set no longer had the detail of the previous 2011-12 study. The 2015 study only analyzed the number of librarians; it failed to ask if other types of employees such as librarian media (aide) specialists or other professional/paid staff performed librarian functions. The 2015 study also used different school size ranges and did not disaggregate school size ranges by school type (elementary, middle and high). When comparing the two data sets, it would appear that the number of individuals supporting school libraries dropped from 2011-12 to 2015-16; however, if positions other than librarian had been counted in the later data set, the total number of "library staff" may have only changed modestly.

Using the latest 2015-16 data from NCES regarding school library personnel, for schools between 100 to199 students, NCES found the average school librarians was 0.71 FTE. As the number of students in a school increased to 750 students and higher, the number of librarians grew to 0.99 FTE. While the student population more than tripled, total librarians only increased by approximately 40 percent. This example demonstrates that as school size increases, total average library staff increases at a slower rate implying that once a library has sufficient staff to meet the basic demands such as opening the doors and running the counter, additional personnel are hired at a much slower rate and in many cases not at all. These practices suggest that providing a full time librarian for each of the EB prototypical schools would follow average national practice.

The 2023 EB Recommendation: Provide one librarian position for each prototypical elementary, middle ang high school.

School Computer Technicians

The school computer technician position has evolved. Decades ago, these individuals generally were library media aides and set up film strip and movie projectors and portable screens. Their responsibilities evolved into configuring computers and showing teachers how to set up tricky new peripherals like printers and LCD projectors, and connect them directly to classroom computers. As in-school networks were built, these technicians helped create local login names for students who accessed resources on local school servers. Now as network connections among schools, the district, and the Internet have gained capacity and matured, these technicians configure Chromebooks to use the cloud to access educational resources that exist at the district, state, or national level. Computer operating systems have progressed to the point where computers can discover network-available projectors and printers through wireless connections allowing technicians to focus on more difficult issues and to manage the larger local school inventory of computers and devices.

For teachers and other staff to take full advantage of the benefits technology can provide, they need to feel support is close by or a phone call or email away. Having a school computer technician on campus can generate a sense of technological security. The work of the computer technician is cyclical; they are busiest at the beginning of a school year or during the deployment of a new resource or software. After peak demand cycles, technicians can address routine maintenance and other technological housekeeping. Even when moving to a one-to-one computer to student program, with the improvements to hardware, cloud software, and operating systems that have evolved over the last 10 years, the number of school computer technicians generated by the EB Recommendation is common in other states and districts and should be adequate to provide the necessary technical support to students and staff.

General support for computers and for their maintenance and configuration has traditionally been district-based. School sites submit service requests to the district and wait to see when a technician will come. In the EB recommendation, central district technology staff still handle the more difficult issues, while school computer technicians have most of their time scheduled by a district administrator to be at specific campuses. When a site has the ADM to generate a full technician, these individuals may participate at a particular site like a staff member and can be directed during their scheduled time by the principal and/or other site administrators. However, even though these individuals may be at a specific site, the district should be able to redirect them for specific deployments or other cyclical technical needs.

2023 Evidence-Based recommendation: Provide 4 school computer technicians for the prototypical 3,900 student district level.

11. Principals and Assistant Principals

Every prototypical school needs a principal. Larger schools need assistant principals as well.

Much has been written about the importance of school principals. Studies of schools that boost student learning always discuss the important role of the principal. Nearly all high performing schools, including those we have studied as part of state adequacy projects, have strong principal leaders. Chenoweth and Theokas (2011) provide one of the most readable descriptions of the various role’s principals play in creating and leading effective schools. These roles include instructional leadership, managing the building, creating a culture of respect and high expectations for students and teachers, and managing outside relationships. Principals who want to “get it done,” meaning produce large gains in student learning while also reducing achievement gaps, would be wise to read this helpful book.

Neumerski (2012) reviews the knowledge about the principal’s role in instructional leadership, and updates that knowledge base in relation to current findings on the emerging roles of teachers and instructional coaches – individuals who also provide instructional leadership inside schools. Her review identifies ways all three roles can be integrated to ensure that a robust set of coordinated, direct and indirect instructional leadership functions exist in schools – all of which are compatible with the EB model's leadership resources. Chenoweth's (2017) most recent book on cases of schools that improve student achievement provides additional details on the management and leadership tasks of principals who have successfully turned around schools, started effective schools from scratch, or led schools to even higher levels of performance.

Liebowitz and Porter's (2019) review of the impact principals have on critical elements of schools – including student performance – found that principals have large and significant effects on all aspects of schools including: student achievement (effect size up to 0.16 SD); teacher well-being (~0.35); teacher instructional practice (0.35); and, school organizational health (0.72-0.81). These results provide evidence that principals positively impact both instructional leadership and overall school management, so both skills are important for their schools to be effective.

There is no research evidence on the performance of schools 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 and Evidence-Based studies around the country, include a principal for every school unit (Aportela, Picus, Odden & Fermanich, 2014).

2023 Evidence-Based recommendation: The EB model provides one principal position for all prototypical schools. The EB Model also provides an assistant principal for the prototypical high school.

12. School Site Secretarial Staff

Schools need secretarial staff to provide clerical and administrative support to administrators and teachers, and to answer the telephone, greet parents when they visit the school, help with paperwork, etc.

The secretarial ratios included in the EB Model generally are derived from common practices across the country. We conducted a search of education literature on school performance for a 2020 adequacy study in Wyoming and our research assistants confirmed that they could not find any research on the impact secretarial staff have on student outcomes; yet it is impossible to have a school operate without adequate staff support.

2023 Evidence-Based Recommendation: Provide 2 secretary positions for each prototypical elementary and middle school and three positions for the prototypical high school.

DOLLARS PER STUDENT RESOURCES

This section discusses resources the EB Model provides on a dollar per student basis and includes gifted and talented students, professional development, instructional materials and supplies, benchmark/short cycle assessments, computers and other technology, and extra duty/student activities.

13. Gifted and Talented Students[7]

A complete analysis of educational adequacy should include the gifted, talented, able, ambitious and creative students, most of who perform above state proficiency standards. Gifted and Talented programs are 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:

- Efforts to discover the hidden talent of low income and/or culturally diverse students so that all deserving students have access to gifted programming
- Curriculum materials designed specifically to meet the needs of talented learners
- Acceleration of the curriculum, and
- Special training in how teachers can work effectively with talented learners.

Discovering Hidden Talents in Low-Income and/or Culturally Diverse High Ability Learners

Research studies show the use of performance assessments, nonverbal measures, open-ended tasks, extended try-out and transitional periods, and inclusive definitions and policies produce increased and more equitable identification practices for high ability culturally diverse and/or low-income learners. A 2019 survey of 800 teachers of gifted and talented students and an additional number of district coordinators of gifted and talented programs found that 60 percent of respondents reported that African American and ELL students were still underrepresented in gifted education; over 50 percent of respondents felt the same was true for children from lower income backgrounds as well as for children with disabilities (Mitchell, 2019). The results suggest the country, and probably Alaska as well, still has a long way to go to meet the needs of all gifted children, especially these subgroups (Harwin, 2019). 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). Gains on other measures of school achievement were reported by Struck as well.

[7] This section draws heavily on Robinson, 2007. See also Odden & Picus, 2020, for additional citations, as well as the Fordham Podcast Michael Petrilli, Jonathan Plucker & Amber Northern, (2022), *The Education Gadfly Show #826: Research Deep Dive: What we know about gifted education*. https://fordhaminstitute.org/national/resources/education-gadfly-show-826-research-deep-dive-what-we-know-about-gifted-education. Finally see Plucker and Callahan (2021) for an additional review of what works for gifted and talented students.

Access to Curriculum

Overall, research shows curriculum programs specifically designed for talented learners produce greater learning than regular academic programs. Increased complexity of the curricular material is a key factor. 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; VanTassel-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).

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 over a dozen 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 AP or concurrent college 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 talented student achievement (Gallagher, 1996; Kulik & Kulik, 1984), including AP 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 general classroom teachers make very few, if any, modifications for academically talented learners (Harwin, 2019), 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 adaptations require the support of a specially trained coach at the building level, which could be embedded in the instructional coaches recommended (Element 5). 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 (Delcourt, Loyd, Cornell, & Golderberg, 1994), which could be accomplished with the professional development resources recommended (Element 14).

Overall, research on gifted programs indicates the effects on student achievement vary by the strategy of the intervention. Enriched classes for gifted and talented students produce effect sizes of about +0.40 and accelerated classes for gifted and talented students produce somewhat larger effectives sizes of +0.90 (Gallagher, 1996; Kulik & Kulik, 1984; Kulik & Kulik, 1992). A 2007 review of the research on gifted and talented education reached similar conclusions, finding that in addition to improving achievement among children identified as gifted, many gifted and talented programs also benefit non-gifted and talented students as well as students with disabilities (Field, 2007). A 2016 meta-analyses of 100 years of research on the effects of ability grouping and acceleration on the academic achievement of K-12 students reached similar conclusions about the impacts on gifted as well as non-gifted students (Steenbergen-Hu, Makel & Olszewski-Kubilis, 2016; see also Redding & Grissom, 2022).

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 gifted students skip grades in order to be exposed to accelerated instruction. Research shows neither of these practices systemically produces social adjustment problems. Many gifted students get bored and sometimes restless in classrooms that do not have accelerated instruction. The primary approach to serve gifted students in high schools is to enroll them in advanced courses, such as AP and IB, to participate in dual enrollment in postsecondary institutions, or to have them take courses through distance learning mechanisms. All of these strategies have little or no cost, except for scheduling and training of teachers, resources for which are provided by professional development (Element 14).

A Broader Approach to Giftedness

Over the past several years, we confirmed our understanding of best practices for the gifted and talented *defined as high achievers* with the directors of three of the gifted and talented research centers in the United States: Dr. Elissa Brown, Director of the Hunter College Gifted Institute and previously the Director of the Center for Gifted Education, College of William & Mary; Dr. Joseph Renzulli, The National Research Center on the Gifted and Talented (NRC/GT) at the University of Connecticut; and Dr. Ann Robinson, Director of the Center for Gifted Education at the University of Arkansas at Little Rock.

To broaden gifted and talented education practices, however, the University of Connecticut's Center on the Gifted and Talented developed a very powerful, internet-based platform, Renzulli Learning, which provides a wide range of programs and services for gifted and talented students. In 2005, Renzulli stated that such an approach was undoubtedly the future for the very creative student. 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.

Renzulli (2019) argues that underrepresentation of low income, minority, ELL and students with disabilities in gifted and talented programs begins at the word and definition of "gifted," which usually means identifying very high achieving students. Renzulli argues that many high performing students are different from students who have more creative and productive giftedness, but the latter have the kind of giftedness that is needed for innovation in the evolving global economy. Further, defining gifted as high achieving has the side unanticipated effect of excluding children from non-white, non-middle-income backgrounds, as well as ELL students or students with disabilities.

Renzulli (2019) supports a different kind of gifted assessment that takes into account the characteristics of creativity and productivity. These characteristics include curiosity, interests, learning styles, expression styles, enjoyment and high engagement learning in particular areas. Equally important are co-cognitive skills such as collaboration, empathy, creativity, planning, self-regulation, and other executive functions skills. These are the kinds of skills that many educators' reference when discussing gifted and talented education *and* these are the kinds of skills that lead to major innovations – think Steve Jobs, Elon Musk, Bill Gates. Renzulli Learning is a program that responds to this kind of giftedness. And its cost is modest.

The Renzulli Learning Center describes its program as an interactive online system that provides a personalized learning environment for students, resulting in increased engagement and higher academic performance. Through a comprehensive assessment system, the program quickly identifies student academic strength areas, interests, learning styles, and preferred modes of expression, and then matches each student with thousands of personalized, high interest, engaging educational activities and resources. Renzulli Learning enables teachers to easily differentiate instruction and increase motivation. Renzulli Learning personalizes talent development for each student, giving students the tools and resources to increase engagement and achievement.[8]

Our understanding is that the cost today is approximately $5 per student if the entire district enrolls in the program. Districts can purchase school site licenses for $3,000 to provide all students full access to the program. There are other costs for some materials and site-delivered professional development-- $2,200 a day for a three-day program. If a figure of $40 per pupil were included in the EB Model, all districts would be able to afford this program for interested gifted, talented and otherwise creative students.[9]

2023 Evidence-Based recommendation: Although there are substantial differences in approaches to gifted and talented programs across most states, we continue to recommend that the EB model provide an amount equal to $40 per student, which would enable all districts to access Renzulli Learning. By being available online, Renzulli Learning is especially appropriate for Alaska's many rural and isolated schools.

[8] https://renzullilearning.com/
[9] https://renzullilearning.com/pricing/

14. Intensive Professional Development

Professional development (PD) includes a number of important components. This section describes the specific dollar resource recommendations the EB Model provides for professional development. In addition to the resources listed here, PD includes the instructional coaches described in Element 5 and the collaborative planning time provided by the provisions for elective or specialist teachers in Element 4. Those staff positions are critical to an adequate PD program along with the resources identified in this section.

All school faculty members need ongoing professional development. Improving teacher effectiveness through high quality professional development is arguably one of the most important strategies for improving student performance. Better and more systemic deployment of effective instruction is the key aspect of the education system that improves student learning (Odden, 2011a; Raudenbusch, 2009; Rowan, Correnti, & Miller, 2002; Sanders & Rivers, 1996).

Moreover, all the resources included in the EB model need to be transformed into high quality instruction in order to increase student learning (Chetty, Friedman, & Rockoff, J., 2014; Cohen, Raudenbush, & Ball, 2002). Effective professional development is the primary way those resources get transformed. Further, though the key focus of professional development is better instruction in the core subjects of mathematics, reading/language arts, writing, history, science, and world languages, the professional development resources in the EB Model are adequate to address the instructional needs for gifted and talented, special education, ELL students, for embedding technology into the curriculum, and for elective teachers as well. In addition, all beginning teachers need intensive professional development, first in classroom management, organization and student discipline, and then in instruction. The most effective way to "induct" and "mentor" new teachers is to have them work in functional collaborative teacher teams.

There is substantial research on effective professional development and its costs (e.g., Crow, 2011; Cohen, et al., 2021; Didion, et al., 2020; Joyce & Showers, 2002; Kraft, Blazar, & Hogan, 2018; Lynch, et al., 2019; Miles, Odden, Fermanich, & Archibald, 2004; Odden, 2011b; Sims, et al., 2022). 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 reports from Learning Forward, the national organization focused on professional development (see Crow, 2011; see also Darling Hamond, et al., 2017), identified six structural features of effective professional development:[10]

- 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. Research suggests effective professional development should be school-based, job-embedded, focused on the curriculum taught and ongoing rather than a one-day workshop.

[10] The more theoretical framework of Sims et al, 2022 align with these six elements.

- The *duration* of the activity, including the total number of contact hours participants are expected to spend in the activity, as well as the span of time over which the activity takes place. 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, when counting PLC hours devoted to instructional practice.

- The degree to which the activity emphasizes the collective participation of teachers from the same school, department, or grade level. Research suggests 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 (i.e., pedagogical content knowledge). Research concludes teachers need to know the content they teach, the common student miscues or problems students typically have learning the content, and effective instructional strategies linking the two. The content focus today should emphasize the content for Alaska's curriculum standards.

- 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. Research has shown professional development is most effective when it includes opportunities for teachers to work directly on incorporating the new techniques into their instructional practice *with the help of instructional coache*s (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, and the development of a professional community. Research supports tying professional development to a comprehensive 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 work to embed the new methodologies into their actual classroom practice, with instructional coaches providing support. Active learning implies some degree of collaborative work and coaching during regular school hours to help the teacher incorporate new strategies into his/her normal instructional practices. It should be clear that the longer the duration, the more time is required of teachers as well as trainers and coaches.

Content focus means 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 to teach the content. Today this means a curriculum program to ensure students are college and career ready when they graduate from high school. Collective participation implies 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 build a professional community.

Coherence suggests 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 professional development opportunities should be given as part of implementing new curriculum and instructional approaches, today focusing on Alaska's curriculum standards. There is little support in this research for the development of individually oriented professional development plans; 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.

In a December 2016 review of the research on effective professional development, Kennedy (2016) generally identified the same structural features of effective professional development as outlined above. She also noted that when effective, the impact of a professional development program is usually stronger in the year following the program and the impact can increase even after that [for examples, see Horn (2010) and Pianta, Allen & King (2011)]. Her review included only programs lasting at least a year, whereas many less effective professional development programs are much shorter in duration. The take-away, we believe, is that professional development needs all the programmatic features identified above, should last at least a year long, and should include intensive coaching of individual teachers in their classrooms – resources for all of which are included in the EB model.

In support of this conclusion, we reference an important recent analysis of the kinds of professional development that work for implementing STEM classes in schools, a national priority. Lynch et al., (2019) assessed results from 95 experimental and quasi-experimental studies of PreK-12 science, technology, engineering and mathematics professional development and curriculum programs. They found an average effect size of 0.21 standard deviations on student performance when the when the professional development specifically:

- Helped teachers learn to use the new curriculum materials
- Focused on improving teachers content knowledge, pedagogical content knowledge and/or understanding of how students learn that content
- Included summer workshops, and
- Included time during the school year for teacher groups to trouble shoot and discuss classroom implementation.

These findings provide specific support for several of the key elements of effective professional development outlined above plus the need for teacher collaborative groups during the school day/year. Finally, the meta-analysis also found wide variation in professional development program implementation and stressed that "fidelity" of implementation of all the elements of professional development is key to having the program produce the desired impacts on teachers' instructional practice and then student achievement.

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

- Ten days of student free time for training embedded in the salary level, and
- Funds for training and miscellaneous costs at the rate of $130 per student.

The resources for student free time and cost of training are in addition to instructional facilitators/coaches (Element 5) and collaborative work with teachers in their schools during planning and collaborative time periods (Element 4).

2023 Evidence-Based recommendation: Provide 10 days of student free time for training embedded in salary levels and $130 per ADM for trainers other than the district's own instructional facilitators/coaches.

15. Instructional and Library Materials

The need for up-to-date instructional and library materials is paramount. Newer materials, whether digital or print, contain more accurate information and incorporate the most contemporary pedagogical approaches. Common standardized print and digital materials offer a structure, an order, and a progression in the teaching and learning process that allow teachers to pace instruction and work together as a collaborative team. Almost all traditional print textbooks now include supplemental digital data and/or media that are delivered with the teachers' edition or can be downloaded from the internet. Many companies offer completely digital versions of their textbooks that can be accessed anytime or anywhere. Districts in about half the states have organized digital, royalty-free, high-quality, open educational resources (OER) to supplement or provide portions of the curriculum (Bentley, 2019; Fletcher, Schaffhauser, & Levin 2012). Newer curriculum materials are critical today as school systems shift to more rigorous college and career ready standards. To ensure that materials are current, nearly half the states have instituted adoption cycles in which they specify or recommend texts that are aligned to state learning standards (Education Commission of the States, 2013). 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 due to lack of funding.

This analysis addresses two issues: instructional materials and library materials.

Instructional Materials

Access to standards-aligned instructional resources is critical for teachers and students.. However, standards do not delineate any particular curriculum, teaching practice, or assessment method. Just under half of states have instituted adoption cycles in which they specify or recommend texts aligned to state learning standards (Education Commission of States, 2013). These cycles range from five to seven years. Unfortunately, Alaska currently does not have a textbook adoption cycle and should consider a textbook adoption cycle as a mechanism for helping schools and districts provide students with up-to-date, relevant and reliable information aligned with a review of subject matter standards. Textbook adoption is a time consuming, labor-intensive process and requires specific expertise. Without state encouragement, these important decision processes can be delayed by districts for extended periods, and/or conducted without the level of expertise that can be brought to bear through a state level approach, to the detriment of the instructional programs and student learning.

Up-to-date textbooks and materials, whether digital or print, are expensive. The type and cost of instructional materials may also differ across elementary and secondary levels. Textbooks at the secondary level are more complex and bigger, and thus more expensive. Elementary grades, on the other hand, use more workbooks, worksheets and other consumables. Both elementary and secondary levels require extensive pedagogical aides such as math manipulatives and science supplies that help teachers demonstrate concepts using different pedagogical approaches.

Textbook prices vary widely. At the high school level, textbooks can cost from $80 to $160. Most major textbook companies now offer electronic versions of their texts; however, contrary to popular belief, these versions can be more expensive than the paper-based texts. Some digital versions are offered with time-bound contracts, much like library database subscriptions, while others may require the purchase of the paper texts with the digital license. Most digital-only materials from standard publishers are the same price or are only marginally discounted from the paper-based version. Many publishers will offer to sell the paper-based texts with the electronic version for a 20 to 30 percent premium.

Unless Alaska decides formally to fund a one-to-one student computer program, it is not practical to rely exclusively on electronic-based textbooks. One-to-one programs also rely on home-based internet connectivity. Until a one-to-one computer program is funded and the infrastructure provided to operate it, it is necessary to continue to purchase paper-based textbooks to ensure all students have access to curriculum-appropriate resources.

Considering the move to more rigorous curriculum standards, districts should focus on purchasing curriculum and instructional materials that will assist teachers to drive student success. These new standards require more reading from information texts across all curricular subject areas. This necessitates the purchase of additional materials that have not been required prior to the implementation of the more rigorous curriculum standards adopted across the country. Thus, the EB model provides $170 per student, an amount sufficient to allow school districts to use a six-year standard adoption cycle.

With more rigorous curriculum standards as a backdrop, the EB Model recommendation is to create one unified support amount for instructional materials at all schools regardless of school level. Resources of $170 per student per year will support the purchase of instructional materials that are best organized to support needed teaching strategies. This funding level will also allow the purchase of digital access to some textbooks if districts desire to adopt and/or experiment with digital access to textbook materials. If combined with a regular adoption cycle, this annual allocation will allow districts to focus on purchasing new curricular materials for one subject area a year, including textbooks and supplementary materials, all of which are needed to enable teachers to raise student achievement.

Principles for curriculum adoption.

It goes without saying that textbook selection substantially determines the specific curriculum a school will teach. And the fact is that some curriculum and instructional programs are more effective than others. Though a complete review of curriculum programs is beyond the scope of this report, which is focused identifying adequate resources to purchase needed curriculum materials, it is important that districts and schools use the funds for instructional materials to select textbooks, curriculum, and instructional programs that research finds effective. For tutoring, for example, Torgeson (2004) argues that structured reading programs, which specifically, systematically, and directly address phonemic awareness and phonics, have been shown by multiple researchers to be more effective than other approaches, especially for children from lower income and ELL backgrounds. Similar evidence suggests mathematics programs and instructional practices matter. Many effective schools have used textbooks that integrate problem solving with concept instruction together with an emphasis on arithmetic basics. Further, a recent study concludes that early elementary children with mathematics difficulties are best served by teachers who provide substantial direct mathematical instruction and routine practice and drill on math facts (Morgan, Farkas & Maczuga, 2015). The fact is that some instructional materials are more effective with some or all students than others, and districts and schools should select specific programs only after careful analysis and review to ensure that funds for instructional materials are spent wisely and address the specific needs of their students.

Reading is a special issue. There is nearly universal agreement that reading is key to learning in *all* subject areas. In recent years there has been an emerging trend to enact state and district reading programs. In selecting instructional materials, it is critically important that districts adopt elementary reading materials that allow teachers to implement a *science-based* reading program (see for example, Moats, 2020). Despite broad agreement on the recommendations of the 2000 National Reading Panel (National Institute of Child Health and Human Development, 2000), several recent studies and surveys have found that science-based reading practices are not evident in the bulk of the nation's classrooms. For example, in a study of whether teachers were implementing science-based reading practices in Tier 1 instruction, Kretlow and Helf (2013) found that most teachers were not using those practices.

In a 2019 survey conducted by Education Week's Research Center, Sawchuk (2019) also found that most teachers were not using science-based reading practices. Sawchuk further found that the non-science-based practices teachers used were often deployed under the banner of "balanced literacy" *as well as* recommended by mentors, coaches, professional groups and teacher training institutions.[11] Lucy Calkins, one of the country's leading reading experts who supported balanced literacy, has recently admitted that such an approach to reading needs to be changed and that successful reading programs must systematically include phonics and phonemic awareness, particularly at the early grades (Education Week, 2020).

Schmoker (2019), moreover, cautions against one classroom organizational strategy that dominates elementary reading instruction: multiple, reading level-based student groups. Even though literacy instruction usually consumes a large portion of the instructional day for elementary students, Schmoker finds that literacy instruction rarely includes the most essential elements of science-based reading instruction – whole class direct instruction, even when educators agree with those practices! The culprit: multiple ability leveled reading groups rather than whole class, direct instruction. Schmoker, who is one of the country's top professional development consultants, says,

> "The most successful K-3 teachers … use small groups sparingly! That is because their *whole class instruction* consistently incorporates the proven effective, but rarely used, elements of successful teaching. They master simple techniques for ensuring that all students are attentive, and conduct frequent, ongoing assessments of the class's progress through the lesson and reteach accordingly."

In a 2018 meta-analysis of a half century's research on the impact of whole-class "direct instruction," Stockard, et al. (2018) found significant positive effects on: 1) reading, language, spelling, mathematics and other academic subjects, 2) ability measures, and 3) affective outcomes. The results showed that such impacts were maintained over time *and* were even greater when students had more exposure to such direct instructional programs.

Library Materials

The NCES (2015) reports the average national expenditure for library materials in SY 2011-12 was $16 per pupil, excluding library salaries. Over 90% of the $16 was spent on book titles and the rest on other resources such as subscription databases. The use of electronic databases has declined in recent years as many instructional resources are offered free to the public on the Web.

Electronic database services allow librarians to strengthen print collections and at the same time ensure students have access to electronic data bases that provide more reliable data and information than they might identify only on easily available websites. Electronic data base services vary in price and scope and are usually charged to school districts on an annual per student basis. Depending on the content of these databases, costs can range from $3 to $10 per database per year per student.

Inflating these two cost estimates – library materials and data bases – to adequately meet the needs of school libraries, we recommend funding of $40 per student to pay for library texts and electronic services. Adding this $40 per student for library materials to the $170 per student

[11] Balanced Literacy has become the modern way for many former proponents of the "whole language" approach to acknowledge the importance of phonics and phonemic awareness, but too often "balanced literacy" in practice provides only a cursory and unsystematic use of instruction in phonemic awareness and phonics.

amount for instructional materials brings the total to $210 per student for instructional and library materials.

2023 Evidence-Based recommendation: Provide an amount for instructional and library materials equal to $210 per student.

16. Short-cycle/Interim Assessments

Nearly all states administer summative assessments in the spring of each school year (Education Commission of the States, 2020). These assessments indicate the level of student performance in select core subjects, usually English language arts, mathematics, and science. Summative assessments – necessary tools to help schools make high-level decisions about the school improvement process – exist alongside a series of other types of assessment data such as benchmark and short cycle assessments, which serve other, more targeted purposes.

Data-based decision making has become a core and important element in school reform and improvement over the past two decades. It began with the seminal work of Black and William (1998) on how teachers can use ongoing data on student performance to frame and reform instructional practice, and continued with current best practices on how professional learning communities use student data to improve teaching and learning (DuFour, 2015; DuFour, et al., 2010; Hamilton, et al., 2009; Steiny, 2009). The goal is to have teachers use student performance data to inform their instructional practice, identify students who need interventions, progress monitor the effectiveness of those interventions and improve overall student performance (Boudett, City & Murnane, 2007). As a result, data-based decision making has become a central element of schools moving the student achievement needle (Odden, 2009, 2012).

Research on data-based decision making has documented significant, positive impacts on student learning. For example, a 2011 study of such efforts using a randomized controlled trial showed that engaging in data-based decision making using interim assessment data improved student achievement in both mathematics and reading (Carlson, Borman & Robinson, 2011).

Several researchers -- Datnow and Park, 2014, 2015; Hamilton et al. (2009); as well as the late Richard DuFour (2015), one of the country's experts on teacher collaborative work using student data – have summarized the research on, and structures of, effective data-based decision-making mechanisms. All rely on access to comprehensive interim and short-cycle assessment data.

To engage in data-based decision making, schools typically use four types of assessment data:

- State summative assessments
- Benchmark assessments
- Short-cycle assessments, and
- Formative assessments.

Schools often start their improvement processes by analyzing the summative assessment data. Analyses of the state accountability (end-of-the-year summative assessments) tests provide a good beginning basis for schools to redesign their overall educational program. But, in order to plan, implement and monitor progress toward higher levels of performance and achieve success in reducing demographics-related achievement gaps, schools need additional assessment data.

One of those additional assessment tools is generally called a “benchmark” assessment. Benchmark assessments are closely aligned with the state’s summative testing system and are usually administered in the fall and winter as well as the spring. Fall assessments indicate where students start the year in terms of performance on state content areas. Winter assessment results show progress half-way through the year toward proficiency, which then is measured by the end-of-the-year summative assessment. Benchmark assessments give feedback on each semester of instruction and are often used to determine which students need interventions or extra help.

A third assessment tool is generally referred to as a “short-cycle” or “interim” assessments. These interim assessments are often computer adaptive tests that are given in shorter cycles – every three to five weeks. These assessments most often are used to progress monitor the effectiveness of interventions for students, including those with IEPs. Short-cycle assessments also provide the bulk of the data teachers use to engage in collaborative, student-data-based decision making. Short-cycle assessments also generally include screeners, or micro-diagnostic tools, that identify student knowledge with respect to specific reading and math skills. Short-cycle interim assessments are also frequently linked to a “learning progression” of specific content areas, with test results providing teachers with micro-information on how to lesson plan for specific curriculum units, deliver instruction with strategies tailored to the exact learning status of the students in their own classrooms, and gauge individual student progress toward proficiency in the standard being covered in the unit.

A fourth assessment tool, called a “formative” assessment, is administered over shorter time periods, usually several times during the teaching of a curriculum unit – sometimes daily. Often, teachers themselves create formative assessments. Used in addition to the previous assessment tools, formative assessments provide teachers with information to help identify additional student learning needs so teachers can improve their instruction. All of these additional assessment tools are used by schools that are successful in moving the student achievement needle.

Examples of “short-cycle” assessments include STAR Enterprise from Renaissance Learning (www.renaissance.com), an online, computer adaptive system that provides data in reading/ literacy and mathematics for grades preK-12. Many Reading First schools and many schools we have studied (Odden & Archibald, 2009; Odden, 2009) use the Dynamic Indicators of Basic Early Literacy Skills (DIBELS) assessments (http://dibels.uoregon.edu). Fast Bridge is a third example of a short-cycle assessment. The NWEA MAP program, used by numerous districts across the country, has been expanded to provide short-cycle assessment data. These examples include screeners for both reading and mathematics. The Galileo Assessment system as well as the Diagnostic Reading Assessment (DRA) are further examples of these needed assessments.

The costs of these powerful assessments are modest. The EB Model generally provides $25 per pupil for such assessment capabilities. This capacity enables teachers to obtain interim assessments for PLCs, screeners, progress monitoring, and/or overall instructional improvement.

2023 Evidence-Based recommendation: Provide $25 per student for short-cycle assessments.

17. Technology and Equipment

Schools have committed to embed technology into instructional programs and school management strategies. Today, states and districts expect students to be technologically proficient when they graduate from high school. Virtual schools, online tutorials, blended instructional strategies, flipped classrooms, and electronic collaborative environments have changed the face of how students are educated (Whitmire, 2014). Infusing technology and online teaching into traditional schools can provide individualized learning and move the teacher into the role of an instructional coach (see Odden, 2012). Research shows technology engages students and can be effective in schools with high concentrations of lower income and minority students (U.S. Department of Education, 2017; Whitmire, 2014). The COVID-19 pandemic emphasized the critical importance technology can play in the education of students.

Infusing technology into the school curriculum has associated costs for computer hardware, networking equipment, software, training, and personnel associated with maintenance and repair. If devices and software are not maintained and updated, teachers and students can become disengaged by "dated" devices and learning opportunities can be lost.

Technology has both direct and indirect costs. This *Technology and Equipment* section focuses on direct costs such as hardware, software, and personnel costs for repairing and maintaining infrastructure and devices. Other EB Model elements incorporate the indirect cost of technology including professional development and school computer technicians to help with keeping school-based technology in working order.

Like other states, Alaska schools have a variety of computers of varying ages that are connected to school networks and the internet. Schools are wired and most are adding Wi-Fi capabilities and increasing bandwidth. The EB recommendation assumes major capital expenses such as bringing high speed internet to the school site and wiring the school have been or will be paid for with school or state capital construction funds

The EB recommendation for computers and related equipment has held constant at $250 per student for many years. This has been possible because as technology advances, the cost of devices and other equipment drops, even though technology and software needs expand. This analysis estimates four categories of technology costs totaling $250 per student (see the analysis of Scott Price in Odden, 2012; Odden & Picus, 2020). The amounts by category should be considered flexible, as districts and schools need to allocate dollars to their highest technology priority outlined in state and district technology plans.

The per-student costs for each of the four subcategories have been approximately:

- Computer hardware: $74
- Operating systems, productivity and non-instructional software: $69
- Network equipment, printers and copiers: $55
- Instructional software and additional classroom hardware: $52.

The overall $250 per student figure has been adequate for schools to purchase, upgrade and maintain computers, servers, operating systems and productivity software, network equipment, and student administrative and financial systems software, as well as other equipment such as copiers. System software packages vary dramatically in price; the figure recommended would cover medium priced student administrative and financial systems software packages.

The $250 per student figure allows a school to have one computer for every three students with additional computers for teachers, the principal, and other key school-level staff.

Over the last few years, computer makers have developed alternative products, such as Chromebooks and tablet computers that have a lower entry price point of about $300 per unit compared to the $500 to $800 cost for laptop or desktop computers. These lower-cost devices are designed with limited hardware specifications that still allow students to access cloud-based internet applications effectively but do not require extensive device computing power or memory. For school districts that value increasing student access to technology, purchase of these lower-cost devices provides an opportunity to lower student-to-computer ratios.

Though Chromebooks use a different operating system than has typically been used in the educational environment, most instructional and interactive testing software is browser-based and housed in the cloud, making these software packages agnostic to operating systems. Additional software is being continually developed for these platforms as they become more commonly used in the educational space. One limiting issue of an internet device like a Chromebook is that if there is no internet connectivity available, then cloud-based productivity or other software loses functionality. This can be a disadvantage in a one-to-one computer program in which some students lack home internet access. But as more software applications move to the cloud, this problem is not limited to Chromebooks or tablets.

As the student-to-computer ratio decreases there is opportunity for districts, such as Alaska's Gateway District, to explore one-to-one student-to-computer ratios at key grade levels, schoolwide or the entire district. The more exposure students have to computer devices, the more accustomed and proficient they become at using them. With the growing use of computers for high stakes testing, it is essential that students are able to comfortably use computers to demonstrate their knowledge. If students have not had sufficient practice with computers in a testing environment, computerized testing can become a barrier to successfully assessing student achievement. If students cannot comfortably type, text responses become more a test of "hunt and peck" skills than a reflection of the student's ability to respond to a prompt. As the education system continues to move more testing and resources online, districts will need to increase the number of devices they have and expand their internet bandwidth to facilitate these activities.

Educational application providers continue to migrate their products from local school and school district servers to the cloud while virtual classroom portals let students and parents track student assignments and achievement from anywhere. The result of this "move to the internet" emphasizes the need for schools to provide students with a technology device that will extend the classroom into the home.

In considering all of the factors described above, a district that adopts a mix of standard and low-cost units that rely more heavily on lower cost, cloud-based approaches will be able to reduce the average cost of a computer unit. Despite this drop in average cost, the EB Model recommendation remains at $74 per student for computer hardware, recognizing that introducing lower priced units will allow districts to move closer to a one-to-one student-to-computer ratio and improve refresh rates for all units. Variance in the types of computers students use will also better prepare students for the workplace.

In the past, for more expensive computers, the EB Model has recommended that districts purchase 24-hour maintenance plans to eliminate the need for school or district personnel to fix computers. For example, a school or district can purchase a maintenance agreement from a number of computer manufacturers that guarantees computer repair on the next business day. Many private sector companies that offer such service often take a new computer with them, leave it, and take the broken computer to fix. On the other hand, when districts analyze the cost of warranty programs for Chromebooks or similar low-cost hardware, they may find it is more practical to replace broken machines than to pay for extended warranties.

As the number of computers in schools increases, it becomes more impractical to hard-wire connections in classrooms or other instructional spaces. Wireless access points within the school site create an instructional environment on campus in which controlled internet access is available anytime or anywhere. Depending on campus configuration, it is possible to serve a small group of wireless computers with just a few wireless access points. However, as the number of computers being simultaneously used increases, additional access points must be added. The original EB Model recommendation for technology and equipment included modest funds to complete small on-campus infrastructure improvements. It is still unclear whether 5G equipment will be able to be used practically in the school setting unless a broadband access pipe is provided to the school site which can then be redistributed on campus through wireless access points or if it will provide access to students' homes that were previously in inaccessible areas.

The 2022 EB Model recommendation for technology remains at $250 unless Alaska decides to move to a one-to-one ratio. As technology specifications advance, the price of what were premium technological features decreases and the relative price for computer units stays fairly constant. In this process, yesterday's most advanced feature become today's common specification. The same is true for network equipment. As network technology improves, price points for many technologies have remained fairly constant even as capacity increases. For example, as the need for bandwidth has jumped, the older network switches with speeds of 100 megabits have been replaced with one gigabit or even 10 gigabit switches that cost the same as a 100-megabit switch years ago. If Alaska funded school-based technology and equipment at $250 per ADM, districts would be able to gradually upgrade necessary network equipment within their campuses and to lower their student-to-computer ratios using a mixture of traditional and new devices.

The EB Model does not yet recommend a one-to-one computer to student ratio; we believe such a decision should be a state policy decision. In our recent Wyoming recalibration report (see picusodden.com, State Studies under the Resources section), we estimated that moving to a one-to-one computer system, using mainly Chromebooks, would cost about $350 per pupil. This cost would nearly double if the district used more costly desktop or laptop computers instead.

2023 Evidence-Based recommendation: Provide $250 per student for a three-to-one student-to-computer ratio but increase it to $350 per ADM for a one-to-one computer ratio. The decision on 1:1 computing support is, we believe, a policy choice the state would need to make.

18. Extra Duty Funds/Student Activities

Elementary, middle and high schools typically provide an array of non-credit producing after-school programs, such as clubs, bands, sports, and other activities. Teachers supervising or coaching these activities usually receive small stipends for these extra duties.

Participation in Student Activities

A 2009 national survey (Aud, et al., 2012) asked high school seniors about their participation in high school activities including school newspaper, yearbook, music, performing arts, athletics, academic clubs (e.g., world language, science), student government and other school activities. Student respondents indicated 38 percent participated in athletics, followed by other school activities at 32 percent and music and performing arts at 24 percent. Female students participated in other school clubs at a rate of 40 percent, athletics 31 percent and music and performing arts 30 percent. Male students participated in activities as follows: athletics 46 percent, other social clubs 24 percent, music and performing arts 18 percent, and other activities 12 percent. Other than athletics, female students participated in activities at higher rates than male students.

Knop and Siebens (2018) used U.S. Census data to estimate the percentage of children aged 6 to 17 who participated in sports, lessons, and clubs between 1998 and 2014. After 1998, the percentage of children participating in sports was higher than participation in lessons or clubs. An increase in sports involvement occurred between 2011 and 2014, increasing by nearly 7 percentage points from 35 percent to 42 percent. Between 1998 and 2014, participation in clubs declined from 35 percent to 28 percent. Participation in lessons remained about 30 percent over these years. Children in poverty were less likely to participate in these three extracurricular activities.

Sparks (2019b) reports that a poll conducted by the C.S. Mott Children's Hospital found that that more than half of students responding participated in sports and 40 percent were involved in arts or other clubs during the 2018-19 school year. The poll found that only one in six secondary (middle and high) school students participated in no extracurricular activities. In short, large numbers of secondary students in America participate in extra-curricular activities.

Impact of Participation in Student Activities

Research shows, particularly at the secondary level, that students engaged in student activities tend to perform better academically than students not so engaged (Feldman & Matjasko, 2005), although 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, 1996, 1997). Feldman and Matjasko (2005) found participation in interscholastic (as compared to intramural) sports had a positive impact for both boys and girls on: grades, postsecondary education aspirations, reducing dropout rates, lowering alcohol and substance abuse, and led to more years of schooling. The effect was particularly strong for boys participating in interscholastic football and basketball. One reason for these impacts is participation in interscholastic athletics places students in new social groups that tend to have higher scholastic aspirations and those aspirations "rubbed off" on all the participants. But the effects differed by race and gender and were not as strong for African Americans.

Fredericks & Eccles (2006) found that secondary students who participated in afterschool activities had higher academic outcomes, increased safety and higher participation in civic activities, and conversely reduced negative behaviors such as use of drugs and alcohol. Other research shows that participation in high school athletics has positive impacts on educational attainment and wages (Barron, Ewing & Waddell, 2000; Eoide & Ronan, 2001; Stevenson, 2010).

In addition, a U.S. Census Report (Knop & Siebens, 2018) found that that children tend to have higher levels of school engagement when involved in one or more activities, like sports, lessons or clubs. The report found that 42 percent of children who took lessons (i.e., music, dance, etc.) were highly engaged compared to 33 percent of children who did not. Children in poverty were less likely to participate in each of the three extracurricular activities (sports, lessons and clubs) than those not in poverty, and had less school engagement. Similarly, Crispin (2017) used multiple methods to analyze data from a 1988 longitudinal study and found that for both at-risk and non-at-risk students' participation in extracurricular activities reduced the likelihood of dropping out of high school by 14 to 20 percentage points. In short, the greater the engagement the better students perform in schools and the less they drop out of school.

The positive impact of student activities on student performance are viewed by many as an integral component of a student's education. Across the country schools invest in student activities and students who participate in extracurricular activities from grades 8 to 12, attend college, vote in national and regional elections and volunteer at a higher rate (Zaff, et al., 2003).

During the past several years, the EB Model developed in other states has allocated between $200 and $314 per pupil for student activities, including intramural sports. These figures generally are in line with average amounts spent on such activities in many states (Odden & Picus, 2020). However, our research has not found a common model for allocating state support for student activities

Thus, in our most recent adequacy study (see Wyoming 2020 in State Studies under the Resources section in our website picusodden.com) we developed sports and activities prototypes for the EB Model's prototypical 450-student middle school and 600-student high school. The prototypes produced a figure of $600 per pupil for the high school and $322 per pupil for the middle school. Averaging these figures by weighting them for the different numbers of grade levels covered, together with $25 for elementary school, produced an overall figure of $284 per pupil, well within the EB model's figure of $300 per pupil (Odden & Picus, 2020).

2032 Evidence-Based recommendation: Provide $300 per student for extra duty funds and extra-curricular activities.

CENTRAL FUNCTIONS

This section covers two operations usually association with the central office: maintenance and operations, and the central office itself.

19. Operations and Maintenance

Computation of operations and maintenance costs is complicated by the lack of a strong or consistent research base. Some school finance models allocate a percentage of current expenditures to operations and maintenance. The EB Model uses standards to compute the number of personnel needed for custodial, maintenance and grounds workers. Additional funding is provided for utilities.

This section has two parts: one that reviews the literature on the linkage between facilities and student performance and a second focused on professional standards in staffing for operations and maintenance.

Review of Literature on Operations and Maintenance

The research evidence linking the operations and maintenance of schools directly to student performance is both limited and mixed. Even without a strong basis to support the linkage between facility quality and student outcomes, all students are entitled to attend schools in a safe, clean and well-maintained environment. The importance of operating and maintaining this investment is clear regardless of the strength of the relationship between them.

Earthman (2002) underscored the importance of school facility conditions noting at the time that researchers had consistently found a deficit of between 5 and 17 percentile points in student performance in poorly maintained buildings compared to students in standard buildings. The research Earthman cites also suggests via correlational analysis that teacher effectiveness decreases in schools with poor facilities. This led Earthman, who was for many years the leading researcher on school facilities in the United States, to argue not only for the importance of clean, facilities, but also for the importance of quality thermal and acoustic materials in the environment where students learn.

Similar work, completed by The Tennessee Advisory Commission on Intergovernmental Relations (Young, et. al., 2003), showed a statistically significant relationship between the condition of a school or classroom and student achievement. Students attending schools in up-to-date facilities scored higher on standardized tests than those in substandard buildings. The committee concluded that policy makers should consider the relationship between school facilities and student learning outcomes, not only because of safety and welfare responsibilities to the students and staff, but also because a lack of adequate funding for facilities repair and maintenance can undermine spending in other areas focused on educational reform.

Young, et. al. showed positive educational outcomes were correlated with the following factors:

- New facilities

- Well-maintained buildings
- Thermal regulations to avoid excessive temperatures
- Appropriate lighting levels
- Utilizing relaxing shades of paint, and
- Limited external noise.

Contrary to this, Picus, Marion, Calvo and Glenn (2005) studied the correlation between the quality of Wyoming school facilities and student outcomes. School quality was measured with a 100-point scale developed specifically for Wyoming schools and used to assess every school. These scores were correlated with measures of student outcome controlling for student characteristics, and no statistically significant relationship was found. While this finding does not mean a state should abandon its efforts to provide safe, clean and well-maintained facilities, expectations that student performance will improve with better facilities should be moderated.

Whatever research concludes on the link between facilities and student performance, students and educators deserve adequate, clean and well maintained buildings. The challenge is how to provide such resources. The EB Model uses professional standards to address this challenge.

Professional standards for operations and maintenance staff

Drawing on professional standards in the field, we have developed a cost basis for staffing maintenance and operations (Odden & Picus, 2020). The discussion below uses these standards to identif the needs for custodians (school level), maintenance staff (district level) and groundskeepers (school and district level), as well as the costs of materials, supplies and utilities to support these activities.

Custodians

Custodians are responsible for the cleanliness of school 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 replacing light bulbs, and are expected to clean restrooms, cafeterias/multipurpose rooms, lockers and showers. Custodial workers' duties are time-sensitive, structured and varied. Many schools see custodians as a front-line employee who often interact with teachers and students on a daily basis. Custodians are also often responsible for ensuring that major mechanical equipment within the facility is running well and identifying appropriate services to make repairs when needed.

Zureich (1998) developed the standards to estimate custodial needs at the school level. Zureich's standards were updated by Nelli (2006) as part of a Wyoming adequacy study. The standards include the number of teachers, students, classrooms and gross square feet (GSF) in the school:

- One custodian for every 13 teachers, plus
- One custodian for every 325 students, plus
- One custodian for every 13 classrooms, plus
- One custodian for every 18,000 allowable GSF, and
- The total divided by four to calculate a base FTE school level custodian position.

This base FTE position is further adjusted by an additional 0.5 FTE for secondary schools. Custodian positions for non-educational buildings are based solely on gross square footage (GSF).

The formula calculates the number of custodians needed at prototypical schools and the district. The advantage of using all four factors for the school custodians is it accommodates growth or decline in enrollment and continues to provide the school with adequate coverage for custodial services over time.

Recently we found three other standards for determining custodians for school buildings:

1. A public formula used in Pennsylvania (Pennsylvania Association of School Business Officials (PASBO)
2. A private sector formula used by Aramark and other private providers of cleaning for schools, and
3. A public formula used by Florida to suggest M & O staffing for schools.

In order to compare the four different approaches, we used a simulation for the generic EB model that comprises a 3,900-student prototypical school district, with four 450-student elementary schools, two 450-student middle schools and two 600-student high schools. The EB Model yields a total of 23.3 custodians for this prototype.

The Pennsylvania formula for staffing custodians uses the same four factors as the EB model – number of teachers, students, classrooms and GSF as well as the additional factor of the number of washroom fixtures (sinks, urinals, toilets) – but has different benchmarks for each of these five elements. Pennsylvania’s model is as follows:

- 1 custodian for every 9 teachers
- I custodian for every 300 elementary/200 secondary students
- 1 custodian for every 12 classrooms
- 1 custodian for every 16,000 Gross Square Feet (GSF)
- 1 custodian for every 35 washroom fixtures (sinks, urinals, toilets)
- All the above summed and divided by 5.

The Pennsylvania model yields a total of 27.3 custodians for the EB prototypical district or four additional custodians.

The private sector model employs a simpler formula for cleaning, using only Gross Square Footage (GSF) of the building. It then takes 80 percent of the GSF as Cleanable Square Footage (CSF) and provides one custodian position for every 22,000 CSF for elementary schools and one custodian position for every 28,000 CSF for secondary schools. The private sector model yields just short of 20 custodians for the EB prototypical model, about 3.3 fewer custodians than the EB model and 7.3 fewer than the Pennsylvania model.

The Florida model is similar to the private sector model but uses 19,000 CSF instead of 22,000 CSF. This would allow for more custodians than the private sector model but fewer than the Pennsylvania model putting it very close to the current EB model. The Florida model would produce 25.8 custodians, 2.5 more than the current EB model.

All four models are relatively close in their calculation of custodial staffing. The Pennsylvania model, though, assumes a higher level of cleanliness that is often associated with hospitals and nursing homes. The private sector model assumes that cleaning is largely a nighttime function provided by part time workers. Schools, however, need custodial support during the day so the leaner private sector model would place at most one custodian at the school during the day. The Florida model produces somewhat more custodians. We conclude that the current EB model, which provides a level of custodial staff in between these three alternative standards, is the most appropriate choice for staffing custodians for the education sector.

Maintenance Workers

Maintenance workers function at the district level, rather than at individual schools. Core tasks provided by maintenance workers include preventative maintenance, routine maintenance and emergency response activities. Individual maintenance worker accomplishment associated with core tasks are (Zureich, 1998):

- HVAC systems, HVAC equipment, and kitchen equipment
- Electrical systems, electrical equipment
- Plumbing systems, plumbing equipment, and
- Structural work, carpentry and general maintenance/repairs of buildings and equipment.

Zureich's standards for maintenance workers for instructional facilities as follows:

- Calculated on the basis of four factors:
  - An initial 1.10 maintenance worker FTE, plus
  - One maintenance worker for every 60,000 allowable educational GSF at factor of 1.2, plus
  - One maintenance worker for every 1,000 School ADM at factor of 1.3, plus
  - One maintenance worker for every $5 million of general fund operating expenditures from SY 2004-05 at a factor of 1.2.
- These four FTE factors are added together and divided by four to arrive at a base maintenance worker FTE.
- The base FTE is further adjusted for:
  - School level (base FTE is multiplied by 0.80 for elementary schools, 1.0 for middle schools, and 2.0 for high schools)
  - Building age, where schools under 10 years old are multiplied by a factor of 0.95 and over 30 years old by a factor of 1.10, and
  - Small district size where the base FTE is multiplied by a factor of 1.10 for districts with ADM under 1,000.

The current EB model eliminates the general fund operating expenditure factor. The size of school district general fund budgets has increased considerably over the past 15 years since this formula was developed, and we have been unable to identify an empirical basis for an alternative number. The impact of eliminating this computation provided a modestly higher number of maintenance workers in a recent state adequacy study; it provides modestly fewer worker for th prototypical district. We also assume that the maintenance worker FTEs determined on the basis of a district's total allowable educational GSF for schools are sufficient to service all buildings in a district, both educational and non-educational.

Florida has a simpler formula to determine the number of maintenance workers:

- One Maintenance FTE for every 45,000 sq. ft
- One Support FTE for every six maintenance workers.

The current EB model formula produces 9.88 maintenance staff in a prototypical school district of 3,900 students while the Florida formula produces 13.8 maintenance staff plus 2.3 support staff to support the maintenance workers – this amounts to 3.9 more maintenance workers and 2.3 more support staff.

The current EB model uses a standard recommended by Zureich (1998). In our search for how other states provided for maintenance workers, we could not find any state, except Florida, that either directly used a standard for maintenance worker staffing or suggested a standard. Most states simply do not reach this level of detail in their school funding models.

Unlike custodians, there is some uncertainty in projecting staffing loads and maintenance costs without assessing the individual needs of each district and its composite buildings. For example, one district that has a centralized HVAC control system might be able to monitor and project motor or condenser failures well in advance and thus hold down costs, while this possibility is not available to another district that does not have a centralized HVAC monitoring system. Private sector companies that provide services in this area use sophisticated software that calculates staffing needs and costs based on the individual inventory of the district.

Groundskeeper Positions

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. We have estimated that an elementary school needs 62 days per years of groundskeeper support, a middle school 140 days and a high school 388 days per year. Groundskeepers are determined at the site rather than building/program level. The number of groundskeepers for all sites, both educational and non-educational, is based on the following:

- The number of acres of the site and the standard for the number of annual work hours per acre (93 hours). The FTE calculation assumes a 2,008-hour work year for groundskeepers
- The initial FTE is adjusted for the primary school level or use of the site, with non-educational and elementary school sites receiving no additional adjustment, middle school sites receiving an adjustment factor of 1.5 and high school sites an adjustment factor of 2.5

Florida has a suggested staffing formula for groundskeeper positions for schools, that is simpler than the EB Model:

- Total acreage divided by 40
- Add one FTE
- Plus, one FTE per 500,000 gross square feet (GSF) of athletic fields.

This formula produces more groundskeeper positions than the EB Model, but we see no compelling rationale to adopt it for Alaska.

Supplies/Materials and Utilities

We have increased the figure for operation and maintenance supplies and materials to $1.00 per GSF and estimate $350 per pupil for utilities. The latter is a guesstimate that should be addressed in more detail by a cost factor study as utility costs vary substantially across Alaska's districts.

20. Central Office Staffing/Non-Personnel Resources

All districts require central office staff to meet the overall management needs of their educational programs. School district central office administrators exercise essential leadership, in partnership with school-site leaders, to build capacity throughout public educational systems for teaching and learning improvements (Honig, et al., 2010). Central Office functions include the overall management of all aspects of a school district regardless of enrollment size including fiscal management (including budgeting, accounting and enrollment and fiscal projections), supervision of teaching and learning, human resources, legal matters and communications. Central Office functions require both certificated and non-certificated personnel.

As described in Chapter 2, the EB model uses a theory of action about successful schools and districts – that is districts providing all students with an equal opportunity to meet their state's performance standards – and describes our research-based estimates of an adequate level of resources to provide that level of schooling. To facilitate the analysis and description of the EB model, we rely on prototypical schools and districts to help estimate the cost of an adequate level of resources in a given state. While we realize there are likely few if any schools or districts that have these exact combinations of schools and students, the prototypical school enables us to develop resource estimates and the prorate (using a variety of algorithms) actual resources and associated costs to schools and districts.

The prototypical school district we use for the EB model has a total of 3,900 students located in eight schools. There are four elementary schools of 450 students, two middle schools with 450 students and two 600 student high schools. The logic behind this relates to the core class sizes in the EB model of 15 in grades K-3 and 25 in grades 4-12. A prototypical 450 student elementary school with 75 students in each of six grades (K-5) has five classrooms of 15 students each in grades K-3 (300 students) and three classrooms of 25 students each in grades 4 and 5 (150 students). A prototypical middle school has three grades (6-8) of 150 students each for a total of

450 students and a prototypical high school has four grades (9-12) of 150 students each for a total of 600 students. Thus a prototypical district has 3,900 students – 1,800 elementary, 900 middle and 1,200 high school.

These numbers may seem small or low to some, particularly readers living in large urban school districts, but on a national basis, the National Center for Education statistics estimates the average school district had 3,713 students in Fall 2016. That same year the average elementary school had 481 students and the average secondary school 488 students (NCES, 2018). At the same time, these figures might seem large to some small districts and schools in Alaska. But we have used these prototypes in many states with both smaller and larger schools and districts.

Over the past 20 years, we have developed central office staffing recommendations in states where we have conducted adequacy studies. Initially, we began with the research of Elizabeth Swift (2005), whose Ed.D dissertation at USC relied on professional judgment panels to estimate adequate central office staffing for a prototypical school district. That research addressed the issue of the appropriate staffing for a district of 3,500 students. Swift's work formed the basis of our early state analyses. We conducted further professional judgment panels in several adequacy studies (North Dakota, Washington, Wisconsin, and Wyoming) to review the basic recommendations that emerged from Swift's research. Through that work we were able to estimate the central office resources required for a district of 3,500 students. The initial studies estimated a need for about 8 professional staff (superintendent, assistant superintendent for curriculum, business manager, and directors of human resources, pupil services, technology, and special education) and nine clerical staff positions.

Beyond the Swift study and our Professional Judgment panels, the research basis for staffing school district central offices is relatively limited. Analysis of the 2009 Educational Research Service Staffing Ratio report showed that nationally, school districts with between 2,500 and 9,999 students employed an average of one central office professional/administrative staff member for every 440 students (Educational Research Services, 2009). This equates to about eight central office professionals (7.95) in a district of 3,500 students, effectively matching our research-based staffing formula of eight FTE professional staff.

Over time, we realized that the 3,500-student district size we used for estimating central office staff did not readily incorporate the EB model's prototypical school and school district size we had developed. Consequently, we modified our central office staffing estimates to use a district size of 3,900 students with eight schools as described above.

This larger size allowed the addition of testing and evaluation, and computer staff to our central office staffing estimates. This is supported by current operations of school districts and the professional judgment panel recommendations we have generated from a number of states in more recent years. Panels in states as diverse as Vermont, Maryland, Michigan, and Wyoming have described the importance of these personnel.

Testing and evaluation staff are critical given the growing use of standardized testing throughout education. As a result, we added a director of assessment and evaluation to our recommended central office staff. Technical staff to support technology is also critical today. To meet the needs of schools for both educational and administrative computing, we have added school computer technicians, i.e., individuals who install computers and software, maintain wired and wireless connections, keep computers and printers operating and stocked with supplies. Although primarily serving school sites, these positions would be staffed through the central office so they could be dispatched to meet the greatest need at any specific time. Given the increased use of computers, the model now includes four school computer technicians in the prototypical central office. Central office staffing for a prototypical district of 3,900 students today includes a director of technology, a network supervisor, a software supervisor and four school computer technicians (see Table 20.1:

Table 20.1: EB Central Office Staffing for a District with 3,900 Students

Office and Position	FTE	
	Admin	**Classified**
Superintendent	1	
Secretary		1
Business Manager	1	
Director of Human Resources	1	
Accounting Clerk		2
Accounts Payable		2
Secretary		1
Assistant Supt. for Instruction	1	
Director of Pupil Services	1	
Dir. of Assessment and Evaluation	1	
Secretary		3
Director of Technology	1	
Network Supervisor (Hardware)		1
Systems Supervisor (Software)		1
School Computer Technician		4
Secretary		1
Director of O&M	1	
Secretary		1
Central Office Staffing	**8**	**17**

2023 Evidence-Based recommendation:

Central Office Personnel:8.0 professional and 17.0 classified positions.

Non-Personnel Resources: $400 per ADM for non-personnel resources

RESOURCES FOR STRUGGLING STUDENTS

The staffing for core programs section contains positions for supporting teachers and students beyond the regular classroom teacher. Those positions include elective or specialist teachers, core tutors, instructional facilitators, substitute teachers, core guidance counselors, nurses, supervisory aides, librarians, library aides, school computer technicians, school administrators and school secretarial and clerical staff.

In many instances, even more additional support is needed for struggling students. The resources described in this section 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 to give all students multiple opportunities to achieve to proficiency levels. The EB Model elements for extra help are also embedded in the RTI schema described at the beginning of this chapter.

It is important to note that the EB model uses two student counts to trigger extra help resources: ELL students and non-ELL poverty students (the latter usually being the number of students eligible for free and reduced price lunch). The goal is to ensure that the unduplicated count of both ELL and poverty students serves as proxies to trigger these additional resources.[12]

The EB Model provides substantial additional resources for struggling students, as indicated by these two pupil counts: tutors, pupil support, summer school and extended day programs, additional teaching staff for ELL students and staff for alternative learning environment schools. These resources for struggling students should be viewed in concert with resources for students with identified disabilities. Districts sometimes over identify students for special education services as the “only” way to trigger more resources for some struggling students. The EB Model’s goal in providing a robust set of resources for struggling students, whether or not they have been identified as a student with a disability, is to provide adequate resources for all struggling students, with or without a diagnosed disability, and to reduce over time any over identification of students with disabilities.

This section includes discussion of seven categories of services: additional tutors, additional pupil support, extended day programs, summer school programs, ELL teachers, special education, Career Technical Education (CTE) and alternative schools.

21. Tutors

The first strategy to help struggling students is to provide tutoring support as described in Element 6 above. In addition to the one core tutor position provided to every prototypical school discussed above for Element 6, the EB Model provides additional tutor/Tier 2 interventionist positions at the rate of one for every 100 ELL and non-ELL poverty students.

Section 6 above provided the general evidence for tutors as a very effective strategy for helping struggling students to achieve to higher performance standards. And although the bulk of the

[12] A state could also use all poverty students and all non-poverty ELL students. The goal is to provide the extra resources for an unduplicated count of all ELL and poverty students.

evidence addressed one-to-one tutoring, the section also addressed research on small group tutoring, up to groups of 5 students. However, most research on tutoring was conducted prior to the COVID 19 pandemic, which produced dramatic learning loss across many subjects and many students in the country. This reality in part led some analysts to identify and then conduct research on the impacts of a new form of tutoring, called High Dosage Tutoring or HDT.

HDT uses one person to tutor one, two or up to four students at a time for a full period a day five days a week. This is substantially more time than the traditional 20-30 minutes of tutoring often studied by other research. Brown University Professor Matthew Kraft and the late Johns Hopkins University Professor Bob Slavin recommended the development of a national effort of "high dosage tutoring" as the strategy to reverse the learning loss caused by COVID (see also Barshay, 2020). Rather than a licensed teacher, HDT is usually provided by a recent college graduate who has been trained in a specific math or reading tutoring program, or other content area (e.g., science) linked to the school's curriculum. The tutors are not volunteers, nor traditional paraprofessionals, but full-time school employees who have earned a bachelor's degree in a content area and are typically paid at a rate between an instructional aide and a new teacher. Kraft and Falken (2021) outline how the country could scale up a HDT program, and the concepts and ideas put forth could also be adopted by a state, such as Alaska.

Research suggests this HDT approach has larger effect sizes than found in the studies of more traditional tutoring programs described above (see Baye et al., 2019; Cook et al., 2015; Freyer, 2016; Fryer & Noveck, 2017). Guryan, et al.'s (2021) randomized controlled trial research showed that HDT positively impacts adolescents as well as elementary students, thus arguing that HDT is an effective, and cost effective K-12 strategy for improving academic outcomes for students. Robinson & Loeb (2021) provide additional research on the significant, positive effects of HDT and outline more detail on how such programs should be structured at the school level. In sum, creating a corps of HDT tutors could be one powerful strategy for making up for the loss of learning caused by COVID-19, or any other reasons, and could be funded by the tutoring resources included in the EB model. HDT tutors hopefully could boost achievement by significant amounts for any group of students achieving below expectations and is a tutoring strategy Alaska should seriously consider.

2023 Evidence-Based recommendation: Provide one teacher tutor/Tier 2 interventionist position for every 100 ELL and non-ELL poverty students. It is important to note that the EB model allocates these additional tutor positions above the core tutor positions generated at each prototypical school.

22. Additional Pupil Support

Core pupil support positions for school counselors and nurses are discussed in Element 8. At-risk students, however, generally have more non-academic needs that must be addressed by additional pupil support staff, which include additional school counselors, as well as social workers, family liaison staff, and psychologists. Complementing the core school counselor and nurse positions, the EB Model provides additional pupil support positions at the rate of one position for every 100 at-risk students – non-ELL poverty and all ELL students.

ELL students and students from low income backgrounds tend to have a multiplicity of non-academic needs that schools should address. This usually requires interactions with families and parents as well as more counseling in school. The greater the concentration of at-risk students, the more intensive these family and student outreach efforts need to be. The EB Model addresses this by providing additional pupil support staffing resources based on the counts of ELL and non-ELL poverty student counts.

Various comprehensive school designs have suggested different ways to provide more intensive family and student outreach programs (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.

Although there are many ways schools can provide outreach to parents or involve parents in school activities – from fund raisers to governance – research shows school sponsored programs that have an impact on achievement address what parents can do at home to help their children learn. For example, parent outreach that explicitly and directly addresses what parents can do to help their children be successful in school, and to understand the standards of performance that the school expects, are the types of school-sponsored parent activities that produce discernible impacts on students' academic learning (Steinberg, 1997).

At the secondary level, the goal of parent outreach programs is to have parents learn about what they should expect of their children in terms of course taking and academic performance. If a district or a state requires a minimum number of courses for graduation, those requirements should be made clear. If either an average score on an end-of-course examination or a cut-score on a comprehensive high school test are required for graduation, they too should be discussed. Secondary schools need to help parents understand how to more effectively assist their children to identify an academic pathway through middle and high school, understand standards for acceptable performance, and be aware of the course work necessary for high school graduation and college entrance. This is particularly important for parents of students in the middle or lower end of the achievement range, as often these students know very little about the requirements for transition from high school to postsecondary education (Kirst & Venezia, 2004).

At the elementary 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 parent-teacher organizations, 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 student learning would include: 1) reading to them at young ages, 2) discussing stories and their meanings, 3) engaging in conversations with open ended questions, 4) setting aside a place where homework can be done, and 5) ensuring that their child completes all homework. Recent research shows that *texting* these ideas to parents can result in improved student performance (Smith, 2021).

The resources in the EB Model are adequate to create and deploy the ambitious and comprehensive parent involvement and outreach programs that are part of two comprehensive school designs: Success for All Program and the Comer School Development Program. The Success for All Program includes a family outreach coordinator, a nurse, a social worker, a counselor and an education diagnostician for a school of about 500 students. This group functions as a parent outreach team for the school, serves as case managers for students who need non-academic and social services, and usually includes a clothing strategy to ensure all students, especially in cold climates, have sufficient and adequate clothes, and coats, to attend school.

The Comer School Development Program was created on the premise of connecting schools more to their communities. Its Parent-School team has a somewhat different composition and is focused on training parents to raise expectations for their children's learning, to work with social service agencies and to work with the school's faculty to raise their expectations for what students can learn. Sometimes the team co-locates on school site premises to provide a host of social services. The need for robust family outreach programs and the efficacy of the Comer designed School Development Program today was reinforced by Linda Darling Hammond and colleagues (2019) who argued that the program is as relevant in current times as when it was created in the late 1990s.

A program called Communities in Schools (www.communitiesinschools.org), which now operates in 26 states and the District of Columbia, and can be resourced by the additional staffing provided by this element, has been successful in raising school attendance rates as students need to attend school in order to learn. The program adds a caseworker, often trained in social work, to a school's pupil support team to help match social services provided by non-educational agencies to students who need them. KIPP Charter schools also have robust parent involvement strategies, which also can be supported by these extra pupil support resources.

These additional pupil support staff can also be used to provide some of the mental health services educators in several states increasingly argue many students need. At the Professional Judgment Panels we conducted over the past several years in Maryland, Michigan, Vermont and Wyoming, one of the overwhelming findings has been the increasing need for staff to meet the social and emotional needs of students and their families. The COVID-19 pandemic and the changes required to maintain personal physical and mental health further increased the need for school staff to help students and their families cope with a wide range of challenges, including mental health challenges.

2023 Evidence-Based recommendation: Provide one additional pupil support position for every 100 ELL and every 100 non-ELL poverty students.

23. Extended-Day Programs

At both elementary and secondary school levels, some struggling students are likely to benefit from after-school or extended-day programs, even if they receive tutoring or other kinds of Tier 2 interventions during the regular school day.

Extended-day programs provide environments for children and adolescents to spend time in school *after* the regular school day ends, but during the *regular school year*. Reviews of research found that well designed and administered after-school programs yield numerous improvements in academic and behavioral outcomes (Fashola, 1998; Posner & Vandell, 1994; Vandell, Pierce & Dadisman, 2005; Vandell et al., 2020). On the other hand, the evaluation of the 21st Century Community Learning Centers 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 the control groups had higher pre-existing achievement, which reduced the potential for finding program impact. Critics also argued the small impacts identified had more to do with the lack of full program implementation during the initial years than with the strength of the program. The research evidence on extended-day programs is somewhat mixed because of research methods (too few randomized trials), poor program quality, and imperfect implementation of the programs studied.

Nevertheless, multiple studies and research reviews have documented positive effects of extended-day programs on the academic performance as well as behavioral outcomes of students who participated in select after-school programs (e.g., Kakoata & Vandell, 2013: Vandell, Pierce & Dadisman, 2005; Vandell et al., 2020; Wu, 2020). Kraft (2015) describes how individual tutoring programs in extended day programs can have significant impacts on student learning.

After school, extended day programs can help improve student learning but it depends on multiple features of the programs, and the participation behaviors of students. In practical terms, program evaluators 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).
- A program culture of mastery, i.e., engaging in activities to become more proficient and/or to meet various standards of performance.
- Consistent participation in a structured program.
- 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 EB Model includes resources for an extended-day program that can meet these structural supports for all school prototypes. The resources can be used to provide students in all elementary and all secondary grades with additional help during the school year, but *after* the normal school day, to meet academic performance standards. Because not all at-risk students will need or will attend an after-school program, the EB model provides extended day resources for half of the at-risk students in a school, a need and participation rate identified by Kleiner, Nolin, and Chapman (2004).

The EB model assumes that each extended day teacher serves 15 at-risk students each day for two hours and is paid an additional 25 percent of salary to meet with those students. The EB model also assumes half of the at-risk students will participate in the program, so a school with 120 at-risk students will receive funding for four individuals to serve 60 students in groups of 15 for two hours (25 percent FTE) a day. Simplified, the formula equates to one teacher position for every 120 at-risk students.

2023 Evidence-Based recommendation: Provide one extended-day teacher position for every 120 ELL and every 120 non-ELL poverty students. Provide more resources as student participation on after school programs increases

24. Summer School Programs

Many students need extra instructional time outside of the regular school year to achieve the state's proficiency standards. Summer school programs should be part of the range 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). It should be noted summer school services are provided outside of the regular school year.

Evidence dating back to 1906 shows 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 low income 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 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).

Evidence on the effectiveness of summer programs in attaining either of these goals is mixed. Although 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 the average student in summer programs outperformed about 56 to 60 percent of similar students not receiving the programs. However, the certainty of these conclusions was compromised because only a small number of studies (e.g., Borman, Rachuba, Hewes, Boulay & Kaplan, 2001) used random assignment, and program quality varied substantially. A more recent meta-analysis of summer programs that specifically addressed math achievement found positive impacts on student performance (Kraft, et al., 2021).

Randomized controlled trial research of summer school reached more positive conclusions about how summer programs can positively impact student learning (Borman & Dowling, 2006; Borman, Goetz & Dowling, 2009). A 2016 randomized control trial of summer school, found that summer programs that focused on academics, provided small classes of 15, and lasted for several weeks, produced significant positive impacts on elementary student academic achievement (Augustine, et al., 2016). Not surprisingly, the study found that students who attended these summer programs for longer times experienced larger gains in reading and math scores than students who attended for less than four weeks. 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.

Browne (2019) found that voluntary summer school programs in five large districts, with class sizes of 15 and that provided both academics and enrichment, increased student test scores the next year 20-25 percent of the typical annual gain for frequent attenders but smaller gains for those students who were not frequent attenders. About 60 percent of program participants were frequent attenders. One implication, clearly, is to enhance strategies to get more students to attend summer school more often.

Researchers (see Browne, 2016-17; McCombs, et al., 2011; Pitcock & Seidel, 2015.) 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
- Careful scrutiny for treatment fidelity, including monitoring to ensure good instruction in reading and mathematics is being delivered, and
- Monitoring student attendance.

Summer programs that include these elements hold promise for improving the achievement of at-risk students and closing the achievement gap. A 2013 review of the effects of summer school programs reached this same conclusion (Kim & Quinn, 2013). Kim and Quinn's meta-analysis of 41 school- and home-based summer school programs found students in kindergarten through grade 8 who attended summer school programs with teacher directed literacy lessons showed significant improvements in multiple areas including reading comprehension. Moreover, the effects were much larger for students from low-income backgrounds. Borman et al. (2020) found similar significant impacts on student's reading performance, for a replicable summer reading program with the effect size rising to 0.19 for students who read the most books over the summer.

A comprehensive book on the "summer slide," written by several of the analysts cited above, expands on the points outlined above. The book describes what is known about learning loss over the summer and what can be done to prevent it (Alexander, Pitcock & Boulay, 2016). The authors' suggestions for how to structure effective summer school programs echo the recommendations above.[13]

In sum, research generally suggests summer school is needed and can be effective for at-risk students. Studies suggest 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 at-risk students in all grades K-12, an estimate of the number of students still struggling to meet academic requirements (Capizzano, Adelman & Stagner, 2002). The EB Model provides resources for a program of eight weeks in length with a six-hour day. This allows for at least four hours of instruction in core subjects. A six-hour day also allows for up to two hours of non-academic activities each day. The formula for staffing summer school programs equates to one teacher position serving 15 students and paid at 25 percent of annual salary or 4.0 FTE teachers per 120 at risk students (recall that only half or 60 of the 120 students are estimated to enroll in summer school). This position is paid at the rate of 25 percent of the annual teacher salary. Simplified, the formula equates to one full time teacher position for every 120 at-risk – ELL and non-ELL poverty – students.

As the discussion to this point shows, the EB Model's resources for at-risk students are 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. The EB model provides resources so that the most academically deficient at-risk students receive Tier 2 interventions that include tutoring, an extended-day program with an academic focus, and a summer school program that is structured and focused on academics. ELL students receive all of these services *as well as* the additional ELL resources discussed in the next section. Further, these additional instructional resources are supplemented by additional pupil support staff as well (Element 22).

2023 Evidence-Based recommendation: Provide one summer school teacher position for every 120 ELL and for every 120 non-ELL poverty students.

[13] Lynch and Kim (2017) report that a randomized controlled trial of an *on-line* summer school program for mathematics had no impact on student learning but could not determine whether it was the on-line curriculum itself, or some other programmatic element – like monitoring of students engaging in the online instruction – that diminished the impact.

25. English Language Learner (ELL) Students

Research, best practices and experience show that ELL students need additional assistance to learn English, as well as content and content-related language in regular content classes. This can include some combination of small classes, Sheltered English for content 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 as new immigrants to the country and the school throughout the year.

The EB Model provides resources for ESL teachers in addition to the at-risk resources for tutors, pupil support, extended day, and summer school for all ELL students using the ELL count. Specifically, the EB Model provides one teacher position for every 100 ELL students for tutoring, one teacher position for every 100 ELL students for extra pupil support, one teacher position for every 120 ELL students for summer school, one teacher position for every 120 ELL students for extended day programming, <u>*and in addition*</u>, one teacher position for every 100 ELL students for additional language support. This represents a robust set of additional resources beyond core staff for ELL students.

Good ELL programs work, whether the approach is structured English immersion (Clark, 2009) or initial instruction in the native language, often called bilingual education. Bilingual programs have been studied intensively. A best-evidence synthesis of 17 studies of bilingual education (Slavin & Cheung, 2005) found 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 2011 randomized controlled trial also produced strong positive effects for bilingual education programs (Slavin, et al., 2011), but concluded the language of instruction was less important than the approaches taken to teach reading.

Addressing the important issue of learning to read in *The Elementary School Journal,* Gerstein (2006) concludes 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, in other words, follows the current science of reading instruction discussed in Element 15. Gerstein's studies also showed ELL students benefit from instructional interventions initially designed for monolingual English-speaking students, the resources for which are included in the four at-risk student triggered programs: tutoring, extended-day, summer school and pupil support.

Bilingual education is difficult to provide in most schools today because students come from multiple language backgrounds and it is difficult to find teachers who are fluent in the many languages represented by small groups of students. Consequently, most schools have adopted the Sheltered English approach. The EB Model also uses the Sheltered English model for estimating ELL resources in schools. Brown University's Education Alliance Project defines sheltered instruction as an approach to teaching English language learners that integrates language and content instruction. Sheltered instruction has two prime goals: 1) to provide access to mainstream, grade-level content, and 2) to promote the development of English language proficiency, including the academic language specific to the content area (The Education Alliance, 2020).

One specific sheltered English approach is the Sheltered Instruction Observation Protocol (SIOP) Model. SIOP is a research-based and validated instructional model that has proven effective in addressing the academic needs of English learners throughout the United States. The SIOP Model consists of eight interrelated components: lesson preparation, interaction, building background, practice and application, comprehensive input, lesson delivery, strategies and review and assessment (see Echevarria, Vogt, & Short, 2017 for more detail). Three studies by Short, Echevarria, and Richards-Tutor (2011) found that students with teachers who were trained in the SIOP Model of sheltered instruction and implemented it *with fidelity* performed significantly better on assessments of academic language and literacy than students with teachers who were not trained in the model, underscoring the importance of professional development in implementing this instructional approach. Further, Le and Polikoff (2020) found that schools that adopted specific English language development curriculum produced larger impacts on students' English proficiency, suggesting that English language development needs to be a structured and systemic aspect of instruction for ELL students.

In focus groups we conducted as part of EB studies in several states, many educators also argued that sheltered instruction represents high-quality and effective instruction and is effective not only for ELL students but also all students, and particularly non-ELL, at-risk students (e.g., Odden & Picus, 2018). This suggests developing Sheltered English instruction for all teachers can have the side benefit of improving the performance of all students, not just ELL students.

For Sheltered English instruction, districts and schools of education should provide professional development and training for the pedagogical skills needed by teachers to implement this approach. The EB Model has recommended the Sheltered English approach for over a decade and includes substantial professional development resources.

Providing a classroom aide that speaks some of the languages of the ELL students does not result in improved student performance. And co-teaching classes with ELL students is not cost-based. Sheltered English programs, by being cost-based, supersede the practice in many districts of having two teachers provide instruction to a class of ELL students – one content knowledgeable teacher speaking English, and a second teacher who has expertise in the second language represented in the classroom, but often does not know the content. Co-teaching, moreover, is twice as expensive as Sheltered English Instruction and, even if it were effective, would not be cost-based because of its high cost (District Management Group, 2020).

Beyond the most cost-effective general structure for providing instruction to ELL students, however, research shows ELL students need a solid and rigorous core curriculum as the foundation on which to provide both core instruction and any extra services (Gandara & Rumberger, 2008; Gandara, Rumberger, Maxwell-Jolly, & Callahan, 2003). This research suggests ELL students need:

- Effective teachers – a core goal of all the staffing in the EB Model.
- Adequate instructional materials and good school conditions.
- Good assessments of ELL students so teachers know in detail their English language reading and other academic skills.

- Less segregation of ELL students
- Rigorous and effective curriculum and courses for all ELL students, including college and career ready, and affirmative counseling of such students to take those courses, and
- Professional development for all teachers, focused on sheltered English teaching skills as well as the content and pedagogical content knowledge needed for teaching any subject.

Torff and Murphy (2019, 2020) emphasize these important points by arguing that a major reason for the ELL achievement gap is that ELL students often are not offered a rigorous curriculum, even when it is recommended as appropriate. And when used, teachers often choose less rigorous activities and expectations when teaching ELL students. The result, not surprisingly, is lower ELL academic achievement. Tarff and Murphy argue there is a self-fulfilling prophecy: ELL students receive less than rigorous instruction, which limits their performance, which justifies the lower expectations, all the while non-ELL students receive more rigorous instruction and achieve at a higher level.

The solution, Torff and Murphy argue, is knowing the difference between the academic demands of a curriculum and the linguistic demands – and then for teachers to provide the linguistic supports that allow the ELL students to meet the same rigorous achievement standards in all content areas as other, native English-speaking students. In part this is also the approach and goal of Sheltered English instruction. Teachers need to teach both academic content and the academic language that is part of that content, which is a more demanding challenge for ELL students. Intensive PD is needed to help teachers acquire these language support skills.

Educators know that ELL students from lower income and less educated backgrounds struggle most in school and need extra help to learn both academics, regular English and content-related academic English. The EB Model addresses this need by ensuring the ELL resources triggered by ELL counts are *in addition to* other Tier 2 intervention resources including tutoring, pupil support, extended-day and summer school.

Given this allocation of one teacher position for every 100 ELL students, it is important to understand that the EB Model provides all ELL students with additional language resources *as well as* tutoring, additional pupil support, extended day, and summer school. This is all in addition to the assumption that districts provide Sheltered English instruction in classrooms that enroll ELL students.

*2023 Evidence-Based recommendation**:** One position for every 100 ELL students. Note this is in addition to the tutoring, pupil support, extended-day and summer school resources also generated by ELL students.*

27. Special Education

Providing appropriate special education services, 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– before a student is identified as an individual with a disability and an IEP is created. This intervention includes effective core instruction as well as targeted Tier 2 intervention programs, particularly one-to-one tutoring and high dosage tutoring (Elements 6 and 21).

For students with mild and moderate disabilities who require special programs as identified through an IEP, the EB model relies on a census-based formula that provides additional teaching resources based on the *total* number of students in a school. As described below, these resources are expected to meet the instructional needs of children with mild and moderate disabilities. For children with severe and profound disabilities, the EB model recommends that the state pay the entire cost of their programs, minus federal funds for these programs, up to 2 percent of all students. This section also addresses the issue of related services: speech and hearing disabilities, and the need for Occupational and/or Physical Therapy (OT and PT).

In their book on the best approaches to serve students with disabilities, Frattura and Capper (2007) conclude that both research and most leading educators recommend that educating students in general education environments results in higher academic achievement and more positive social outcomes for students with and without disability labels, as well as being the most cost-effective way to educate students. Thus, they recommend that school leaders focus their efforts on preventing student underachievement and alter how students who struggle are educated. Doing so, they argue, will overcome the costly and low performance outcomes of multiple pullout programs. Further, fewer students will be inappropriately labeled with a disability, more students will be educated in heterogeneous learning environments, and higher student achievement and a more equitable distribution of achievement will result (Frattura & Capper, 2007). The bulk of the April 2017 issue of *Educational Leadership* provides this argument in a more advocacy oriented manner and also includes multiple examples of how this approach can be implemented in schools and classrooms. Most states have implemented this philosophy for several years and it is the rationale behind the Evidence-Based model as well.

Supporting this argument, research shows that many mild and moderate disabilities, particularly those associated with students learning to read, are correctable through intensive early intervention. For example, several studies (e.g., Borman & Hewes, 2003; Landry, 1999; Slavin, 1996) have documented that through a series of intensive instructional interventions (e.g. preschool, small classes, rigorous reading curriculum, 1 to 1 tutoring), 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.

That is why the EB recommendations for extended learning opportunities (Elements 21, 23 and 24) are so important. They, along with core tutoring and pupil support services, are the series of service strategies that can be deployed *before* IEP specified special education services are needed. This sounds like a common-sense approach that would be second nature to educators, but often educator practices have been rooted in a "categorical culture" that can be modified through professional development and leadership from the district office and the site principal. Further, unlike the EB funding model, many states do not provide sufficient resources for early intervention and preventive services, so students who could have been helped often end up unnecessarily in special education programs.

Using a census approach to provide most of the extra resources for students with disabilities, an approach increasingly used across the country, works best for students with mild and moderate disabilities, but only if a functional, collaborative early intervention model (as outlined above) is also implemented. At the same time, it is perfectly legal for a student's IEP to call for tutoring, extended day help or summer school services that are part of the EB model, even though the services may not be provided by a person with a special education certification.

This proactive approach to special education became evident in the Individuals with Disabilities Education Act (IDEA) of 2004, which changed the law about identifying children with specific learning disabilities. The reauthorized law states that schools will "not be required to take into consideration whether a child has a severe discrepancy between achievement and intellectual ability ..." (Section 1414(b)). Instead, in the Commentary and Explanation to the proposed special education regulations, the U.S. Department of Education encouraged states and school districts to abandon the IQ-achievement discrepancy model and adopt Response to Intervention (RTI) models, also discussed above, based on recent research findings (Donovan & Cross, 2002; Lyon et al., 2001; President's Commission on Excellence in Special Education, 2002; Stuebing et al., 2002). An RTI model, called a proactive approach above, identifies students who are not achieving at the same level and rate as their peers and provides appropriate interventions, the first ones of which should be part of the "regular" school program and not funded with special education resources (Mellard, 2004).

The core features of RTI, which is a critical part of the EB approach, include:

- High-quality classroom instruction
- Research-based instruction
- Classroom performance
- Universal screening
- Continuous progress monitoring
- Research-based interventions, that would include 1-1 tutoring
- Progress monitoring during interventions
- Fidelity measures (Mellard, 2004).

This proactive model fits seamlessly into the EB broader approach to helping all struggling students through early interventions.

At the same time, there is some emerging evidence, using the national representative sample of students called the Early Childhood Longitudinal Study (ECLS), that full inclusion classrooms can have some negative spillover impacts on students without disabilities, particularly classrooms with students with significant emotional/behavioral problems [see for example, Fletcher (2010)and Gottfried (2014)]. The authors still sanction the inclusion model but suggest that teachers need training in both how to manage such complex classrooms as well as how to provide instruction in such mixed classrooms.

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 at least explored. Students in these categories generally include: severely emotionally disturbed (ED); severely mentally and/or physically handicapped; and children with 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 would make sense to explore clustering of services where possible and design cost parameters for clustered services in each category. In cases where geographic isolation necessitates serving students individually or in groups of two or three, 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.

On the Use of Paraprofessionals. In many states across the country, school systems often use paraprofessionals to provide a significant portion of services to students with disabilities. As University of Vermont Professor Michael Giangreco argues, however, this strategy puts the least expert individuals in the role of providing instruction to the students with the most educational challenges and is not the most effective strategy. Giangreco (2015) further states that the use of paraprofessionals often occurs when schools do not have a proactive strategy for addressing the needs of students who struggle to achieve to standards and recommends, as does the EB model, the proactive approach.

Providing another example of heavy use of paraprofessionals, individual students with severe and profound disabilities, including many students with autism, often are provided the service of a 1-1 paraprofessional aide. These practices have been studied in great depth in Vermont. Studies have found that up to half of all paraprofessionals in Vermont might be assigned 1-1 to individual students (Giangreco, 2015; Shultz, et al., 2015). Although there are situations for which a student needs an individual aide, in many cases such aides can work to the inadvertent detriment of students (Giangreco. et al., 2005) implying that the use of paraprofessionals generally as well as in the 1-1 context should be discouraged and implemented only when absolutely needed.

These arguments are also reflected in the most recent Picus and Odden comprehensive study of services provided to students with disabilities in Wyoming (District Management Group, 2020). This study also found heavy use of paraprofessionals and also concluded that such a service delivery strategy was generally ineffective and should be changed.

As should be clear, the EB model aligns with these arguments and includes few paraprofessionals, except for some students with severe and profound disabilities. Instead, the EB model provides skilled teachers to provide the extra services needed by students who struggle to learn to standards as well as skilled teachers for the additional needs of students with disabilities.

Census Approach to Funding. The proactive approach to providing services to struggling students as well as students with disabilities has led to what is called the census approach to funding core special education services. The census method is accomplished by providing additional teacher resources at a fixed level.

The census funding approach for the high-incidence, lower-cost students with disabilities should be combined with a different strategy for the low-incidence, high-cost students, whose costs are funded separately and totally by the state (with the exception of basic education funding), as these students are not found proportionately in all districts. This is the catastrophic funding for school districts that provides resources for special education students who require services exceeding some figure (after Medicaid, federal special education grants, and other available third-party funding are applied).

Today, diverse states such as Alabama, Arkansas, California, Massachusetts, Montana, North Dakota, Pennsylvania, and Vermont all use census-based special-education funding systems. And as just noted, most new federal money under the IDEA program is distributed on a census basis. Moreover, all current and future increases in federal funding for disabled students are to be distributed on a census basis.

The issue then becomes the staffing standards for the various categories in special education:

- Students with mild and moderate disabilities
- Students with severe and profound, and high cost-to-serve, disabilities
- Related services
- Costs associated with developing and continually reviewing IEPs.

Each of these is addressed below.

As context, however, we conduct this analysis by making an assumption that about 25 percent of an average of 16 percent incidence of students with disabilities could be serviced by the EB model's extra help resources: core tutors and school counselors, and additional tutors, pupil support, extended day, summer school and ESL resources. This would bring the percentage of students needing and triggering additional special education resources to 12 percent.

Mild and Moderate Disabilities. At an incidence rate of 12 percent, it would be reasonable to assume that 1 to 2 percentage points of that total would be for children with severe and profound disabilities. That would leave 10 percent with mild and moderate disabilities.

The service load for special education teachers for mild and moderate disabilities ranges widely across the country, with some school districts setting the load at 15 and others at 30. And there is no national legal requirement for service loads, or to our knowledge, a national standard. In the following analysis, we assume special education teachers service an average of 20 students with mild and moderate disabilities, which is at the lower end of the range. If the incidence of such students is 10 percent, that means about 10 students of every 100 students would have a mild or moderate disability. The EB formula then needs to provide 0.5 special education teacher positions for every 100 students (the 0.5 is determined by dividing the number of mild and moderate special education students in a group of 100, which is 10, by the service load for a teacher, which is 20). In other words, 1.0 special education teacher would be needed for every 200 students, or five positions for every 1,000 students.

Nathan Levenson (2011, 2012), a national expert on effective special education servicing, also recommends, as does the above discussion, that most of the services needed by students with mild and moderate disabilities should be provided by content-expert teachers, not by less skilled special education aides. In fact, he argues that places with many special education aides serving students with mild and moderate disabilities usually work in educational sites that have few preventive services like the EB model provides. Thus, the argument is that few – if any – aides are needed for students with mild and moderate disabilities.

The aides used by many if not most schools across the country frequently focus on behavioral issues. But rather than having aides work individually with students on behavioral issues, what is needed is a teacher behaviorist, who works with teachers to develop their skills to manage classrooms even with students with behavior challenges, including students with autism. Some of the best private schools for students with autism do not have any aides in the classroom, but the teachers are skilled in classroom management and behavior strategies. The EB model proposal is to provide one teacher behaviorist for every 5 special education teachers. This equates to a formula of one behaviorist teacher for every 1,000 students.

District Management Group (2020) also notes that much of content services provided to students with a mild and moderate disability should be provided by content experts and not just teachers with a special education endorsement. Often the latter do not have the content expertise needed to help students learn to a content performance standard. DMG also is skeptical about "co-teaching," the strategy of having two teachers in a classroom – one special education teacher and one content expert. Such an approach rarely works, DMG argues, and when it does it is twice as expensive so is not cost based.

The above analysis produces an EB recommendation of 5 special education teachers and 1 teacher behaviorist, or a total of 6 teacher positions, for every 1,000 students.

Related Service. Related services include the need for speech/hearing pathologists, occupational therapy (OT), physical therapy (PT) and other services required for a student to benefit from special education services. The incidence of related services is generally half of that for mild and moderate disabilities, or five percent in this case. Further, related service personal usually service 45 students needing these kinds of related services. A group of 1,000 students, at an incidence of five percent, would have 50 students needing related services, meaning the need for related services staff per 1,000 students would be 50/45, or 1.1 related services staff positions.

This brings the total special education services staff for 1,000 students to 7.1, the sum of six positions for mild and moderate disabilities and an additional 1.1 for related services.

Psychologists. Finally, districts need psychologists for the primary role of overseeing the development and continued review of Individual Education Programs, which must be reviewed and reassessed every three years. A typical standard for psychologists is developing 75 IEPs a year. At a special education incidence rate of 16%, a group of 1000 students would have 160 who needed an IEP. As IEPs are reviewed every three years, that reduces the burden to 53. On the other hand, for every 1000 PreK-12 students, there typically is the need to administer an IEP review process for an additional 20 or so students for incoming preschoolers, kindergartners and first graders, many of whom would need the review but most of whom would not actually receive an IEP. This adds to the 53 another 20 IEP reviews for a total of 73. Thus, at a typical load of 75, a group of 1,000 K-12 students would trigger the need for an additional 1.0 psychologist.

Severe and Profound Disabilities. The EB approach for children with severe and profound disabilities is for the state to fund 100% of the extra costs for students with severe and profound disabilities, minus federal Tile VIb. To control costs for this recommendation, the EB model would limit the number of students so covered to 2 percent of students in the district.

The total 2023 EB recommendation for special education resources assuming the above averages is:

- 8.1 positions for every 1000 students, which includes:
    - 7.1 positions per 1,000 students for services for students with mild and moderate disabilities and for the related services of speech/hearing pathologists and/or OT PT, which equals approximately 1 position for every 141 students.
    - 1.0 psychologist for every 1,000 students (included in the Central Office).
- 100 percent state funding of services for students with severe and profound disabilities, minus federal Title VIb funds, capped at 2% of all students.

28. Career Technical Education (CTE)

Alaska multiplies the previously adjusted ADM by the Career & Technical Education (CTE) factor of 1.015 to account for higher costs of CTE. The EB Model provides extra CTE resources on the basis of the number of CTE teachers.

The EB Model does not recommend any additional teachers for CTE courses because our analyses (see below) of recommended class sizes for the more modern types of CTE courses – computer science, pre-engineering/computer assisted design, and the bio- and health tech programs – show that the class size provided by the EB Model recommendation of 25 students is adequate for these newer types of CTE programs.

Over the past decade, vocational education, or its modern term – career and technical education – has experienced a shift in focus across the nation. Traditional Voc-ED often addressed practical, applied skills needed for wood and metal working, welding, automobile mechanics, typing and other office assistance careers, as well as home economics. Today, many argue that Voc-ED should be Voc-tech including info-tech, nano-tech, computer-tech, bio-tech, and health-tech. Today's CTE supporters argue that CTE should begin to aggressively incorporate courses that provide students with skills for positions in the emerging and higher skill/higher wage economy that 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 *and for work in these higher wage, higher skill jobs* are similar.

Funding legacy CTE programs is no longer a focus of the new Federal Perkins V Act (Senate File 143). The new Federal Perkins Act V allows CTE to be recognized for the upper levels of the state high school graduation requirements and many college admission requirements. In addition, business and industry often partner with schools to redesign CTE programs to create a springboard to align to CTE high skill, high wage and high demand careers in the state.

If states want to be serious about educating its youth in career pathways that will allow them to earn a living and support a family, as well as create a quality life, then the state must assure students have access to career exploration in middle and junior high and even elementary schools that leads to high quality CTE programs at the high school and postsecondary level. As argued below, Project Lead the Way is a high quality CTE program that creates elementary through high school pathways to careers in engineering, computer science and biotechnology, and its costs can be covered by existing elements in the Funding Model.

Moreover, this paradigm shift from legacy Voc-ED to CTE requires sufficient funding for and support of high quality CTE. High quality CTE includes many aspects. A high quality CTE program begins with a CTE or provisional industry certification (PIC) licensed teacher who is current in his or her content area and receives support to remain current in his or her content area. The program must have adequate space and access to equipment/technology that reflects what is currently being used in business and industry. The program must also offer exposure to innovative and emerging technologies while ensuring student safety. Quality programs allow students to participate in work-based learning opportunities, earn college credit through dual or concurrent enrollment while enrolled in high school, and to participate in co-curricular career and technical student organizations. High quality CTE programs also offer an integrated sequence of at-least three courses. Upon completion of a high quality CTE program students should be able to demonstrate skills by attaining an industry recognized credential of value.

The EB Model has supported high quality CTE programs since 2005. Further, there are now several emerging studies that show high quality CTE programs do have a positive impact on student learning, increased high school graduation rates, employment after high school, and wage levels. Using data from the 1997 National Longitudinal Survey of American Youth, Kreismanm and Stangem (2020) found that students largely self-selected into vocational education and CTE courses and those courses were not dumping grounds for low achieving students as some have asserted in the past. They also found that students who took CTE courses at the upper levels – i.e., learned in depth in one area –were more likely to graduate from high school and also experienced a two percent increase in subsequent wages for each additional year of vocational education or CTE courses. Kreismanm and Stangem also found that students taking only introductory CTE courses did not experience these benefits. These findings support the current CTE emphasis on students' taking a sequence of CTE courses that add up to expertise and certification in a specified area.

Plasman, Gottfried, & Klasik(2020) found that over the past decade students who enrolled in CTE classes in the earlier years of high school tended to continue to enroll, thus taking more sequences of CTE courses and upping their chances of high school graduation. Similarly, Dougherty's (2016) study of career technical programs in Arkansas (see also Dougherty, Gottfried & Sublett, 2019) found that students who took three or more coherent CTE classes (a key element of high quality CTE programming) were 21 percentage points more likely to graduate from high school in four years, and 25 percentage points more likely to graduate from high school if the student was from a low-income background. These students also were more likely to attend two- and four-year colleges, to succeed in those college settings, and to earn higher wages after high school. This represents one study that shows the potential power of the CTE approach. Importantly, the study found that such programs did not track low income students into low quality vocational or career-tech programs.

Dougherty (2018) came to similar conclusions after studying the CTE programs in Massachusetts. The study investigated the causal impact of participating in a specialized high school based CTE delivery system on high school persistence, completion, earning professional certifications, and standardized test scores, with a focus on individuals from low-income families. The results suggested that participation in a high-quality CTE program boosted the probability of on-time graduation from high school by seven to ten percentage points for higher income students, and possibly even larger effects for their lower-income peers. Dougherty notes that these impacts on high school graduation complement previous research findings that participation in high quality CTE programs produces longer term increases in earned income. Dougherty and Smith (2022) further conclude that these programs are cost effective. However, if the states they studied – Connecticut and Massachusetts – funded their schools at the level of the EB model, the "extra" costs would be *deminimus* making cost effective calculations even better.

For years, we have identified Project Lead the Way (PLTW) (www.pltw.org) as a nationally prominent exemplar of high quality CTE education. Often implemented jointly with local postsecondary education institutions, employer advisory groups, and local companies that provide internships and cooperative opportunities, 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 experience preparing students for the real world, the program is designed to develop the science, technology, engineering, computer science and mathematics skills essential for achievement in the classroom and success in college or jobs not requiring a four-year college education.

Project Lead the Way has a K-12 sequence in computer science, engineering and biomedical sciences. At all levels the courses and modules are designed to impart knowledge and skills, applying those knowledge and skills through a variety of hands-on projects, and then encouraging students to use that newly acquired expertise to explore additional novel problems. The sequences at all three levels are aligned to both national mathematics and reading standards, as well as the new science standards. The elementary Launch program includes 43 different modules across grades K-5/6 which, if adopted schoolwide, could be the science curriculum for the school.

The Launch program is designed to ensure that all students are prepared for the more rigorous PLTW programs in middle school. Whether designing a car safety belt or building digital animations, students engage in critical and creative thinking, build teamwork skills, and learn to try and try again when faced with challenges. The middle school Gateway program is designed to spark a joy of discovery in science and technology areas and provides experiences in a range of paths – engineering, biotechnology and computer science -- students can look forward to pursing in more depth in high school and beyond. Students apply knowledge and skills from a variety of disciplines. By tackling challenges like designing a therapeutic toy for a child with cerebral palsy, creating their own app, or solving a medical mystery, students are empowered to make a real-world impact.

The high school program has three major areas: computer science, engineering and biotechnology. There are 11 engineering courses, four biomedical courses and 4 computer science courses (www.pltw.org). In 2018, PLTW was offered in more than 5,000 elementary, middle and high schools in all 50 states and enrolled over 500,000 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 focused on engineering foundations (design, principles, and digital electronics) and specializations (e.g., architectural and civil engineering, bio-technical engineering) 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 meet many state standards for science and other mathematics classes.

It should be noted that there are clearly multiple links between STEM and the curricula of newer CTE courses, so emphasizing CTE over Voc-ed would naturally increase STEM classes.

Massachusetts is scaling up Project Lead the Way (PLTW). For the first year of a six-year scale-up, Papay (2019) found that Project Lead the Way had a high school student performance effect size of 0.14 for English/language arts, 0.16 for mathematics and 0.18 for science.

One issue often raised is the cost of high quality CTE programs, such as PLTW. Many districts and states believe that these new career-technical programs cost more than the regular program and even more than traditional vocational classes. But in a review conducted for a Wisconsin school finance adequacy task force, (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 cost analyses we have conducted of Project Lead the Way for

Wyoming. And the Washington State Institute for Public Policy found that PLTW produces benefit-cost ratios above 7, meaning that for every dollar invested in the program, $7 of benefits were produced (Washington State Institute for Public Policy, 2017).

The major potential cost areas for the PLTW program are class size, professional development and computer technologies. Most programs recommend class sizes of 25, which is what the EB model recommends for high schools. The professional development and most of the computer technologies are covered by the professional development and computer allocations of the EB Model discussed above in this report. Further, PLTW training for teachers now can be accessed in an on-line format so is available to all schools, even remote, isolated rural schools. The program also has a training program for "lead" teachers who can then train other teachers in the school or district. Some of the PLTW concentration areas require one-time purchase of expensive equipment, which could be covered by approximately $10,000 per career-technical education teacher.

Elementary and middle school programs also require students to have access to the internet and Chromebooks. As described above, the computer and technology element of the EB funding program provides for most of the technology required for PLTW.

Thus, short of the costliest PLTW programs, which are usually funded jointly by schools and local businesses (Sawchuk, 2020), the EB funding model provides sufficient resources, for high quality CTE programs. All these cost figures, except for the $10,000 per CTE teacher, can be covered by the core EB provisions.

2023 EB Recommendation: Provide $10,000 for each CTE teacher – one in each prototypical high school.

29. Alternative Schools

It is not clear whether the EB approach to Alternative Schools is compatible with that in Alaska, in part because the Alaska school funding formula references Alterative Schools that are much larger than those in the EB model. Thus, we have not included a specific ALE element for the Alaska Basic Student Allocation.

Chapter 4
Educator Review Panels

An important component of our Evidence Based (EB) approach to estimating school finance adequacy is to seek the judgement of education professionals in the state to review the EB recommendations and provide advice as to the adequacy and applicability of the resources included in the Model for their individual state and district. To meet this requirement, we proposed two Educator Review Panels for the Alaska study, each including 12-15 individuals, each hopefully with a majority of teachers. We also recommended that the panel members be selected from the top five districts in Alaska, and from schools of "normal" size, i.e, not small schools, because the study only addressed the Basic Student Allocation and not the school size adjustments that are in the formula.

When Anchorage administrators contacted leaders from the other four large districts for nominations to be part of the study's educator review panels, those districts expressed reluctance participate in the study. Thus, only educators from Anchorage were selected to participate on the panels. The panels were originally scheduled to be held on December 15 and 16, 2022 but schools were closed those days because of snow, so the panels were rescheduled for January 17 and 19, from 12:00 p.m. to 4 p.m.

The goal was to have half or more of the members of the panel be teachers from different school levels (elementary, middle, and high school) as well as teachers with varying work assignments including core subjects, elective classes, special education, English for speakers of other languages (ELL), and others. We desired teachers who had experience helping to improve student performance in schools, because those experiences would help determine the adequacy of the resources provided by the EB as they sought to educate all students to rigorous student performance standards. We also sought lead teachers, mentor teachers, instructional coaches, and certificated personnel serving in the role of tutors. In addition to teachers, we wanted participation from school site administrators and central office administrators.

The panel members organized by the district were the following:

January 17 Panel

Position	Name
Superintendent	Dr. Jharrett Bryantt
Chief Financial Officer	Jim Anderson
Chief Academic Officer	Sven Gustafson
Elementary Teacher	Kelley Carpenter
Elementary Teacher	Chuck Zimmer
Elementary Teacher	Josh Pheley
Elementary Teacher	Mikayla Corral
Secondary SpecEd Teacher	Kelly Heppner
Secondary Teacher	Ellen Scott

Secondary SpecEd Teacher	Ash'shanta Swisher
Elementary SpecEd Teacher	Stephanie Marzano

January 19 Panel

Position	**Name**
School Board Member	Margo Bellamy
Special Education Director	Tarlesha Wayne
ELL/ESL Director	Bobbi Lafferty
Elementary Teacher	Christina Berger
Elementary Teacher	Claire Ellis
Elementary Teacher	Joslyn Stinson
Elementary Teacher	Laura Adams
Elementary Teacher	Marvat Obeidi
Elementary Teacher	MiCall Sweet
Elementary Teacher	Ben Elbow
Secondary Teacher	Isidora Lopez
Secondary Teacher	Russel Gates
Secondary Teacher	Carolyn Harley
Secondary Teacher	Katie Swanson
ELL/ESL Teacher	Andrea Allen
Principal, Elementary	Linson Thompson

Several days prior to the meetings, we sent all participants an e-mail outlining the purpose of the panel, along with an electronic copy of the draft EB report and a PowerPoint describing the EB Model. The panels convened via Zoom for four hours on January 17 and 19, 2023, with Allan Odden and Lawrence Picus moderating the meetings. Picus presented a summary of the school improvement process embedded in the EB Model and Odden provided a quick overview of the elements of the EB model. Odden and Picus then led a discussion of each of the 29 elements of the EB Model, regarding the appropriateness of the model's resources for Alaska schools. The study team also solicited panel members' views on how the provision of those resources could improve student learning. The findings from these two panels form the basis for the findings presented in this section.

Overall Findings

Overall, the panelists felt that the EB Model provided a level of resources that would allow all schools and teachers to boost student academic achievement and produce major gains toward the Alaska student performance standards. There was strong support for a full-day kindergarten program, for the small class sizes for both core and elective teachers, for the robust professional development resources including instructional coaches, for the extensive extra help resources to give struggling students more instruction to help them meet academic standards, and for special education – both mild and moderate as well as for severe/profound and self-contained classrooms.

As the panelists discussed the various elements of the EB Model, particularly the staffing elements, several issues emerged about potential challenges to implementing the recommendations, which they strongly supported. The issues were the following:

- Need for a Talent Acquisition Strategy
- Need for a Consistent Approach to PLCs
- Need for a Behavior Management System for Student Discipline
- Computer Technologies
- Assessment of School Entrance/Exit Security
- Special Education and its Staffing
- Cost of Utilities.

Talent Acquisition

Almost immediately, both panels raised the issue of the difficulty of recruiting the additional staff that would be part of the EB Model. Most panelists said the district has difficulty recruiting and retaining staff with current resources and were pleased that the EB Model provides funds to hire more teachers, instructional coaches, counselors, nurses, tutors, and other extra help staff. Further, most panelists stated that the district has difficulty hiring classified staff as well. This includes supervisory aides, bus drivers and maintenance workers.

Several reasons for these difficulties were mentioned. One that impacted both certified and classified staff was a declining overall population especially those of working age. A second issue for classified staff was competition from the private sector including the tourist industry. And a third for certified staff was insufficient production of new educators by the State's universities.

We cannot outline the details of a talent acquisition, training, rewarding and retention strategy. But given the stated difficulties of recruiting and retaining staff, we recommend that the district – and state – create a comprehensive talent acquisition strategy designed to acquire the level of talent needed for the public schools. Other districts that have had similar talent shortages have partnered with national talent recruitment groups such as Teach for America, TNTP, New Leaders for New Schools, and out-of-state flagship universities to open up new channels for educator talent (see for example, Odden, 2011). Without a comprehensive talent acquisition strategy, Anchorage and Alaska will have a difficult time staffing schools with an appropriate level of teacher and non-teacher staff, with or without the resources provided by the EBM Model.

Consistent Approach to Creating and Operating PLCs

Another issue that emerged was that while both panels endorsed the importance of schools' creating and implementing Professional Learning Communities (PLCs) or data-based decision-making teams, the issue was that the structure and operation of these teams varied widely across schools. Odden and Picus argued that the staffing resources in the EB Model, and the 7.5 hour teacher workday, would allow schools to create these teams such that they could meet virtually every day or at least three times a week for 45 minutes. There was pretty much uniform agreement that effective data-based, decision-making teams were curial to improving student achievement. Given that, we would urge the district to ensure that all schools have PLCs that meet several times a week; this would be a more urgent need should the state adopt and implement a new and higher BSA, which, with the additional staff resources provided, would further facilitate creating and operating these important teacher teams.

Behavior Management

Most panelists stated that student discipline, misbehavior, anxiety, and self-control had worsened over the course of the COVID pandemic. Several argued that there was need for more school level administrators – who would be disciplinarians – as well as need for more counselors, mental health services, and perhaps even supervisory aides. No one talked about whether a district-wide student behavior program and related set of teacher responses to student misbehaviors was in place, which we conclude is a prerequisite for any expansion of additional behavioral staff.

Over the past five years we have enhanced the EB Model with more counselor and nurse positions and have added a behaviorist in our special education recommendations. Consequently, we are reluctant to provide even more non-academic staffing resources for discipline purposes. Our reading of the research suggests that many behavioral problems could be better addressed by a district-wide behavior program, that would include training school level educators in the structure of behavior programs, how to implement those programs, and ways to enhance a school's approach to social and emotional issues. All of these can be addressed with the current level of resources in the EB Model.

We refer readers to Nate Levenson who now directs New Solutions K12 (https://newsolutionsk12.com). He is a national expert on behavorial issues, and has written extensively about them, including related behavioral issues in special education (Levenson, 2017, 2020). We have worked with Levenson in the past and he has assured us that with the EB Model's resources, schools can implement several effective programs that address student behavioral and social/emotional issues.

Computer Technologies

The EB Model recommends a dollar per pupil figure for computer technologies that would provide computers at the rate of one computer for every three students. Anchorage, however, has moved to a 1-1 computer ratio at secondary schools, and for some grades in elementary schools. The EB Model falls short of providing sufficient resources for this approach to computer technologies. To date we have been reluctant to shift the EB Model to a 1-1 computer to student ratio, because our position is that moving to a 1-1 computer to student ratio, in terms of state funding, is a state rather than a local policy decision. Thus, for this report we retain the $250 per ADM for computer technologies. We note that the state should address this policy issue, especially in the light of the computer technologies needed to weather the COVID pandemic.

School Entrance/Exit Security

Panelists raised two issues that had not been raised in other states with respect to the EB Model's allocation of supervisory aides. The first is that school needs for such personnel were for short periods of time in the morning, during lunch and at the end of the school day, and that it was difficult to hire individuals for these multiple short periods of time. The second was that many schools had several wings, each with separate entry doors in addition to the main school entrance. This meant that at the beginning and end of the school day, multiple people were needed to monitor all these entrances and exits. As a result, schools have made monitoring building entrances a part of teachers' monitoring duties.

The philosophy of the EB Model is that teachers should be used for instructional purposes and not monitoring duties, whether at school entrances/exists, hallways or the lunchroom. Monitoring, moreover, is the rationale for the EB Model's providing supervisory aides. We argue that given a teacher workday of 7.5 hours, a portion of the 60 minutes beyond the 6.5 hours of instruction and lunch could be used as time for collaborative teacher teams. If teachers are monitoring entrances and exits before and after school, it is not possible to use this time for collaboration. Our dilemma is that we have not previously received feedback that the Model's supervisory aide provisions were inadequate, so are reluctant to enhance them in this instance.

We do not have a solution for what we see as unique Anchorage (possibly Alaska) issue and would encourage the district to think about how school safety in terms of security for school entrances and exits could be structured so that these duties can be provided largely by supervisory aides, to enable teachers could to use non-instructional times more productively.

Special Education

The January 19 panel had several educators who were experts on special education and its staffing and provided invaluable detail on special education staffing. We compared the EB special education staffing recommendations to current staffing loads and allocations in Anchorage. Specifically, we compared the staffing for students with mild and moderate disabilities in the EB Model with that in an Anchorage elementary, middle and high school and found they were approximately the same – about 7 teacher positions for every 1,000 students (or 1 position for every 143 students). We were told that current staffing loads in Anchorage for related services were the following:

- Speech 48
- Hard of hearing 35
- Audiology 50

- OT 40
- PT 30
- Adapted PE 24,

which roughly averages close to the 45 students per teacher load in the EB Model. After extensive discussion, panelists concluded that the EB special education recommendations for staffing for students with mild and moderate disabilities was adequate.

There also was support for the extensive array of services for struggling students in the EB Model – tutoring, extended day, summer school and additional pupil support staff. The feeling was that these additional staff, together with the special education specific EB staff, would provide adequate resources for serving students struggling to meet rigorous academic standards, including students with IEPs.

One issue that that did emerge was interest in the district's moving to a more inclusive approach to providing special education services, a philosophy very much in line with that in the EB Model. There also was agreement that, in many cases, extra help in a content area provided to students with an IEP could best be provided by a content-certified teacher rather than a teacher with special education certification. Though such teachers would need some additional training that could be provided by the EB Model's professional development resources, this approach could make it easier to find special education staff, another challenge the panelists identified. We conclude that the district should consider altering its approaches to servicing students with disabilities, shifting to strategies that are more inclusive and more effective (see the Picus Odden Wyoming special education report led by Nate Levenson at https://picusodden.com/wp-content/uploads/2021/03/Wyoming-Special-Education-Report-2020.pdf.

Cost of Utilities

The EB Model estimates the cost of utilities at $350 per ADM. This includes gas, electricity, heating, cooling, trash, telephones, etc. For Anchorage, however, last year's expenditures for these items were about $534 per pupil, significantly higher than the EB Model figure. We know that utilities expenditures vary dramatically across the very diverse Alaska districts. The EB Model could be enhanced by using the Anchorage figure for utilities expenditures, but we leave the issue of how to include utilities costs up to the state to decide. The EXCEL-based simulation tool that accompanies this report can easily substitute the Anchorage figure for utiliites costs in the progam and determine a new BSA total. Using the Anchorage cost of $534 per pupil, for example, would increase the BSA figure estimated in Chapter 5 from $13,612 to $13,796 (the result of adding $134 per pupil for utilities). Alternatively, the state could include a varying utilities cost per pupil for each district ***or*** ensure that an updated cost factor would include an adjustment for the differing utilities costs across geographic regions of the state.

Chapter 5 provides the estimated new BSA generated through the EB Model. Because we have not made any changes to the E Model's core recommendations as a result of the Educator Review Panels, Chapter 5 uses the data in Table 3.1 to estimate an adequate BSA for the state.

Chapter 5
Calculating the New Basic Student Allocation and Pupil Weights

To estimate an adequate Basic Student Allocation using the EB Model, we developed an Excel-based simulation that provides the Evidence-Based Model's Basic Student Allocation, as well as computes pupil weights for special education, struggling students and English Language Learners. To produce the EB Model's BSA, we use the core numbers and ratios provided in Table 3.1 because we did not make any changes to them after the Educator Review Panels.

Estimating a New Basic Student Allocation

Personnel costs are critical to make these estimates. We used the salary and benefits data from Anchorage, because Anchorage is the 1.0 cost district in the Alaska school funding formula. We received these data from Anchorage staff. Table 4.1 shows the salary data used in our developing estimates of an adequate Basis Student Allocation (BSA) for Alaska.

TABLE 4.1
2016-17 AVERAGE SALARY BY POSITION

Position	Certified or Classified	Average Salary
Principal	Certified	$121,409
Assistant Principal	Certified	$112,292
Teacher	Certified	$79,805
Instructional Coach	Certified	$79,805
Substitute Teacher	Certified	$54,086
Guidance Counselor	Certified	$83,497
Nurse	Certified	$74,112
Instructional/Supervisory Aide	Classified	$22,573
Library Media Specialist	Certified	$86,396
School Secretary/Clerical	Classified	$40,946
Custodian	Classified	$37,224
Maintenance Worker	Classified	$75,367
Grounds Maintenance	Classified	$64,995
Superintendent	Certified	$276,300
Business Manager	Classified	$175,100
Director – Personnel/HR	Classified	$175,100
Asst. Supt. of Instruction	Certified	$185,713
Director of Pupil Services	Certified	$147,403
Director of Assessment	Certified	$143,260
Director of Technology	Classified	$175,100
Director of O&M	Classified	$175,100
Secretary/Clerical	Classified	$48,311
Network/Systems Supervisor	Classified	$95,000
School Computer Technician	Classified	$65,000
Psychologist	Certified	$80,575

To estimate total compensation, the model uses the benefit rates in Table 3.1, also provided to us by Anchorage. It should be noted that social security is included in benefits only for classified – and not certified staff – because certified staff do not participate in Social Security in Alaska school districts. With these compensation figures, the EB-based Basic Student Allocation is estimated to be **$13,612**. The additional funding per pupil estimated for ELL students is $5,840 which produces an extra weight of 0.43 ($5,840/$13,612); the additional funding per pupil estimated for non-ELL poverty students is $4,584 which produces an extra weight of 0.34 ($4,584/$13,612). We have rounded all weights to the nearest hundreds.

The special education cost estimate and derived weight require further explanation. It is important first to note that the EB model assumes the state funds 100 percent of the excess costs of programs for students with severe and profound disabilities, which is addressed in Step 5 (Intensive Needs) of the Alaska school funding formula.

To estimate costs for students for the remaining students with disabilities, i.e., the mild and moderate disabilities, the EB model uses a "census" approach and computes an additional amount based on the count of all students in a district not on the special education student count in each district. This is similar to the approach the Alaska school funding formula takes in Step 3 – special needs factor (although this factor also includes additional resources for gifted and talented, bilingual and vocational education). The EB estimate for the cost of special education is $906 per pupil for ***all*** students.

This equates to a weight of 0.07 ($906/$13,612) applied to the total number of students in a district (or state). The effect is that the total revenue generated through the EB model for special education for children with mild and moderate disabilities is equal to the Basic Student Allocation estimate ($13,612 for the EB Model) times 0.07 for all students in the district (or state). Or viewed another way, every student (except those with severe and profound disabilities) in a district (or state) generates 1.07 times the Basic Student Allocation estimate, or an additional $906 beyond the estimated base of $13,612 for a total of $14,518.

Even though the EB Model provides extra resources for students with mild and moderate disabilities on a census basis, and the special education weight of 0.07 is applied to ALL students, we can convert that 0.07 extra weight all on students to a weight on just students with mild and moderate disabilities. Recall that we started with a total special education incidence of 16 percent. Given all the extra help resources the EB Model provides, which allows schools to provide an array of extra help services before issuing an IEP, we argued that those resources could reduce the incidence of students needing and IEP by a quarter, or down to 12 percent. We then assumed that about two percent of all students would be students with severe and profound disabilities, reducing to 10 percent students with mild and moderate disabilities. Thus, a census special education weight of 0.07 for ALL students, would be a 0.70 weight if applied only to students with mild and moderate disabilities.

Finally, it is important to remind readers that the Excel-based simulation model can be used to model alternative Basic Student Allocation figures such as increasing the utilities figure. When used to do so, a revised base per pupil cost estimate will result, along with new estimates and weights for English language learners, non-ELL poverty students and for special education.

Using the New BSA in the Alaska Funding Formula

We believe the structure of the current Alaska school funding formula can easily incorporate the EB Model-based BSA. But the new BSA cannot just replace the current BSA. Several adjustments need to be made to the current formula before the new BSA can be appropriately used in the formula. In this section, we walk through the six steps of the current formula, suggesting both changes in the order of the steps (cost index) and changes in the factors themselves (school size and cost factors) and show how the EB BSA relates to and requires changes in the other parameters in the current formula.

The BSA is the "driving" factor in the Alaska funding formula. However, incorporating the BSA estimated by this study into the current school funding formula should not be done unless several changes are made to the funding formula. To highlight the areas of needed change, this section assesses the use of the new BSA estimated through the EB model in each of the six steps of the formula. As stated earlier in the report, the EB model supports the use of the Weighted or Adjusted Average Daily Membership (WADM) as the base student count for the formula.

Step 1

In Step 1, the Alaska school funding formula adjusts the ADM for the size of each school within the district. The current size adjustments represent a rational approach to recognizing different per pupil costs based on school size, and represent an appropriate and unique element of the Alaska school funding formula. Few if any other state school funding formulas include school size adjustments.

However, we encourage the state to revisit the specific size adjustments now in the formula. The current Alaska school size adjustment would give the EB Model's 450 prototypical elementary and middle schools a WADM of 517, even though the Model's prototypical schools need no size adjustment. Similarly, the current Alaska school size adjustment would give the EB Model's 600 prototypical high school a WADM of 653, a more modest adjustment but still one that is not needed.

Thus, we recommend that the current school size adjustments be reviewed and modified. The EB Model could be used to calculate those adjustments, as we have made provisions for small schools down to even one student in Wyoming, but recalculating school size adjustments for Alaska was not part of this project.

Step 2

In Step 2, the Alaska school funding formula applies the district cost factor to the district's school-size-adjusted-ADM, producing a cost factor adjusted ADM. This is sort of an odd entity: what is a cost adjusted ADM? We would retain the cost factor but place it at the end of the process, i.e., as an adjustment to the final calculation of the district's Basic Need. Moving the cost factor to the end of the funding calculation would then adjust the initial calculation of the Basic Need (which is a dollar figure) by a factor – the cost factor – that is designed to adjust for the varying purchasing power of the education dollar across Alaska's district. Moving the cost factor to the last step of the funding formula would make its use more understandable.

Since all the factors in the six steps of the formula are multiplied in a compounded way, shifting the cost factor to the last multiplier would not change the final calculation of Basic Need. But, it could, enhance understanding of the cost factor.

We also strongly recommend that the state revisit and update the current district cost factor. The current cost factor was calculated many years ago and is out of date. While we fully support using district cost factors in state school funding formulas, the variables and the techniques used to construct cost factors have changed since Alaska developed its current cost factor. If the formula is to work fairly, the current district cost factor should be revised and updated.

Step 3

Step 3 provides a special needs factor to the adjusted ADM. This factor seeks to provide extra resources to districts to help them address the special needs of English Language Learning (ELL) students, students with mild and moderate disabilities, gifted and talented students, and vocational education programs. In the nomenclature of school finance, this factor produces a "weighted adjusted ADM pupil count." Most states have some version of weighted students to address such additional needs, and Alaska should retain this factor. But the Alaska adjustment has several shortcomings that the EB Model addresses. Below, we identify those shortcomings and suggest an alternate way to calculate an adjusted weighted pupil count, i.e., an EB Model weighted pupil count.

First, the Alaska 0.2 adjustment is applied in a uniform manner to the size (and cost) adjusted ADM. We know that the incidence of special needs varies substantially across Alaska districts and thus that the special needs adjustment should be applied to each category of possible special needs: ELL students, non-ELL poverty students, and students with mild and moderate disabilities.

For example, the incidence of ELL students varies substantially across districts. We would expect that current uniform special needs adjustment under-resources districts with a high incidence of ELL student and over-resources districts with a low incidence of ELL students.

The EB Model produces an ELL weight of 0.43 that is applied to the actual count of ELL students. For ELL students in Step 3, the EB Model's additional students for ELL students would be the EB ELL weight – 0.43 – times the number of ELL students in the district.

Second, the uniform Alaska 0.2 adjustment does not include extra resources for students from low-income backgrounds, or students eligible for free or reduced-price lunch, which also vary widely across Alaska districts. The vast bulk of states, as does the EB Model, include this factor as a rough estimate of the number of students (in addition to ELL students) who struggle to meet academic standards and need extra instructional time to do so.

The EB Model produces a weight of 0.34 for non-ELL poverty students. For non-ELL poverty students in Step 3, the EB Model's additional students for non-ELL poverty students would be the EB non-ELL poverty weight – 0.34 – times the number of non-ELL poverty students in the district.

Third, the EB Model provides a weight for students with mild and moderate disabilities based on the total number of ADM, just like the special needs factor in the Alaska school funding formula (although the EB Model uses the base ADM and not the size adjusted ADM). As discussed above, this weight just for students with mild and moderate disabilities is 0.07, when applied to all ADM. To produce the number of weighted students for mild and moderate disabilities this weight – 0.07 – would be multiplied by the adjusted ADM. If the EB weight were applied to just the number of students with mild and moderate disabilities it would be 0.70 (using the assumption above that 10% of students in a district receive services for mild and moderate disabilities). For students with mild and moderate disabilities, the EB Model weighted student count would be the EB special education weight – 0.70– times the number of students with mild and moderate disabilities in the district.

Finally, the EB Model addresses the extra costs of career technical/vocational education and finds that the core elements of the EB provide all the resources that are needed for modern career/technical education program, except for some high-cost computers and other specialized equipment that on a base ADM basis would be $10 a pupil. The EB Model would not provide additional resources for this element of the special needs factor.

To sum up, instead of just a uniform ADM adjustment of 0.20 applied to the adjusted ADM computed in steps one and two of the formula, the EB Model would replace this with the following number of additional weighted pupils as the special needs factor:

(0.43 x ELL students) + (0.34 x non-ELL poverty students) + (0.70 x mild/moderate disability students).

This would then produce a WADM for each district that would be added to the size-adjusted ADM, to produce a size and special needs adjusted WADM.

For example, Anchorage has about 42,000 students. Multiplying that by 0.20 would produce 8,400. But Anchorage has about 5,570 students with mild and moderate disabilities (6,670 total special education students minus 1,100 severe and profound/self-contained). Anchorage also has about 6,665 ELL students, and about 10,914 non-ELL free and reduced-price lunch (FRL) students (0.75 times 14,552 as about one-fourth of students eligible for free and reduced-price lunch are ELL). The EB Model would produce the following number of special needs students:

SPED ELL non-ELL FRL
(0.70 x 5,570) + (0.43 x 6,665) + (0.34 x 10,914) = 3,899 + 2,866 + 3,711 = 10,476.

This number would be different than that produced by the uniform 0.20 adjustment to cost and size adjusted ADM, but in our view one that more accurately reflects the extra needs of the district's students.

For gifted and talented students, the EB Model-based BSA includes $40 per pupil for an internet-based program that would give access to all a district's students to learning enriched programming.

Step 4

Step 4 provides an additional weight of 0.015 for all WADM at that step for additional extra expenses for Career and Technical Education. This is substantially more than the EB Model estimates is needed. The EB Model concludes that the only extra resources needed for Career and Technical Education is $10,000 for each CTE teacher. Assuming the prototypical EB district of 3,900 students would have four CTE teachers, two in each high school, the total extra cost would be $40,000. On a total ADM basis of 3,900, this would calculate to about $10 per pupil. $10 as a proportion of the EB BSA – $13,612 – would produce a weight of 0.0007346, an infinitesimal adjustment, so small one could argue that with the large increase in the BAS this element could be eliminated.

Step 5

Step 5 in the Alaska school funding formula, the intensive needs factor, seeks to provide an appropriate level of resources for students with severe and profound disabilities and/or who are served in self-contained classrooms. This factor reflects the EB recommendation that the state fully fund services for such high-cost students. The cost for such students is often 4-5 times the costs for all other students.

Our understanding of Step 5 is that this element seeks to provide approximately $77,000 for each student with intensive needs. The way the formula achieves this goal is to multiply the number of intensive needs students in a district by 13. When the BSA is multiplied by 13 for each intensive needs student, the result is 13 times the current BSA of $5,930 or $77,090 for each such student.

To retain the goal of this step in the formula with the EB BSA, the weight of 13 would need to be reduced so the new multiplier times the EB Model BSA of $13,612 would produce $77,090. This would lead to a reduction of the weight for students with intensive needs in Step five to 5.6. That figure represents the current funding level of $77,000 per pupil divided by the estimated EB BSA of $13,612.

Step 6

Step 6 adds to the pupil count the number of correspondence students in the district. This step reduces the BSA for each corresponding student by 10 percent by counting such students as 0.9 in the formula. Until a study is conducted to estimate the cost of each correspondence student, and that cost is compared to the EB BSA of $13,612, we have no specific recommendation for change. If the state wants to continue to provide 90% of the current BSA, or $5,930, for each corresponding student, or just $5,337 and use the EB BSA in the formula, it should reduce the 90 percent to 39.2 percent, which is $5,337 divided by $13,612.

In sum, this study has produced new BSA for Alaska that we estimate is adequate to meet the needs of the State's students. That number is $13,612. Policymakers need to review each element of the current school funding formula to determine the changes that should be made for each Step in order for the new BSA to function as an appropriate base figure for each step in the current formula. Because the EB Model's BSA is more than twice the current BSA, we argue above that changes should be made in the computation and/or order of the steps currently used to compute each district's WADM and then applied to the BSA. Most of the changes we recommend are simple and straight forward, and use data that are already collected so could easily be incorporated into an updated Alaska school funding formula.

To summarize, we propose the following:

- Step 1, size adjusted ADM, retain but modify the size adjustments to align with the EB School prototypes
- Step 2, cost adjustment, move to last Step (which would be the new Step 5)
- Step 3 now Step 2, special needs adjustment: replace the 0.2 times the size and cost adjusted ADM with (0.43 x ELL students) + (0.34 x non-ELL poverty students) + (0.70 x mild/moderate disability students
- Step 4, eliminate
- Step 5, now Step 3, intensive needs: replace the 13 weight with a weight of 5.66
- Step 6, now Step 4, replace the 0.9 adjustment with 0.392 if the intent is to provide $5,930 for each correspondence student.

OR to simplify and identify the new order and number of steps:

- Step 1, size adjusted ADM, retain but modify the size adjustments to align with the EB School prototypes
- Step 2, special needs adjustment: replace the 0.2 times the size and cost adjusted ADM with (0.43 x ELL students) + (0.34 x non-ELL poverty students) + (0.70 x mild/moderate disability students
- Step 3, intensive needs: replace the 13 weight with a weight of 5.66
- Step 4, replace the 0.9 adjustment with a 0.392 adjustment if the intent is to provide $5,930 for each correspondence student
- Step 5, the cost adjustment made to the initial calculation of Basic Need.

If a different BSA is calculated, then the above Step 3 intensive needs weight and the above Step 4 correspondence student adjustments need to be recalculated.

References

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

Alexander, K., Pitcock, S., & Boulay, M. (Eds.). (2016). The summer slide: What we know and can do about summer learning loss. New York: Teachers College Press.

American Association of School Librarians (AASL). (December 2014). Causality: School Libraries and Student Success. White Paper. American Library Association. Available at: http://www.ala.org/aasl/sites/ala.org.aasl/files/content/researchandstatistics/CLASSWhitePaperFINAL.pdf. Last Retrieved August 18, 2015.

Andrews, M., Duncombe, W. & Yinger, J. (2002). Revisiting economies of size in American education: Are we any closer to a consensus. *Economics of Education Review, 21*(3), 245-262.

Aportela, A., Picus, L., Odden, Allan, & Fermanich, M. (2014). A comprehensive review of state adequacy studies since 2003. Denver, CO: Augenblick, Palaich & Associates.

Aud, S., Kewal Ramani, A. &Frohlich, L. (2012). *America's Youth: Transitions to Adulthood*. U.S. Department of Education, National Center for Education Statistics. Washington, DC: U.S. Government Printing Office.

Augustine, C. H., McCombs, J. S., Pane, J. F., Schwartz, H. L., Schweig, J., McEachin, A., & SilerEvans, K. (2016). Learning from summer: Effects of voluntary summer learning programs on lowincome urban youth. Santa Monica, CA: RAND Corporation.

Barron, J. M., Ewing, B. T., & Waddell, G., R. (2000). The Effects of High School Athletic Participation on Education and Labor Market Outcomes. *Review of Economics and Statistics*, 82(3), 409-421.

Barshay, J. (2020). Takeaways from Research on Tutoring to Address Coronavirus Learning Loss. Hechinger Report, https://hechingerreport.org/takeaways-from-research-on-tutoring-to-address-coronavirus-learning-loss/ Downloaded May 29, 2020.

Baye, A., Lake, C., Inns, A. & Slavin, R. E. (2019). Effective reading programs for secondary students. *Reading Research Quarterly*, 54 (2), 133-166.

Bentley, K. (2019). *What Is Holding Back the Rise of Digital Textbooks?* Center for Digital Education. Available at: https://www.govtech.com/education/k-12/what-is-holding-back-the-rise-of-digital-textbooks.html.

Blad, Evie (2019). *Education Week*. Schools Confront Student Depression as Data Show Rising Rates. 38(26), 1, 13.

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

Blankstein, A. (2010). *Failure Is Not an Option, 2nd Edition*. Thousand Oaks: Corwin Press.

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

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

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

Borman, G.D. & Boulay, M. Eds. (2004). *Summer learning: Research, policies and programs*. Mahwah, NJ: Lawrence Erlbaum Associates.

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

Borman, G. D., Hewes, O.L. & Brown, S. (2003). Comprehensive school reform and achievement: A meta-analysis. *Review of Educational Research*, *73*(2), 125-230.

Borman, G., Rachuba, L., Hewes, G., Boulay, M. & Kaplan, J (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.

Borman, G., Yang, H., & Xin, X. (2020). A Quasi-Experimental Study of the Impacts of the Kids Read Now Summer Reading Program. *Journal of Education for Students Placed at Risk*, 26(1):1-21.

Boudett, K.P., City, E.A. & Murnane, R. (2007). *A Step-by-Step Guide to Using Assessment Results to Improve Teaching and Learning*. Cambridge: Harvard Education Press.

Brabeck, M.M., Walsh, M.E. & Latta, R. (2003). *Meeting at the hyphen: Schools-universities-communities-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.

Browne, D. (2019). *Summer: A Time for Learning. Five Lessons from School Districts and Their Partners about Running Successful Programs. Perspective*. Wallace Foundation.

Retrieved from: https://www.wallacefoundation.org/knowledge-center/Documents/Perspective-Summer-A-Time-For-Learning.pdf

Bruce, A. M., Getch, Y. Q., & Ziomek-Daigle, J. (2009). Closing the gap: A group counseling approach to improve test performance of African-American students. Professional School Counseling, 12 (6), 450-457

Burstein, B., Agostino, H. & Greenfield, B. (2019). Suicidal Attempts and Ideation Among Children and Adolescents in US Emergency Departments, 2007-2015**.** **J**AMA Pediatrics. Published online April 8, 2019. doi:10.1001/jamapediatrics.2019.0464

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

*Carlson, D., Borman, G D. & Robinson, M. (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.

Chenoweth, K. (2007). *It's Being Done: Academic Success in Unexpected Schools* (Harvard Education Press

Chenoweth, K. (2009). *How It's Being Done: Urgent Lessons from Unexpected Schools* Harvard Education Press.

Chenoweth, K. (2017). Schools that succeed. Cambridge, MA: Harvard Education Press.

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

Chetty, R., Friedman, J., & Rockoff, J. (2014). Measuring the impacts of teachers II: teacher value-added and student outcomes in adulthood. *American Economic Review*, 104(9), 2633–79.

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

Coburn, C. E., & Woulfin, S. L. (2012). Reading coaches and the relationship between policy and practice. Reading Research Quarterly, 47(1), 5–30.

Cohen, J. (1969) *Statistical Power Analysis for the Behavioral Sciences*. NY: Academic Press.

Cohen, J., Krishnamachari, A., & Wong, V. C. (2021). *Experimental Evidence on the Robustness of Coaching Supports in Teacher Education. Ed Working Paper 21-468*. Providence, RI: Brown University, Annenberg Instituite.

Cohen, P., Kulik, J. & Kulik, C. (1982). Educational outcomes of tutoring: A meta-analysis of findings. *American Educational Research Journal*, *19*(2), 237-248.

Cohen, D. K., Raudenbush, S. W., & Ball, D. L. (2002). Resources, instruction, and research. In R. Boruch & F. Mosteller (Eds.), Evidence matters: Randomized trials in education research (pp. 80–119). Washington, DC: Brookings Institution.

Coker, E. (2015). *The Washington state school library study: Certified teacher-librarians, library quality and student achievement in Washington state public schools.* Seattle, WA: Washington Library Media Association.

Committee on Increasing High School Students' Engagement and Motivation to Learn. (2004). Engaging schools: Fostering high school students' motivation to learn. Washington, DC: National Academies Press.

*Cook, P., Dodge, K., Farkas, G., Fryer, R.G. Jr, Guryan, J., Ludwig, J., Mayer, S. Pollack, H. & Steinberg, L. (2014). *The (surprising) efficacy of academic and behavioral intervention with disadvantaged youth: Results from a randomized experiment in Chicago. Working Paper 19862*. Cambridge, MA: National Bureau of Economic Research.

*Cook, P. J., Dodge, K., Farkas, G., Fryer, R. G., Guryan, J., Ludwig, J., & Mayer, S. (2015). *Not Too Late: Improving Academic Outcomes for Disadvantaged Youth*. Institute for Policy Research Northwestern University Working Paper WP-15-01.

Cooper, H, Charlton, K., Valentine, J.C. & Muhlenbruck, L. (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, H., Nye, B., Charlton, K., Lindsay, J. &Greathouse, S. (1996). The effects of summer vacation on achievement test scores: A narrative and meta-analytic review. *Review of Educational Research, 66,* 227-268.

Cooper, H, Batts-Allen, A, Patall, E A. &Dent, A L. (2010). Effects of full-day kindergarten on academic achievement and social development. *Review of Educational Research*, 80(1), 34-70.

Cornett, J. & Knight, J. (2008). Research on coaching. In J. Knight, Ed., *Coaching: Approaches and Perspectives (pp. 192-216).* Thousand Oaks, CA: Corwin.

Crispin, L. (2017). Extracurricular Participation, "At-Risk" Status, and the High School Drop Out Decision. *Education Finance and Policy*, 12(2), 166-196.

Crow, T., (Ed.) (2011). Standards for professional learning. *Journal of Staff Development, 32*(4), Special Issue.

Curry, K. & Kachel, D. (2018). *Why school librarians matter: What years of research tell us.* Phi Delta Kappan: Online. Available at: https://kappanonline.org/lance-kachel-school-librarians-matter-years-research/

Darling-Hammond, L., Hyler, M. E., & Gardner, M. (2017). *Effective teacher professional Development*. Learning Policy Institute.

Darling-Hammond, L., Cook-Harvey, C. M., Flook, L., Gardner, M., & Melnick, H. (2019). *With the whole child in mind: Insights from the Comer School Development Program*. Alexandria, VA: Association for Supervision and Curriculum Development.

Datnow, A. & Park, V. (2015). Five (Good) Ways to Talk About Data. *Educational Leadership.* 73(3), 10-15.

Delcourt, M., Loyd, B., Cornell, D., & Goldberg, M. (1994). *Evaluation of the effects of programming arrangements on student learning outcomes.* Storrs, CT: National Research Center on the Gifted and Talented.

Didion, L., Toste, J. R., & Filderman, M. J. (2020). Teacher professional development and student reading achievement: A meta-analytic review of the effects. Journal of Research on Educational Effectiveness, 13(1), 29-66.

Dietrichson, J., Bøg, M., Filges, T., & Klint Jørgensen, A. M. (2017). Academic interventions for elementary and middle school students with low socioeconomic status: A systematic review and meta-analysis. *Review of Educational Research*, *87*(2), 243-282.

District Management Group. (2020). *Assessing the Adequacy and Means of Funding Services for Students with Disabilities in Wyoming*. Prepared for the 2020 Wyoming Select Committee on School Finance Recalibration. https://picusodden.com/wp-content/uploads/2021/03/Wyoming-Special-Education-Report-2020.pdf

Domina, T., Lewis, R., Agarwal, P., & Hanselman, P. (2015). Professional sense-makers: Instructional specialists in contemporary schooling. Educational Researcher, 44(6), 359–364.

Donovan, S., and Cross, C. (2002). *Minority students in special and gifted education*. Washington, DC: National Academy Press.

Dougherty, S. M. (2016). Career and Technical Education in High School: Does It Improve Student Outcomes? Washington, D.C.: The Fordham Institute.

Dougherty, S. M. (2018). The Effect of Career and Technical Education on Human Capital Accumulation: Causal Evidence from Massachusetts. *Education Finance and Policy*, 13(2), 119-148.

Dougherty, S.., Gottfried, M. A.& Sublett, C. (2019). Does Increasing Career and Technical Education Coursework in High School Boost Educational Attainment and Labor Market Outcomes? *Journal of Education Finance*, 44(4), 423-447.

Dougherty, S.M., & Smith, M. (2022). At What Cost?: Is Technical Education Worth the Investment? Providence. *EdWorkingPaper No. 22-640.* RI: Brown University, Annenberg Institute.

DuFour, R., DuFour, R., Eaker, R. & Many, T. (2010). *Learning by doing: A handbook for professional communities at work*. Bloomington, IN: Solution Tree Press.

DuFour, R. (2015). How PLCs Do Data Right. *Educational Leadership*. 73(3), 22-27.

Duncombe, W. &Yinger, J. (2007). Does School District Consolidation Cut Costs? *Education Finance and Policy*, 2(4), 341-375.

Duncombe, W. D. &Yinger, J. M. (2010). School district consolidation: The benefits and costs. *The School Administrator, 67*(5), 10-17.

Durlak, J. A., Weissberg, R. P., Dymnicki, A. B., Taylor, R. D., & Schellinger, K. B. (2011). The impact of enhancing students' social and emotional learning: A meta-analysis of school-based universal interventions. *Child Development*, 82(1), 405-432.

Earthman, G. (2002). *School Facility Conditions and Student Academic Achievement*. Blacksburg, VA: Virginia Polytechnic Institute, October 2002.

Echevarria, J., Vogt, M., & Short, D. J. (2017). *Making Content Comprehensible for English Learners: The SIOP Model, 5th Edition*. New York: Pearson.

Education Commission of the States (2013). *State textbook adoption*. Webpage. Available at: https://www.ecs.org/clearinghouse/01/09/23/10923.pdf

Education Commission of the States. (2020). Fifty-state comparison: *State summative assessments*. Education Commission of the States. Available at: https://www.ecs.org/50-state-comparison-state-summative-assessments/. Last accessed June 16, 2020.

Education Week. (2020). Lucky Calkins Says Balanced Literacy Needs Rebalancing. *Education Week*, 11(40), 4.

Educational Leadership. April 2017. Entire issue on inclusion for special education services.

Educational Leadership. (2020). Rooted in Reading. 71(5). Entire Issue on evidence-based reading strategies.

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, B., Vaughn, S., Hughes, M.T. &Moody, S.W. (1999). Grouping practices and reading outcomes for students with disabilities. *Exceptional Children, 65*, 399-415.

Elbaum, B., Vaughn, S., Tejero Hughes, M., & Watson Moody, S. (2000). How effective are one-to-one tutoring programs in reading for elementary students at risk for reading failure? A meta-analysis of the intervention research. *Journal of educational psychology*, *92*(4), 605.

Elicker, J. & Mathur. S. (1997). What do they do all day? Comprehensive evaluation of a full day kindergarten. *Early Childhood research Quarterly*, 12(4), 459-480.

Eoide, E. R. & Ronan, N. (2001). Is Participation in High School Athletics an Investment or a Consumption Good? Evidence from High School and Beyond. *Economics of Education Review*, 20(5), 431-442.

Farkas, G. (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.

Fashola, O. S. (1998). *Review of extended-day and after-school programs and their effectiveness* [Report No. 24]. Washington, DC: Center for Research on the Education of Students Placed at Risk (CRESPAR), Howard University.

Feldman, A.F. & Matjasko, J.L. (2005). The role of school-based extracurricular activities in adolescent development; A comprehensive review and future directions. *Review of Educational Research*, *7*5(2), 159-210.

Field, G. B. (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, J. (2002). Small classes in America: Research, practice, and politics. *Phi Delta Kappan*, *83*(7), 551-560.

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

*Finn, J. D., Gerber, S.B., Achilles, C. M. &Zaharias, J.B. (2001). The enduring effects of small classes. *Teachers College Record*, *103*(2), 145-183.

Fletcher, J. (2010). Spillover effects of inclusion of classmates with emotional problems on test scores in early elementary schools. Journal of Policy Analysis and Management, 29, 69–83.

Fletcher,G., Schaffhauser, D, & Levin, D. (2012). *Out of Print: Reimagining the K-12 Textbook in a Digital Age.* Washington DC: State Educational Technology Directors Association (SETDA). Available at http://www.setda.org.

Florida Department of Education (2014). Maintenance and Operations Administrative Guidelines for School Districts and Community Colleges. Tallahassee, FL: Florida Department of Education, available at http://www.fldoe.org/edfacil/pdf/5_0.pdf. Last accessed October 29, 2014.

Frattura, E. and Capper, C. (2007). Leading for Social Justice: Transforming Schools for All Learners. Thousand Oaks, CA: Corwin Press.

Fredricks, J. & Eccles, J. (2006). Is Extracurricular Participation Associated with Beneficial Outcomes? Concurrent and Longitudinal Relations, *Developmental Psychology*, 42(4):698–713.

Freyer Jr., R. G. (2016). *The Production of Human Capital in Developed Countries: Evidence from 196 Randomized Field Experiments.* Cambridge, MA: National Bureau of Economic Research.

Fryer Jr, R. G., & Noveck, M. H. (2017). *High-Dosage Tutoring and Reading Achievement: Evidence from New York City.* Cambridge, MA. National Bureau of Economic Research.

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

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

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

Gandara, P. & Rumberger, R. W. (2008). Defining an adequate education for English learners. Education Finance and Policy, 3(1), 130-148.

Gandara, P., Rumberger, R., Maxwell-Jolly, J. &Callahan, R. (2003). English learners in California schools: Unequal resources, unequal outcomes. Education Policy Analysis Archives, 11(3).

Garet, M.S., Porter, A., Desimone, L., Birman, B. &Yoon, K. (2001). What makes professional development effective? Results from a national sample of teachers. *American Educational Research Journal, 38*(4), 915-945.

*Gerber, S., Finn, J., Achilles, C. & Boyd-Zaharias, J. (2001). Teacher aides and students' academic achievement. *Educational Evaluation and Policy Analysis, 23*(2), 123-143.

Gersten, R., Ed. (2006). Elementary School Journal. Entire Issue.

Giangreco, M. F. (2015). Testimony to the Education Committee of the Vermont House of Representatives. January 29, 2015.

Giangreco, M. F., Yuan, S., McKenzie, B., Cameron, P., & Fialka, J. (2005). Be careful what you wish for . . . : Five reasons to be concerned about the assignment of individual paraprofessionals. Teaching Exceptional Children, 37(5), 28–34.

*Gibbs, C. R. (2016). *Treatments, Peers, and Treatment Effects in Full-day Kindergarten: Reconciling Experimental and Quasi-experimental Impact Evidence* [Manuscript]. https://pdfs.semanticscholar.org/160e/a5248d6902bd1e11afea8af060c0ddd05bb7.pdf

Gordon, E. E. (2009). 5 ways to improve tutoring programs. *Phi Delta Kappan,* 90(6), 440-445.

*Grissmer, D. (1999). Class size: Issues and new findings. *Educational Evaluation and Policy Analysis*, *21*(2). [Entire Issue].

Gottfried, M. A. (2014). *Classmates with disabilities and students' noncognitive outcomes*. Educational Evaluation and Policy Analysis, 36(1), 20–43.

Gullo, D. (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.

Guryan, J., Jens Ludwig, Monica P. Bhatt, Philip J. Cook, Jonathan M.V. Davis, Kenneth Dodge, George Farkas, Roland G. Fryer Jr, Susan Mayer, Harold Pollack, and Laurence Steinberg. (2021). *Not Too Late: Improving Academic Outcomes Among Adolescents*. Cambridge, MA: National Bureau of Economic Research.

Hahn, R. A., Rammohan, V., Truman, B. I., Milstein, B., Johnson, R. L., Muntañer, C., Jones, C. P., Fullilove, M. T., Chattopadhyay, S. K., Hunt, P. C., & Abraido-Lanza, A. F. (2014). Effects of Full-Day Kindergarten on the Long-Term Health Prospects of Children in Low-Income and Racial/Ethnic-Minority Populations. *American Journal of Preventive Medicine*, *46*(3), 312–323. https://doi.org/10.1016/j.amepre.2013.12.003

Hamilton, L., Halverson, R., Jackson, S., Mandinach, E., Supovitz, J., & Wayman, J. (2009). *Using student achievement data to support instructional decision making* (NCEE 2009-4067). Washington, DC: National Center for Education Evaluation and Regional Assistance, Institute of Education Sciences, U.S. Department of Education. Retrieved from http://ies.ed.gov/ncee/wwc/publications/practiceguides/.

Hansen, J. & Feldhusen, J.F. (1994). Comparison of trained and untrained teachers. *Gifted Child Quarterly, 38*(3), 115-121.

Hanushek, E. (2002). Evidence, politics and the class size debate. In L. Mishel and R. Rothstein (Eds.), *The class size debate (pp. 37-65)*. Washington, DC: Economic Policy Institute.

Harwin, A. (2019). Schools Struggle to Widen Access to Gifted Classes. *Education Week*, 39(14), 1, 15-17

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

Honig, M., Michael A. Copland, M. A., Rainey, L., Lorton, J.A. & Newton, M. (2010). *Central Office Transformation for District-Wide Teaching and Learning Improvement. Center for the Study of Teaching and Policy*. https://www.k-12leadership.org/sites/default/files/ctp_cotdtli.pdf

Horn, I. S. (2010). Teaching replays, teaching rehearsals, and re-visions of practice: Learning from colleagues in mathematics teacher community. Teachers College Record, 112, 225–259.

Hoyer, K. M. (2020). *Improving and High-Performing Schools in Wyoming: Cross-Case Analysis and Ten School Reports*. Prepared for the 2020 Wyoming Select Committee on School Finance Recalibration.

Jackson, C. K., & Bruegmann, E. (2009). Teaching students and teaching each other: The importance of peer learning for teachers. NBER Working Paper 15202. Washington, DC: National Bureau of Economic Research. www.nber.org/papers/w15202.

James-Berdumy, S., Dynarski, D. & Deke, J. (2005). *When Elementary Schools Stay Open Late: Results from The National Evaluation of the 21st Century Community Learning Centers Program.* Washington, D.C.: Mathematica Policy Research, Inc.

Johnson, S. M., Reinhorn, S. K., & Simon, S. S. (2016). Team work: Time well spent. *Educational Leadership*, 73(8), 24–29.

Jonathan Guryan, Jens Ludwig, Monica P. Bhatt, Philip J. Cook, Jonathan M.V. Davis, Kenneth Dodge, George Farkas, Roland G. Fryer Jr, Susan Mayer, Harold Pollack, and Laurence Steinberg. (2021). *Not Too Late: Improving Academic Outcomes Among Adolescents.* Cambridge, MA: National Bureau of Economic Research.

Joyce, B. & Calhoun, E. (1996). *Learning experiences in school renewal: An exploration of five successful programs*. Eugene, OR: ERIC Clearinghouse on Educational Management.

Joyce, B. & Showers, B. (2002). *Student achievement through staff development (3rd Ed.).* Alexandria, VA: Association for Supervision and Curriculum Development.

Kataoka, S. & Vandell, D.L. (2013) Quality of Afterschool Activities and Relative Change in Adolescent Functioning Over Two Years, *Applied Developmental Science,* 17:3, 123-134, DOI: 10.1080/10888691.2013.804375

Keierleber, M. (2019). 1.3 Million Homeless Students: New Federal Data Show a 70 Percent Jump in K-12 Homelessness Over Past Decade, With Big Implications for Academic Performance. The 74, February 19, 2019. https://www.the74million.org/1-3-million-homeless-students-new-federal-data-show-a-70-percent-jump-in-k-12-homelessness-over-past-decade-with-big-implications-for-academic-performance Last Accessed May 12, 2020.

Kennedy, M. M. (2016). How does professional development improve teaching? *Review of Educational Research,* 86(4), 945–980.

Kim, J.S. & Quinn, D.M. (2013). The effects of summer reading on low-income children's literacy achievement from kindergarten to grade8: A meta-analysis of classroom and home interventions. *Review of Educational Research*, 83(3), 386-431.

Kirst, M. & Venezia, A., Eds (2004). *From High School to College - Improving Opportunities for Success in Postsecondary Education*. San Francisco: Jossey-Bass.

Kleiner, B., Nolin, M.J. & Chapman, C. (2004). *Before and After School Care Programs, and activities through eighth grade: 2001*. Washington, D.C.: U.S. Department of Education, National Center for Education Statistics.

Knop, B. & Siebens, J. (2018). *A Child's Day: Parental Interaction, School Engagement, and Extracurricular Activities: 2014 – P70-159.* Washington, D.C.: U,S. Census Bureau.

Konstantopoulos, S. & Chung, V. (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.

Kraft, M. A. (2015). How to make additional time matter: Integrating individualized tutorials into an extended day. *Education Finance and Policy,* 10(1), 81-116.

Kraft, M.. (2020). *Interpreting Effect Sizes of Education Interventions*. Educational Researcher, 49(4), 241-253.

Kraft, M. A., & Falken, G. T. (2021). A Blueprint for Scaling Tutoring Across Public Schools. Providence, RI: The Annenberg Institute.

Kraft, M. A., Blazar, D. & Hogan, D. (2018). The Effect of Teacher Coaching on Instruction and Achievement: A Metra-Analysis of the Causal Evidence. *Review of Educational Research*, 88(4), 547-588.

Kreismanm D. & Stangem K. (2020). Vocational and career Tech Education in American High Schools: The Value of Depth over Breadth. *Education Finance and Policy*, 15(1), 1-44.

Kretlow, A., & Helf, S. (2013). Teacher implementation of evidence-based practices in Tier 1: A national survey. *Teacher Education and Special Education, 36*(3), 167–185.

*Krueger, A. (2002). Understanding the magnitude and effect of class size on student achievement. In L. Mishel and R. Rothstein (Eds.), *The class size debate (pp. 7-35)*. Washington, DC: Economic Policy Institute.

*Krueger, A. B. & Whitmore, D.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, J.A. & Fletcher, J.D. (2016). Effectiveness of intelligent tutoring systems: A meta-analytic review. *Review of Educational Research*. 86(1), 42-78.

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

Kulik, J. & Kulik C.C. (1992). Meta-analytic findings on grouping programs. *Gifted Child Quarterly*, *36*(2), 73-77.

Lance, K.C. & Hofschire, L. (2012). *Change in school librarian staffing linked with changes in CSAP reading performance, 2005 to 2011*. Denver, CO: Library Research Service. Also Available: https://www.lrs.org/documents/closer_look/CO4_2012_Closer_Look_Report.pdf?lrspdfmetric=no

Landry, S. 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: Oxford University Press.

Lapan, R. T., Gysbers, N. C., Bragg, S., & Pierce, M. E. (2012). Missouri professional school counselors: Ratios matter, especially in high-poverty schools. Professional School Counseling, 16 (2), 108-116.

Le, Q. T. & Polikoff, M. (2020). *The Effects of English Language Development Curriculum Materials on Students' English Proficiency*. Providence, R.I.: Brown University, Annenberg Institute.

Lee, V. &Smith, J. (1997). High school size: Which works best, and for whom? *Educational Evaluation and Policy Analysis, 19*(3), 205-228.

Leon, A., Villares, E., Brigman, G., Webb, L, & Peluso, P. (2011). Closing the achievement gap of Latina/Latino students: A school counseling response. Counseling Outcome Research and Evaluation, 2 (1), 73-86.

Levenson, N. (2011). *Something has got to change: Rethinking special education, Working Paper 2011-01*. Washington, D.C.: American Enterprise Institute.

Levenson, N. (2012). *Boosting the quality and efficiency of special education*. Dayton, OH: Thomas Fordham Institute.

Levenson, N. (2017). *Improving and Expanding Social, Emotional & Behavioral Supports: 10 Best Practices*. Boston: District Management Group.

Levenson, N. (2020). *Six Shifts to Improve Special Education and Other Interventions: A Commonsense Approach for School Leaders***.** Cambridge, MA: Harvard Educational Press.

Lewis, M. (2016). Professional learning facilitators in 1:1 program implementation: Technology coaches or school librarians? *School Libraries Worldwide, 22* (2), 13-23.

Liebowitz, D. D. & Porter, L. (2019). The Effect of Principal Behaviors on Student, Teacher and School Outcomes: A Systematic Review and Meta-Analysis of the Empirical Literature. *Review of Educational Research*, (89)5, 785-827.

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

Lynch, K., Hill, H. C., Gonzalez, K. E., & Pollard, C. (2019). Strengthening the research base that informs STEM instructional improvement efforts: A meta-analysis. Educational Evaluation and Policy Analysis, 41(3), 260-293.

Lynch, K., An, L., & Zid, M. (2021). The Impact of Summer Learning Programs on Low-Income Children's Mathematics Achievement: A Meta-Analysis. EdWorkingPaper No. 21-379. Providence, RI: Brown University, The Annenberg Institute.

Lynch, K. and Kim, J. S. (2017). Effects of a Summer Mathematics Intervention for Low-Income Children: A Randomized Experiment, *Educational Evaluation and Policy Analysis,* 39(1), 31-53.

Lynch, K., Hill, H. C.; Gonzalez, K. E., & Pollard, C. (2019). Strengthening the Research Base that Informs STEM Instructional Improvement Efforts: A Meta-Analysis. *Educational Evaluation and Policy Analysis*. 41(3), 260-293.

Lyon, G. R., Fletcher, J. M., Shaywitz, S. E., Shaywitz, B. A., Torgesen, J. K., Wood, F. B., et al. (2001). *Rethinking Learning Disabilities*. Washington, DC: Thomas Fordham Foundation. URL: http://www.edexcellence.net/library/special_ed/index.html

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

Marsh, J. A., McCombs, J.S. & Martorell, F. (2010). How instructional coaches support data-driven decision making. *Educational Policy*, ***24***(6), 872-907.

*May, H., Gray, A., Gillespie, J., Sirindes, P., Sam, C. Goldsworth, H., Armijo, M. & Tognatta, N. (2013). *Evaluation of the i3 Scale-up of Reading Recovery*. Philadelphia: University of Pennsylvania. Downloaded July 2014 at http://www.cpre.org/sites/default/files/researchreport/1488_readingrecoveryreport.pd

McCombs, J. S., Augustine, C. H., Schwartz, H. L., Bodilly, S. J., McInnis, B., Lichter, D. A. & Cross, A. B. (2011). *Making Summer Count: How Summer Programs Can Boost Children's Learning*. Santa Monica, CA: RAND Corporation. Retrieved December 3, 2013, from, http://www.rand.org/pubs/monographs/MG1120.htm

Mehta, J. (2020). *How Social and Emotional Learning Can Succeed*. Washington, DC: American Enterprise Institute. Available at: https://www.aei.org/wp-content/uploads/2020/05/How-social-and-emotional-learning-can-succeed.pdf. Downloaded June 8, 2020.

Mellard, D. (2004). *Understanding Responsiveness to Intervention in Learning Disabilities Determination*. Lawrence, Kansas: National Research Center on Learning Disabilities. Retrieved January 17, 2007 at: http://nrcld.org/publications/papers/mellard.pdf

Miles, K. H., Odden, A. R., Fermanich, M., & Archibald, S. (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, S. 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.

Mitchell, C. (2019). Gifted Services Don't Reach All, Survey Finds. *Education Week*, 39(14), 1, 15, 17.

Moats, L. C. (2020). Teaching Reading is Not Rocket Science. *American Educator*. https://www.aft.org/ae/summer2020/moats Downloaded June 8, 2020.

Morgan, P. L., Farkas, G., & Maczuga, S. (2015). Which Instructional Practices Most Help First-Grade Students with and Without Mathematics Difficulties? Educational Evaluation and Policy Analysis, 37(2), 184-205.

*Mosteller, F. (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.

Mulhern, C. (2022). Beyond Teachers: Estimating Individual Guidance Counselors' Effects on Educational Attainment. (EdWorkingPaper: 22-632). Retrieved from Annenberg Institute at Brown University: https://doi.org/10.26300/sjxm-zw40

Mutter, D. and Randolph, J. (1987). A Step-By-Step Plan for an Inhouse Maintenance Audit of School Buildings, *Educational Facility Planner*, (25)4, July-August.

National Association of School Nurses (2020). School Nurse Workload: Staffing for Safe Care. https://www.nasn.org/advocacy/professional-practice-documents/position-statements/ps-workload. Last accessed May 12, 2020.

National Center for Educational Statistics. (2013) *Characteristics of Public Elementary and Secondary School Library Media Centers in the United State: Results from the 2011-12 Schools and Staffing Survey*. Washington, DC. Available at: http://nces.ed.gov/pubs2013/2013315.pdf (last accessed August 22, 2014).

National Center for Education Statistics (NCES). (2015). Table 701.20 : Selected Statistics on Public School Libraries/Media Centers. *Digest of Education Statistics – 2013*. NCES 2015-11:791. Available at: http://nces.ed.gov/pubs2015/2015011.pdf . Last retrieved August 16, 2015.

National Education Commission on Time and Learning. (1994). *Prisoners of time.* Washington, DC: Author.

National Institute of Child Health and Human Development. (2000). Report of the National Reading Panel: Teaching children to read: Reports of the subgroups. Washington, D.C.: U.S. Government Printing Office.

Nelli, R. (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.

Neumerski, C. M. (2012). Rethinking instructional leadership, a review: What do we know about principal, teacher and coach instructional leadership, and where should we go from here? *Educational Administration Quarterly*, 49(2), 310–347.

Newman, S.B. & Cunningham, L. (2009). The Impact of Professional Development and Coaching on Early Language and Literacy Instructional Practice. *American Educational Research Journal*, 46, 532-566.

Nickow, A., Oreopoulos, P., & Quan, V. (2020). *The Impressive Effects of Tutoring on Prek-12 Learning; A Systematic Review and Meta-Analysis of the Experimental Evidence*. Cambridge, MA: National Bureau of Economic Research. https://www.nber.org/papers/w27476, Downloaded July 6, 2020.

*Nye, B. A., L. V. Hedges, &S. Konstantopulos. (2001a). The long-term effects of small classes in early grades: Lasting benefits in mathematics achievement at grade nine. *Journal of Experimental Education*, *69*(3), 245-258.

*Nye, B. A., L. V. Hedges & S. Konstantopulos. (2001b). Are effects of small classes cumulative: Evidence from a Tennessee experiment, *Journal of Educational Research*, *94*(6), 336-345.

*Nye, B., Hedges, L.V. & Konstantopoulos, S. (2002). Do low-achieving students benefit more from small classes? Evidence from the Tennessee class size experiment. *Educational Evaluation and Policy Analysis 24*(3), 201-217.

Odden, A. (1997). How to rethink school budgets to support school transformation. *Getting better by design series, Volume 3.* Arlington, VA: New American Schools.

Odden, A. (2009). *Ten strategies for doubling student performance*. Thousand Oaks, CA: Corwin Press.

Odden A. (2011a). *Strategic management of human capital in education*. New York: Routledge Press

Odden, A. (2011b). The dollars and sense of comprehensive professional learning. *Journal of Staff Development*, 32(4), 26-32.

Odden, A. (2012). *Improving student learning when budgets are tight*. Thousand Oaks, CA: Corwin Press.

Odden, A. (2011). *Strategic Management of Human Capital in Education*. New York: Routledge Press.

Odden, A. and Archibald, S. (2009). *Doubling Student Performance and Finding the Resources to Do It.* Thousand Oaks, CA: Corwin Press.

Odden, A., and Picus, L. O. (2020). *School Finance: A Policy Perspective, 6th edition*. New York: McGraw-Hill.

Odden, A. & Picus, L. O. (2018). *An Evidence-Based Approach to School Finance Adequacy in Michigan: Determining the Cost for Funding Educational Achievement for All Michigan Students*. Available at www.picusodden.com.

Papay, J. (2019). *The Impact of Applied Learning on Student Achievement and Engagement: First Year Results of Scaling Project Lead the Way in Massachusetts.* Mass STEM Hub, mass-stemhub.org.

Parzych, J., Donohue, P., Gaesser, A., Chiu, M. (2019). Measuring the impact of school counselor ratios on student outcomes. ASCA Research Report. Retrieved from www.schoolcounselor.org/asca/media/asca/Publications/ Research-Release-Parzych.pdf

Peterson, A. (2022). More Children are Being Screened for Anxiety, Depression. But Then What? *Wall Street Journal*. October 30, 2022.

Petrilli, M., Davidson, B. & Carroll, K. (2022). *Follow the Science to School: Evidence-Based Practices for Elementary Education*. Clearwater, FL: John Catt Educational Ltd.

Phelps, L. A. (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, R., Allen, J. &King, H. (2011). An interaction-based approach to enhancing secondary school instruction and student achievement, *Science*, 333 (6045), 1034-1037.

Pitcock, S., & Seidel, B. (2015). Summer Learning: Accelerating Student Success. *The State Education Standard*, *15*(1), 4-10.

Plasman, J. S., Gottfried, M. A., & Klasik, D. (2020). Trending Up: A Cross-Cohort Exploration of STEM Career and Technical Education Participation by Low-Income Students. *Journal of Education for Students Placed at Risk (JESPAR)*, *25*(1), 55–78. https://doi.org/10.1080/10824669.2019.1670066

Plucker, J., & Callahan, C. (2021). The Evidence Base for Advanced Learning Programs, *Phi Delta Kappan*, 102(4), 14-21.

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

President's Commission on Excellence in Special Education (2002). *A new era: Revitalizing special education for children and their families.* Washington, DC: US Department of Education.

Ramon, I., Chattopadhyay, S. K., Barnett, W. S., & Hahn, R. A. (2018). Early Childhood Education to Promote Health Equity: A Community Guide Economic Review. *Journal of Public Health Management and Practice : JPHMP*, *24*(1), 8–15. https://doi.org/10.1097/PHH.0000000000000557

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

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

Redding, C. & Grissom, J.A. (2022). Do Students in Gifted Programs Perform Better? Linking Gifted Program Participation Achievement and to Nonachievement Outcomes. *Education Evaluation and Policy Analysis*, 43(3), 367-390.

Reed, K (2018). *School librarians as co-teachers of literacy: Librarian perceptions and knowledge in the context of the Literacy Instruction Role*. School Library Research. V(21) 2018. Available at: http://www.ala.org/aasl/sites/ala.org.aasl/files/content/aaslpubsandjournals/slr/vol21/SLR_SchoolLibrariansasCoteachers_V21.pdf

Renzulli, J. (2019). How to Close Gifted Education's Opportunity Gap. *Education Week*, 39(13), 16.

*Roberts, G. (2000, September). *Technical Evaluation Report on the Impact of Voyager Summer Programs*. Austin, TX: University of Texas.

Robinson, A. (2007). *Best Practices in Gifted Education: An Evidence-Based Guide*. Waco, TX: Prufrock Press.

Robinson, C. D., and Loeb, S. (2021). High-Impact Tutoring: State of the Research and Priorities for Future Learning. (EdWorkingPaper: 21-384). Retrieved from Annenberg Institute at Brown University: https://doi.org/10.26300/qf76-rj21

Rodney, M. J., Lance, K. C., and Hamilton-Pennell, C. (2003). *The Impact of Michigan school librarians on academic achievement: Kids who have libraries succeed*. Lansing, MI: Library of Michigan.

Ronfeldt, M., Farmer, S. O., McQueen, K., & Grissom, J. (2015). Teacher collaboration in instructional teams and student achievement. American Educational Research Journal, 52(3), 475–514.

Rowan, B., Correnti, R. & Miller, R.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.

Sailors, M., & Price, L. R. (2010). Professional development that supports the teaching of cognitive reading strategy instruction. Elementary School Journal, 110, 301–322.

Sanders, W. L., & Rivers, J. C. (1996). Cumulative and residual effects of teachers on future student academic achievement. Research Progress Report. University of Tennessee Value-Added Research and Assessment Center.

Sawchuk, S. (2019). Why Reading Practices are so Hard to Shift. Education Week, 39(15), 10-14.

Sawchuk, S. (2020). Where Classroom and Workplace Meet. *Education Week*, 39(20), 14, 18-19.

Scammacca, R., & Schmoker, M. (2019). A Misguided, Inefficient Mess: K-3 Reading Instruction Needs an Overhaul. *Education Week*, 39(14), 18.

Scholastic. (2016). *School libraries work! A compendium of research supporting the effectiveness of school libraries.* www.scholastic.com/slw2016

Shanahan, T. (1998). On the effectiveness and limitations of tutoring in reading. *Review of Research in Education, 23, 217-234*. Washington, DC: American Educational Research Association.

Shanahan, T. & Barr, R. (1995). Reading recovery: An independent evaluation of the effects of an early instructional intervention for at-risk learners. *Reading Research Quarterly, 30*(4), 958-997.

Sheridan, Susan M., Smith, Tyler E., Kim, Elizabeth Moorman, Beretvas, S. Natasha & Park, Sunyoung. (2019). A Meta-Analysis of Family-School Interventions and Children's Social-Emotional Functioning: Moderators and Components of Efficacy. *Review of Educational Research*, 89(2), 296-332.

Shultz, G., Leibowitz, S., Tapper, J., & Ells, S. (2015). A study of the use of paraprofessionals to deliver special education services in Vermont schools. Prepared by the UMass Donahue Institute for the Vermont Legislative Joint Fiscal Office on behalf of the Vermont General Assembly.

Sims, Sam, Harry Fletcher-Wood, Alison O'Mara-Eves, Sarah Cottingham, Claire Stansfield, Josh Goodrich, Jo Van Herwegen, and Jake Anders. (2022). Effective teacher professional development: new theory and a meta-analytic test. (EdWorkingPaper: 22-507). Retrieved from Annenberg Institute at Brown University: https://doi.org/10.26300/rzet-bf74

Slavin, R. E. (1996). Neverstreaming: Preventing learning disabilities. *Educational Leadership*, *53*(4), 4-7.

Slavin, R.E., Karweit, N. &Wasik, B. (1994). *Preventing early school failure: Research policy and practice*. Boston: Allyn and Bacon.

Slavin, R. & Cheung, A. (2005). A synthesis of research on language of reading instruction for English language learners. *Review of Educational Research*, *75*(2), 247-284.

*Slavin, R. E., Madden, N., Calderon, M., Chamberlain, A. & Hennessy, M. (2011). Reading and language outcomes of a multi-year randomized evaluation of transitional bilingual education. *Educational Evaluation and Policy Analysis*, *33*(3), 47–58.

Smith, J. (2021). Texting parents helps improve student literacy. But how much is too much? https://fordhaminstitute.org/national/commentary/texting-parents-helps-improve-student-literacy-how-much-too-much

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 and A.H. Passow (Eds.), *International handbook of research and development of giftedness and talent* (pp. 387-410). Exeter, United Kingdom: Pergamon.

Sparks, S. (2019a). Schools Finding Record Number of Homeless Students, Study Says. *Education Week*. 38(25), 1, 9.

Sparks, S. (2019b). *Extracurricular Activities: National Poll on Children's Health*. Education Week. 38(26), 5.

Steenbergen-Hu, S. W., Makel, M., & Olszewski-Kubilis, P. (2016). What one hundred years of research says about the effects of ability grouping and acceleration on K–12 student academic achievement: Findings from two second order meta-analyses. Review of *Educatonal Research,* 86(4), 849–899.

Stevenson, B. (2010). Beyond the Classroom: Using Title IX to Measure the Return to High School Sports. *Review of Economics and Statistics*, 92(2), 284-301.

Steinberg, L. (1996). *Beyond the classroom: Why school reform has failed and what parents need to do*. New York: Simon and Schuster.

Steinberg, L. (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, J. (2009). A work in progress: Formative assessments shape teaching and provide mutual professional development. *Journal of Staff Development*, 30(3), 32-37.

Stockard, J., Wood, T. W., Coughlin, C., & Khoury, C. R. (2018). The Effectiveness of Direct Instruction Curricula: A Meta-Analysis of a Half Century of Research. *Review of Educational Research*, 88(4), 479-507.

Storrow, B. Wyoming's Oil Booms Means Hotel Rooms Are Hard to Find. *Casper Star-Tribune Online*. Casper Star Tribune Communications, 21 Sept. 2014. Web. 15 Aug. 2015. <http://trib.com/business/energy/wyoming-s-oil-booms-means-hotel-rooms-are-hard-to/article_a3a85264-f029-5e73-ab43-3e3dae830414.html>.

Stringfield, S., Ross, S. & Smith, L. (1996). *Bold plans for school restructuring: The New American Schools designs.* Mahwah, NJ: Lawrence Erlbaum (1996)

Stringfield, S. & Stone III, J. R. (2017). The Labor Market Imperative for CTE: Changes

Struck, J. (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.

Stuebing, K.K., Fletcher, J.M., LeDoux, J.M., Lyon, G.R., Shaywitz, S.E. & Shaywitz, B.A. (2002). Validity of IQ-discrepancy classifications of reading disabilities: A meta-analysis. *American Educational Research Journal, 39,* 469-518.

Sun, M., Loeb, S., & and Grissom, J. A. (2017). Building teacher teams: Evidence of positive spillovers from more effective colleagues. Educational Evaluation and Policy Analysis, 39(1), 104–125.

Sun, Min, Shu, Junmeng & LeClair, Zachary. (2019). Using A Text-as-Data Approach to Understand Reform Processes: A Deep Exploration of School Improvement Strategies. *Educational Evaluation and Policy Analysis*. 41(4), 510-536.

Swift, E. (2005). *Estimating the central office resources necessary for an adequate educational program.* Doctoral dissertation at the USC Rossier School of Education, August 2005.

The Education Alliance, (2020). Sheltered English Instruction. https://www.brown.edu/academics/education-alliance/teaching-diverse-learners/strategies-0/sheltered-english-instruction-0. Accessed May 30, 2020.

Thompson, J. A., & Sonnenschein, S. (2016). Full-day kindergarten and children's later reading: The role of early word reading. *Journal of Applied Developmental Psychology*, *42*, 58–70. https://doi.org/10.1016/j.appdev.2015.11.005

Torff, B. & Murphy, Audrey Figueroa. (2019). Relationship Between Teachers' Beliefs and Their Instructional Practice in Reading. In R. Garner & P.A. Alexander (Eds.), *Beliefs About Text and Instruction with Text*. Pp. 137-153. New York, NY: Routledge.

Torff, B. & Murphy, Audrey Figueroa. (2020). Teachers' Belief about English Language Learners: Adding Linguistic Support to Enhance Academic Rigor. *Phi Delta Kappan.* 101(5), 14-17.

Torgeson, J. K. (2004). Avoiding the devastating downward spiral. *American Educator*, *28*(3), 6-19, 45-47.

U.S. Department of Education (2017). *Reimagining the role of technology in education: 2017 National Education Plan Update.* Office of Educational Technology. Available at: https://tech.ed.gov/files/2017/01/NETP17.pdf

Vandell, D. L., Pierce, K. M., and Dadisman, K. (2005). Out-of-school settings as a developmental context for children and youth. In R. Kail (Ed.) *Advances in Child Development and Behavior, 33*. Academic Press.

Vandell, D. L., Lee, K. T.H., Whitaker, A. A. & Pierce, K. M. (2020). Cumulative and Differential Effects of Early Child Care and Middle Childhood Out-of-School Time on Adolescent Functioning. *Child Development*, 91(1), 129–144.

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.

Washington State Institute for Public Policy. (2017). *Project Lead the Way, Benefit-Cost Estimates Updated May 2017*. Olympia, WA: Washington State Legislature.

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

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

Whitmire, R. (2014). *On the Rocketship*. San Francisco: Jossey-Bass.

Wilkerson, K., Perusse, R., & Hughes, A. (2013). Comprehensive school counseling programs and student achievement outcomes: A comparative analysis of RAMP versus non-RAMP schools. Professional School Counseling, 16 (3), 172-184.

*Word, E., Johnston, J., Bain, H., Fulton, D.B., Boyd-Zaharias, J., Lintz, M.N., Achilles, C.M., Folger, J. & Breda, C. (1990). *Student/teacher achievement ratio (STAR): Tennessee's K-3 class-size study.* Nashville, TN: Tennessee State Department of Education.

Wu, D. (2020). Disentangling the Effects of the School Year from the School Day: Evidence from the TIMSS Assessments. *Education Finance and Policy,* (15)1, 104-135.

Young, E., Green, H.A., Roehrich-Patrick, J.D., Joseph, L. & Gibson, T. (2003). *Do K-12 School Facilities Affect Educational Outcomes?* Tennessee Advisory Commission on Intergovernmental Relations (TACIR), January 2003.

Zaff, J., Moore, K., Romano Papillo, A. & Williams, S. (2003). Implications of Extracurricular Activity Participation During Adolescence on Positive Outcomes, *Journal of Adolescent Research*, 18(6): 599–623.

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