Appendix One: An Analysis of Colorado's School Funding Formula: Strengths and Weaknesses

Introduction

In fiscal year 2023-24 (FY24), Colorado's school finance formula identified approximately $9.2 billion for public PK-12 education.[1] The state provided $5 billion of this amount, and local school districts contributed the remaining $4.2 billion. These funds were distributed through a complex school funding formula that originated in the Public School Finance Act of 1994. Although policymakers in Colorado have often expressed concern over the age of this legislation, the Public School Finance Act of 1994 has been flexible.[2] Over time, the formula's components have been modified by the legislature and, at times, impacted by state constitutional amendments. The State Legislature changes this act annually through a school finance bill that amends the original act and describes how the state and local tax revenues should be distributed among the state's 178 school districts.[3] It has adapted to the Tax Payers Bill of Rights (TABOR) and voter overrides and, for 14 years, included a Budget Stabilization Factor (BSF) that reduced each district's funding to help balance the state's budget.

In 2024, under HB24-1448, the Colorado Legislature made substantial modifications to the school funding formula, which will be implemented over six years starting in FY26.[4] This report analyzes Colorado's current school funding formula for FY25, identifies its strengths and weaknesses, and compares that with an analysis of the formula scheduled for implementation in FY26.

Although the "algebra" of a school finance formula appears straightforward, the apparent simplicity disappears in each state's approach to funding schools. All 50 state constitutions establish public education systems but offer different standards for the provision and expectations of public education. State and local tax systems and the political systems that have put them in place over the years vary considerably. In addition, over time, we have learned that the considerable (and ever-changing) characteristics of school districts and the demographics of the students enrolled in those districts have led each of the 50 states to implement school funding policies and formulas differently. Colorado's funding formulas adjusts for school district characteristics such as location, size, population density, and differences in the cost of living (COL). The formulas also adjust the demographic characteristics of students in each district, including additional resources for at-risk students, English language learners (ELL), and students with disabilities (SwD).

The formula created by the Public School Finance Act of 1994 operates largely as it did when it was first passed. However, there have been several changes to the specifics of the formula as the education community has identified areas where students need different levels of resources. This report argues that while the 1994 act, as currently amended, has adapted well to many of the district and student differences for which it attempts to compensate, and for other political changes in the state, notably voter enactment

[1] Colorado Legislative Staff, 2024
[2] Colorado Legislative Staff, 2018
[3] Colorado Legislative Staff, 2018
[4] Mention Governor's suggestion to go four years

of TABOR, there are other areas where alternative approaches or different ways to compute the various adjustments could strengthen the formula further.

In describing the strengths and weaknesses of the Colorado school funding formula, this report starts with a brief context for school finance reform and establishes a framework for analyzing school finance systems. The paper then analyzes the components of Colorado's current (FY25) and future (FY26) funding systems, first by assessing individual components of the current formula and then describing how the HB24-1448 changes that assessment.

A Framework for Analyzing Colorado's School Finance Formula

Colorado relies on a foundation formula for funding its schools. Foundation formulas are used in about 40 other states and represent a reliable way to equalize differences in a local school district's ability to raise revenues for schools through local property taxes. Foundation formulas can be adjusted to meet differing district and student characteristics, and as states move toward identifying the adequate levels of resources for schools, funding levels within the formula can be adjusted to meet the adequacy levels.

The United States Constitution is silent on education, leaving the provision of education to the individual states. Before the early 1900s, most states left school funding to local communities or school districts. The result was that school funds were mostly raised through property taxes. The advantage of property taxes is that the property on which they are assessed cannot be moved to another jurisdiction. On the other hand, there were, and continue to be, vast differences in the amount of money the same property tax rate (i.e., the number of mills) will raise depending on the value of the property on which it is assessed. This leads to significant differences in the revenues available to public school students.[5]

A larger tax base is required to resolve these differences, hence partnerships between states and local districts. Revenue sources like sales and income taxes are more efficiently collected at the state level and distributed to local governments as determined by state law. A foundation program establishes a base or foundation level of revenue and a tax rate that each school district must levy. Districts that do not raise all the required revenue from local property taxes receive the balance from the state, allowing all districts to reach the foundation level, regardless of their property tax capacity. States can adjust for differential district and student characteristics by adjusting district foundation levels or computing "weighted students" but leaving the required tax rate the same.[6]

One issue that each state must resolve is what to do if a district's revenues at the required tax rate exceed the foundation minimum. Some states allow the district to keep the balance, others cap the amount to be raised, while others "recapture" all or a part of that revenue. Another issue is whether districts can raise property tax rates above the required tax rate. While this allows communities that want to spend more on education, the inequities identified above come into play again if some districts raise large sums of revenue with additional taxes because of higher property wealth per student. The state's options are

[5] There are also issues related to differential or poor property assessment practices in many states. Colorado has regularly scheduled assessment practices and therefore this issue does not cause further complications in the analysis of school funding equity.

[6] States also use categorical programs to help districts meet these needs. Colorado relies on a combination of adjustments to the foundation level and categorical programs.

to equalize these additional taxes, like the foundation level, or cap the tax rate or amount of money districts can raise. Some states choose to equalize higher tax rates to a certain level, allowing districts to raise unequaled revenues above that tax rate.

The impact of allowing districts to raise taxes and spend above the minimum tax rate and foundation level varies with district perceptions of how well the foundation level meets their spending preferences. In recent years, school finance adequacy studies in many states have helped identify a logical or reasonable foundation level in those states. If a state provided adequate funding through the foundation program to ensure all districts were able to raise the identified adequate level of revenue, there is a high probability that fewer districts would seek to raise additional revenues, and if they choose to do so, they likely will elect smaller funding increments above the foundation level.

The following analysis focuses on the operation of Colorado's foundation program. Still, it does not address the issue of adequacy directly, which is the topic of the larger study that includes this analysis. This identification of the formula's strengths and weaknesses will allow state policy makers to consider the best ways to raise and distribute educational resources at current or higher levels depending on the outcome of the adequacy studies.

Analysis of Colorado's Funding Formula

Colorado's school funding formula estimates the total revenue for each school district. The current formula starts with a Legislatively determined base funding amount per student and makes a series of adjustments to this amount to reach a district's total funding. The new formula, established through HB24-1448, also starts with a legislatively determined base funding level, but changes the way some adjustments are calculated and revises the order in which they are included in the calculations. Both changes impact the relative distribution of funds to districts and address some of the weaknesses of the current system. Table A1.1 summarizes the two approaches side-by-side.

Following Table A1.1, each component of the current formula is discussed. The discussion includes an analysis of how the new funding formula modifies the current formula and the strengths and weaknesses of each. The strengths and weaknesses of each component of the formula are summarized in Table A1.2.

Table A1.1
Comparison of Colorado's Current and Revised School Finance Formulas

	Current Formula	HB24-1448
Base per Student	Historical figure adjusted annually for inflation, not related to reaching adequacy	Historical figure adjusted annually for inflation, not related to reaching adequacy
Funded Student Count	Single Day Count with up to five-year declining enrollment adjustment, some students counted separately, such as online	Single Day Count with up to four-year declining enrollment adjustment, some students counted separately, such as online
Cost of Living Adjustment (COL)	Complex formula focused on the cost of a basket of goods, applied in multiplicative approach impacting all funding (includes Personnel Cost Factor)	Complex formulas focused on the cost of a basket of goods, not applied multiplicatively (no longer includes Personnel Cost Factor, caps adjustment at .23)
Size Adjustment	Adjustment with largest impact for smallest districts, though all districts get some funding. Applied in multiplicative approach impacting all funding	Adjustment with largest impact for smallest districts, no longer funds all districts, no longer applied in multiplicatively
Rural Factor	Provides funding for rural districts with less than 6,500 students	Not Included
Locale Factor	Not Included	Provides funding based on NCES Locale codes ranging from .25 to .025 weight
At-Risk	Minimum weight of .12 but with a greater concentration factor for larger districts. Applied to COL/Size adjusted per student amount	.25 weight with concentration factor only for smaller districts with at least 75% concentration. Applied to the same base amount for all districts
ELL	.08 weight applied to COL/Size adjusted per student amount	.25 weight applied to the same base amount for all districts
Special Education	Not Included	.25 weight
Online and Extended High School	Funded at specified per student amount	Funded at specified per student amount

[A] Source: Colorado Legislative Council Staff (2024)
[B] Source: Colorado School Finance Project 2024)

Funded Student Count

The first step in the current and HB24-1448 processes is determining a district's student count. Funding is based on the number of students enrolled in each school district as counted on October 1 of each school year. Counts are expressed at Full Time Equivalent (FTE) students. Under the current formula, for the student counts for districts with declining enrollment, the student count is the greater of the current year count, or a two-year, three-year, four-year, or five-year average of the October counts. The new (HB24-1448) formula only averages over four years. Online, extended high school, and some kindergarten and Charter School Institute (CSI) students are not included in the averaging but are included in the final funded student count. District-funded student counts range from a minimum of 50 (regardless of actual enrollment) to Denver's total of over 84,000 students. The HB24-1448 increases the minimum enrollment to 60 students.

Colorado's approach to counting students for funding schools is a strength of the current and new funding formulas. It minimizes the bureaucratic complexities of frequent student counts and provides a soft landing for districts experiencing enrollment declines. It also addresses the needs of very small school districts by providing for a minimum student count of 50 (old formula) or 60 (HB24-1448).

Per Student Funding for Each District

The current funding formula's first step is to estimate each district's preliminary district per student funding. This is determined by adjusting the statewide base per student funding by a COL adjustment and locale and size adjustments.

Statewide Base per Student Funding

The statewide base per student funding amount is the first step for both formulas. The amount is set each year by the General Assembly, subject to Amendment 23 (Article IX, Section 17 of the Colorado Constitution), which required that beginning in FY03, the base amount be increased annually by the rate of inflation plus one percent through FY11, and at the rate of inflation each year thereafter.

A weakness of this approach is that the funding level upon which the rest of the formula is based is simply a historical artifact not tied to a measure of educational needs. If data suggested this amount was not adequate, the Legislature could appropriate more than Amendment 23 requires, although data from the 2024 School Finance Handbook suggests it has not done so.[7] The adequacy studies of which this work is a part of directly address the issue of an appropriate level of school revenue.

A second weakness in this approach (which will be discussed in more depth below) is the Budget Stabilization Factor (BSF), a tool used by the Legislature every year since FY11 to reduce each district's total education funding, effectively reducing the total funding amount each year. The BSF has been a tool to balance the State's budget and has negatively impacted the level of school funding since its implementation.

[7] Colorado Legislative Council Staff, 2024: p8

Under the new funding model, the base per student funding level will be determined by either Amendment 23 or the Legislature if it provides funding above the level required by Amendment 23.

Cost of Living Adjustment (COL)

The current and new funding formulas include a COL adjustment. Adjusting cost differentials across school districts in a state as large and diverse as Colorado is important. All other things equal, recruiting personnel to regions with high COL is harder. Adjusting for these cost differences makes it possible for districts in high-cost regions to recruit the same quality teachers as districts in lower-cost regions of the state. Colorado uses a COL factor applied to a portion of district budgets spent on personnel services. That proportion is based on district enrollment rather than actual spending patterns.

The COL factor is computed every other year using a complex market basket approach, resulting in a cost adjustment factor for each of the state's 178 districts.[8] Each district's cost factor is applied to its per student funding using the percentage of their expenditures estimated to be for personnel. The old and new formulas (HB24-1448) assume that smaller districts spend a smaller percentage of their budget on personnel than larger districts. Each district's personnel cost factor is applied to the funding amount using a formula that sets the factor at 90.5% of expenditures for personnel in districts with 30,000 or more students. That factor declines on a student-by-student basis in very small increments to a low of 82.5% of expenditures for districts with fewer than 453.5 students.

There are three issues to consider in analyzing the COL factor:

1) Where in the formula the index is applied to each district's funding;
2) How the index is computed; and
3) The determination of the percentage of each district's expenditures to which the factor is applied.

Placement of the cost of living (COL) adjustment:

Across Colorado, there are substantial differences in the impact the COL adjustment has on each district's per student funding, ranging from $19 per student to over $4,500 dollars per student.[9] This is in large part because the COL adjustment is the first adjustment made to the base funding per student amount for each district. As further adjustments are made, the impact of the COL factor is multiplied by the number of weighted students added to the formula, further advantaging districts in high-cost areas. A better approach would be to compute the COL factor at the end of the process and apply it to the final per student cost amount computed. This weakness in the formula is corrected in the new funding formula.

Computing of the Cost of Living (COL) Index

As required by statute, the cost of living index for Colorado's 178 school districts is computed every two years using a formula established in law. The process uses a market basket approach that estimates household consumption, gets price information on that basket of goods and services, adjusts where individuals living in remote areas are likely to consume goods and services, and then provides individual

[8] The methodology is detailed in Corona Insights, 2024.
[9] Colorado Legislative Council Staff, 2024

index values for all 178 districts. The study includes an examination of the alternative approaches for adjusting for cost differences districts face, including an analysis of the comparative wage index (CWI), which is likely less expensive and complex to implement.

Application of the Cost of Living (COL) Index

Colorado appropriately applies the COL index only to the portion of school district expenditures that are for personnel. However, the application of the index combines certificated and classified staff, and rather than use each district's actual percentage of total costs allocated for personnel, it uses a formula based on student enrollments as described above. The state will likely collect enough data from school districts to compute the percentage of total expenditures devoted to personnel (both certificated and classified staff separately) to apply the COL factor to each district's percentage of total expenditures devoted to personnel.

In summary, the COL adjustment strengthens Colorado's funding formula. Moving it closer to the end of the formula computations, ensuring it is an additional component rather than a multiplicative component, will reduce the vast differences the current formula has created. Applying the COL adjustment to the portion of each district's budget spent on personnel is a strength of the formula. However, it could be strengthened further by using data from each district to use the actual proportion of expenditures devoted to personnel. Alternative approaches are discussed in the study's review of cost adjustment alternatives.

Size Adjustment

Both funding formulas include an adjustment for school district size, which is important as small districts cannot benefit from the economies of scale available to larger districts. The old formula only adjusted for district enrollment (size), in theory capturing both diseconomies of scale due to few students and a measure of remoteness, assuming there is a relatively strong correlation between enrollment numbers and remoteness. The new factor adjusts for both size and locale, a measure of remoteness. Adding the locale computation to the formula is a strength of the HB24-1448 formula as geographically large districts with small enrollments incur substantial costs for student transportation, access to schools for maintenance and repairs, and costs of travel for educators assigned to multiple small schools.

Under the old formula, all school districts in the state received funding through the size factor. The smallest districts with fewer than 276 students received a size factor adjustment of 1.5457 times the per student funding. The size factor declined in seven steps, providing a size adjustment factor of 1.0297 for districts with more than 5,000 students. The strength of this adjustment is that it accommodates the needs of small districts that may experience diseconomies of scale, but because every district received these funds, very large districts were receiving dollars for a size adjustment that is not needed.

The HB24-1448 formula modifies the size factor and adds a locale factor to adjust for measures of remoteness as well as size. The HB24-1448 formula's size factor contains categories, ranging from less than 276 students to between 3,500 and 6,499 students. Districts with 6,500 or more students do not receive a size adjustment.

The new size adjustments appear on the surface to adjust for size differences better than the old formula's adjustment did, and in that case, would be a strength of the HB24-1448 formula. Because the size adjustment is capped at fewer than 6,500 students, larger districts no longer receive any size adjustment.

Rural Factor

In recent years, the Colorado Legislature has provided additional funding for rural schools, utilizing additional per student funding for districts who are rural and have enrollment below 6,500 students. This funding was differentiated for districts below 1,000 students and those above. In the 2024-25 school year, rural funding was added to the formula, and a minimum funding amount of $100,000 was added. The rural factor is not included in the HB24-1448 formula, with the locale factor replacing this adjustment.

Locale Factor

The locale factor is computed first and is based on the National Center for Education Statistics Locale Classification and Criteria. It includes four basic types of locale (City, Suburban, Town and Rural), each with three subtypes (large, midsize, and small for City and Suburban; and Fringe, Distant, and Remote for Town and Rural).[10] Depending on a district's NCES classification, the locale factor ranges from a high of a 25% adjustment to the preliminary per student funding in districts classified as Rural Remote, and declines in value for other classifications of Rural and Town. Additionally, districts classified as Rural Remote and Town Remote receive an additional $100,000. The locale factor is zero for all districts classified as Suburban and City. The current application includes a high number of districts in the Rural Remote category, which have varying demographic characteristics and distances from more urban areas. If a district moves between categories, it could face a cliff in funding. Districts are allowed to appeal classification, though no clear criteria have been identified for the appeals process.

Assessing the impact of the locale factor is more complex. Because it is tied to the NCES classification, and because there are fairly large shifts in the adjustment for locale as NCES classifications change (and it is zero for half of the classifications), some districts may benefit substantially from the locale factor. In contrast, when combined with the loss of size factor revenues, others will lose revenue. Since HB24-1448 is the first time Colorado has used the NCES classification scheme, it is unclear whether this will lead to greater equalization among districts or further complicate the complex relationships within the formula that lead to the generation of a district's final revenue.

[10] https://nces.ed.gov/programs/edge/docs/LOCALE_CLASSIFICATIONS.pdf

Total Funding for Each District

Once each district's preliminary per student funding has been calculated, including adjustments for cost of living and district size, total district funding is determined by multiplying the per-student funding amount by the district's funded student count and further adjusted for at-risk, ELL, online, and extended high school students.

At-Risk Students

Colorado's current funding formula provides additional resources to school districts for programs for at-risk students. Before this year, at-risk students were defined as students from low-income families, determined by eligibility for free and reduced-price lunch (FRL). Because participation FRL programs tends to be lower in high schools, Colorado districts could use the proportion of students in grades one through eight times total district enrollment if this generated a larger number of at-risk students.

A number of programs, including the federal Community Eligibility Program and Colorado's universal free meals, have cut into the validity of FRL data. Beginning in 2024-25, the state has implemented a new measure that seeks to identify students at risk of below-average academic performance due to socioeconomic disadvantage or poverty. This measure considers students whose families receive public benefits from a number of sources, such as SNAP, TANF, Food Distribution Program on Indian Reservation, and Direct Certification, as well as other categories such as foster children, homeless, migrant, runaway, or Head Start, and finally students participating in Medicaid or Children's Basic Health Plan. In addition to this, a neighborhood socioeconomic status index weighs student needs based on five or more socioeconomic factors identified by census block.[11]

Under the old formula, at-risk students are funded through a complex formula that provides at least 12% of the district's preliminary per student funding for each at-risk student. Districts with enrollment below 459 students receive this 12% for all identified at-risk students. For larger districts, there is a concentration factor that provides more per student for the number of at-risk students above the state average percentage of at-risk students. Operationally, for districts with 439 to 50,000 students, if the state average proportion of at-risk students is 30%, a district with a lower proportion receives 12% of its preliminary per student funding for all at-risk students. If the proportion of at-risk students exceeds the state average (in this example, 30%), the additional funding per student is 12% plus 0.30 of a percentage point for each percentage point the district's percentage exceeds the state average. Thus, if a district's at-risk percentage is 40%, it receives 12% of the preliminary per student funding amount for the first 30%, and it receives 15% of its preliminary per student funding amount for the remaining ten percent of at-risk students (40% - 30% = 10%; 10% * 0.30 = 3%; 12 % + 3 % = 15 %). For districts with enrollment over 50,000, the premium factor is 0.36 of a percentage point. The premium for either district size group is capped at 30% of the per student funding amount, meaning the maximum at-risk payment per student is 30% for the percentage of at-risk students in a district that exceeds the state average.

A further complication of the current formula is that the at-risk weight is applied to each district's COL and size-adjusted per student funding amount. Thus, districts with the same at-risk weight generate

[11] Colorado Legislative Council Staff, 2024

different funding per at-risk student. This, along with the differences in the concentration factor related to size, creates different effective at-risk weights for districts with the same percentage of at-risk students.

Under the new finance formula, at-risk formula is 25% of the per student funding amount times the number of at-risk students. There is a concentration factor that uses a weight of 32% in the HB24-1448 formula for small districts that have more than the statewide average of at-risk students.

The strength of the current and HB24-1448 formulas is that both provide additional funding for at-risk students. The at-risk count uses a comprehensive approach to identifying all students who are likely to be at risk and need additional educational services.

Under the current formula, the 12% "weight" is low compared to most other state compensatory funding programs. However, Colorado is one of a few states that does offer a concentration supplement through the adjustment in funding when the proportion of at-risk students exceeds the state average. While there is little research on the effectiveness of concentration supplements, several states have begun to implement a concentration factor when the number of at-risk students reaches a certain level that varies by state. As in Colorado, other state programs only provide the concentration funding for the students above a pre-determined cutoff.

The new funding formula eliminates the concentration factor but establishes a weight of 0.25 for each at-risk student, likely providing more money for at-risk students for all districts, an obvious strength of the HB24-144 formula. This figure is in line with adjustments made in many other states. The adequacy studies suggest that the 25% weight remains lower than needed to meet the needs of at-risk students fully. There is a concentration factor that uses a weight of 32% in the HB24-144 formula for small districts that have more than the statewide average of at-risk students. One flaw in the new concentration factor is it creates a cliff for districts close to either the size or concentration cut-off. Gaining a student in overall enrollment or decreasing at-risk concentration can mean a district loses the full impact of the concentration factor based on extremely small changes in demographics.

ELL Students

ELL students are either non-English proficient or have limited English proficiency. Under the current formula, the ELL factor or weight is eight percent of the preliminary per student funding level times the ELL count. Under the HB24-1448 formula, this will increase to 25%. Like for at-risk, the current formula applies the .08 weight to the COL and size adjusted base, resulting in different effective weights for districts.

Special Education

The current funding formula does not provide any funding for special education, with all funding coming from categorical funding. The HB24-1448 formula adds funding for special education students at a .25 weight. This weight is lower than other states' funding, and the formula does not adjust for differences in the costs of special education students based on different service needs.

Online and Extended High School

Students who participate in online or extended high school programs are funded at a single rate each year under the current funding formula. Under the HB24-1448 formula, funding for these students will continue as a flat amount for each qualified student. This is a strength of both programs, allowing school districts funding for important programs that meet the needs of these students. Moreover, it represents a very small portion of total school funding in Colorado, costing less than $50 million in FY24.

Budget Stabilization Factor (BSF)

A unique component of Colorado's school funding system is the BSF. First implemented in FY11, there is a percentage reduction in each district's total funding determined annually by the Legislature. Although it has been eliminated for FY25 and is not part of the new finance formula, the BSF reduced available funding for schools for fourteen years. This was a major weakness of the funding formula, and its elimination will help school districts with their budgeting in the future. If the adequacy studies being conducted at the same time as this study lead to appropriations that fully fund those recommendations, the specter of the Budget Stabilization Factor will not complicate reaching that adequacy level.

Local and State Share of Funding

A long-time goal of the Public School Finance Act of 1994 was that the state and local school districts would each fund half of the education costs. Over time, the determination of the local share of school funding, which is mostly funded through local property taxes, has varied as relative property values change across the state and as the state has dealt with the effects of TABOR and district budgets accommodated the Budget Stabilization Factor. Before the 2008 recession, the state's share of funding was about 43%. Today, that has been reduced to approximately 35%. The goal of the HB24-1448 formula is that the state contributes 40% of education costs and districts the remaining 60%.

State funding for local school districts is the difference between a district's local share and total funding. The local share comprises current-year property taxes and prior-year collections of specific ownership taxes. Under traditional foundation programs, each district's local share would be based on a fixed property tax rate with the state funding the difference between the foundation level (in Colorado terms, the district's total funding). The process is made more complicated in Colorado due to the rules surrounding voter overrides that allow districts to keep property tax revenue above their TABOR limit, and growing assessment values in many districts; each district's total program mill level is set to the lesser of:

- 27 mills;
- The number of mills the district levied when it received voter approval to override TABOR limits increased by up to one mill each year; and
- The lowest number of mills necessary to fund the district's total program in any year since the district received voter approval.

At present, only one district, Steamboat Springs, has not received voter override approval and is subject to the TABOR property tax revenue limit. This will reduce that district's total program mill levy annually.

For Steamboat Springs and districts whose tax rate has not reached 27 mills, the state funds the difference between what districts raise through the property taxes they levy and the total funds computed through the formula. For districts that raise more than the required local share, the state requires them to buy out a portion of their categorical funding (funded by the state for districts not subject to this requirement). Districts that do not reduce their mill levies can also keep the excess revenue in a reserve fund to replace funding lost through the BSF.

The result of the complexity of the property tax levies for school districts is that most districts have levies lower than 27 mills due to their slowly increasing the mill rate annually through the TABOR override or because assessments have increased. This is a weakness in the system. In some instances, districts benefit from "excess" state aid because they are not able to fully fund their share. Moreover, in the few cases where district property tax collections exceed the total funding level, the state does not recapture those funds for use in other districts (notwithstanding the share of categorical programs those districts are required to fund). Over time, these weaknesses will become less problematic as district mill levies increase through the override, and the total funding for each district is not reduced by the BSF.

Categorical Programs

Categorical programs provide additional revenue for students with various needs or disabilities. In FY24, Colorado spent nearly half a billion dollars on categorical programs, over $340 million of which was for special education. This funding must grow by the inflation rate and cannot be reduced in economic downturns. Categorical programs can be used to ensure students with specific needs receive additional funding that is not available through the general funding formula. In addition to special education, programs include ELL, gifted and talented, small attendance centers, transportation vocational education, and several others. A strong categorical funding program is a strength of any school finance formula. The largest of these, special education, is the topic of a separate study that is part of this analysis, and appropriate funding levels for other programs may be estimated from the adequacy studies as well.

Additional Property Taxes

School districts, with voter approval, can raise additional revenue through mill levy overrides. These overrides are limited to 25% (30% for small rural districts) of a district's total funding. These levies, along with those used by school districts for debt, capital improvements, transportation, full-day kindergarten, special building maintenance, and technology, are generally not equalized with state funding. The strength of this is that districts may, at their choice, spend more money on schools than is allowed through the school funding formula. The weakness is that districts with high property wealth per student can raise more funds at lower tax rates than districts with low property wealth per student. A limited amount of matching for lower wealth districts with mill levy overrides has been put in place, which helps mitigate some of the negative impacts. The HB24-1448 formula increases the override cap for districts that have reduced revenue with new cost of living changes, something that has potential to create greater variances in local levy decisions and less overall school funding equity.

Conclusion

Colorado's Public School Finance Act of 1994 survived for thirty years largely because the legislature could modify its components to meet the ever-changing needs of public school systems. Moreover, as school finance research, and education research in general, has grown and identified new approaches to funding schools to better meet student needs, the Public School Finance Act of 1994 has been amended to focus on those needs. Beginning in FY26, under HB24-1448, Colorado will begin a six-year implementation of a new funding formula. Many of the components of the current formula remain in place, some with modifications to how they are implemented or where in the formula they are placed.

The goal of a school finance formula is to ensure all students have equal access to the resources needed to be able to meet the state's student performance standards. The funding formula is only a part of that process; the adequacy studies, of which this analysis is a part of, will provide information on whether Colorado appropriates adequate funding for its schools. Regardless of the level of funding, the school finance formula used by the state will determine how fairly those funds are distributed to school districts. The identified strengths and weaknesses of each are summarized in Table A1.2.

Table A1.2
Summary of Strengths and Weaknesses of Each Formula Component

Current Funding Formula School Finance Act of 1994		HB24-1448 Formula Effective FY26	
Strengths	**Weaknesses**	**Strengths**	**Weaknesses**
Student Count			
Once a year count with a "soft landing" for districts with declining enrollments		Once a year count with a "soft landing" for districts with declining enrollments	
Statewide Base per Student Funding			
	No clear rationale for determining the base funding level		No clear rationale for determining the base funding level
	BSF	Eliminated BSF	
Cost of Living Adjustment			
	The multiplicative method advantages districts with a high cost index	The additive method adjusts for costs at the end of the computations	
	Computation of the index is overly complex		Computation of the index could be more complex. A review of alternatives is recommended

Current Funding Formula School Finance Act of 1994		HB24-1448 Formula Effective FY26	
Strengths	**Weaknesses**	**Strengths**	**Weaknesses**
	The percentage of district expenditures for personnel is not based on actual district expenses, but rather a formula based on enrollment		The percentage of district expenditures for personnel is not based on actual district expenses, but rather a formula based on enrollment
Size Adjustment, Rural Factor, and Locale Factor			
Adjusts for additional costs of small schools through a comprehensive formula—additional funding for small rural districts	Provides an adjustment for all districts regardless of size. Even though the size of the adjustment declines, large districts may garner a large share of the funds intended for this purpose	Adjusts for additional costs of small schools through a comprehensive formula that includes both locale and district size. Most large districts will no longer receive funds for the size adjustment	The final impact of the combination of a locale and size factor leaves it unclear as to its impact
At-Risk Students			
The new formula to count at-risk students is more comprehensive. The concentration factor is likely a strength	The weight of 12% is relatively low compared to other states and lower than the current adequacy studies are likely to recommend	New weight of 25% combined with the new at-risk count will better serve at-risk students	The 25% weight, while similar to what most states currently use, may remain lower than what is needed to serve at-risk students
ELL Students			
Funding is available for ELL students	Weight of 8% is low compared to programs in other states	New weight of 25% provides more resources for ELL students	Adequacy studies may recommend higher weights
Online and Extended High School Students			
Provides funding at an amount approximately the same as the base funding level		Provides funding at an amount approximately the same as the base funding level	
Budget Stabilization Factor			
	Reduces funding across the board for all school districts providing fewer resources than the funding model estimates are needed	No longer part of the formula	

Current Funding Formula School Finance Act of 1994		**HB24-1448 Formula Effective FY26**	
Strengths	**Weaknesses**	**Strengths**	**Weaknesses**
Local and State Share of Funding			
Shared state and local funding responsibility. Limited recapture through categorical buyout requirements	Many district property tax mill rates are below the goal of 27 mills due to the time required to increase those mill rates. The budget stabilization factor's impact on total revenues	Elimination of the budget stabilization factor	Districts are able to further increase override levies if they experience reductions in their total funding level due to the cost of living adjustment

Section A: References

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Appendix Two: Landscape Analysis of Current Resourcing in Colorado Schools and District

Approach

The study team conducted a landscape analysis to examine the current resourcing in Colorado schools and districts, focused on identifying differences in how resources are utilized in different types of schools and districts and what, if any, relationships exist between school level demographics and needs, spending patterns, and academic performance. Analyses focused on both the dollars that school districts generate and how these dollars get used to fund investments in education. The study team developed two databases, one at the district level for all districts and one at the school level for all public schools in the state. The databases compile datapoints across many variables and facilitate the process of categorization of both districts and schools into key archetypes based on a variety of characteristics to allow for comparative analyses. The study team populated these databases with publicly available data and data received from the Colorado Department of Education (CDE) through a data request process. Primary data elements for the landscape analysis included:

- FY21-FY23 school-level enrollment (student membership) by grade level;
- FY21-FY23 school-level counts for demographic and student needs categories;
- School-level and student demographic grouping level proficiency-based academic performance metrics for the 2022-23 school year focused primarily on the "percentage of students meeting or exceeding expectations" for Math and ELA on the Colorado Measures of Academic Success (CMAS) and the ACT/SAT exams; [1]
- FY23 LEA-level total expenditures, school-level total expenditures, and per student expenditures by type of expenditure category for FY23 actual expenditures as reported on CDE Financial Transparency website;
- FY23 LEA-level funding by state, local, and federal sources with component details and back-up calculations;
- FY23 LEA-level Median Household Income, as used in the state's calculation for Mill Levy Override Capacity;
- FY23 school-level student-teacher ratios; and
- FY23 LEA-level non-recurring stimulus funding (ESSER) and related school-level non-recurring stimulus funding expenditures by expenditure type.

The study team utilized this data to determine proposed archetypes by which schools and districts were categorized to serve as a way of grouping schools for comparison of resource allocation and student performance across and within archetype groups. Assigning schools and districts to non-mutually exclusive archetype categories allowed the study team to facilitate peer comparison by setting the universe of data points in a given analysis to explore statistical relationships between spending and demographics from broad groups of schools to more specific and more comparable groups of schools. For example, spending per student can be driven by factors outside of student needs, including school

[1] The study team received data on student-group level performance within schools, but many schools exclude this level of granularity in reporting due to n-size.

size, district size, grades served, and school type. As such, comparing spending per student within archetype groups that reflect these factors allows for a more comparable analysis. The archetypes that emerged as part of this analysis fit broadly into three main categories:

1. **District and School Location and Size:** Geographic location by the National Center for Education Statistics (NCES) geography codes; district size (enrollment); district size (count of schools in the district); school size (enrollment); school enrollment trend / declining enrollment schools; schools adding grades and not yet at full enrollment;
2. **School Type:** sector (Charter vs. Traditional District); grade bands served (ES, MS, HS, ES/MS, MS/HS, ES/MS/HS); specialty school designation (online, schools primarily serving students with disabilities (SwD), and PreK only); and
3. **Student Demographics and Attendance:** percent Free and Reduced Lunch (FRL); percent English Learners (ELL); percent SwD; race/ethnicity make-up; attendance rates; chronic absenteeism rates.

The study team used a combination of descriptive statistics, simple linear regression, and multivariate regression analyses to explore and identify any differences in how resources are utilized in different types of schools and districts. Additionally, the team explored the relationships between school-level demographics and needs, spending patterns, and academic performance. The study team:

- Used descriptive statistics to identify total, mean, median, minimum, maximum, and quintile ranges of metrics for funding, spending, demographic and student needs concentrations, and student performance for each district and school archetype;
- Conducted simple linear regression analyses to measure the relationships between funding, spending, demographic and student needs concentrations, and student performance. For example, they explored the correlation and strength of the relationship between per student spending on instruction and the percent at-risk for elementary schools in rural settings; and
- Conducted multivariate regression to help control for different factors simultaneously, allowing the study team to better isolate the effect of specific variables on the per student spending and performance.

Current State Introduction

Attributing student outcomes directly to funding, investments, or any initiative is challenging due to the complexity of causal relationships in education. Many factors affect student outcomes, such as demographics, school leadership, school climate and culture, community involvement, and non-academic influences. While local strategic investment decision-making is just one part of a broader ecosystem influencing the student experience and academic performance, this section of the report aims to summarize the current landscape of PreK-12 public school education in Colorado and explore the relationships between school funding, spending, student needs and demographics, and academic performance.

In FY23,[2] Colorado's public schools served approximately 883K students across 178 districts and 1,935 public schools (figures are inclusive of the Charter School Institute district, which includes 43 schools

[2] This Landscape Analysis is grounded in the 2022-2023 school year, or Fiscal Year 2023 (FY23) unless otherwise noted. FY23 is the most recent year for which CDE reported school-level financial expenditure data was available at the time of this report.

that serve 22,003 students).[3] Of the schools within the 178 districts, approximately 14% are public charter schools, and three percent are online schools. While the state has experienced a 2.33% increase in overall PreK to grade twelve public school enrollment over the last decade, it has also observed a 3.10% decline from peak enrollment of 911K in FY18. The student demographic comprises 35% of students identifying as Hispanic or Latino, 51% as White, five percent as Black or African American, and smaller percentages of Asian, Native Hawaiian or Other Pacific Islander, and multi-racial backgrounds.

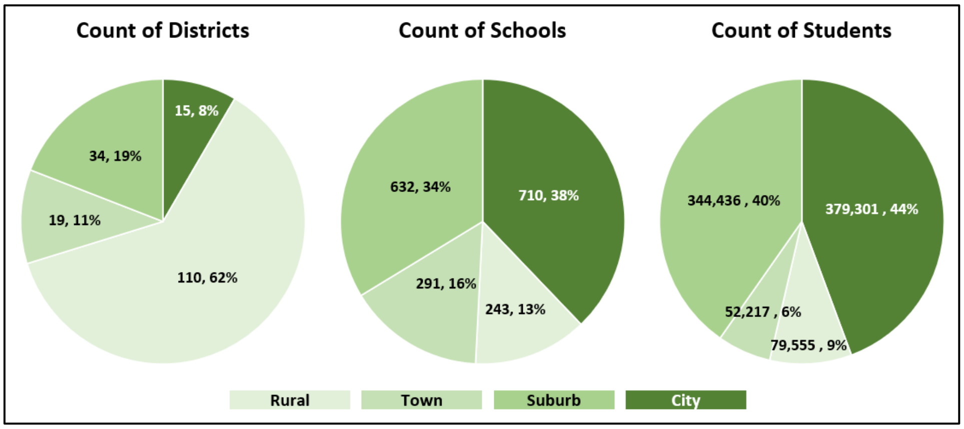
The Public School Finance Act of 1994 total program funding formula and separate categorical funding streams recognize the additional needs of specific student groups by allocating incremental funding to districts based on the count of students they serve with these needs. In Colorado, approximately 39% of students qualify for FRL, identifying them as economically disadvantaged (at-risk), and ELLs and SwD each represent 12% of the student body. While these figures help demonstrate the needs of the student population in total for the state, this report will highlight wide variation in the concentration of student needs across the state's districts and individual school landscape.[4]

The size of school districts and schools can materially influence administrative efficiency and strategies, the scope of curricular activities, student-staff ratios, resource allocation decisions, and the overall learning environment. In Colorado, the median number of schools per district is three, but districts vary significantly in size from single-school districts to over 200 schools in Denver Public Schools. The average school enrollment in FY23 was 471, with 132 schools serving fewer than 100 students and 127 schools serving more than 1,000 students.[5]

Schools and students are distributed across Colorado's diverse range of geographies. This analysis shows geographic distribution categorized using two frameworks: the NCES geography codes, which detail twelve distinct types of geographic areas, and a more generalized grouping into four categories (city, town, suburb, and rural) using these same NCES codes. These classifications often correlate with varying resource access, demographic compositions, and general educational challenges. For instance, schools in urban areas may face different infrastructural and socioeconomic challenges compared to remote, rural settings. While most Colorado school districts are rural (62%), only 15% of schools and six percent of students are in rural settings. Conversely, while only 15% of school districts are in city settings, 38% of schools and 45% of students are in city settings. Schools in Colorado's cities tend to serve more diverse and higher needs student populations.

[3] Student Membership for Colorado PreK through 12th grade public school membership, based upon the Student October Count.
[4] Race/Ethnicity and Student Needs Data Sources: Colorado State Education Snapshot; 2022-2023 Pupil Membership by Grade and School
[5] Excludes Online, Pre-K only, schools serving primarily SwD students, and schools reporting fewer than 10 students enrolled.

Figure A2.1
NCES Locale Makeup by Districts, Schools, and Students



In FY23, in total, districts across the state reported $15.5B in funding received across local, state, federal, and other sources: $7.9B (51%) in funding from local sources, $6.0B (39%) from state sources, $1.4B (9%) from federal sources, and $288M (2%) from other sources. It is important to note that FY23 federal funding includes $541M of non-recurring COVID-19 stimulus funds. While school districts' per student funding levels and proportionality of funding sources varies widely across the state, the average school district was funded at $18,160 per student, comprised of $9,205 per student (51%) in funding from local sources, $7,026 per student (39%) from state sources, $1,592 per student (9%) from federal sources, and $337 per student (2%) from other sources.[6]

CDE's Financial Transparency website provides interactive, publicly available data that shows *how* these resources are invested in schools across a variety of different expenditure categories, allowing for district-by-district and school-by-school resource allocation comparison. Districts in Colorado exercise considerable autonomy over their funding allocations, and given the diverse needs across schools, the study team observed substantial variation in both the amount of total per student spending and the specific types of resources that districts and schools prioritize for investment. While variation is high, on average schools spent $11,830 per student (76%) on Learning Environment and $3,797 per student (24%) on Operations, for total spending of $15,627 per student.[7] Learning Environment spending includes a variety of categories, including instructional, student support, instructional staff support, general administration, and school administration expenses. Conversely, operations spending includes maintenance and operations, student transportation, food services, and other business, central and enterprise expenses.

On average, compared to low-need schools, defined as the quintile with the smallest proportion of at-risk students, the quintile with the largest proportion of at-risk students (high-need schools) perform at

[6] Analysis excludes District Bond Sale Proceeds, which impacted 12 districts in FY23.
[7] Per student spending figures in this report include expenditures reported at the district-level centrally, allocated to each district's schools on a per student basis. While CDE Financial Transparency website expenditures for reported school-level spend exclude central expenditures, the study team's analysis and figures include district-level central expenditures to account for district-level discretion on coding specific types of expenditures that may be coded to a central location but benefit schools. Per student spending excludes CDE category of Construction, Debt, Refinancing & Other, which are expenditures not associated with day-to-day operation of school activities. Analysis excludes Online, Pre-K only, schools serving primarily SwD students, and outlier schools reporting below $7k and above $40k per student.

lower rates, spend more per student, enroll fewer students (smaller schools), tend to serve higher concentrations of ELLs and SwD, and have slightly more teaching staff per child enrolled. Not all high-need schools perform or spend uniformly. These differences between low- and high-need schools are illustrated below.[8] Some schools achieve higher academic outcomes despite similar or lower spending levels, suggesting the influence of effective instructional strategies and efficient resource management. This report explores spending on areas within these categories and compares levels of investment by area across schools.

Table A2.1
Enrollment, Student Demographics and Performance by Income Level

School Type	Avg. School Enrollment	% of Total Schools	% of Total Enrollment	Mean % FRL	Mean % EL	Mean % SwD	CMAS ELA Proficiency	CMAS Math Proficiency
High-Need	319	29%	21%	84%	31%	16%	28%	20%
Low-Need	669	18%	26%	12%	4%	11%	63%	53%

Table A2.1 shows student proficiency on state assessments remains a concern as it is still below pre-pandemic levels, with only 43.7% of students meeting or exceeding expectations in ELA and 32.9% in mathematics during the 2022-23 assessments. While this represents a 0.5 and 1.4 percentage point increase over the prior year for Math and ELA, respectively, it does not close the COVID-19 achievement gap. The achievement gaps are particularly pronounced among historically underserved populations, with substantial disparities observed between racial groups and between at-risk and ELL students and their peers.

School District Funding

Funding Overview

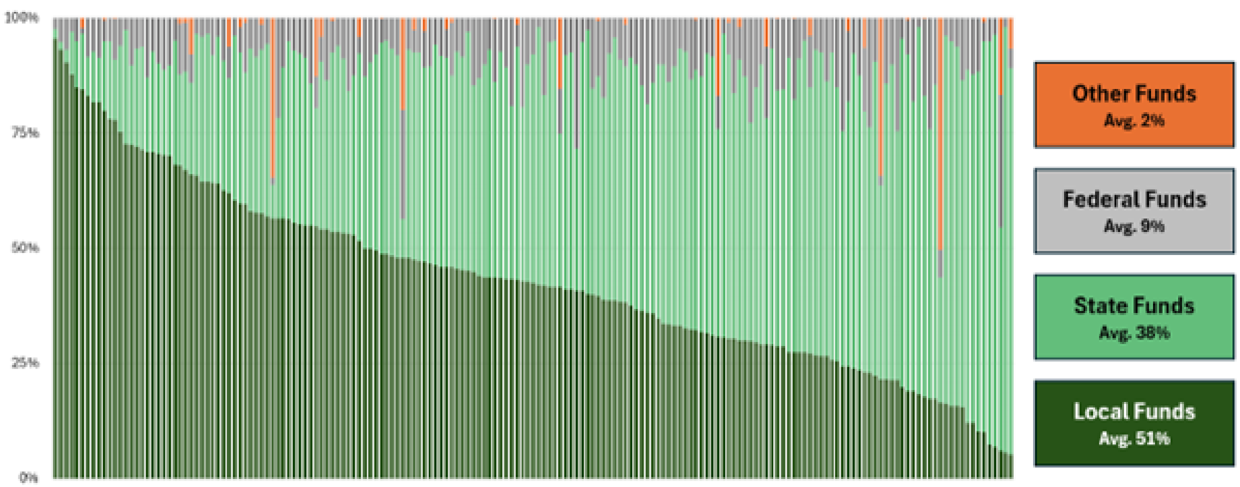
The majority of funding received by Colorado's 178 school districts is allocated through the Public School Finance Act of 1994. A district's funding under the school finance act calculation provides a per student base amount, adjustments for student characteristics (at-risk and ELL), and adjustments for district characteristics (cost of living and size). Once the total program funding is set, the split between the state and local shares is determined. The share of local funding is determined first. It primarily depends on mill levies, except for overrides, which each locality's residents vote on and are set by the state and impacted by local property values. Once the local share is established, the state determines its funding obligation based on the gap between total district funding and the local share. The study team worked with CDE to review and analyze the FY23 district level funding formula, including component details and back-up calculations, to compare how districts are funded across the state. District funding was analyzed on a total per student basis using FY23 district-funded student counts and on a proportion-to-total-

[8] Low-income districts are defined as those in the highest at-risk Quintile (i.e., having 72% or more of students classified as at-risk) and high-income districts are defined as those in the lowest at-risk quintile (i.e., having 20% or fewer of students classified as at-risk).

funding basis. Colorado school district funding ranges from $1.5M to $15B, driven primarily by the count of students served in the district.

State and local funding sources comprise about 90% of school funding in Colorado. In FY23, the average school district generated approximately 51% of its funding from local sources, 38% from state, nine percent from federal, and two percent from other sources. However, the proportion of total district funding from local, state, federal, and other sources varies widely across the state. Across all districts, while state funding as a proportion of total funds ranged from two to 92% and local funding from five to 96%, the range of state and local funds combined was much narrower from 44 to 98%. The chart below shows all 178 districts, ordered from highest to lowest, in proportion to total funding generated from local sources.

Figure A2.2
Percent Total District Funding by Funding Source



The study team analyzed many possible factors affecting FY23 funding distribution and found that district size and community income had the strongest impacts. **Even so, there is wide variability in both per student funding levels and the proportion of total district funding coming from local, state, federal, and other sources.**

All Districts

In FY23, the average school district was funded at $18,160 per student, comprised of $9,205 per student from local sources, $7,026 per student from state sources, $1,592 per student from federal sources, and $337 per student from other sources.

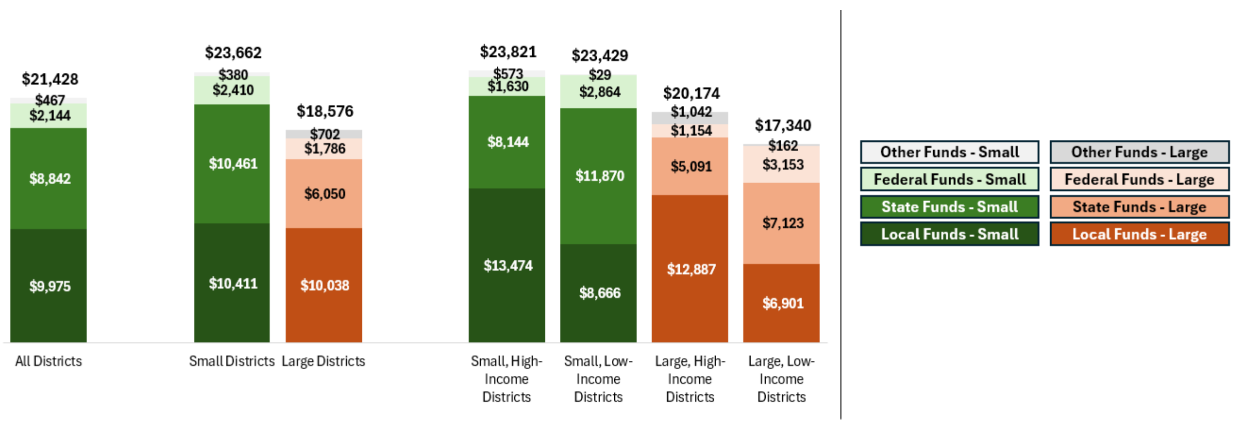
District Size

Larger districts often generate significantly higher total funding due to their higher student counts, but this does not always translate into higher per student funding. Compared to larger districts serving between 1,000 and 6,500 students, on average, smaller districts, defined as those serving fewer than 1,000 students, reported $5,086 more per student in total funding. While per student funding levels are higher for small districts in each funding level aside from other (local, state, and federal), this total difference is driven primarily by the size adjustment in the state funding formula. However, of the 108 districts classified as small, 56 do report per student funding levels below the maximum large district per student funding. Of these 56 small districts with lower funding, 84% are rural, 46% are low-income, and 46% are low-wealth. While these districts serve the average proportion of SwD (state average of 13%) they serve a significantly smaller proportion of ELL students (7% versus the state average of 12%).

Community Income Levels

Small, low-income districts report higher total revenue per student despite smaller local revenue contributions. This difference is largely made up of state funding, which, considering that this difference is not seen across low- and high-income large districts, can be attributed to the size adjustment components of the funding formula. In all, low-income districts have a higher average size adjustment at 1.6 compared to 1.2 for high-income districts, causing an increase in state funding, a product of the state equalization formula.[9]

Figure A2.3
Average Reported Funding per Student Funded by Small and Large Districts



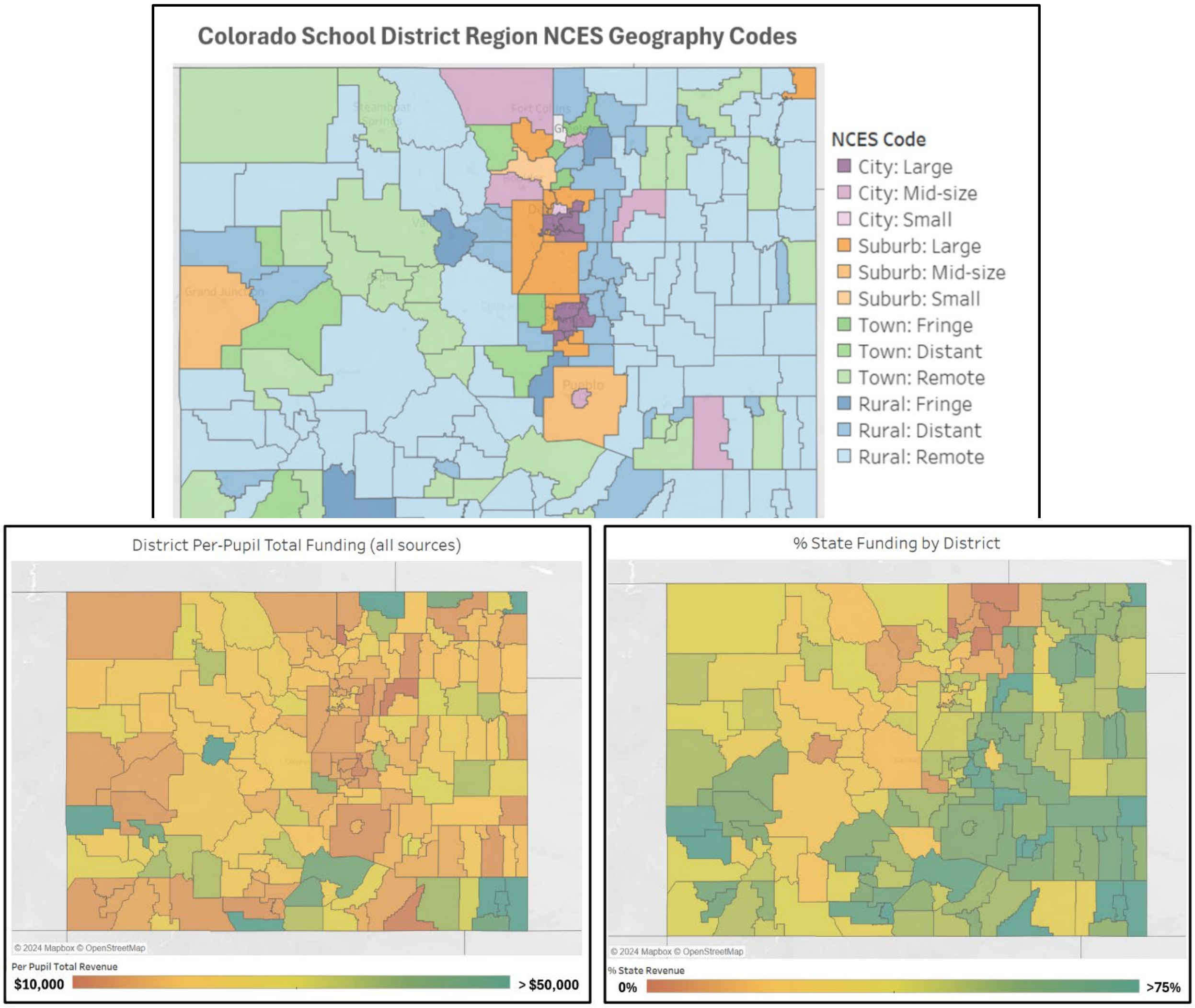
Funding by Geographic Location

A geographic analysis of Colorado's school district funding further highlights the considerable variation in per student funding levels and the sources from which districts derive their funds. The maps below show Colorado school district regions, their associated NCES geography codes, and the variability in district total per student funding inclusive of local, state, federal, and other funding sources.

[9] All Districts n-size of 178:

- Small Districts defined as those with fewer than 1,000 enrolled students, n = 108; Large Districts defined as those with more than 6,500 enrolled students, n = 27.
- High Cost-of-Living (COL) Districts defined as those with a cost-of-living multiplier greater than the statewide median of 1.167, n = 88; Low Cost-of-Living Districts defined as those with a cost-of-living multiplier less than the statewide median of 1.167, n = 90.
- High-income Districts defined as those with a median household income above $84,366, n = 60; Low-income Districts defined as those with a median household income below $67,658, n = 59.

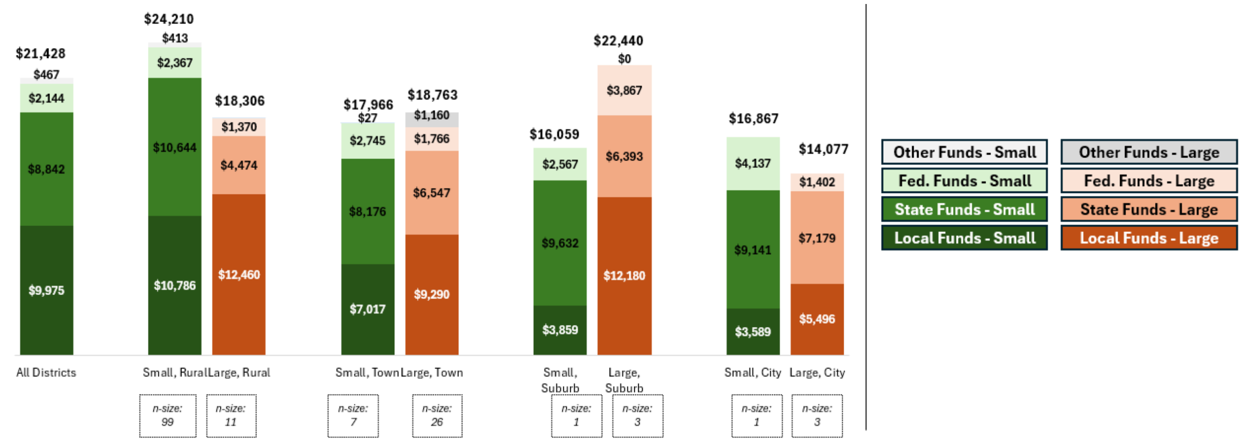
Figure A2.4
Colorado School District Region NCES Geography Code



- **Significant Variation in Rural Funding:** Rural districts exhibit the widest variation in each of the following: state funding per student, local funding per student, the proportion of state funding to the total, and the proportion of local funding to the total.
- **Higher Per Student Funding in Rural Districts:** Mean and median per student funding for both state and local funding sources is highest in rural districts. This could be due, in part, to the size-factor adjustment, as 90% of rural districts are also classified as small.
- **Lower Per Student Funding in City Districts:** Regardless of size, city districts, which typically have higher concentrations of at-risk students, largely report lower local, state, and total per student funding despite higher levels of federal at-risk-related funding. The lower total per student funding suggests the state funding formula is not adequately accounting for at-risk populations prevalent in city districts.

Figure A2.5 shows the average reported per student spending by state, local, and federal funding for the four NCES geography groupings, further broken down by district size.

Figure A2.5
Average Reported per Student Funding by NCES Codes



School-level Resourcing

Colorado's school districts exercise autonomy over how the funding they generate gets allocated to their individual schools. Generally, smaller, higher-needs schools, schools with larger concentrations of at-risk, ELLs, SwD, spend more per student. Throughout the study, the team analyzed how schools' resource allocation, influenced by district and school size, and how various student needs impact student outcomes. Analysis reveals particular differences across district and school size and strong correlations related to at-risk and ELL students, which are comprehensively examined in the following sections of the report.

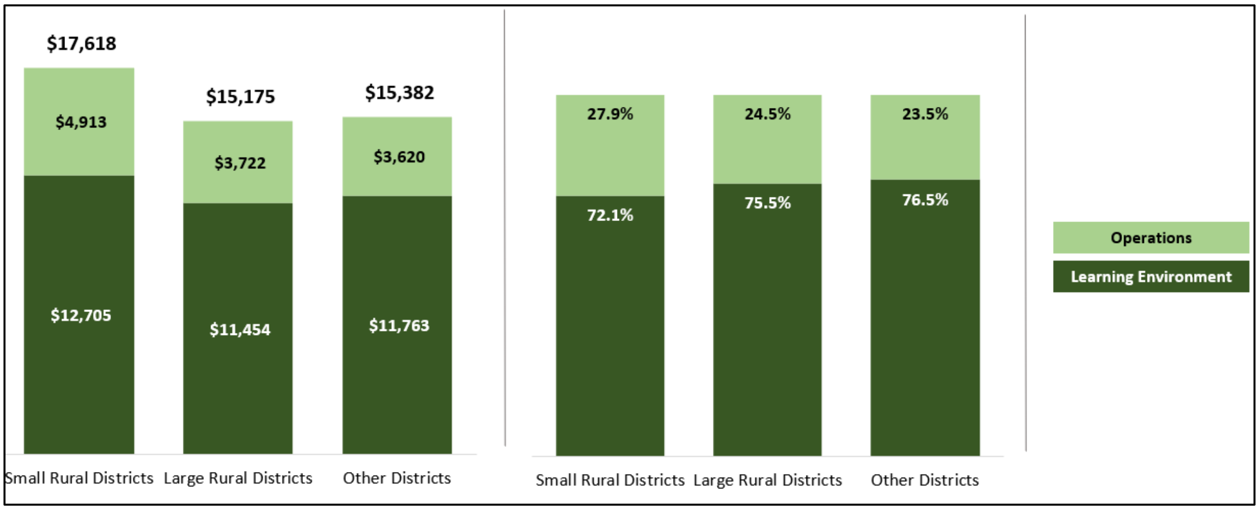
District Size

There are 110 rural districts and 291 rural schools in Colorado, resulting in 2.6 schools per rural district. This is in stark contrast to city districts, which average 47.3 schools per district, and suburban districts which average 33.3 schools per district.

In May 2024, Governor Polis signed into law an act that re-upped and increased state funding for both small and large rural districts.[10] "Small rural districts" were defined in the act as rural districts with fewer than 1,000 enrolled students; "large rural districts" were defined as rural districts with more than 1,000 enrolled students but fewer than 6,500. **Currently, small rural districts spend more on a per student basis than their larger counterparts and all other, non-rural districts. These districts also spend smaller proportions of their budgets on Learning Environment when compared to other districts.**

[10] SB24-188

Figure A2.6
Average Per Student Spending Categories by District Classification (values and percentages)



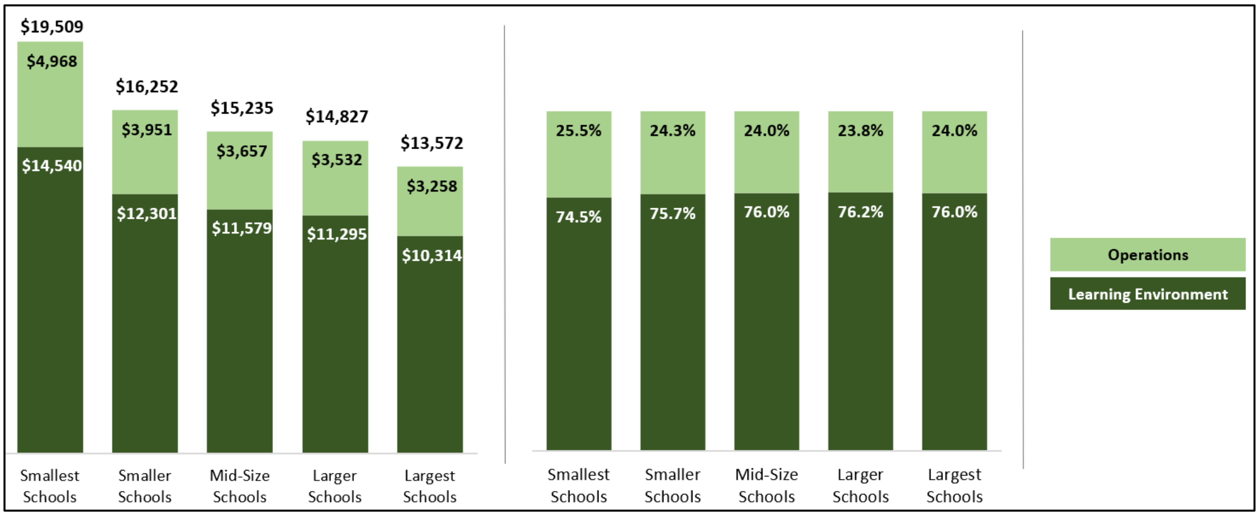
On average, the student body served by small rural districts reflects that of the state. This subset of districts enrolls at-risk students and SwD in similar proportions to statewide averages. At-risk enrollment in large rural districts differs from the state; on average, **35% of students in large rural districts are at-risk, notably lower than the statewide average of 46%.**

School Size

School size in Colorado ranges widely, with an average and median school enrollment of 457 and 366 students, respectively.[11] As schools grow, they benefit from efficiencies; consequently, larger schools report lower average total per student spending. Schools of all sizes report spending similar proportions of their budget on Learning Environment and Operations, but the smallest schools (in the first size quintile) spend slightly less on Learning Environment and more on Operations than schools in other quintiles.

[11] Figures based on 2022-2023 reported total school enrollment.

Figure A2.7
Average Per Student Spending Categories by Size Quintile (values and percentages)

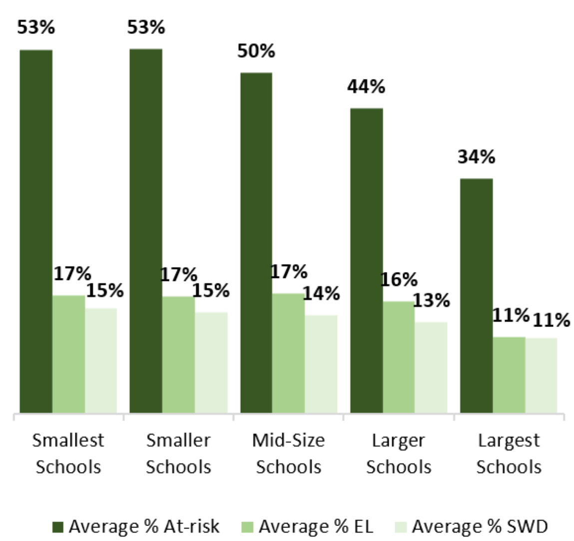


Although the smallest schools spend the most on average per student, they tend to pay their teachers lower salaries, with an average salary of roughly $62K in comparison to the average salary of the largest schools, roughly $71K. They also employ more teachers per student compared to the largest schools, 16:1 compared to 19:1. **Almost half of the state's smallest schools are located in rural districts. Further, 61% of rural schools fall within the smallest size quintile**; town districts have the next highest concentration of small schools, with 27% of their schools in the smallest quintile. City and suburb districts have significantly fewer small schools, with a majority of their schools falling between the third and fifth size quintiles.

Generally, smaller schools enroll higher proportions of at-risk students and SwD. On average, the share of at-risk students in the smallest quintile schools is 53%, a notable increase from the 34% at-risk in the largest quintile schools. Additionally, smallest quintile schools enroll SwD at higher rates, with average SwD enrollment at 18% in smallest vs. 11% in largest quintile schools, as shown in Figure A2.8.

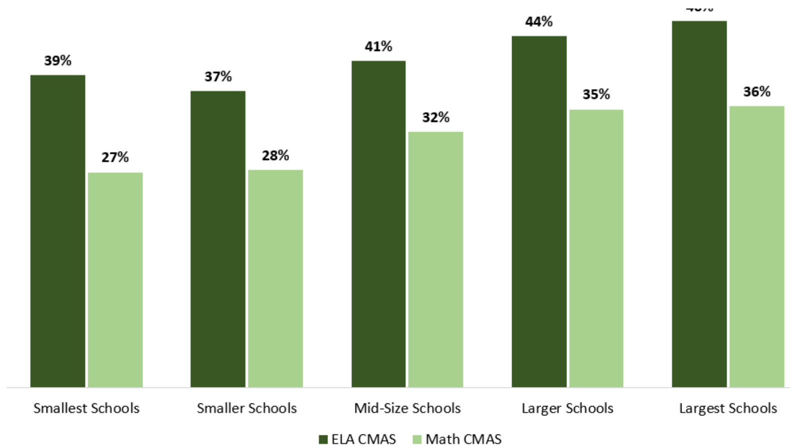
Performance analysis across size quintiles reveals that smaller schools face larger achievement gaps. Though there are wide ranges of scores across all quintiles, on average, smallest quintile schools report lower scores across ELA and Math for both the CMAS and SAT.

Figure A2.8
Student Demographics by Size Quintile



Notably, on almost all tests, at-risk students and SwD performed at similar rates in the smallest and largest quintile schools, implying that school size does not impact at-risk or SwD achievement gaps in either direction.

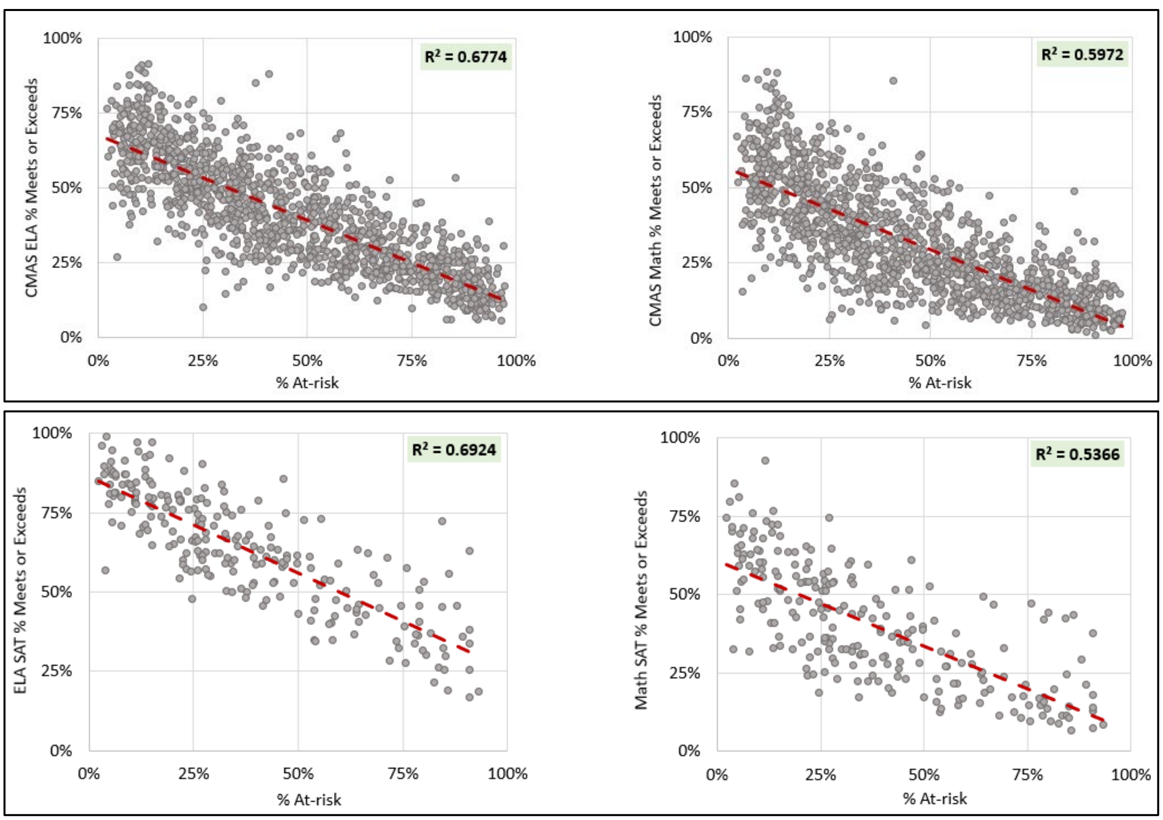
Figure A2.9
Student Performance by Size Quintile



Student Needs: At-Risk

Across all archetypes, the study team found that a school's concentration of students identified as FRL (at-risk) was the strongest predictor of school CMAS and SAT performance. Schools with higher concentrations of at-risk students face larger achievement gaps on average. This relationship remains true when looking at districts of different sizes but is more pronounced for large districts.

Figure A2.10:
CMAS and SAT Performance by At-risk Concentration



However, when controlling for district size, the relationship between at-risk concentration and achievement varies. As shown below, there is no relationship for small districts; though the n-size is small, there is a strong, negative relationship between at-risk and performance in large districts.

Figure A2.11
CMAS Performance by At-Risk Concentration, Small Districts

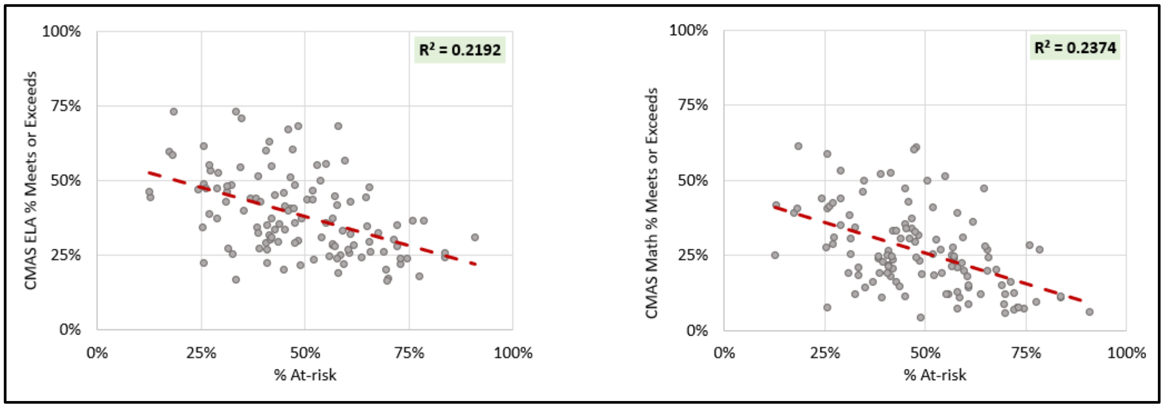
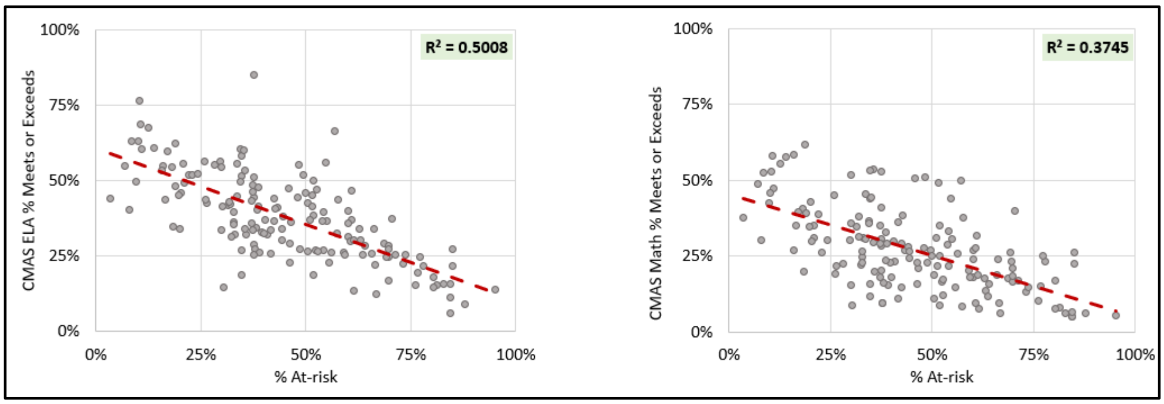


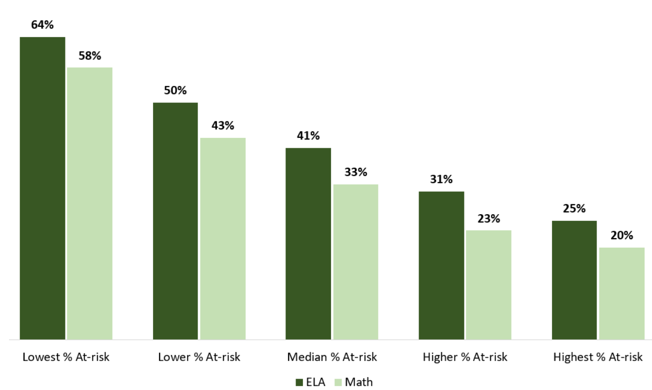
Figure A2.12
CMAS Performance by At-Risk Concentration, Large Districts



To understand how schools with different concentrations of low-income students compare, the study team organized all Colorado public schools into at-risk quintiles, with the first quintile being the schools with the lowest concentrations of at-risk students ("high-income") and the fifth quintile being the schools with the highest concentrations of at-risk students ("low-income"). An analysis of the state's elementary schools shows that on average, the **achievement gap between low-income and high-income schools is 39 percentage points for ELA and 38 percentage points for Math.**[12]

Narrowing the focus, the study team examined the performance of student subgroups against at-risk concentration and found that as the proportion of at-risk students increases, low-income students and students with other needs, particularly ELL and

Figure A2.13: Student Performance by At-Risk



[12] Achievement gap here is proficiency based and defined as the difference in CDE-reported school-level percentage of students meeting or exceeding expectations in ELA and Math on the Colorado Measures of Academic Success (CMAS) exam.

SwD, face larger achievement gaps. There is more variability present within these relationships, with the at-risk concentration's effect on ELL student achievement being the strongest correlation.

Figure A2.14
At-Risk CMAS Performance by At-Risk Concentration

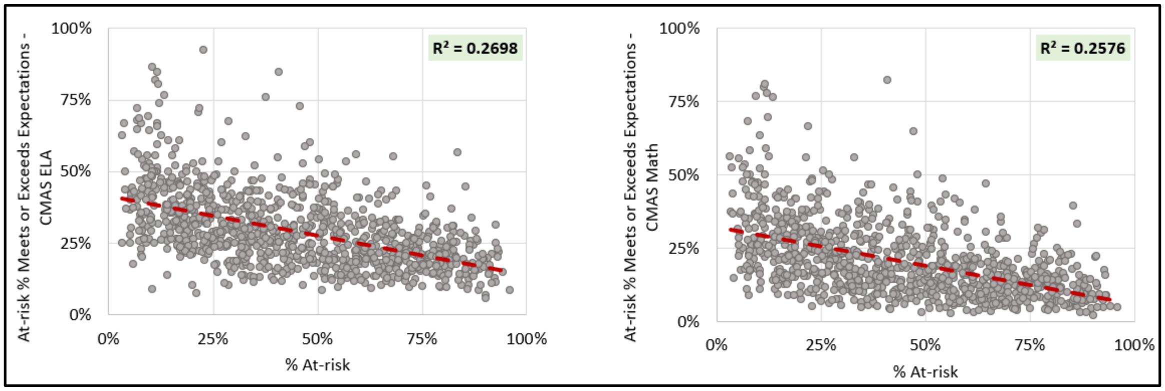


Figure A2.15
ELL CMAS Performance by At-Risk Concentration

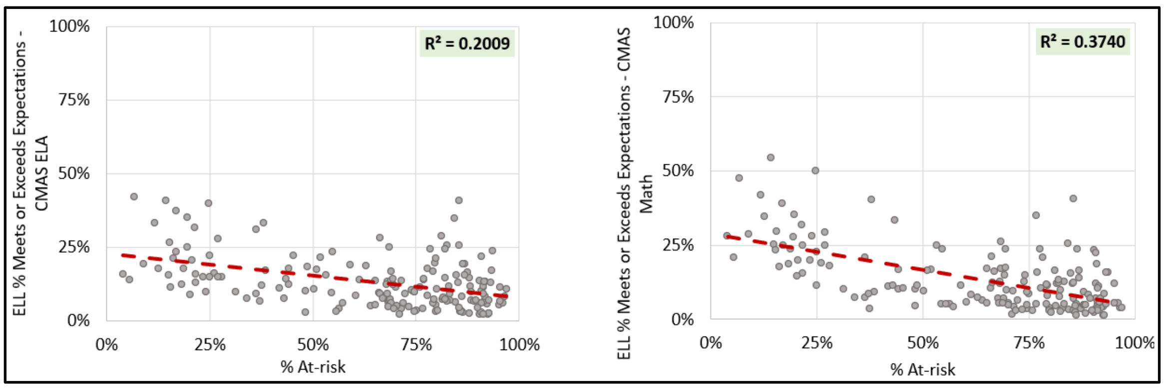
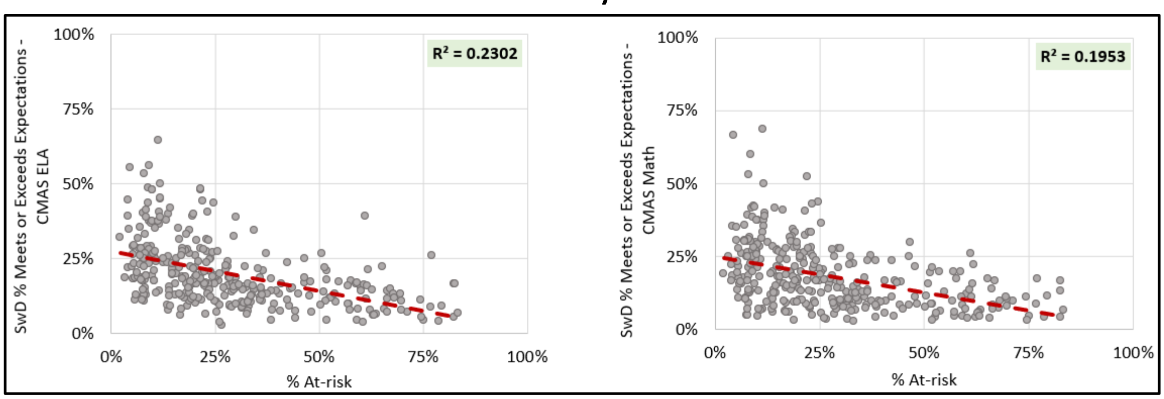


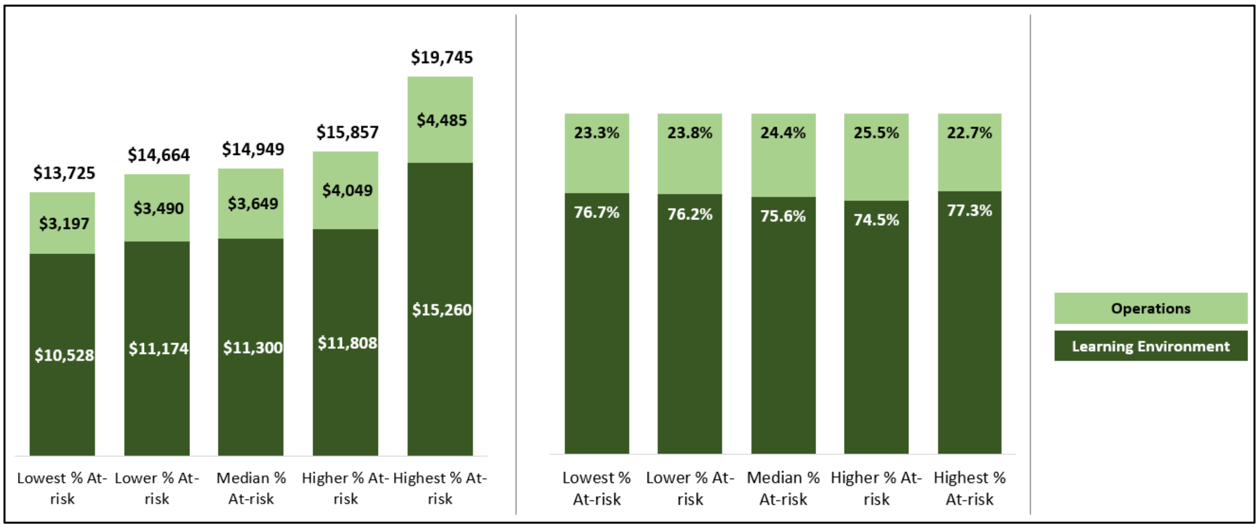
Figure A2.16
SwD CMAS Performance by At-Risk Concentration



The study team used FY23 school-level actual expenditure data as reported on CDE Financial Transparency website to compare how schools are spending.[13] On average, compared to high-income schools, low-income schools face higher achievement gaps, spend $3,977 more per student,[14] enroll fewer students (smaller schools), tend to serve higher concentrations of ELLs and SwD, and have slightly lower student-teacher ratios. An analysis of all schools' spending by the at-risk quintile shows that, on average, low-income schools spend more per student on both Learning Environment and Operations. The proportion of schools' total spending on the learning environment compared to operations is relatively similar across at-risk quintiles, as shown in the illustration below. Differences in district size do not easily explain this spending difference as 14% of low-income districts are classified as large and 13% are small.

Figure A2.17

Average Per Student Spending Categories by At-Risk Quintile (Values and Percentages)



Although schools with the highest percentage of at-risk students spend more per student on average, they do not pay their teachers higher salaries, with an average teacher salary of roughly $70K in comparison to schools with the lowest percentage of at-risk students who have an average teacher salary of $72K. They do, however, employ more teachers for every student, with an average student teacher ratio of 16:1 compared to 18:1.

The study team also examined the geographic distribution of districts across at-risk quintiles, finding that city districts have the highest concentration of low-income schools at 40% of total city districts,

[13] Per student spending figures included in this report include expenditures reported at the district-level centrally, allocated to each district's schools on a per student basis. While CDE Financial Transparency website expenditures for reported school-level spend, the study team's analysis and figures include district-level central expenditures to account for district-level discretion on coding specific types of expenditures that may be coded to a central location but benefit schools. Per student spending excludes CDE category of Construction, Debt, Refinancing & Other, which are expenditures not associated with day-to-day operation of school activities.

[14] Analysis excludes Online, Pre-K only, schools serving primarily SwD students, and outlier schools reporting below $7k and above $40k per student. As pointed out in the District-Level Funding section, higher concentrations of low-income students can generate more state and categorical funding for districts. Low-income schools defined as schools in the 5th at-risk Quintile and high-income schools defined as schools in the 1st at-risk Quintile.

while rural districts have the lowest at 22% of total rural districts. The geographic distribution of districts among at-risk quintiles is illustrated below:

Table A2.2

At-Risk Concentration by District Geography

Geography	District Count	Lowest % At-risk	Lower % At-risk	Median % At-risk	Higher % At-risk	Highest % At-risk
Rural	110	15%	19%	24%	20%	22%
Town	34	18%	18%	6%	29%	29%
City	15	27%	20%	0%	13%	40%
Suburb	19	26%	26%	26%	5%	16%

1. Controlling for school size, percent white students, percent ELL, and percent SwD, a statistically significant relationship exists between at-risk concentration and the proportion of students who meet CMAS proficiency. For every percent increase in at-risk concentration, we find a 0.5% decrease in CMAS proficiency, suggesting high at-risk schools face larger achievement gaps than other schools even after for controlling for other factors.

2. There is some statistically significant relationship between at-risk concentration and higher per student expenditures. After controlling for enrollment size, percent white students, percent ELL, and percent SwD, the analysis finds that higher at-risk schools spend on average more per student.[9] When we break down this analysis by expenditure type, we find that high-at-risk schools spend slightly less on instruction and slightly more on student and staff support.

3. There is no statistically significant relationship between at-risk concentration and school revenue. However, because district data rather than school data drove this analysis, this analysis may not be statistically significant because of a low n-size.

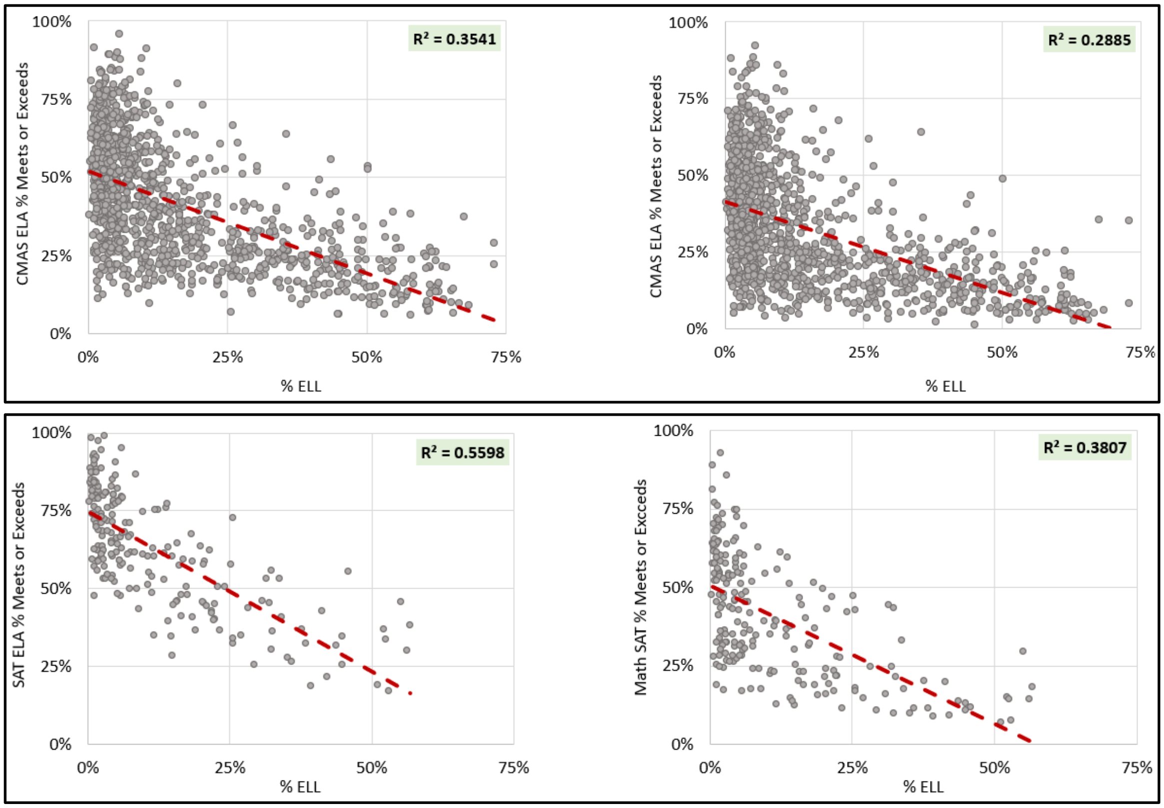
Together, these relationships suggest that at-risk concentration has a meaningful impact on student achievement and necessitates a higher level of per student spending. It would appear the current state funding formula does not provide adequate funding to ensure the required resources are available.

Student Needs: English Learners

Similarly to students identified by at-risk status, ELLs often face distinct challenges that can influence their academic performance and resourcing needs at the schools that serve them. The study team found that the percentage of ELLs in a school correlates with school academic performance, and schools with higher concentrations of ELLs generally face larger achievement gaps on the CMAS and SAT.

[15] Note: This model has a fairly low R squared (0.34), which suggests that other unaccounted factors could drive per student spending beyond the at-risk concentration

Figure A2.18
CMAS and SAT Performance by ELL Concentration

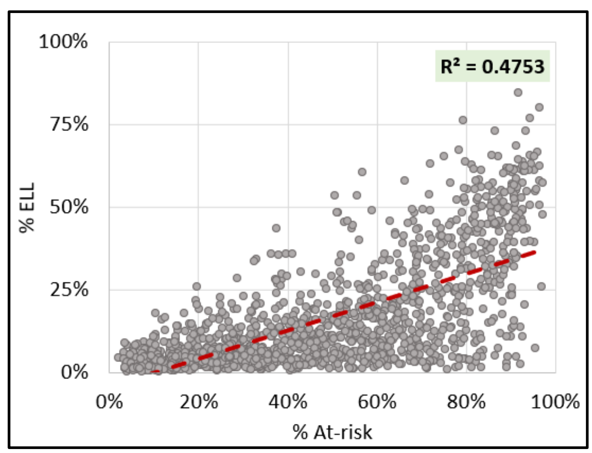


Additionally, **there is a correlation between percent ELL and percent at-risk, showing that schools with higher ELL populations are more likely to also serve a higher concentration of low-income students.**

Schools in the highest ELL quintile, on average, spend more per student than their counterparts in lower quintiles.[10] Schools in the highest ELL quintile spend approximately $3,952 more per student than schools in the lowest quintile and spend more in nearly all of CDE's expenditure categories.

For schools in the highest ELL quintile, greater portions of the budget are dedicated to student supports and instructional staff supports. While they spend about $2,300 more per student on instructional resources, they spend a smaller portion of their overall budget on

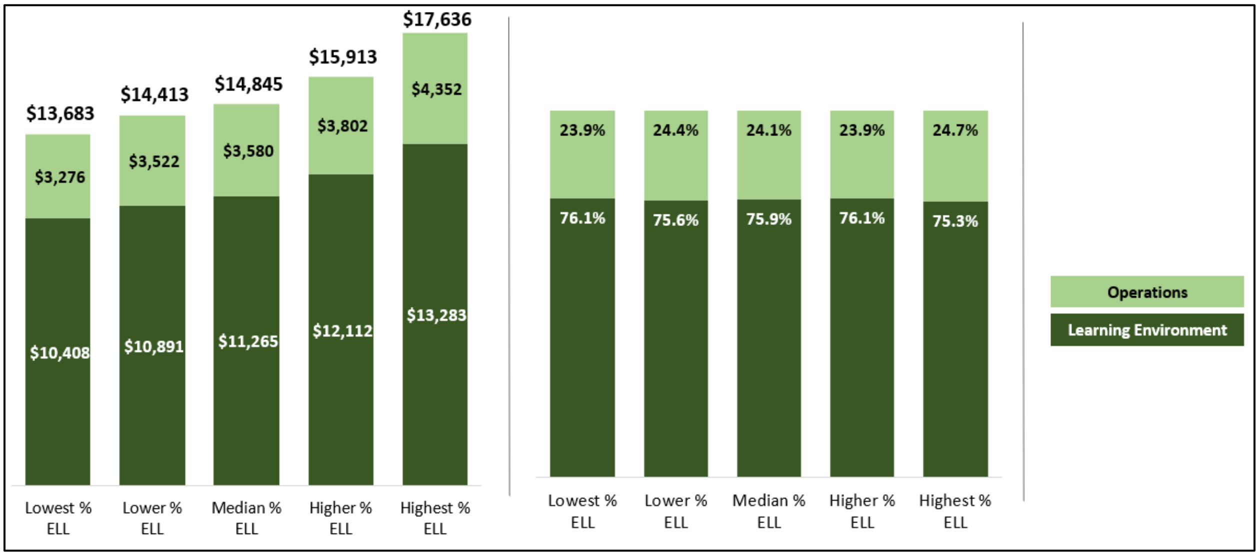
Figure A2.19
ELL Concentration by At-risk Concentration



[16] Analysis excludes Online, Pre-K only, schools serving primarily SwD students, and outlier schools reporting below $7k and above $40k per student.

instruction as compared to schools in the lowest ELL quintile, as illustrated in Figure A2.20 below.

Figure A2.20
Average Per Student Spending Categories by ELL Quintile (values and percentages)



Though teacher pay and student-to-teacher ratios are roughly the same across schools with the lowest percentage of ELLs and schools with the highest percentage of ELLs, not all schools with high concentrations of ELLs perform or spend uniformly. Some schools manage to achieve higher academic outcomes despite similar or lower spending levels, suggesting the influence of effective instructional strategies and efficient resource management.

Landscape Analysis Conclusion

This landscape analysis utilized a range of data, metrics, and methodologies to examine and compare resourcing across Colorado's districts and schools. Among other findings, the data show that:

- Schools with higher concentrations of at-risk student needs face more significant achievement gaps and higher spending needs. However, these schools, particularly in city districts, are not receiving adequate additional funding to address the higher needs of their student populations;
- As schools grow, they benefit from efficiencies; consequently, larger schools report a lower average total per student spending;
- While schools of all sizes report spending similar proportions of their budget on Learning Environment and Operations, the smallest schools in the state spend slightly less on Learning Environment and more on Operations than larger schools. Additionally, they tend to pay their teachers lower average salaries and have lower student-to-teacher ratios;
- The proportion of ELL and at-risk students in schools is correlated. On average, in schools with high ELL concentrations, there are also high at-risk concentrations, which indicates an increasing level of support needed in such schools.
- On average, smaller districts, many of which are rural, generate more funds per student, though they do not serve the highest concentrations of high-needs students.

While this report may confirm suspected trends and relationships in some areas and shed light on others, it reveals a consistent theme of variability evident across the state and within distinct school archetype groupings. This variability, particularly in performance among schools with similar budgets and student demographics, highlights the existence of influential factors not analyzed here or captured by traditional data collection methods. To that end, the landscape analysis and related findings should be considered as a component of the larger study to help inform overall recommendations within the Colorado context.

Appendix Three: Impacts of Wealth and Income

Introduction

As detailed in the Landscape Analysis of this report (Appendix Two), districts in Colorado generate funding through federal, state, and local sources, with local contributions primarily derived from property taxes based on Net Assessed Valuation (NAV) and adjusted by voter-approved mill levies. In FY23, approximately 90% of school funding in Colorado was sourced from state and local contributions, with significant variability across districts in both per student funding levels and the proportions from each source.

The local mill levy override system further increases school funding variability, as it allows districts to increase local funding for schools. This mechanism predominantly benefits districts with higher property values and median incomes, contributing to disparity, with wealthier districts generally securing more funding independent of state contributions. The state attempts to mitigate this disparity through a mill levy state matching program, which totaled just $10M in FY23 and $21M in FY24, a small fraction of the state's total budget for education funding. In addition to the mill levy state match, the state funding formula is designed to target resources to communities with high concentrations of at-risk students, and the Landscape Analysis confirms higher levels of state funding and higher levels of school-level spending at schools and districts with high concentrations of at-risk students.

This study explores the impact of varying levels of community wealth and income on the funding available to school districts and, consequently, the education opportunities available to students. It examines the juxtaposition of districts with high property tax bases that may not necessarily represent high-income populations against those with lower bases that might not capture significant low-income populations. It will show that the state funding formula directionally combats the disparity caused by local funding generated. However, even with these corrective efforts, when looking at local and state funding combined, low community wealth districts (or those with lower local property tax bases) still need to be funded compared to their high-wealth counterparts. When controlling for size, high-income and low-wealth districts generate the least combined local and state funding per student, while high-income and high-wealth districts generate the most.

Definitions

- **At-risk:** A proxy for the socioeconomic status of the student population. It is used in this section as an additional measure of relative family income levels. This district-level metric indicates the percentage of students eligible for free or reduced-price meals.
- **District Override Mill Capacity:** A formula-based criteria used by CDE to determine which districts are eligible for the Mill Levy Override (MLO) State Match, calculated using the following formula: [(district average median income – state's lowest district average median income) / (state's median income gap)].

- **Local Property Tax Funding per Student:** The amount each district generates from local property taxes divided by the total number of students.[1]
- **Median Household Income (MHI):** A measure of relative family income levels and socioeconomic status, the median annual income for all households within a school district region's geographic boundary, encompassing income from all sources, provided by CDE at the school district level.
- **Mill and Mill Levy:** A mill is a tax rate applied to NAV, where one mill represents one dollar of tax per $1,000 of assessed property value. The mill levy is the combined number of mills applied to the assessed property within a school district to fund its budget. In Colorado, the state requires school districts to impose a tax of up to $27.00 for every $1,000 of assessed local property wealth to participate in the state's school funding formula.[2]
- **Mill Levy Override (MLO):** Voter-approved additional mills above the base mill levy, designated to increase funding for education beyond the base budget.
- **Mill Levy Override State Match**: A financial mechanism where the state provides additional funding to districts with mill levy overrides, aimed at equalizing educational opportunities by supplementing local efforts with state resources.
- **Net Assessed Valuation (NAV):** The total dollar value assigned to taxable property within a district, forming the basis for calculating property taxes.
- **NAV per Student:** A measure of relative community wealth, district's NAV divided by the total number of students served, indicating the district's potential revenue capacity from property taxes.
- **Small Districts:** Districts with fewer than 1,000 students enrolled. [3]

[1] Because districts are not permitted to levy a higher property tax than is necessary to fund their statutory school finance obligations without voter approval, a limit is set at a lower level in districts with high property values and may decrease as property values rise. A limit is also set at a lower level in districts whose voters have not approved a tax rate of $27.00 per $1,000 of property wealth at any point since 1994.
[2] Definition: https://www.cde.state.co.us/cdefinance/fy2018-19brochure.
[3] Definition: https://leg.colorado.gov/bills/sb24-188.

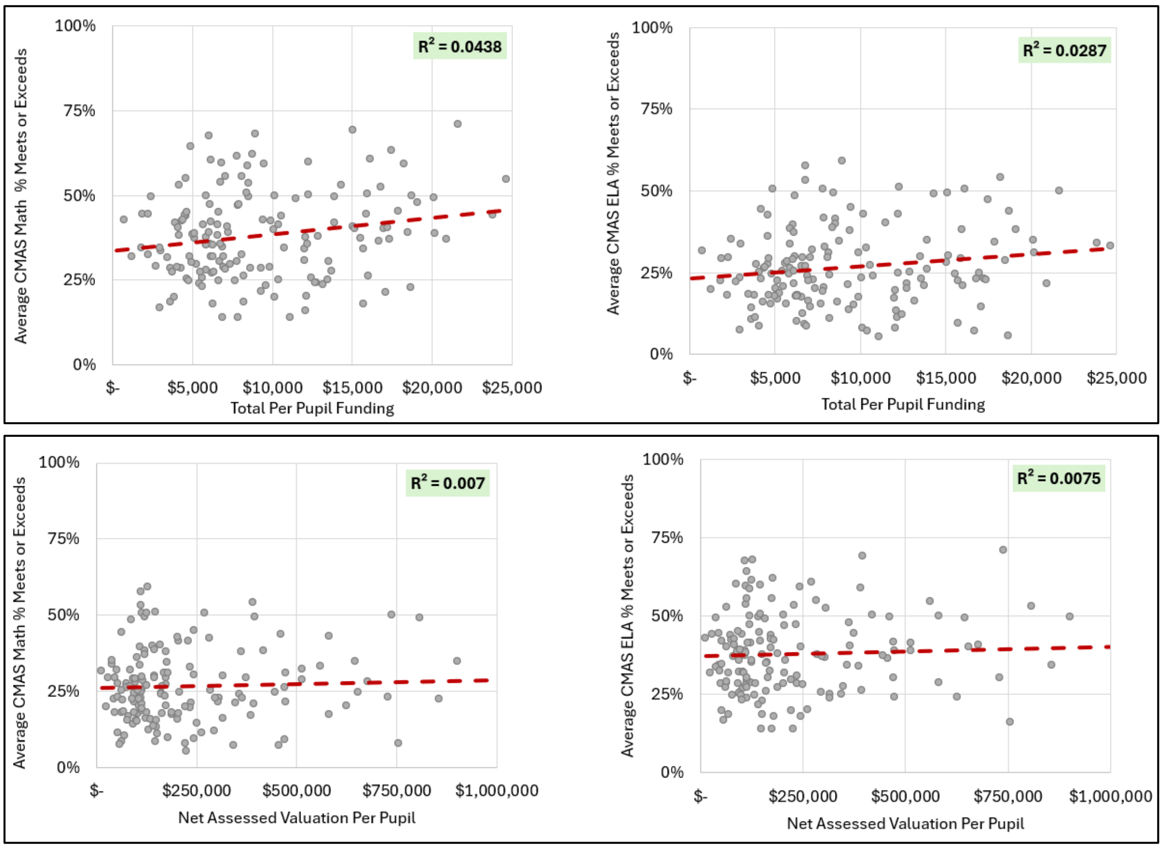
Findings

Wealth and Income vs. Performance

Community wealth, as measured by NAV per student and total local funding per student, is a poor predictor of student performance. As shown in Figure A3.1, the strength of the correlation as measured by R-squared is extremely weak.

Figure A3.1

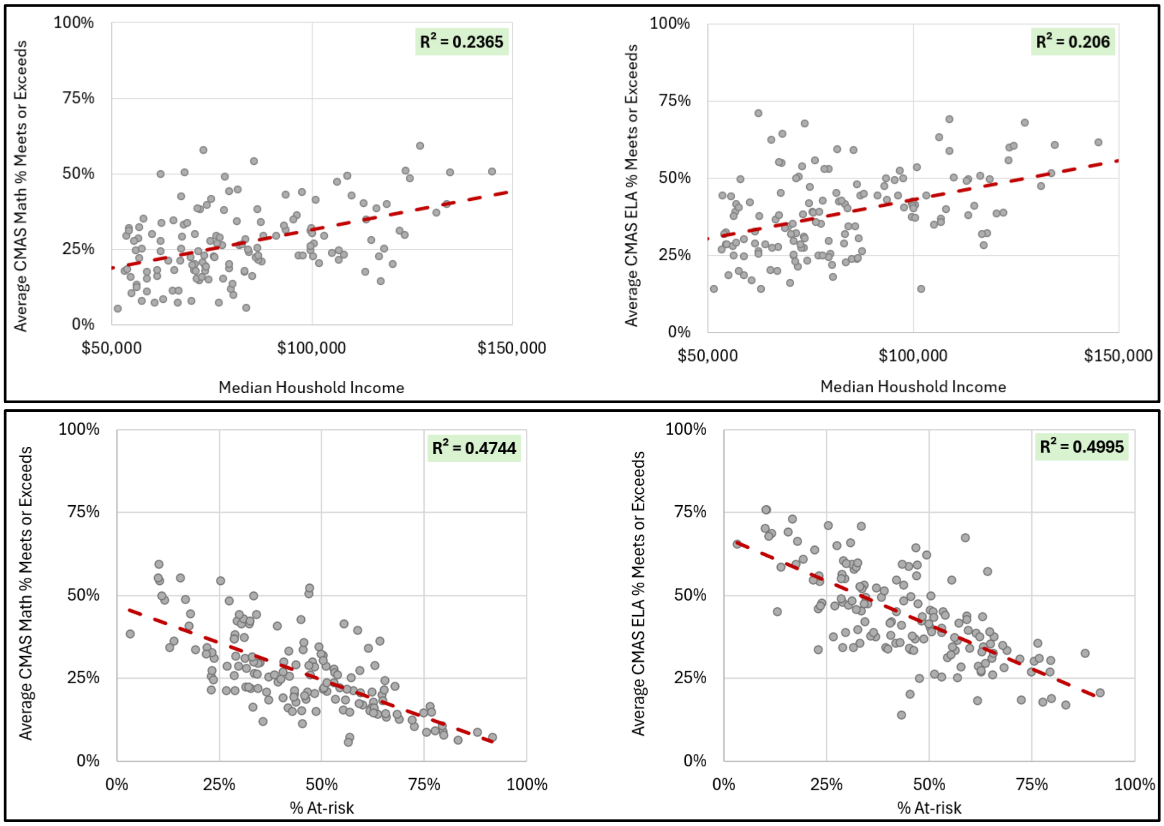
Average CMAS Math and ELA Performance by Local per Student Funding and NAV per Student



Conversely, as highlighted in the Landscape Analysis and shown in Figure A3.2, **district family income metrics, as measured by both percent at-risk and MHI, have a positive but weak relationship with student performance**. On average, districts serving higher concentrations of low-income students underperform those with lower concentrations. Of note, the strength of the relationship is stronger for the percent at-risk than for MHI.

Figure A3.2

Average CMAS Math and ELA Performance by Median Household Income (MHI) and % At-risk



Mill Levy Overrides

Districts can increase funding for education above the total program from the state funding formula base mill levy with voter-approved additional mills through MLO. **In FY23,[4] 114 (64%) school districts generated funding from MLO, while 64 (36%) did not.** On top of that, beginning in FY23, the state passed a bill directing CDE to allocate funds as a match to the local revenue raised (MLO State Match funds). Of the 114 school districts generating MLO revenue in FY23:

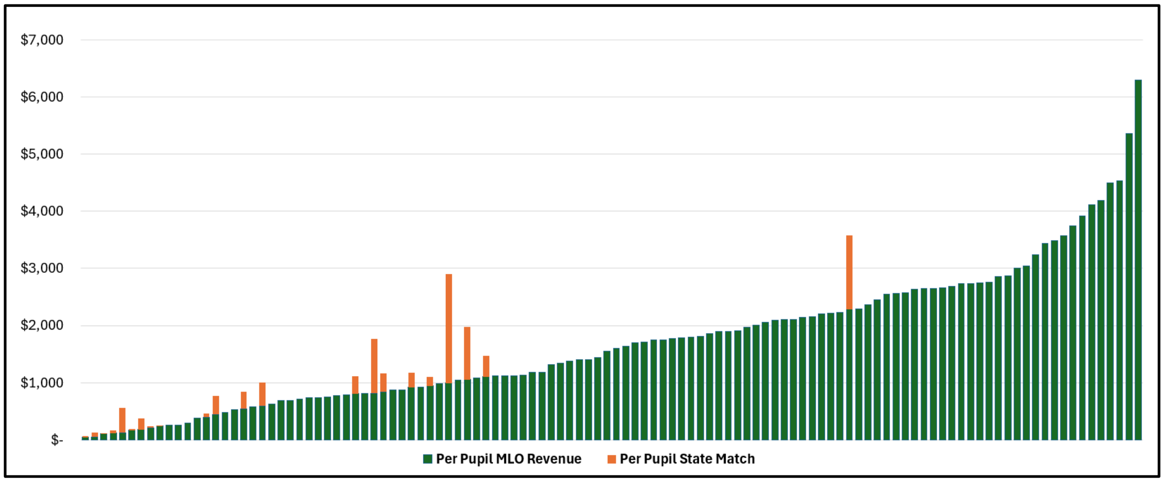
- Total MLO revenue generated ranged widely across districts, from about $16K to over $240M, with a median MLO of $347K;
- On a per student basis, MLO revenue generated ranged from $45 per student to $6,299 per student, with a median override of $735 per student;
- Six districts (5%) raised up to their maximum allowable MLO;[5] and
- 22 districts (19%) received state matching funds.

As shown in Figure A3.3, there is a wide range of MLO revenue on a per student basis across districts, and generally, state matching funds are allocated sporadically. This is reflective of the small size of the

[4] This analysis is grounded in the 2022-2023 school year, or Fiscal Year 2023 (FY23) unless otherwise noted, to align to the Landscape Analysis. FY23 is the most recent year for which CDE reported school-level financial expenditure data was available at the time of this report.
[5] Adams-Arapahoe 28J, Aspen 1, Cherry Creek 5, Dever County 1, Park County RE-2, and Sheridan 2.

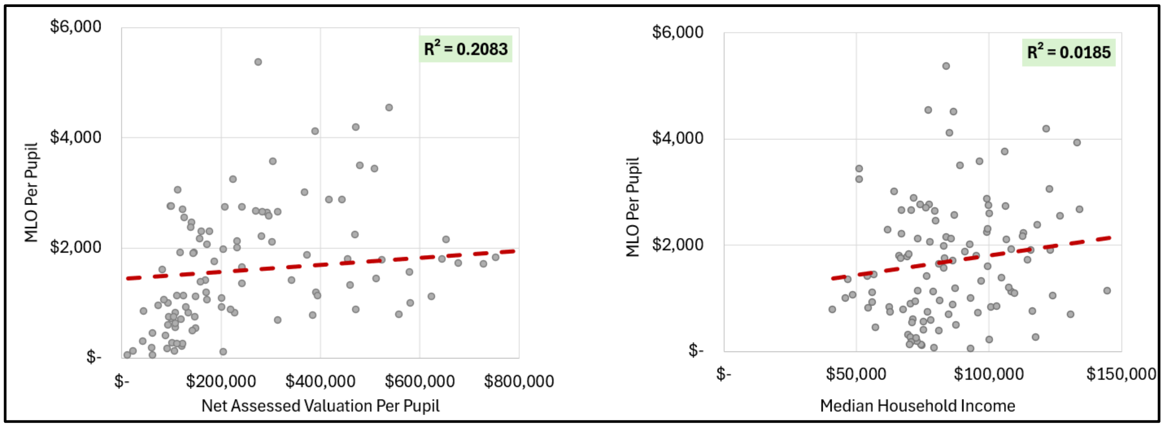
total allocation from the state, at roughly $10M in FY23. [6] This funding represents less than one percent of total program funding for public schools that year.

Figure A3.3
Mill Levy Override (MLO) and State Match per Student Revenue by District



Additionally, though total mill levy revenue generally increases as district wealth increases, regression analysis (Figure A3.4) found no real relationship between MLO revenue values and district levels of wealth and income, as measured by MHI and NAV.

Figure A3.4
Per Student MLO Revenue by Net Asset Valuation (NAV) Per Pupil and Median Household Income (MHI)



Of the 64 school districts not generating MLO revenue in FY23:

- 51 (80%) are rural districts, as defined by NCES geography codes;
- 55 (86%) are small districts, as defined by serving fewer than 1,000 students;

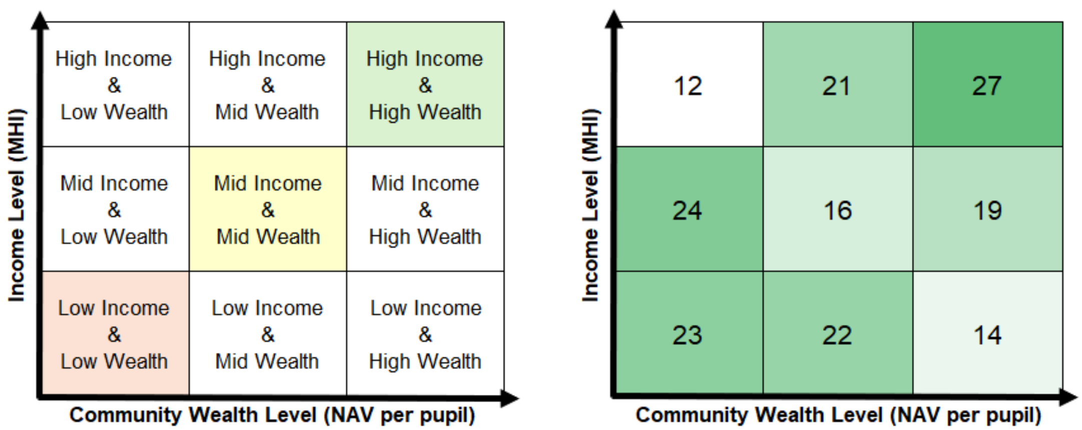
[6] Source: https://leg.colorado.gov/sites/default/files/mlo_match_interested_persons_memo_0.pdf.

- The group exhibits a wide range along the socioeconomic spectrum, from seven to 88% at-risk, with an average of 52% at-risk, higher than the state average;
- The group exhibits a wide range of total local funding generated for the finance act (including mill levy revenue, specific ownership tax revenue, and other local revenue), from $1,864 to $29,927 of local funding per student, with an average of $7,434 per student;
- 32 (50%) are lower performing, as defined by the lowest two performance quintiles using the percentage of students meeting or exceeding expectations on CMAS;
- 32 (50%) are in the "Low-income & Medium-wealth" (the lowest tertile for MHI and middle tertile for NAV per student) and "Low-income & Low-wealth" (lowest MHI tertile and lowest NAV per student tertile) district type categories (see next section).

Combined Effects of Wealth and Income - District Type Categories

To better isolate the impacts of wealth versus income and acknowledge unique community circumstances across the state, the study team classified all 178 school districts into distinct categories based on the combined effects of wealth and income levels. For this analysis, districts are assigned to tertiles, low, medium (mid), and high, for MHI and NAV per student, creating nine distinct district types:[7]

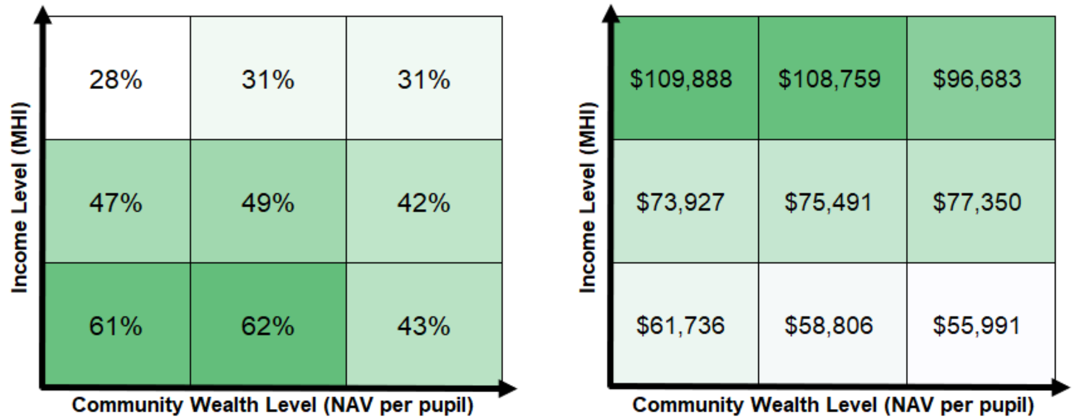
Figure A3.5
District Type Categories (left) and Count of Districts (right) by Type



Across these district-type categories, districts classified as high-income districts are in areas with the highest reported MHI levels and serve the lowest concentrations of at-risk students, whereas low-income districts have both the lowest MHI levels and serve the highest concentrations of at-risk students.

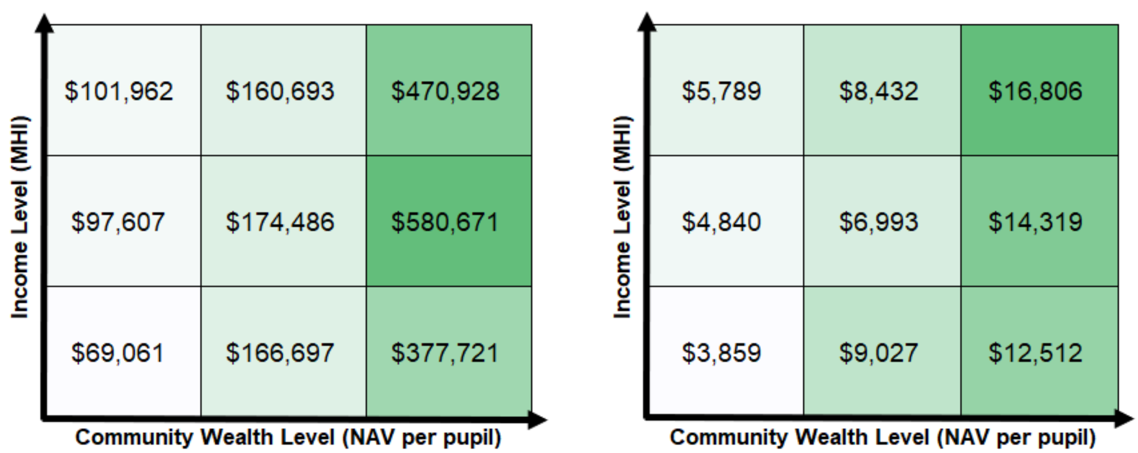
[7] Low-income Tertile range: $34,545-$67,658 MHI; Mid-income Tertile range: $67,658-$84,366 MHI; High-income Tertile range: $84,366-$151,914 MHI; Low-wealth Tertile range: $12,002-$116,596 NAV per student; Mid-wealth Tertile range: $116,596-$251,498 NAV per student; High-wealth Tertile range: $251,498-$8,398,748 NAV per student.

Figure A3.6
Median % At-risk (left) and Median District Household Income (MHI) (right)



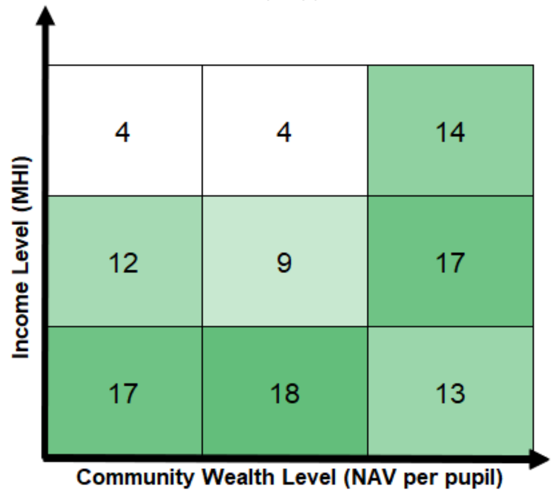
Additionally, districts classified as high-wealth districts for this analysis, regardless of family income classification, are in areas with the highest reported NAV per student and generate the highest levels of local property tax funding per student.

Figure A3.7
Median NAV per Student (left) and Median Local Property Tax School Funding per Student (right)



Narrowing the analysis further, the study team examined these relationships solely in small districts and found that the statewide relationships persisted. Of the 108 districts classified as small, **44% are considered low-income. However, a large portion (27%) of the low-income, small districts are also considered high-wealth.** Further, across income types, 41% of small districts are also high-wealth.

Figure A3.8
Count of Districts by Type – Small Districts



Additionally, when comparing small districts to the state, the study team found that small districts report lower averages across wealth and income metrics. Specifically, the highest income, small districts still report a lower average MHI than the state; the same can be said about the lowest-income, small districts. In terms of wealth, though there is some variation in NAV per student, local property tax funding per student is consistently lower in small districts compared to their statewide counterparts.

Figure A3.9
Median % At-risk (left) and Median District Household Income (MHI) (right) – Small Districts

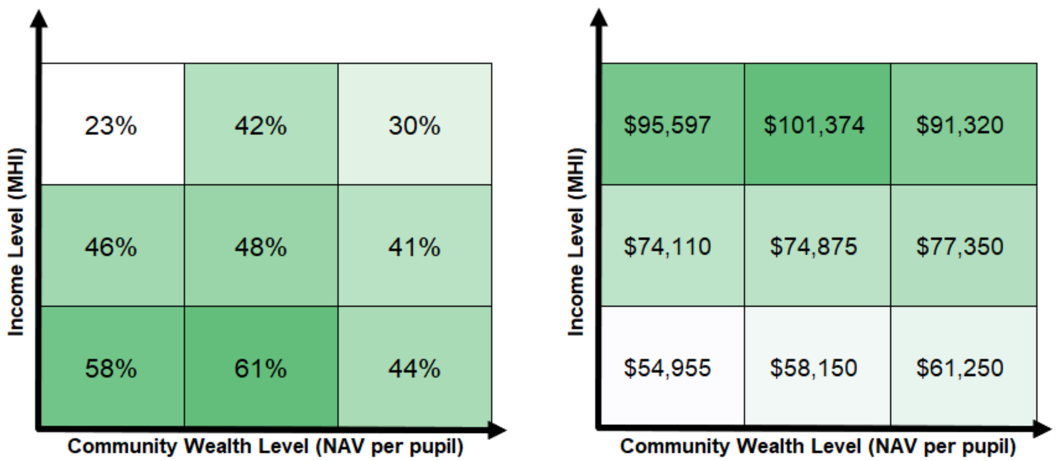
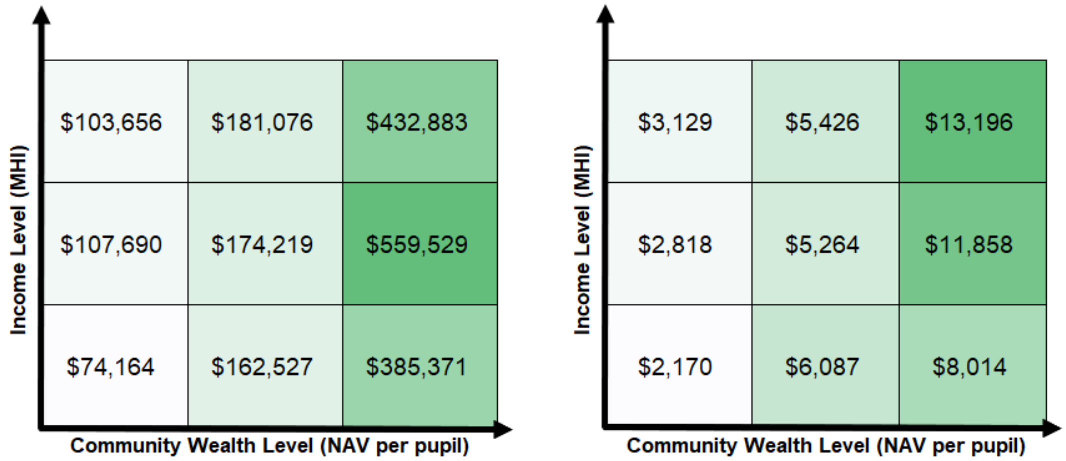


Figure A3.10

Median Net Asset Valuation (NAV) per Student (left) and Median Local Property Tax School Funding per Student (right) – Small Districts



The study team's analysis shows that voters in both higher-income and higher-wealth districts are more likely to approve MLOs for increased local education funding. 93% of high-income and high-wealth districts generate MLO revenues, whereas just 13% of low-income and low-wealth districts generate MLO revenues. Within each wealth-level tertile, as income-level increases, the percentage of districts generating MLO increases.

Conversely, state match funds favor districts in lower income and lower wealth tertiles, suggesting the matching mechanism is rewarding districts as intended, regardless of how low funding levels for state match funds may be. Of the 22 districts receiving the state match, 15 are in the low-wealth tertile, and zero are in the high-wealth tertile. This aligns with the program's design, which allocates matching funds depending on a district's override mill capacity. Override mill capacity is a function of median household income; essentially, as a district's median household income goes up, its override mill capacity goes up because the government can reasonably rely on that district to raise additional local funds. A district with low median household income has a lower override mill capacity, meaning the state government cannot reasonably expect the district to raise a large amount of additional local funds, thereby qualifying that district for state match funds.

Figure A3.11
Count of Districts with MLO (left) and Percent of Districts with MLO (right)

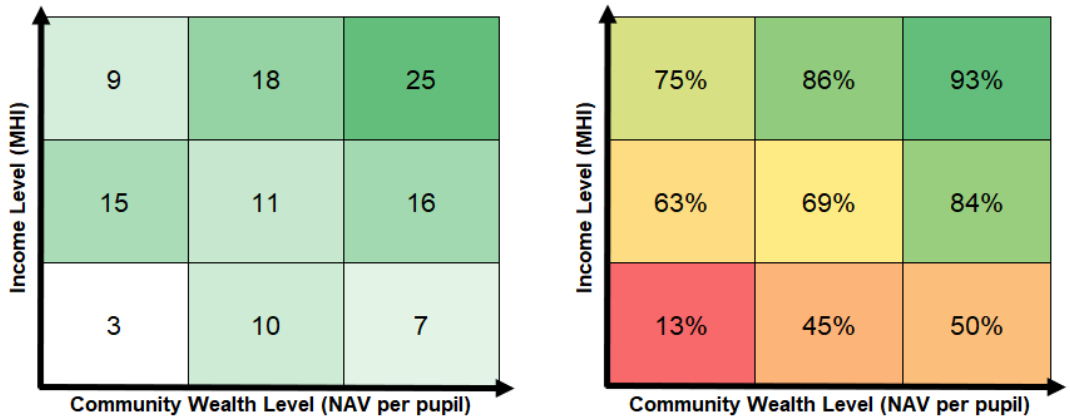
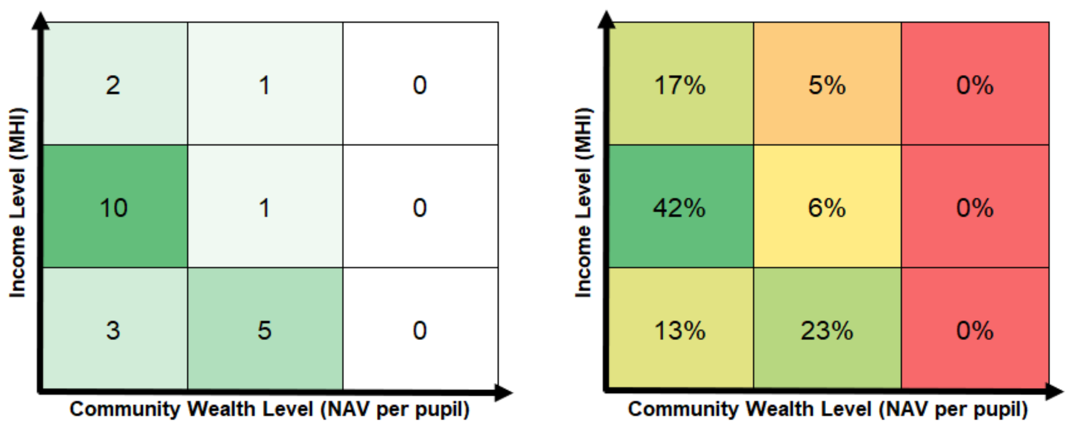


Figure A3.12
Count of Districts with MLO State Match (left) and Percent of Districts with MLO State Match (right)



The matrices below show funding generated through MLOs and the MLO state match. The average and median override mills matrices show median and average counts of overrides for those districts that receive these revenue streams, and the average MLO and MLO state match per student matrices show total funding among all districts in the tertile divided by total students enrolled at districts in that same tertile, for those districts that receive these revenue streams. These charts confirm that:

- Though high-wealth districts, on average, approve fewer override mills, they generate more MLO funding per student than low-wealth districts with MLOs within each income level tertile;
- High-income & high-wealth districts approve the fewest override mills but generate the highest MLO funding per student, with 93% of districts in this category generating MLOs; and
- Only 13% of low-income & low-wealth districts generate MLO funding. Those that do generate, on average, a similar number of override mills as districts with higher levels of wealth.

Figure A3.13

Average Override Mills (left) and Median Override Mills (right) for LEAs Generating

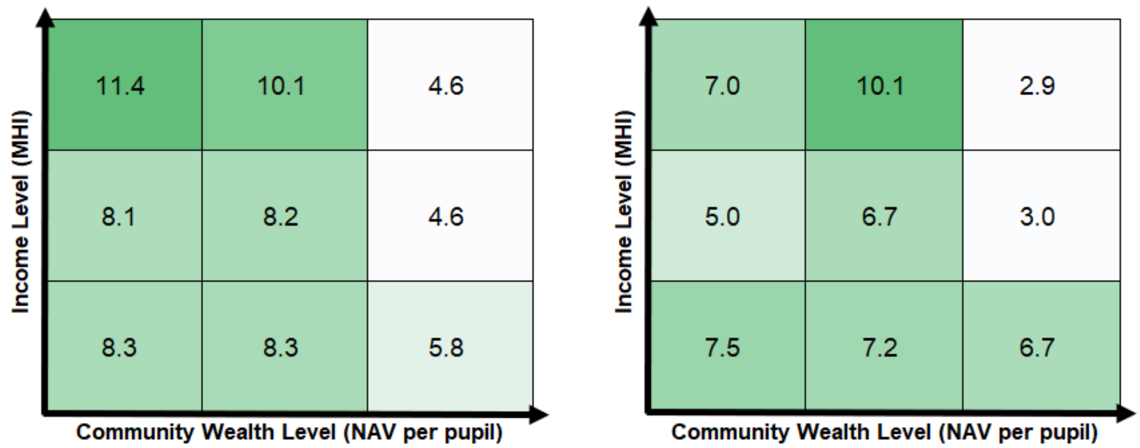
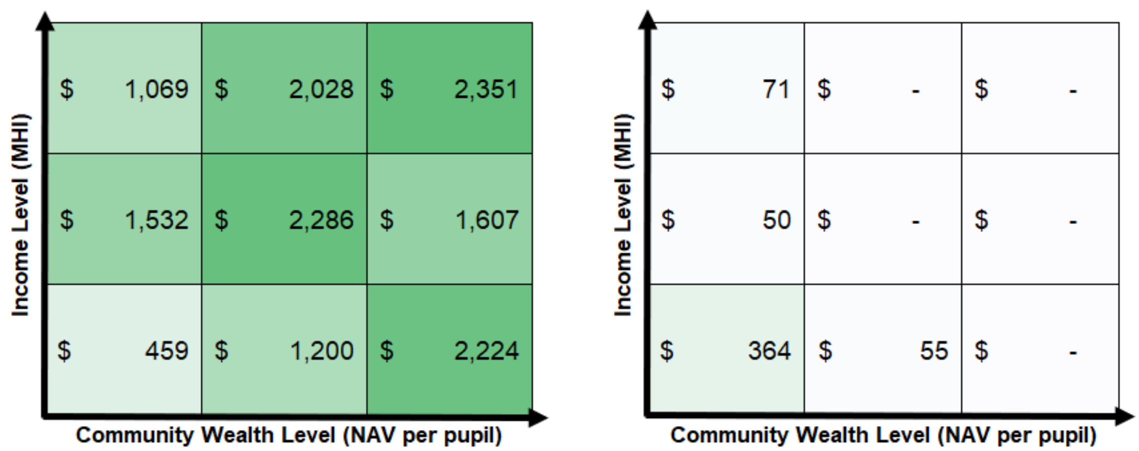


Figure A3.14

Average MLO per Student (left) and MLO State Match (right) per Student for LEAs Generating



When controlling for size, similar trends emerge between districts of different income and wealth levels, as shown below in Figure A3.15. Generally, high-income & high-wealth districts generate more MLO revenue per student, and low-income & low-wealth districts receive more state match funds.

Figure A3.15
Average Override Mills (left) and Median Override Mills (right) for LEAs Generating – Small Districts

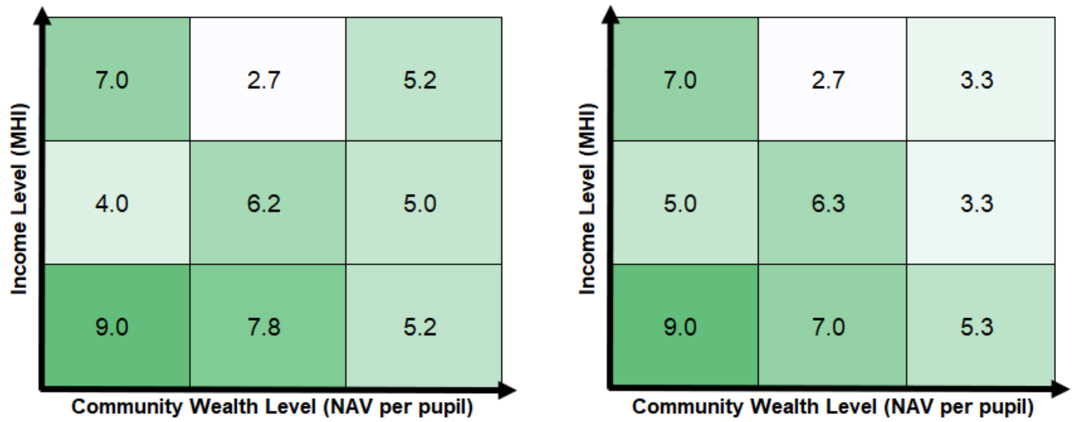
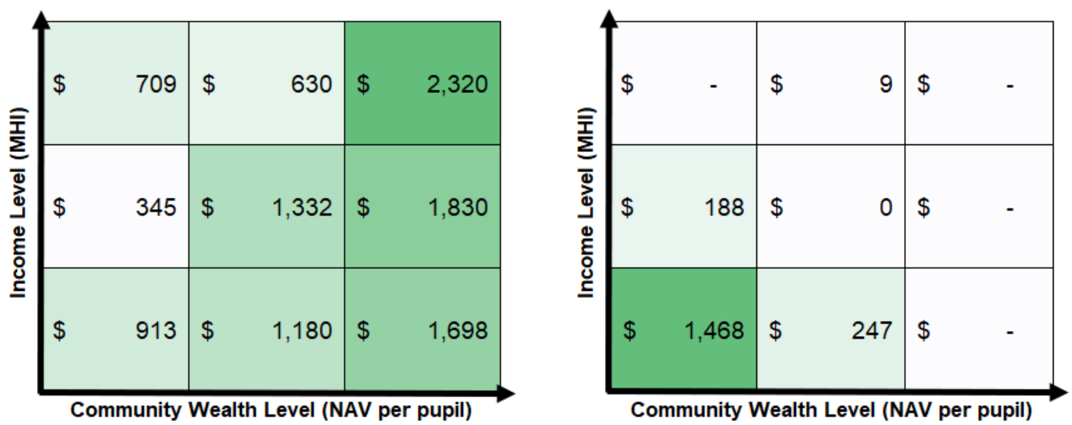


Figure A3.16
Average MLO per Student (left) and MLO State Match per Student (right) for LEAs Generating – Small Districts



Finally, the study team examined the differences in critical educational inputs across districts of differing wealth and income, specifically comparing districts that generate MLO revenue to those that do not. The study found several key findings, illustrated using matrices below:

- Regardless of MLO revenue generation, higher-income and higher-wealth districts, on average, pay their teachers higher salaries. Low-income & high-wealth districts maintain the lowest student-to-teacher ratios, while the highest-income districts maintain the highest ratios;
- When comparing districts that generate MLO revenue to those that do not, on average, medium-income & medium-wealth districts that generate MLO revenue have a teacher salary $2,375 higher than those that do not generate MLO revenue, representing the smallest increase across groupings. On average, high-income & medium-wealth districts that generate MLO revenue have **an average teacher salary $18,878 higher than those that do not generate MLO revenue**, representing the largest increase across groupings. Low-income & low-wealth and high-income

& high-wealth districts that generate MLO revenue both saw equal decreases in the number of students per teacher.

Figure A3.17

Average Teacher Salary (left) and Student-to-Teacher Ratio (right) for LEAs Generating

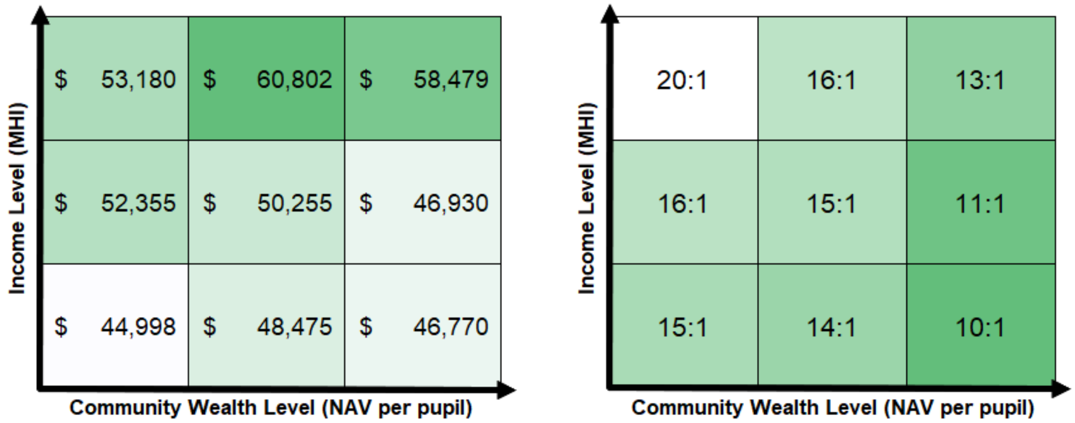
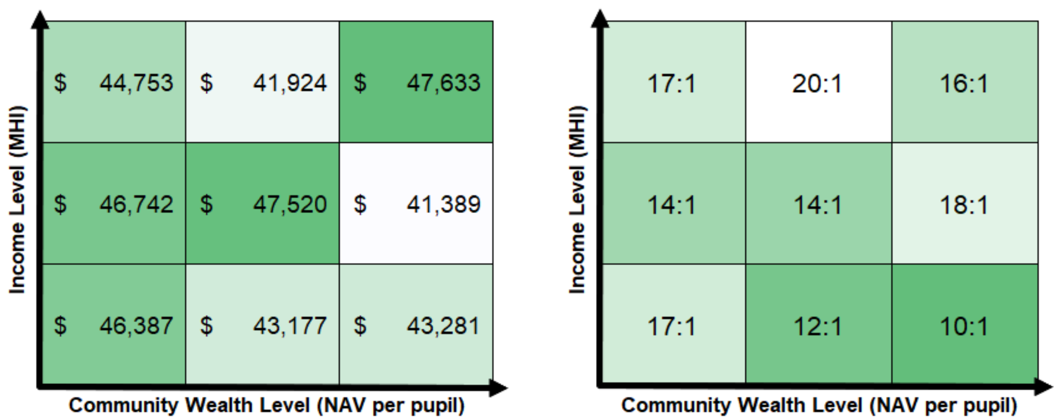


Figure A3.18

Average Teacher Salary (left) and Student-to-Teacher Ratio (right) for LEAs Not Generating



When controlling for size, the study team found that the trends observed remained consistent in small districts, as shown in Figures A3.19 and A3.20.

- In all but three cases, small districts generating MLO revenue are more likely to pay higher average teacher salaries than small districts that do not; and
- In all but two cases, small districts generating MLO revenue are more likely to employ more teachers per student than small districts that do not.

Figure A3.19
Average Teacher Salary (left) and Student-to-Teacher Ratio (right) for LEAs Generating – Small Districts

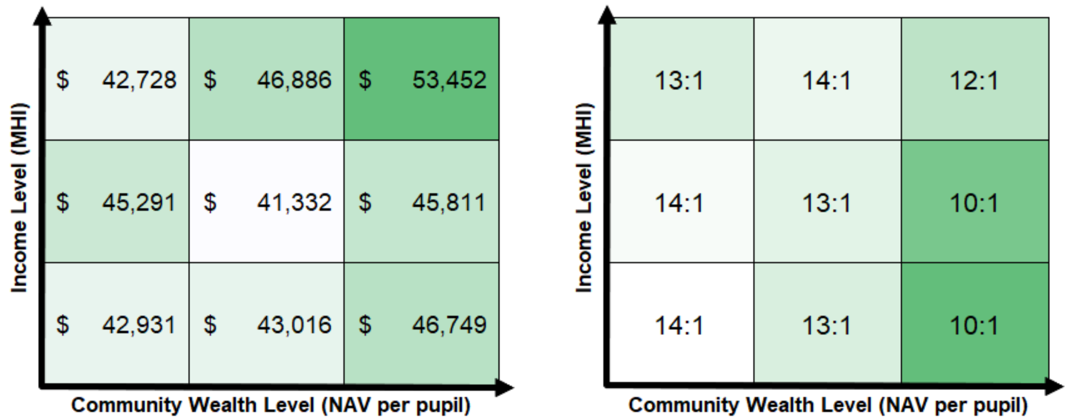
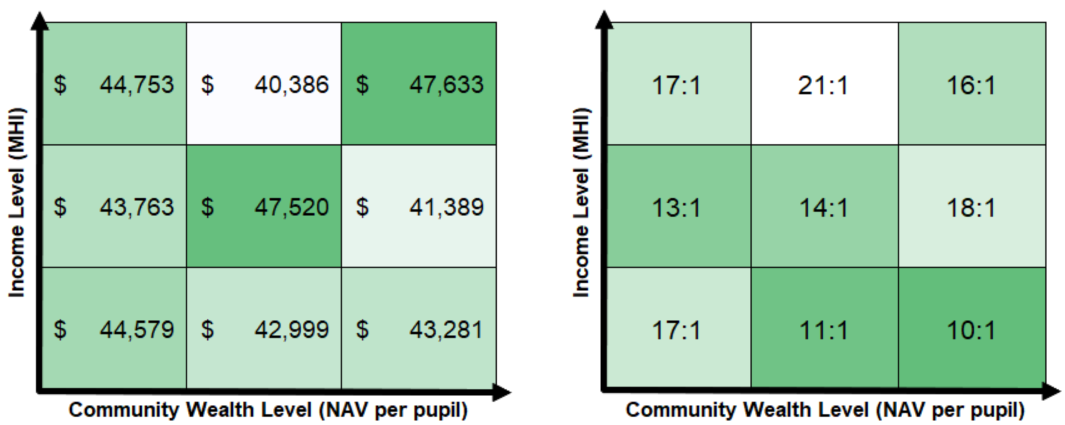


Figure A3:20
Average Teacher Salary (left) and Student-to-Teacher Ratio (right) for LEAs Not Generating – Small Districts



Even when only looking at small districts, the impact of additional dollars from MLO revenue generation is clear, as students in these districts tend to face lower achievement gaps. Specifically, the differences in resource allocation between small districts that generate MLO revenue and those that do not lead to an aggregate six percent and four percent increase in CMAS ELA and Math proficiency, respectively, for small districts that generate MLO revenue.

Conclusion

This study has shown that higher wealth districts benefit from greater local funding by leveraging higher net assessed valuations and mill levy overrides, while lower wealth districts, regardless of the socioeconomic status of their students, often struggle to secure similar funding levels. This not only highlights the limitations of relying heavily on local property taxes for funding education, but also underscores the critical role of state funding formulas in attempting to allocate funds where needed most. Given that income levels strongly predict student performance, and with state funding aimed at addressing disparities in lower-income districts, the local property tax base, particularly a district's ability to generate local revenue through use of overrides, becomes a crucial determinant of whether these districts can secure sufficient levels of total funding. The state, through the MLO state match program, is attempting to remedy these inequities in local funding capacity across districts with varying degrees of wealth. However, this funding stream, totaling $10M in FY23 and $21M in FY24, currently constitutes a small portion of total education funding. It appears that this is not a strong enough incentive for low-income, low-wealth districts to generate MLOs, as evidenced by the 13% of low-income, low-wealth districts that have approved MLOs compared to the 93% of high-income, high-wealth districts.

Ensuring a new formula that lessens these disparities is imperative. The lower-income & lower-wealth districts that generate lower levels of MLO revenue serve larger concentrations of higher-needs students, making it more difficult to adequately serve their higher-needs populations. Additionally, evidence suggests that additional funding is used on critical inputs, such as higher teacher pay and additional teachers per student, that ultimately can lead to (and have already led to) the closing of achievement gaps.

Implementing a formula that is adequacy-based would ensure that all districts are starting with the resources needed for all students to meet state standards. Districts would rely less on MLOs to provide the resources needed to adequately serve students. Colorado could also consider reducing the allowed amount of MLOs if adequacy was reached and making it so that any MLOs are wealth equalized by the state.

Appendix Four: Survey

Approach

Study team members conducted a wide-reaching survey of parents, students, educators, district and school leaders, community members, business groups, advocates, and policymakers. The goal of the survey was to understand better what the Colorado public values at their schools and the resources they would prioritize if additional funding were available. The survey was open for response for roughly one month and had both English and Spanish language response options. Ultimately, the study team collected responses from nearly 1,500 respondents. Please see Appendix A4 Section 4 for the full list of survey questions.

Demographics

Survey respondents represented a diverse range of voices across the state. The majority of respondents identified as school or district staff, with 35% identifying as school instructional/certified staff, 14% as school or district leaders, and 10% as school support staff.[1] The remaining 41% of respondents identified as family, students, and community members. Most respondents also identified their racial/ethnic background as white (75%) or Hispanic/Latino (12%).

Table A4.1
Respondent Type by Racial Ethnic Background

	American Indian/ Alaskan	Asian	Black/ African American	Hispanic/ Latino	Hawaiian/ Pacific Islander	White	Two or more races	Prefer not to answer
Family, Student, Community Member (including Parent, Guardian, Family Member, Community Member)	1%	<1%	<1%	7%	<1%	29%	1%	3%
School Instructional/Certified Staff (including Teacher, Counselor, Social Worker, Nurse, Instructional Coach, Interventionist, Other Licensed Staff)	1%	<1%	<1%	2%	_	28%	1%	2%
School or District Leader (including Principal, Assistant Principal, Dean, Central Office Leadership)	<1%	<1%	<1%	1%	_	11%	<1%	1%
School Support Staff (including Teacher Assistant, School Clerk, Food Service, Bus Drivers, Engineer, Custodial, Other Non-Classroom Staff)	<1%	_	<1%	2%	_	7%	<1%	<1%

[1] School Instruction/Certified Staff including Teacher, Counselor, Social Worker, Nurse, Instructional Coach, Interventionist, Other Licensed Staff; School or District Leader (including Principal, Assistant Principal, Dean, Central Office Leadership); School Support Staff (including Teacher Assistant, School Clerk, Food Service, Bus Drivers, Engineer, Custodial, Other Non-Classroom Staff)

Geography & School Type

129 of Colorado's 178 school districts were represented. The five districts with the highest percentage of respondents came from Gunnison Watershed RE1J (183 responses), Jefferson County R-1 (158 responses), Monte Vista C-8 (104 responses), Aspen 1 (86 responses), and Ellicott 22 (66 responses). Table A4.2 shows that nearly half of all respondents (46%) were associated with rural districts, while 22% were associated suburban districts, 18% with town districts, and nine percent with city districts. Table A4.3 shows that over 90% of respondents were most associated with at least one traditional public school type, with four percent being associated with an alternative school and two percent being associated with an online school.

Table A4.2

Respondent Type by District Type as Defined by NCES

	City	Rural	Suburb	Town	N/A
Family, Student, Community Member (including Parent, Guardian, Family Member, Community Member)	3%	19%	7%	11%	1%
School Instructional/Certified Staff (including Teacher, Counselor, Social Worker, Nurse, Instructional Coach, Interventionist, Other Licensed Staff)	3%	14%	11%	4%	2%
School or District Leader (including Principal, Assistant Principal, Dean, Central Office Leadership)	1%	7%	3%	2%	1%
School Support Staff (including Teacher Assistant, School Clerk, Food Service, Bus Drivers, Engineer, Custodial, Other Non-Classroom Staff)	2%	6%	1%	1%	1%

Table A4.3

Respondent Type by School Type

	Traditional Public School	Alternative School	Private School	Online School
Family, Student, Community Member (including Parent, Guardian, Family Member, Community Member)	32%	1%	<1%	1%
School Instructional/Certified Staff (including Teacher, Counselor, Social Worker, Nurse, Instructional Coach, Interventionist, Other Licensed Staff)	22%	1%	<1%	1%
School or District Leader (including Principal, Assistant Principal, Dean, Central Office Leadership)	24%	2%	<1%	2%
School Support Staff (including Teacher Assistant, School Clerk, Food Service, Bus Drivers, Engineer, Custodial, Other Non-Classroom Staff)	10%	<1%	<1%	<1%
N/A	4%	<1%		<1%

School Resourcing

The survey first asked respondents to indicate what they valued most in their school(s) by rank ordering options from 1 to 15, with 1 being the **most** valued option and 15 being the **least** valued option. Table A4.4 below shows the priorities broken separately for Families, Students, and Community Members (Community), School Instructional/Certified Staff (Instructional Staff), School Support Staff (Support Staff), and School or District Leaders (Leaders). Across all three groups, teacher quality was ranked as the highest priority, with school culture, academic performance, school leadership, and support for mental and emotional health following. Meanwhile, before/after school opportunities and extracurricular activities were consistently ranked in the bottom four for all four groups. Community respondents ranked course offerings higher than either School Staff or Leaders. School Staff and Leaders ranked low-income and English Learners higher than Community respondents.

Table A4.4

School Resourcing Ranks by Respondent Type

Rank	Families, Students and Community Members	School Instructional/Certified Staff	School Support Staff	School or District Leader
1	Teacher Quality	Teacher Quality	Teacher Quality	Teacher Quality
2	School Academic Performance	School Culture	School Academic Performance	School Culture
3	School Culture	School Leadership	Support for Low-Income Students	School Academic Performance
4	School Leadership	Support for Emotional and Mental Health	School Culture	School Leadership
5	Course Offerings	School Academic Performance	Support for Emotional and Mental Health	Support for Emotional and Mental Health
6	Support for Emotional and Mental Health	Support for Special Education Students	Support for Special Education Students	Support for Special Education Students
7	Family Engagement	Low-Income Students	School Leadership	Course Offerings
8	Facilities	Support for English Language Learners	Facilities	Support for Low-Income Students
9	Support for Special Education Students	Family Engagement	Support for English Language Learners	Family Engagement
10	Technology	Course Offerings	Family Engagement	Support for English Language Learners
11	Low-Income Students	Facilities	Technology	Facilities
12	Extracurricular Activities	Technology	Transportation	Technology
13	Before/After School Opportunities	Extracurricular Activities	Before/After School Opportunities	Extracurricular Activities
14	Transportation	Before/After School Opportunities	Extracurricular Activities	Transportation
15	Support for English Language Learners	Transportation	Course Offerings	Before/After School Opportunities

When looking at the responses by locale type defined by the National Center for Education Statistics (NCES) codes (Table A4.5), teacher quality is still ranked highest by all groups. Additionally school culture, academic performance, and support for emotional and mental health are highly rated. City and suburban respondents tended to value course offerings at a lower level than town and rural respondents. City respondents ranked support for low-income students and English language learners (ELL) higher than other locales. Town respondents ranked facilities higher than any other locale group. All four locales ranked extracurricular activities, before/after school programs, and transportation the lowest.

Table A4.5
School Resourcing Ranks by District Type

Rank	City	Suburb	Town	Rural
1	Teacher Quality	Teacher Quality	Teacher Quality	Teacher Quality
2	School Culture	School Culture	School Academic Performance	School Culture
3	School Leadership	School Leadership	School Culture	School Academic Performance
4	School Academic Performance	School Academic Performance	School Leadership	School Leadership
5	Support for Emotional and Mental Health	Support for Emotional and Mental Health	Support for Emotional and Mental Health	Course Offerings
6	Support for Low-Income Students	Support for Special Education Students	Course Offerings	Support for Emotional and Mental Health
7	Support for Special Education Students	Course Offerings	Facilities	Support for Special Education Students
8	Support for English Language Learners	Support for Low-Income Students	Support for Special Education Students	Family Engagement
9	Course Offerings	Family Engagement	Family Engagement	Facilities
10	Family Engagement	Support for English Language Learners	Support for Low-Income Students	Support for Low-Income Students
11	Facilities	Facilities	Technology	Technology
12	Technology	Technology	Support for English Language Learners	Support for English Language Learners
13	Extracurricular Activities	Extracurricular Activities	Extracurricular Activities	Extracurricular Activities
14	Before/After School Opportunities	Before/After School Opportunities	Transportation	Transportation
15	Transportation	Transportation	Before/After School Opportunities	Before/After School Opportunities

Additional Funding Prioritization

The survey then focused on understanding how and where respondents would prioritize additional funding. Responses to this question closely aligned with what respondents most valued in their school across respondent and district types.

When looking at the responses by respondent type when rankings Table A4.6:

- **Community respondents** prioritized funding for course offerings *higher* than they ranked it in value; and, conversely, they prioritized funding for family engagement *less* than they ranked it in value.
- **Instructional staff** prioritized funding for family engagement *less* than they ranked it in value; and prioritized funding facilities *higher* than they ranked in value, moving from eleventh to seventh.
- **Support staff** prioritized funding for course offerings *far higher* than they ranked in value, moving from fifteenth to fifth.
- **Leaders** prioritized funding for facilities *higher* than they ranked in value, moving from eleventh to eighth.

These variations in responses help to highlight the tension schools and districts face when making tradeoff decisions about their resource allocations.

Table A4.6
School Funding Prioritization by Respondent Type

Rank	Family, Student, Community Members	School Instructional/ Certified Staff	School Support Staff	School or District Leader
1	Teacher Quality	Teacher Quality	Teacher Quality	Teacher Quality
2	School Academic Performance	Support for Emotional and Mental Health	School Academic Performance	School Academic Performance
3	Course Offerings	School Culture	School Culture	School Culture
4	School Culture	Support for Special Education Students	Support for Emotional and Mental Health	Support for Emotional and Mental Health
5	Support for Emotional and Mental Health	School Academic Performance	Course Offerings	School Leadership
6	School Leadership	Support for Low-Income Students	School Leadership	Support for Special Education Students
7	Facilities	Facilities	Facilities	Course Offerings
8	Technology	Course Offerings	Support for Special Education Students	Facilities
9	Support for Special Education Students	Support for English Language Learners	Support for Low-Income Students	Support for Low-Income Students
10	Support for Low-Income Students	School Leadership	Technology	Technology
11	Family Engagement	Technology	Family Engagement	Support for English Language Learners
12	Extracurricular Activities	Family Engagement	Support for English Language Learners	Family Engagement
13	Before/After School Opportunities	Before/After School Opportunities	Extracurricular Activities	Extracurricular Activities
14	Transportation	Extracurricular Activities	Before/After School Opportunities	Transportation
15	Support for English Language Learners	Transportation	Transportation	Before/After School Opportunities

When examining responses by locale, city and suburb respondents prioritize funding for special education and support for emotional and mental health higher than they were ranked in value. Support for emotional and mental health is the second highest funding priority (behind teacher quality) for both groups. Suburb, town, and rural respondents all rank facilities as the seventh highest funding priority, higher than the ranking for suburb and rural, and the same for town (value rank was eleventh and funding rank was seventh). Family engagement was a lower funding priority than value ranking for all four locale groups.

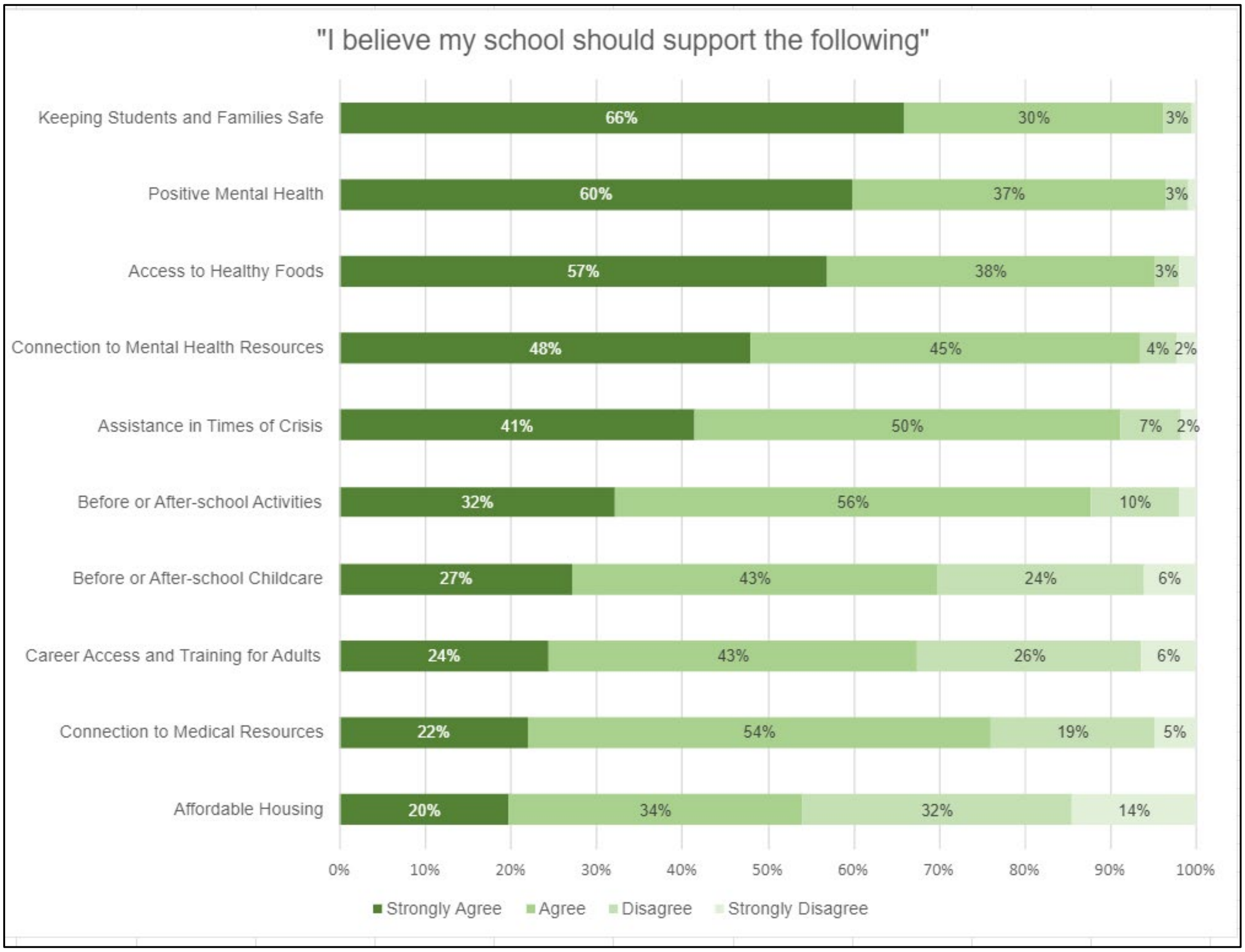
Table A4.7
School Funding Prioritization by Locale

Rank	City	Suburb	Town	Rural
1	Teacher Quality	Teacher Quality	Teacher Quality	Teacher Quality
2	Support for Emotional and Mental Health	Support for Emotional and Mental Health	School Academic Performance	School Academic Performance
3	School Academic Performance	Support for Special Education Students	School Culture	School Culture
4	School Culture	School Culture	Support for Emotional and Mental Health	Course Offerings
5	Support for Special Education Students	School Academic Performance	Course Offerings	Support for Emotional and Mental Health
6	Support for Low-Income Students	Support for Low-Income Students	School Leadership	School Leadership
7	Course Offerings	Facilities	Facilities	Facilities
8	School Leadership	Course Offerings	Support for Special Education Students	Support for Special Education Students
9	Facilities	Support for English Language Learners	Support for Low-Income Students	Technology
10	Support for English Language Learners	School Leadership	Technology	Support for Low-Income Students
11	Family Engagement	Technology	Family Engagement	Family Engagement
12	Technology	Family Engagement	Support for English Language Learners	Support for English Language Learners
13	Before/After School Opportunities	Extracurricular Activities	Extracurricular Activities	Transportation
14	Extracurricular Activities	Before/After School Opportunities	Before/After School Opportunities	Extracurricular Activities
15	Transportation	Transportation	Transportation	Before/After School Opportunities

School Supports

To better understand how respondents view the role of the school, the survey asked whether they believe schools should support specific programs and resources. Across all respondent types, the majority of respondents either strongly agreed or agreed that schools should support keeping families and students safe, positive mental health, access to mental health resources, access to healthy foods, assistance in times of crisis, and before/after school activities. Though a majority of respondents agreed or strongly agreed with supporting all areas, respondents across all types were less likely to agree or strongly agree that schools should provide affordable housing, connection to medical resources, career access and training for adults, and before/after school childcare.

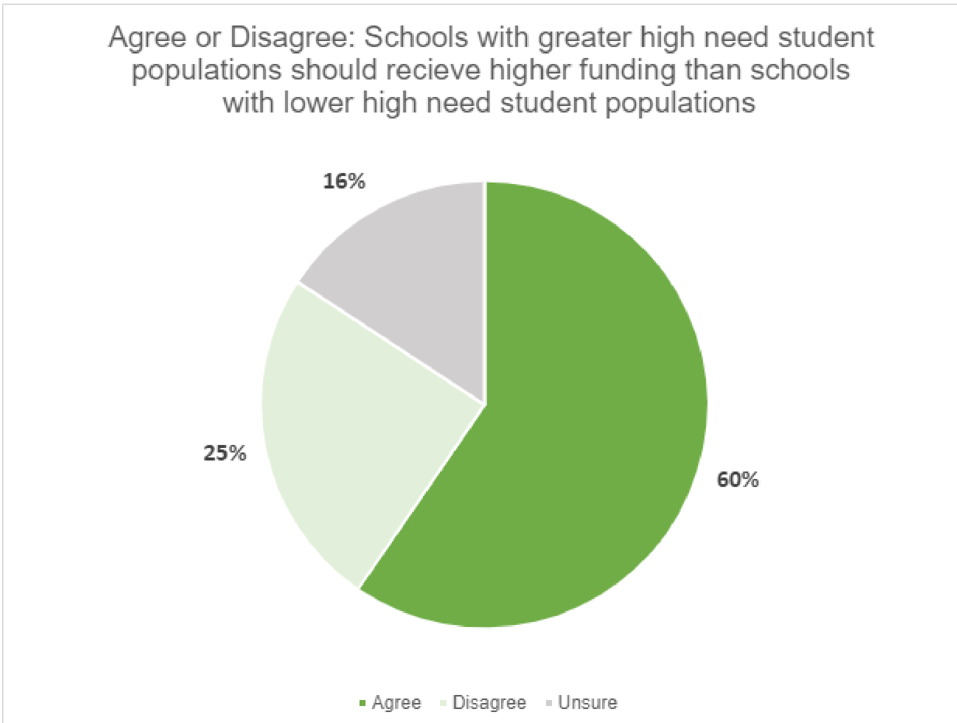
Figure A4.8
Expected School Supports



High-Need Schools

Respondents were asked whether they agree, disagree, or were unsure regarding the following statement: School A has more high-need students (low-income, special education, ELL) than School B. Therefore, School A should receive more money than School B. Across all respondents, 65% agreed, 19% were unsure and 16% disagreed.

Figure A4.9
High Need School Supports



There is a wider range of variation when examining these responses across respondents and locale types. Community and support staff respondents were less likely to agree with this statement and more likely to be unsure about their response than instructional staff and leaders. Similarly, rural and town respondents were less likely to agree with this statement and more likely to be unsure about their response than city and suburb respondents.

Figure A4.10
High Need School Supports by Respondent Type

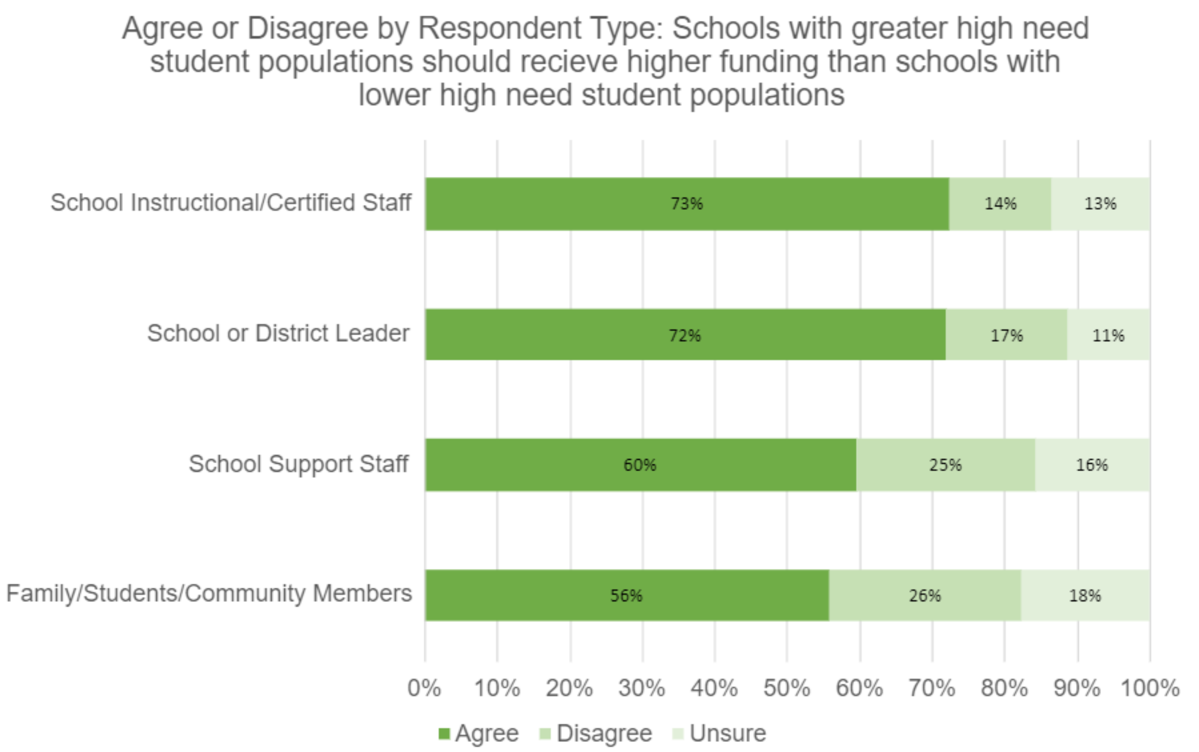
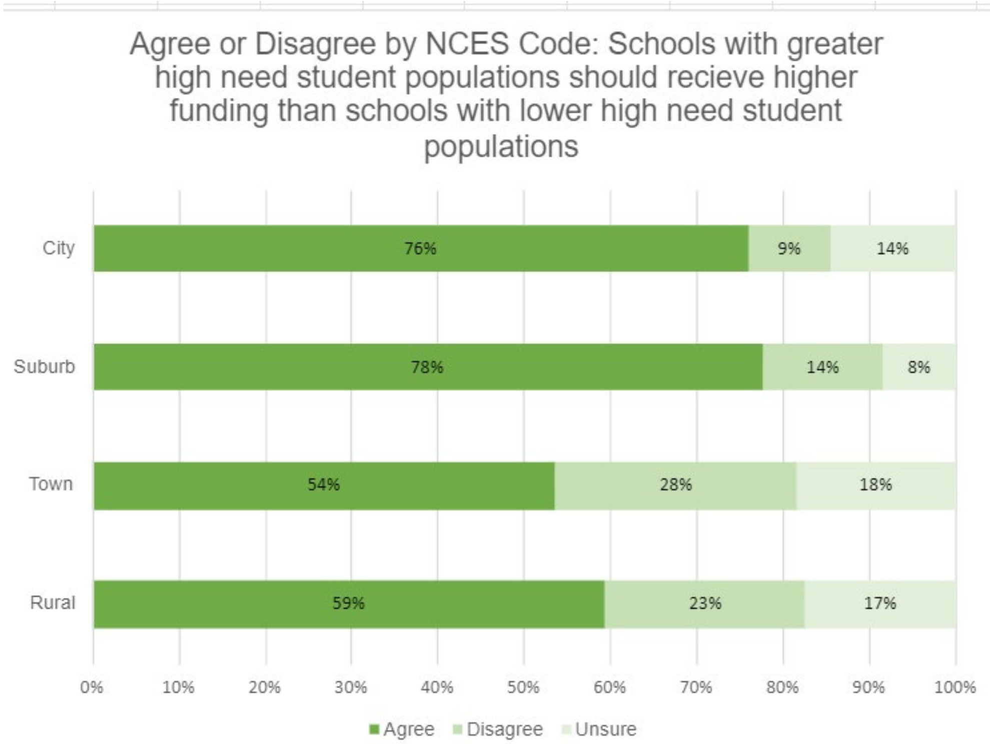


Figure A4.11
High Need School Supports by Locale



Sustaining ESSER Investments

The survey asked respondents to indicate whether they were familiar with ESSER/COVID-19 funding and based on this response, asked to indicate which ESSER-funded investments they felt were the most valuable to sustain. Of the respondents who indicated they were familiar with ESSER/COVID-19 funding (54% of total respondents), instructional staff, increased compensation, and school based mental health programming were identified as the most critical investments to sustain, which tracks closely with the results of the school resourcing questions. Community partnerships, extracurricular activities, and administrative staff were identified as the least critical investments to sustain.

Budget Stabilization Factor

The final survey question asked respondents to indicate whether they were familiar with the Colorado Budget Stabilization Factor (BSF). Based on this response, respondents were asked to indicate what resources have not been provided to their school because of the BS factor. It is important to note that only a small percentage of respondents (7% of total respondents) responded to this question. The low response rate may also indicate a general lack of awareness about the BSF and its impact on district funding. Of the seven percent who responded, 71% indicated that they were familiar with the BS factor. Of those respondents, increased compensation and instructional staff were the most indicated resources their district/school could not provide due to the BS factor.

Section A: Survey Questions

**Note: The following questions were also offered in Spanish.*

1. **I prefer to take this survey in (Select One):**
    a. English
    b. Spanish

2. **The role I am in completing this survey is (Select One)**
    a. Family, Student, Community Member (including Parent, Guardian, Family Member, Student, Former Student, Community Leader)
    b. School or District Leader (including Principal, Assistant Principal, Dean, Central Office Leadership)
    c. School Instructional/Certified Staff (including Teacher, Counselor, Social Worker, Nurse, Instructional Coach, Interventionist, Other Licensed Staff)
    d. School Support Staff (including Teacher Assistant, School Clerk, Food Service, Bus Drivers, Engineer, Custodial, Other Non-Classroom Staff)

3. **My LEA/school district and/or school is (Select one, Dropdown of all CO Districts)**

4. **I am associated with the following school types (Select all that apply):**
    a. Pre-K
    b. Elementary School
    c. Middle School
    d. K-8 School
    e. High School
    f. Alternative School
    g. Private School
    h. Online School

5. **Race/Ethnicity (Select all that apply):**
    a. American Indian or Alaska Native
    b. Asian
    c. Black or African American
    d. Hispanic or Latino
    e. White
    f. Native Hawaiian or Other Pacific Islander
    g. Two or More Races
    h. Prefer not to answer
    i. Other

6. **What do you most value in your school (Rank Order):**
    a. School Academic Performance
    b. Course Offerings
    c. Teacher Quality
    d. School Culture
    e. School Leadership
    f. Technology
    g. Facilities
    h. Transportation
    i. Family Engagement
    j. Support for Emotional and Mental Health
    k. Support for Special Education Students
    l. Support for Low-Income Students
    m. Support for English Language Learners
    n. Before/After School Opportunities
    o. Extracurricular Activities

7. **I believe my school should support students and families with the following (Rank from Strongly Disagree to Strongly Agree):**
    a. Affordable housing
    b. Access to healthy foods
    c. Before or after-school childcare
    d. Connection to medical resources
    e. Connection to mental health resources
    f. Keeping students and families safe
    g. Assistance in times of crisis
    h. Positive mental health
    i. Career access and training for adults
    j. After-school enrichment and summer activities for students
    k. Other

8. **If my school had more money, I would want to see it prioritized in the following way (Rank Order):**
    a. School Academic Performance
    b. Course Offerings
    c. Teacher Quality
    d. School Culture
    e. School Leadership
    f. Technology
    g. Facilities
    h. Transportation
    i. Family Engagement
    j. Support for Emotional and Mental Health
    k. Support for Special Education Students
    l. Support for Low-Income Students
    m. Support for English Language Learners
    n. Before/After School Opportunities
    o. Extracurricular Activities

9. **School A has more high need students (low income, special education, English language learners) than School B. Therefore School A should receive more money than School B. (Select One)**
    a. Agree
    b. Disagree
    c. Unsure

10A. Are you familiar with ESSER/Covid funding? (Select One)
    a. Yes
    b. No

10B. If yes, what types of ESSER funded investments do you see as most valuable to sustain? (Select All that Apply)

a. Administrative staff
b. Instructional staff
c. Non-Instructional staff
d. Increased Compensation
e. Community Partnerships
f. Tutoring
g. Summer Programming
h. Before/After School Programming
i. Extracurricular Activities
j. School based mental health programming
k. SEL programming
l. Technology
m. Facilities
n. Other

11A. Are you familiar with the budget stabilization factor, also known as the negative factor? (Select One)

d. Yes
e. No

11B. If yes, what resources have you not been able to provide within your school or District as a result of the budget stabilization factor? (Select all that Apply)

f. Administrative staff
g. Instructional staff
h. Non-Instructional staff
i. Increased Compensation
j. Community Partnerships
k. Tutoring
l. Summer Programming
m. Before/After School Programming
n. Extracurricular Activities
o. School based mental health programming
p. SEL programming
q. Technology
r. Facilities
s. Other

Section B: Survey Outreach

Note: The following outreach was also provided in Spanish.
Augenblick, Palaich and Associates, Inc. (APA) and Afton Partners (Afton) are partnering with the Colorado Department of Education to determine the costs necessary to provide elementary and secondary students an education that meets the state's educational goals. As part of this effort, APA is reaching out to members of the public (students, parents, educators, district and school leaders, community members, business groups, advocates, and policymakers) to ensure that their perspectives on resources, staffing, and programs in schools are considered as part of this work.

We want to hear from you!

Link to Survey: https://survey.alchemer.com/s3/7940672/APA-CO-Funding-Study-Survey

Responding to this survey will help state policymakers better understand the voices of the Colorado public on what they value at their school and the resources they would prioritize if additional funding was available to their school.

This survey should take no more than 5 minutes to complete.

I already completed a survey from AIR, is this the same?

No, this is a separate survey focusing on resources and funding available to districts and schools, while the AIR survey focuses on student outcomes and types of educational programs. We encourage individuals to complete both surveys if possible.

What about my privacy and confidentiality?

This is a voluntary and confidential survey. You are not obligated to participate and can skip any question you are not comfortable answering. To encourage honest responses to the survey questions, we are not collecting any information that would allow you to be identified.

Questions?

If you have any questions or concerns about participation in the survey, please contact apasurvey@aftonpartners.com.

Appendix Five: Professional Judgment Approach

The **Professional Judgment** (PJ) approach relies on the experience and expertise of educators in the state to identify the resources needed to ensure that all districts, schools, and students can meet state standards and requirements. Resources include school-level personnel, non-personnel costs, additional supports and services, technology, and district-level resources. These resources are first identified for students with no additional needs (which allows for the calculation of a base cost) and then separately for students in specific groups with additional needs, presented as weights.

Like the EB approach, the PJ approach is able to identify resources for special needs students while also addressing future standards and performance expectations. Both the EB and PJ approaches have higher benchmarks for academic success compared to the SSD approach.

Creating Representative Schools and Representative Districts

The PJ approach estimates the adequacy costs by creating a series of representative schools and districts. These representative schools are intended to resemble actual schools and districts in Colorado in terms of size, configuration, and demographics, including the percentage of students who are at-risk or English Language Learners (ELL).[1] This allowed PJ panelists to comfortably estimate what resources are needed based on the characteristics of their own schools and districts. At the same time, by looking at multiple sizes and different configurations of schools and districts, the approach developed per-student figures that can be applied in each unique district and school in Colorado based on actual enrollment figures and demographics.

Tables A5.1a-d list the representative schools and representative districts for Colorado, including demographics.

Table A5.1a

PJ Representative Elementary Schools and K-8 School

	K-8 School	Elementary Schools		
Enrollment	**40**	**240**	**360**	**540**
Special Need Populations				
At-risk, 25% Concentration	10	60	90	135
At-risk, 55% Concentration	22	132	198	297
At-risk, 75% Concentration	36	180	270	405
ELL, WIDA Levels 1&2 (3%)	5	14	23	35
ELL, WIDA Levels 3&4 (5%)	6	17	25	38
ELL, WIDA Levels 5&6 (1%)	3	7	11	17

[1] The term "at-risk" was used to refer to students that struggle academically and was defined using free and reduced-price lunch (FRPL) eligibility as a proxy, and for this study ELL students were further disaggregated into World-Class Instruction Design and Assessment (WIDA) levels by school type. Further, the PJ approach did not examine resources for special education students, as there was a separate study specifically on special education. Gifted students were also discussed as part of the base resources needed in a school.

Table A5.1b
PJ Representative Middle Schools

	Middle Schools		
Enrollment	**225**	**450**	**735**
Special Need Populations			
At-risk, 25% Concentration	56	113	184
At-risk, 55% Concentration	124	248	404
At-risk, 75% Concentration	169	338	551
ELL, WIDA Levels 1&2 (3%)	7	14	27
ELL, WIDA Levels 3&4 (5%)	11	23	45
ELL, WIDA Levels 5&6 (1%)	2	5	9

Table A5.1c
PJ Representative High Schools

	High Schools				
Enrollment	**40**	**200**	**400**	**800**	**2,000**
Special Need Populations					
At-risk, 25% Concentration	10	50	100	200	500
At-risk, 55% Concentration	22	110	220	440	1,100
At-risk, 75% Concentration	30	150	300	600	1,500
ELL, WIDA Levels 1&2 (3%)	1	6	12	14	27
ELL, WIDA Levels 3&4 (4%)	2	8	16	32	80
ELL, WIDA Levels 5&6 (1%)	0	2	4	8	20

Table A5.1d
PJ Representative School Districts

	Very Small District	Small District	Moderate Small District	Moderate Large District	Large District
Enrollment	**130**	**600**	**1,750**	**6,250**	**35,000**
Special Need Populations					
At-risk, 25% Concentration	40	150	438	1,563	8,750
At-risk, 55% Concentration	72	330	963	3,438	19,250
At-risk, 75% Concentration	98	450	1,313	4,688	26,250
ELL (12%)	16	72	210	750	4,200

Professional Judgment Panel Design

Based on its experience using the PJ approach in other states, the study team utilized multiple levels of PJ panels because: 1) multiple panels allow for the separation of school-level resources (which include resources like teachers, other school staff, supplies, materials, and professional development) from district-level resources (such as district administration staff, facility maintenance and operations, insurance, and school board activities); and 2) the study team believes strongly in having each panel's work reviewed by another panel for a consensus approach to be effective.

The PJ panel structure in Colorado was designed to conduct panels in the following progression:

1. School-level panels: The study team first held three school-level panels based on grade level (elementary, middle, and high school). Each of these panels focused first on the resources needed to serve students with no special needs and then identified the additional resources needed to serve students in poverty at the 55 percent concentration level.

2. Special needs panels: Next, the study team held two special needs panels (one each for at-risk and ELL) to review the work of the previous panels. Then, the team identified additional resources needed to serve ELL students and additional concentration levels of students in poverty.

3. District-level panels: Four district panels were reviewed, and the work of the previous school-level and special needs panels were reviewed. The district panel reviewed the schools similar to those associated with the district's size and then identified the needed district-level resources for a very small-sized district, small-sized district, moderate small-sized district, and moderate large-sized district. Due to the complexities of budgeting for large districts, the study team used per student costs provided by chief finance officers in these settings instead of identifying each resource.

4. Chief Financial Officers (CFO) panel: The study team also held a panel specifically with CFOs to identify all non-personnel costs for all school and district-levels.

5. Remoteness Panel: The study team held a panel specifically to address additional costs incurred by districts in remote areas.

6. Statewide panel: finally, the study team held a statewide panel to review the work of all previous panels and resolve any remaining inconsistencies across panels.

Each panel had between five and nine participants, with a combination of classroom teachers, principals, support personnel for students with additional needs, directors, superintendents, paraprofessionals, and school business officials. The study team worked with districts, the Colorado Association of School Executives (CASE), the Colorado Association of School Boards (CASB), the Colorado Education Association (CEA), and CDE to encourage educators to volunteer as potential panelists and then selected individuals from a variety of backgrounds and locations to serve on panels. A list of panel participants is provided in Section C. Panels were held from August 2024 through September 2024. All panels were held via Zoom. Table A5.2 provides the dates of these meetings.

Table A5.2
PJ Panel Dates

Date	Panel
August 7, 2024	Elementary School Panel; Middle School Panel
August 8, 2024	High School Panel
August 29, 2024	At-risk Panel; English Language Learner Panel
September 10, 2024	Very Small District Panel; Small District Panel
September 11, 2024	Moderate Small District Panel; Moderate District Panel
September 17, 2024	Chief Financial Officer
September 23, 2024	Remote District Panel
September 25, 2024	Statewide Panel

Summarizing Colorado State Standards and Requirements

Before the commencement of any PJ panel discussions, all panelists reviewed a specific set of background materials and instructions prepared by the study team. Panelists were instructed that their task was to identify the resources needed to meet all Colorado standards and requirements, which included curriculum and graduation requirements, as well as additional requirements for schools and districts around assessment, accountability, and educator evaluation. The study team prepared a document summarizing standards and requirements, which was reviewed by CDE, and shared with panelists (Section B). The document was not meant to be an exhaustive list, but rather to reminder participants of key education policies and practices in Colorado and to focus panel discussions on resources needed for all Colorado students to meet or exceed standards. The instructions and background information used during PJ panels can be found in Section A.

Using Best Practice Research and Professional Association Recommendations as a Starting Point for PJ Panels

The study team provided the PJ panels with starting point figures from a research review of best practices and any available staffing recommendations from the evidence-based baseline report. These figures were used to prompt discussion and did not constrain panelists. Instead, panelists could adjust the figures to best suit Colorado and were allowed to add additional staffing positions.

Tables A5.3a-c summarize the starting point figures shared with the panelists based on the team's research review and recommendations from the evidenced-based baseline report. For illustration purposes, the following tables show the starting point figures for one school at each grade span. In practice, panelists were provided different starting point figures for each school level and school size.

Table A5.3a

Research-Based and Professional Association Starting Point Personnel Figures

Elementary School of 360 Students

Personnel Position	Research-Based Recommendations
Instructional Staff	
Classroom Teachers	20.8
Specials Teachers (art, music, PE, world language, etc.)	4.2
Instructional Facilitators (Coaches)	1.8
Interventionists	1.0
Librarians/Media Specialists	1.0
Student Support Staff	
Counselors	0.8
Nurses	0.8
Administrative Staff	
Principal	1.0
Clerical	1.6
Other Staff	
Supervisory Aides	2.0

The study team's research review produced a range of class sizes shown to positively impact student success: 15 in kindergarten through grade three and 25 in grades four and five. Additional specials teachers were recommended as well. Other key recommendations from the research were related to counselors, which recommended staffing at 250:1, librarians one per school, nurses one per school, and principals one per school. The research review also recommended instructional coaches, teacher tutors/interventionists, clerical staff, and supervisory aides.

Table A5.3b
Research-Based and Professional Association Starting Point Personnel Figures
Middle School of 450 Students

Personnel Position	Research-Based Recommendations
Instructional Staff	
Teachers	24
Instructional Facilitators (Coaches)	2.3
Interventionists	1.0
Librarians/Media Specialists	1.0
Student Support Staff	
Counselors	1.8
Nurses	0.6
Administrative Staff	
Principal	1.0
Assistant Principals	1.0
Clerical	2.0
Other Staff	
Supervisory Aides	2.0

The research review recommended class sizes of 25:1 on a block schedule for middle school, with teachers teaching three out of four blocks. All other staffing positions used ratios similar to the elementary recommendations.

Table A5.3c
Research-Based and Professional Association Starting Point Personnel Figures
High School of 800 Students

Personnel Position	Research-Based Recommendations
Instructional Staff	
Teachers	42.7
Instructional Facilitators (Coaches)	4.0
Interventionists	1.0
Librarians/Media Specialists	1.0
Student Support Staff	
Counselors	3.2
Nurses	1.0
Administrative Staff	
Principal	1.0
Assistant Principals	1.0
Clerical	3.0

The research review recommended the same class sizes (25:1) and schedule (a four-period block) as the middle school level for the high school level. All other staffing positions used ratios similar to the elementary and middle school recommendations.

Professional Judgment Panel Procedures

All PJ panels followed a specific procedure. At least two study team members attended each panel meeting to facilitate the discussion and to take notes about the level of resources needed and the rationales behind participant decisions. The study team provided panelists with instructions and background information. In each meeting, panelists were frequently reminded to identify the necessary resources to meet state standards most efficiently without sacrificing quality.

Each school and special needs panel discussed the following school-level resource needs:

1. Personnel, including classroom teachers, other teachers, psychologists, counselors, librarians, teacher aides, administrators, nurses, etc.
2. Non-traditional programs and services, including before- and after-school programs, and summer school programs.

District-level panels also addressed the following district-level resource needs:

1. Personnel, including central office administrators, special programs directors and coordinators, and support staff.

CFO panels addressed the following school-level and district-level resource needs:

1. School-level non-personnel costs, such as professional development, supplies, materials, textbooks, technology and equipment, and the cost of offering student activities and extracurriculars.
2. District-level non-personnel costs, such as maintenance and operations, legal, communications, safety and security, and insurance.

PJ panels first identified the above resources for students with no special needs and then addressed the additional resources needed to serve special needs students (at-risk students and ELLs). Keeping these costs separate allowed for creating a base cost and additional special needs weights (discussed in greater detail later in this report).

The figures the study team recorded for each panel represent a consensus among participants. At the time of the meetings, no participant (either panel member or study team member) had a precise idea of the costs of resources being identified (the study team costs out the resources after all panels were complete). This is not to say that panel members were unaware that higher levels of resources would produce higher base cost figures or weights. However, without specific price information and knowledge of how other panels were proceeding, it would have been impossible for any individual or panel to suggest resource levels that would lead to specific base cost figures or weights.

Professional Judgment Resources Identified

While panels varied in the resources they identified as necessary for an adequate education, several key recommendations were common across most panels:

- Small class sizes, with student-to-teacher ratios of 15:1 in kindergarten through grade one, 18:1 in grades two and three, 22:1 in grades four and five, 25:1 in grades six through twelve;
- Significant time for teacher planning, collaboration, and embedded professional development with instructional coaches to allow teachers to continuously improve their practice;
- A high level of student support (staffed as counselors, social workers, and psychologists) available for all students to address mental health and behavioral needs;
- Sufficient health support ensures students receive necessary medical care and monitoring from nurses and/or health aides, with a full-time person at each school;
- Administrative support in the form of assistant principals to address behavior issues and allow for required staff evaluations to be done thoroughly and effectively;
- Before- and after-school programs and summer-level learning opportunities, particularly for at-risk students;
- Sufficient staff to serve at-risk and ELL students, including teachers, interventionists and student support professionals, and deans, as well as coordination support for gifted and talented students and students with 504 plans;
- Counselor and career exploration staff to ensure students can achieve post-secondary goals; and
- Extended learning opportunities, including afterschool, summer school and bridge programs, for at-risk students.

It should be noted that the resources PJ panels identified in this report are examples of how funds might be used to organize programs and services in representative schools. The study team cannot emphasize strongly enough that the resources identified are not the only ways to organize programs and services to meet state standards. Instead, the exercise aims to estimate the overall level of resources and, therefore, the cost of adequacy, not to determine the best way to organize schools and districts.

School-level Personnel

PJ panels discussed and recommended staffing, including staffing levels for:

- **Instructional staff,** including teachers, instructional aides, instructional coaches, interventionists, librarian/media specialists, 504/ GT coordinators, and technology specialists.
- **Student support staff,** including counselors, social workers, psychologists, behavior specialists, nurses and health aides.
- **Administrative staff,** including principals, assistant principals, bookkeepers, and clerical/secretarial staff.
- **Other staff members,** including supervisory aides, full-time substitutes, and security and school resource officers.

Tables A5.4a-c show the school-level resources panels identified for the base education of students in Colorado. The tables first provide the school or program size and the panel-recommended average class size. The tables then identify the personnel needed to serve all students (on an FTE basis), regardless of need, at the elementary, middle, and high school settings (base education). Subsequent tables identify the additional personnel needed to serve special needs students.

As noted previously, specific resources and approaches may vary by school level. These resources are not intended to be prescriptive. Subsequent review panels allowed for variation if participants felt that differences were reasonable and that resource levels were sufficient to serve at each level, allowing local decision-making on how resources would be used.

Table A5.4a

Elementary/K-8 School Personnel as Recommended by Colorado PJ Panels, Base Education

School Configuration & Size	K-8 270 students	K-5 240 Students	K-5 390 Students	K-5 540 Students
Average Class Size	Grades K-8: 10	Grades K-1: 15 Grades 2-3: 18 Grades 4-5: 22	Grades K-1: 15 Grades 2-3: 18 Grades 4-5: 22	Grades K-1: 15 Grades 2-3: 18 Grades 4-5: 22
Instructional Staff				
Teachers	10.0	13.4	20.1	30.2
Specials Teachers	2.0	4.0	4.0	6.0
Instructional Coaches	0.5	1.0	1.0	1.5
Interventionists	0.5	2.0	2.0	3.0
Librarians/Media Specialists	0.5	1.0	1.0	1.0
Media Aide			0.5	1.0
Technology Specialist	0.25	0.75	1.0	1.0
Assessment/504/GT Coordinator	0.25	0.5	0.8	1.0
Instructional Aides	1.0	2.7	4.0	6.0
Student Support Staff				
Counselors	0.5	1.0	1.0	1.5
Nurses	0.5	0.5	0.5	1.0
Health Aides		0.5	0.5	
Psychologists	0.2	0.2	0.2	0.2
Social Workers	0.6	0.6	1.0	1.0
Administrative Staff				
Principals	0.5	1.0	1.0	1.0
Assistant Principals		1.0	1.0	1.0
Clerical/Data Entry Staff	1.0	2.0	2.0	3.0
Other Staff				
IT Technicians		0.2	0.2	0.5
Substitutes	1.0	1.0	1.0	1.0
Supervisory Aides			2.0	2.0

For the three elementary schools, the panelists recommended an average class size of 15:1 in kindergarten through grade one, 18:1 in grades two and three, and 22:1 in grades four and five, for a total of 13.4, 20.1, and 30.2 classroom teachers, respectively. In the K-8 school, panelists recommended an average class size of 10:1 in kindergarten through grade 12. Panelists also identified the need for specials teachers to teach subjects such as art, music, physical education, STEM, and to allow for sufficient planning and collaboration time for classroom teachers. Additionally, interventionists were identified to provide direct support to students through one-on-one or small group pull out/push in support in the areas of literacy and math. Other recommended instructional staff included a librarian/media specialist to manage the library/media center (with support from media aides in larger settings) and to support students; a technology specialist to coach teachers on technology, curriculum, and integration; at least a part-time assessment/504/GT coordinator who would oversee assessment administration and facilitate data analysis, coordinate 504 plans for students, and identify GT students; and instructional aides to provide classroom support in lower grades.

Recommended support staff included various positions including psychologist time to assist in identifying special education students. Local school sites would determine the specific student support positions that would be the best fit for their school. IT staff were also recommended to manage 1:1 student devices, and a full-time substitute teacher at all levels to provide continuity of instruction when teachers are out of the classroom. Additionally, the 390 and 540 students in the elementary school would include two FTE supervisory aides to assist in covering recess, lunch, pickup, and drop off.

Table A5.4b
Middle School Personnel as Recommended by Colorado PJ Panels, Base Education

School Configuration and Size	Grades 6-8 225 Students	Grades 6-8 450 Students	Grades 6-8 735 students
Recommended Average Class Size	25	25	25
Schedule	Eight-period day; teachers teaching six periods	Eight-period day; teachers teaching six periods	Eight-period day; teachers teaching six periods
Instructional Staff			
Teachers	12.0	24.0	39.2
Instructional Coaches	1.0	2.0	2.0
Interventionists	1.0	2.0	2.0
Librarians/Media Specialists	1.0	1.0	1.0
Media Aides		1.0	1.5
Technology Specialists	0.5	1.0	1.5
Assessment/504/GT Coordinator	0.5	1.0	1.3
Instructional Aides	3.0	3.0	6.0
Student Support Staff			
Counselors	1.0	2.0	3.0
Nurses	1.0	1.0	1.0
Heath Aides			1.0
Behavior Interventionists	0.5	1.0	2.0
Administrative Staff			
Principal	1.0	1.0	1.0
Assistant Principals	0.5	1.0	2.0
Clerical/Data Entry Staff	3.0	3.0	4.0

School Configuration and Size	Grades 6-8 225 Students	Grades 6-8 450 Students	Grades 6-8 735 students
Other Staff			
IT Technicians	0.2	0.5	1.0
Supervisory Aides	2.0	2.0	4.0
Substitutes	0.5	1.0	1.0

For each middle school size configuration, panelists felt that 25:1 was an appropriate average class size. Panelists also based their staffing for middle school grades on an eight-period day with teachers teaching an average of six classes per day, which would allow (on average) 25 percent of the day for planning, collaboration, and embedded professional development. There is no distinction between classroom or special teachers at the secondary level, so both are included in the total teacher figure. High school panelists provided similar rationales as elementary panelists in justifying recommended staffing.

Table A5.4c
High School Personnel, as Recommended by Colorado PJ Panels, Base Education

School Configuration and Size	Grades 9-12 40 Students	Grades 9-12, 200 students	Grades 9-12, 400 students	Grades 9-12, 800 students	Grades 9-12, 2,000 students
Recommended Average Class Size	10	25	25	25	25
Schedule	Eight period day; teachers teaching six periods	Eight period day; teachers teaching six periods	Eight period day; teachers teaching six periods	Eight period day; teachers teaching six periods	Eight period day; teachers teaching six periods
Instructional Staff					
Teachers	6.0	11.0	21.3	42.7	106.7
Instructional Coaches	0.5	1.0	2.0	4.0	10.0
Interventionists	0.5	1.0	1.0	2.0	5.0
Librarians/Media Specialists	0.5	0.5	1.0	1.0	1.0
Media Aides		0.5		0.5	2.0
Technology Specialists	0.2	0.5	1.0	2.0	3.0
Assessment/504/GT Coordinator	0.5	0.5	1.0	2.0	3.0
Student Support Staff					
Counselors	1.0	2.0	2.0	3.2	8.0
Nurses	0.5	1.0	1.0	1.0	1.0
Health Aides					2.0
Psychologists			0.5	1.0	2.0
Social Workers	0.5	0.5	0.5	1.0	2.0
Addiction/Mental Health Counselors		0.5	0.5	1.0	2.0
Workforce Coordinators	0.5	0.5	1.0	1.5	2.5
Administrative Staff					
Principal	0.5	1.0	1.0	1.0	1.0
Assistant Principals	0.5	1.0	1.0	2.0	4.0
Athletic/Activities Director		0.5	1.0	1.0	1.0
Bookkeepers		1.0	1.0	1.0	2.0
Clerical/Data Entry Staff		2.0	2.0	4.0	6.0

School Configuration and Size	Grades 9-12 40 Students	Grades 9-12, 200 students	Grades 9-12, 400 students	Grades 9-12, 800 students	Grades 9-12, 2,000 students
Other Staff					
IT Technicians	0.2	0.2	0.5	1.0	2.5
Supervisory Aides	1.0	2.0	2.0	2.0	2.0
Security Staff	1.0	1.0	1.0	1.0	2.0

Panelists recommend a class size of 10:1 for the smallest high school size. For each of the other four high school sizes, panelists kept the same average class size of 25:1 and recommended an eight-period day (or a four-block day) to allow for a wide range of courses so that students could meet all graduation requirements. Teachers would teach six periods on average, allowing about 25 percent of their days for meaningful collaboration and embedded professional development. Panelists also included a workforce coordinator position at the high school level to assist students with postsecondary and career exploration opportunities and an addiction/mental health counselor to address the rise in student drug use. Additionally, panelists have recommended school resources officers (SROs) and security guards at all campuses but preferred such funding to come from the district budget; therefore, the study team added school security personnel as additional costs to the district resources.

Special Needs Personnel at the School-level

The previous sections of this report detail the resources that any student in Colorado should expect to find in schools. This section focuses on additional resources that schools and districts need to serve at-risk and ELL students. As noted previously, the study team did not factor special education costs into this analysis because SPED was analyzed separately in the Colorado input adequacy study. Tables A.1a-c earlier in this chapter outlined the different ways that the study team examined at-risk and ELL needs:

- Panelists looked at three concentration levels (25%, 55%, and 75%) for at-risk panels.
- The resources needed for ELL students were identified by WIDA level. The three WIDA levels examined include WIDA 1&2, WIDA 3&4, and WIDA 5&6.

At-Risk Resources

Tables A5.5a-c identify the resources needed to serve at-risk students at a 25%, 55%, and 75% concentration level. Additional personnel were identified at the district-level (Table A5.9). Each table should be considered separately. For example, Table A5.5a identifies one and a half instructional aides for a large elementary school with 25% at-risk concentration, while Table A5.5b shows three instructional aides for the 55% concentration. These are separate identifications and should not be added together.

Table A5.5a

Additional Personnel Needed to Serve At-Risk Students, 25% Concentration of at-risk Identified by Colorado PJ Panels

25% At-Risk Students					
Elementary School					
District Size	Very Small	Small	Moderate Small	Moderate Large	Large
# of At-Risk Students	23 students	60 students	90 students	90 students	135 students
Additional Staff					
Interventionists			0.4	0.4	0.8
Instructional Aide			1.0	1.0	1.5
Counselor	0.3	0.3	0.3	0.3	0.3
Psychologists		0.2	0.3	0.3	0.3
Social Workers		0.3	0.3	0.3	0.3
Family Liaisons		0.3	0.3	0.3	0.3
Middle School					
District Size	Very Small	Small	Moderate Small	Moderate Large	Large
# of At-Risk Students	23 students	56 students	56 students	113 students	225 students
Additional Staff					
Interventionists		0.4	0.4	0.8	1.0
Instructional Facilitator		0.2	0.2	0.5	0.8
Social Workers	0.3	0.25	0.25	0.5	0.8
Family Liaisons		0.25	0.25	0.5	0.8
Assistant Principals		0.2	0.2	0.4	0.8
High School					
District Size	Very Small	Very Small	Small	Moderate	Large
# of At-Risk Students	10 students	50 students	100 students	200 students	500 students
Additional Staff					
Interventionists		0.3	0.5	1.0	3.0
Instructional Facilitators	0.2	0.4	0.8	1.6	2.0
Social Workers		0.1	0.2	0.4	1.0
Family Liaisons		0.1	0.2	0.4	1.0
Addiction/Mental Health Counselors		0.1	0.2	0.4	1.0
Workforce Counselors		0.1	0.2	0.4	1.0
Assistant Principal		0.1	0.2	0.4	1.0

Resources shown in Table A5.5a identified for poverty students are above and beyond the resources identified in the base. To fully serve these at-risk students, panelists identified the need for teacher tutors/interventionists to push into classrooms and work directly with students. At the elementary level, the panelists recommended instructional aides for moderate small, moderate large, and large districts to support the teacher tutor/interventionist with small group instruction. At the high and middle school levels, the panelists recommended having instructional facilitators coach teachers with strategies to serve at-risk students. The panelists added further student support, including social workers and family liaisons, to address the added student and family needs. An additional 0.3 counselor and psychologist time was added at the elementary level. At the middle and high school levels, an additional portion of the assistant principal's time was cited as a need to help with the increased evaluations and student behavior support. The high school level added extra addiction/mental health counselors and workforce counselors.

Table A5.5b
Additional Personnel Needed to At-Risk Serve Students, 55% Concentration

55% At-Risk Students					
Elementary School					
District Size	Very Small	Small	Moderate Small	Moderate Large	Large
# of At-Risk Students	50 students	132 students	198 students	198 students	297 students
Instructional Staff					
Interventionists	0.5	1.3	2.0	2.0	3.0
Instructional Aide	1.0	1.4	2.0	2.0	3.0
Counselor	0.7	0.4	0.55	055	0.8
Psychologists		0.4	0.55	0.55	0.8
Social Workers		0.4	0.55	0.55	0.8
Family Liaisons		0.4	0.55	0.55	0.8
Middle School					
District Size	Very Small	Small	Moderate Small	Moderate Large	Large
# of At-Risk Students	50 students	124 students	124 students	248 students	495 students
Additional Staff					
Interventionists	0.5	1.0	1.0	2.0	4.0
Instructional Facilitator		0.5	0.5	1.0	2.0
Counselors	0.7	0.5	0.5	1.0	2.0
Social Workers		0.5	0.5	1.0	2.0
Family Liaisons		0.5	0.5	1.0	2.0
Assistant Principals		0.5	0.5	1.0	2.0

High School					
District Size	Very Small	Very Small	Small	Moderate	Large
# of At-Risk Students	22 students	110 students	220 students	440 students	1,100 students
Additional Staff					
Teacher	1.0	2.3	4.6	9.0	21.0
Interventionists	0.25	1.0	2.0	4.0	10.0
Social Workers	0.25	0.3	0.5	1.0	2.5
Family Liaisons		0.3	0.5	1.0	2.5
Addiction/Mental Health Counselors		0.3	0.5	1.0	2.5
Workforce Counselors		0.3	0.5	1.0	2.5
Assistant Principal		0.3	0.5	1.0	2.5

Panelists recommended increasing resources for schools with 55% at-risk concentration (Table A.5b) from what was needed at 25% concentration in terms of both instructional and support staff. The panelists at the middle school level identified a need for additional counselors to assist with address higher student needs. At the high school level, panelists recommended additional teachers to provide smaller class sizes and more targeted instruction.

Table A5.5c

Additional Personnel Needed to Serve At-Risk Students, 75% Concentration

75% At-risk Students					
Elementary School					
District Size	Very Small	Small	Moderate Small	Moderate Large	Large
# of At-Risk Students	68 students	180 students	270 students	270 students	378 students
Additional Staff					
Teachers	1.0	2.5	4.0	4.0	6.0
Interventionists	1.0	2.0	2.0	2.0	2.8
Instructional Aide	1.5	3.0	3.0	3.0	4.2
Counselor	1.0	1.0	1.0	1.0	1.0
Psychologists		1.0	1.0	1.0	1.0
Social Workers		1.0	1.0	1.0	1.0
Family Liaisons		1.0	1.0	1.0	1.0
Assistant Principals		0.5	1.0	1.0	1.0
Middle School					
District Size	Very Small	Small	Moderate Small	Moderate Large	Large
# of At-Risk Students	68 students	169 students	169 students	338 students	675 students
Additional Staff					
Interventionists	1.0	2.5	2.5	4.7	8.4
Instructional Coach		1.0	1.0	2.4	4.8
Counselors	1.0	1.0	1.0	1.4	2.8
Social Workers		1.0	1.0	1.4	2.8
Family Liaisons		1.0	1.0	1.4	3.0
Assistant Principals		1.0	1.0	1.5	3.0

High School					
District Size	Very Small	Very Small	Moderate Small	Moderate Large	Large
# of At-Risk Students	30 students	150 students	300 students	600 students	1,500 students
Additional Staff					
Teacher	1.5	3.0	6.0	12.3	29.0
Interventionists	0.5	1.4	2.7	5.5	14.0
Social Workers	0.5	0.7	0.7	1.4	3.0
Family Liaisons		0.7	0.7	1.4	3.0
Addiction/Mental Health Counselors		0.7	0.7	1.4	3.0
Workforce Counselors		0.7	0.7	1.4	3.0
Assistant Principal		0.7	1.0	1.4	3.0

Panelists added teachers to elementary schools to help reduce class sizes and also added more assistant principal time to account for hiring, evaluating, and supporting additional instructional staff.

ELL Resources by WIDA Level

Tables A5.6a-c identify the resources needed to serve ELL students, disaggregated by WIDA levels, which measure students' language acquisition levels against the WIDA ELP Standards[2].

Table A5.6a:
Additional Personnel Needed to Serve WIDA 1&2 ELL Students

WIDA 1&2 ELL Students					
Elementary School (6%)					
District Size	Very Small	Small	Moderate Small	Moderate Large	Large
# of ELL Students	5 students	14 students	23 students	23 students	35 students
Additional Staff					
Teachers	0.5	0.5	0.75	0.75	1.13
Instructional Coaches	0.1	0.25	0.25	0.25	0.5
Middle School (4%)					
District Size	Very Small	Small	Moderate Small	Moderate Large	Large
# of ELL Students	5 students	7 students	7 students	14 students	27 students
Additional Staff					
Teachers	0.25	0.3	0.3	0.6	1.2
Instructional Coaches	0.1	0.25	0.25	0.25	0.38
High School (3%)					
District Size	Very Small	Small	Moderate Small	Moderate Large	Large
# of ELL Students	1 student	6 students	12 students	24 students	60 students
Additional Staff					
Teachers	0.3	0.3	0.6	1.2	3.0
Instructional Coaches		0.5	0.5	0.6	1.5

WIDA 1&2 ELL students have the highest language needs and focus on the communication aspect of the language. On average, in Colorado, six percent of ELL students are in elementary school, four percent in middle school, and three percent in high school. There is a higher number of WIDA 1&2 students in earlier

[2] https://www.wida.us/standards/Resource_Guide_web.pdf

grades because elementary school could be the first time the student has had prolonged exposure to the English language.

At the WIDA 1&2 level, panelists indicated there needed to be additional teaching staff to assist students with their language needs. Additional instructional facilitators were added to train teachers on educating and working with ELL students. Panelists said there was a need to have a minimum of a half-time teacher in each elementary school, a quarter of a teacher's time in each middle school, and a third of a teacher's time in each high school, no matter the size. Even though there are fewer students at the high school level than the middle school level, panelists discussed the need for more teaching support at the high school level due to students needing to acquire language and gain credits.

Table A5.6b
Additional Personnel Needed to Serve WIDA 3&4 ELL Students

WIDA 3&4 ELL Students					
Elementary School (7%)					
District Size	Very Small	Small	Moderate Small	Moderate Large	Large
# of ELL Students	5 students	17 students	25 students	25 students	38 students
Additional Staff					
Teachers	0.2	0.5	0.65	0.65	0.98
Instructional Coaches	0.1	0.3	0.2	0.2	0.4
Middle School					
District Size	Very Small	Small	Moderate Small	Moderate Large	Large
# of ELL Students	6 students	11 students	11 students	23 students	45 students
Additional Staff					
Teachers	0.2	0.3	0.3	0.6	1.1
Instructional Coaches		0.2	0.2	0.4	0.7
High School					
District Size	Very Small	Small	Moderate Small	Moderate Large	Large
# of ELL Students	2 students	8 students	16 students	32 students	80 students
Additional Staff					
Teachers	0.2	0.	1.00	1.60	3.20
Instructional Coaches		0.30	0.60	1.00	1.00

The average percentage of WIDA3&4 students in Colorado was seven at the elementary school level, five percent at the middle school level, and four percent at the high school level. WIDA 3&4 students are beginning to develop oral and written language skills in related content areas. The panelists allocated fewer personnel resources to instruction compared to WIDA 1&2 students.

Table A5.6c
Additional Personnel Needed to Serve WIDA 5&6 ELL Students

WIDA 5&6 ELL Students					
Elementary School (3%)					
District Size	Very Small	Small	Moderate Small	Moderate Large	Large
# of ELL Students	3 students	7 students	11 students	11 students	37 students
Additional Staff					
Teachers	0.05	0.1	0.1	0.1	0.15
Middle School (1%)					
District Size	Very Small	Very Small	Small	Moderate	Large
# of ELL Students	3 students	2 students	2 students	5 students	9 students
Additional Staff					
Teachers	0.05	0.04	0.04	0.08	0.1
High School (1%)					
District Size	Very Small	Small	Moderate Small	Moderate Large	Large
# of ELL Students	0 students	2 students	4 students	8 students	20 students
Additional Staff					
Teachers		0.05	0.1	0.2	0.5

The WIDA Standards for levels 5 and 6 represent the areas where students are bridging and reaching English language proficiency in specialized and technical language.[3] Panelists identified fewer instructional supports and removed instructional coaches at all grade levels. The main goal at this level was to provide students with additional support to stay on track.

School-level Non-Personnel Costs

Tables A5.7a-c, below, show additional school-level non-personnel costs identified by the panels.

Table A5.7a
School-level Non-Personnel Costs Identified by Colorado PJ Panels

Elementary Base Education				
	90 Students	**240 Students**	**360 Students**	**540 Students**
Professional Development	$214/ student	$162/ student	$157/student	$132/ student
Substitutes	$350/student	$196/student	$175/student	$175/student
Supplies, Materials, and Equipment	$200/student	$165/student	$165/student	$165/student
Textbooks	$105/student	$105/student	$105/student	$105/student
Technology hardware and Licensing	$400/student	$400/student	$400/student	$400/student
Assessment	$15/student	$15/student	$15/student	$15/student
Student Activities	$60/student	$40/student	$30/student	$20/student
Safety and Security	$100/student	$100/student	$100/student	$100/student
Library Materials	$20/student	$12/student	$12/student	$12/student

[3] https://www.wida.us/standards/Resource_Guide_web.pdf

Table A5.7b
School-level Non-Personnel Costs Identified by Colorado PJ Panels

Middle School Base Education			
	225 Students	**450 Students**	**735 Students**
Professional Development	$146/ student	$146/ student	$121/student
Substitutes	$145/student	$140/student	$139/student
Supplies, Materials, and Equipment	$175/student	$175/student	$175/student
Textbooks	$105/student	$105/student	$105/student
Technology hardware and Licensing	$400/student	$400/student	$400/student
Assessment	$15/student	$15/student	$15/student
Student Activities	$300/student	$275/student	$250/student
Safety and Security	$170/student	$170/student	$170/student
Library Materials	$12/student	$12/student	$12/student

Table A5.7c
School-level Non-Personnel Costs Identified by Colorado PJ Panels

High School Base Education					
	40 Students	**200 Students**	**400 Students**	**800 Students**	**2,000 Students**
Professional Development	$303/student	$223/student	$171/ student	$146/ student	$121/student
Substitutes	$408/student	$224/student	$141/student	$140/student	$140/student
Supplies, Materials, and Equipment	$250/student	$200/student	$165/student	$150/student	$75/student
Textbooks	$105/student	$105/student	$105/student	$105/student	$105/student
Technology hardware and Licensing	$400/student	$400/student	$400/student	$400/student	$400/student
Assessment	$15/student	$15/student	$15/student	$15/student	$15/student
Student Activities	$525/student	$400/student	$350/student	$325/student	$250/student
Safety and Security	$170/student	$170/student	$170/student	$170/student	$170/student
Library Materials	$15/student	$15/student	$15/student	$15/student	$12/student

Panelists developed non-personnel cost figures for instructional supplies, materials, equipment, textbooks, student activities (field trips, sports, extracurricular activities, etc.), technology hardware and licensing, safety and security, and library materials. The panelists recommended $100 per student for security and safety to meet the school's security needs, including SROs. The technology hardware and licensing amounts cover 1:1 devices at all levels and all tech-related licensing. The panel recommended increases in per-student costs for student activities, safety and security, and library materials at higher grade levels due to the higher needs of students.

Professional development costs are shown separately as per student figure to cover materials, trainers, or conference fees. In addition to what is reflected in the tables above, panelists identified a need for two additional days of PD beyond what is already in current teacher contracts. The panels identified the need for 11 days of substitute time for each teacher throughout the year, reflected in the tables as a per student amount.

Table A5.7d.
School-level Non-Personnel Costs for At-risk Students Identified by Colorado PJ Panels

	Elementary	Middle	High
Supplies, materials, and equipment	$25/student	$25/student	$25/student
Student Activities	$20/student	$75/student	$225/student

The panelists added additional funds for student activities, supplies, and materials to eliminate barriers to participation for students in poverty. All figures for at-risk are in addition to base figures and are only applied to the students in those categories. Additionally, panelists did not identify ELL costs at the school level but instead placed them at the district level for efficiency purposes.

School-level Additional Programs

Tables A5.8a-c indicate the other programs, such as afterschool, summer, and bridge programs, that the panels indicated were needed to ensure students meet Colorado state standards and requirements. Panelists recommended that at-risk students participate in these extended learning opportunities to support improved academic outcomes for these students. These programs are in addition to extracurricular sports, clubs and enrichment that were already captured in the per student amount for student activities shown in the prior tables.

It is important to note that while the study did not include transportation, panelists felt that additional transportation (e.g., a second bus pickup for students in an afterschool program) was necessary for offering extended learning opportunities. Table A.8a displays personnel and non-personnel costs by program at the elementary level.

Table A5.8a
Elementary Additional Programs Identified by Colorado PJ Panels

	Afterschool Tutoring	Summer School	Jump Start
Type of Student Served	At-Risk	At-Risk	At-Risk
Percentage of Identified Populations Served	100%	100%	100%
Program Specifics (length of program, length of day)	1 hour, 5 days/week, 36 weeks	4 hours, 4 days/week, 8 weeks	7 hours, 5 days/week, 2 weeks
Personnel			
Teachers	10:1 Ratio	10:1 ratio	10:1 ratio
Coordinators	1	1	1
Other Costs			
Supplies, Materials and Equipment	$20/student	$20/student	$20/student
Snacks	$180/student	$80/student	$70/student

Panelists identified afterschool tutoring and summer school costs for all at-risk students. Tutoring would be held one hour a day for five days a week throughout the school year. Summer school would be offered four hours a day, four days a week for eight weeks. Panelists also identified the need for a jumpstart program that happens seven hours a day, five days a week, and for two weeks for at-risk students to help them adjust to going back to school after summer break.

As shown in Table A5.7b and Table A5.7c, the middle and high school programs are like the identified elementary programs, except a bridge program replaces the jump start program. The bridge program would assist all entering 6th graders in getting accustomed to middle school before the school year officially begins, and the same would be true for entering 9th graders into high school.

Table A5.8b
Middle School Additional Programs Identified by Colorado PJ Panels

	Afterschool Tutoring	Summer School	Bridge
Type of Student Served	At-Risk	At-Risk	All 6th graders
Percentage of Identified Populations Served	100%	100%	33%
Program Specifics (length of program, length of day)	1 hour/day, 5 days/week, 36 weeks	4 hours/day, four days/week, 8 weeks	3 hours/day, 5 days/week, 1 week
Personnel			
Teachers	10:1 ratio	10:1 ratio	25:1 ratio
Coordinators	1.0	1.0	
Other Costs			
Supplies, Materials and Equipment	$25/student	$25/student	$25/student
Snacks	$180/student	$96/student	$5/student

Table A5.8c
High School Additional Programs Identified by Colorado PJ Panels

	Afterschool Tutoring	Summer School	Bridge
Type of Student Served	At-Risk	At-Risk	All 9th graders
Percentage of Identified Populations Served	100%	100%	25%
Program Specifics (length of program, length of day)	1 hour/day, 5 days/week, 36 weeks	4 hours/day, four days/week, 8 weeks	3 hours/day, 5 days/week, 1 week
Personnel			
Teachers	10:1 ratio	10:1 ratio	25:1 ratio
Coordinators		1.0	
Other Costs			
Supplies, Materials and Equipment	$30/student	$30/student	$30/student
Travel	$50/student		
Snacks		$128/student	$5/student

District-level Resources

Panelists also identified resources needed at the district-level to support schools. Table A5.9a-b shows the personnel resources needed for all students (base education), as well as the additional resources needed for ELL. The panelists felt no additional personnel were needed above the base district personnel to serve at-risk students.

Importantly, different districts often use different position titles or levels of personnel to fulfill the same functions or roles. For example, a CFO in one district might perform the same function as a supervisor-level position in another district. Additionally, panelists did not build out a large district due to the number of staff needed to serve 35,000 students; rather, the CFO panel provided per student district costs for large districts.

Table A5.9a
District Personnel Resources Identified by Colorado PJ Panels, Base Education and ELL

Personnel	Very Small District	Small District	Moderate Small District	Moderate Large District
Superintendents	1.0	1.0	1.0	1.0
Assistant/Associate Superintendents		1.0	0.0	3.0
Directors		4.0	5.0	8.0
Supervisors/Coordinators			4.0	14.0
Managers	2.0	3.0	4.0	4.0
Clerical/Data Entry Staff	1.0	1.0	6.0	7.0
IT Technicians		1.5	8.0	10.0
English Language Learners				
Coordinators/Supervisors		0.3	1.0	2.0
Interpreters	0.25	0.5	1.0	2.0
Family Liaison	0.1	0.25	0.5	1.0
Clerical/Data Entry Staff			1.0	3.0

Panelists recommended that interpreters and family liaisons should be included at the district-level to serve ELL students in schools. CFO panels also addressed the district-level costs incurred to support schools and identified costs primarily based on existing district expenditures. Some cost areas, such as assessments were already identified at the school level and are not included at the district-level (even if they are often purchased district-wide) to avoid double counting.

These costs included district operational expenses such as: building maintenance and operations (M&O), technology licensing and hardware, insurance, legal fees, finance and data system fees, and communications. As noted previously, the PJ approach typically does not address transportation, food service, and capital costs; however, panelists strongly recommended an additional per student cost for food service since many CFOs stated that food service is no longer is a net cost for districts. Also of note, panelists identified higher M&O dollars than currently expended to account for deferred maintenance, which many schools face.

In addition to district operation costs, there are also costs included at the district-level to fund different student pathways including CTE, concurrent enrollment, and online programs.

Table A5.9b identifies the additional non-personnel costs at the district-level for base education, shown as per student figures for each district size.

Table A5.9b
District Non-Personnel Costs, Base Education Identified by Colorado PJ Panels

Cost Area	Very Small District	Small District	Moderate Small District	Moderate Large District	Large District
Maintenance and Operations	$3,200/student	$2,700/student	$1,300/student	$1,050/student	$800/student
Safety and Security	$75/student	$30/student	$30/student	$30/student	$30/student
Insurance	$500/student	$400/student	$400/student	$300/student	$220/student
Legal	$150/student	$115/student	$50/student	$50/student	$32/student
School board	$58/student	$49/student	$10/student	$10/student	$10/student
Central Office Supplies	$225/student	$200/student	$150/student	$150/student	$150/student
Transportation for Activities	$175/student	$175/student	$76/student	$25/student	$15/student
Food Service	$325/student	$137/student	$137/student	$63/student	$63/student
Graduation	$12/student	$12/student	$5/student	$5/student	$5/student
Communications	$78/student	$78/student	$78/student	$78/student	$50/student
Concurrent Enrollment	$25/student	$25/student	$25/student	$25/student	$25/student
CTE Costs	$28/student	$28/student	$28/student	$28/student	$28/student
Online	$50/student	$50/student	$50/student	$50/student	$50/student
Audit	$207/student	$43/student	$29/student	$12/student	$3/student
Internet, Phone, & Postage	$100/student	$75/student	$75/student	$75/student	$75/student

District Level Remoteness

The remote panel identified additional resources and costs associated with education in remote settings. The panel did not create a specific definition of a remote district but discussed the resources needed for districts geographically isolated from other districts and towns. The remote district panel reviewed the work of the small school district and identified three areas with increased costs: contracted services, repairs and maintenance, and professional development.

According to the panelists, many remote districts end up contracting out social workers, counselors, and other services because they do not have enough students to hire one full time staff in these areas. Due to their remoteness, districts cannot share these personnel with other schools or districts and pay higher rates for contracted services to cover transportation costs for service providers. Panelists estimated that additional staffing costs for remote districts merited a 25% increase over the small district budget.

Similar to contracted services, repairs, and maintenance are more expensive for remote districts because repair companies charge for increased drive distance, and many repair companies are located a greater distance away from the districts. Panelists found this to be a 25% increase in costs from small districts.

Panelists cited the cost of professional development for their staff in remote districts as an additional area where costs were higher than those seen in other districts. Panelists reported difficulties recruiting professionals to provide PD in many remote places. When districts do find trainers who are willing to commute, they usually pay extended hours to account for the trainer's drive time. Additionally, when districts want to send their staff to PD, they usually must pay for two nights of hotel and extra substitute time due to the distances staff must travel. Panelists found this to cost about twice as much as non-rural small districts.

The study team determined that these changes would result in a 9.6% increase in per-pupil funding from the small district.

Developing Cost Estimates

Once the panels completed their work, the study team undertook the process of costing out the above resources, which primarily involved determining salaries associated with the identified FTE positions and applying the school and district-level per student costs. As the landscape analysis shows, salaries are consistent across the state but the study team felt using average salaries, with a later cost adjustment for district factors, was a good foundation for creating a compensation level adequate for attraction and retention of staff. To further build the adequate compensation level, the study team included a 22.85 percent benefit rate which includes the costs of PERA and Medicaid. Additionally, an average health/dental/vision cost of $13,453 was estimated, based on the assumption that all staff in public schools should have access to similar benefits as state employees. See Section D.

School-level and District-level Costs

Tables A5.10a-c that follow present the base costs per student for each representative school by size. Base costs are disaggregated into costs for personnel (including salaries, benefits and health allotments), professional development, non-personnel, technology, and other programs. The costs for the K-8 school are included in the elementary table.

Table A5.10a.
Elementary and K-8 School Base Costs Identified by Colorado PJ Panels

Enrollment	K-8, 90 Students	Elementary, 240 Students	Elementary, 360 Students	Elementary, 540 Students
School-level Costs, Base	**$18,016**	**$12,295**	**$10,657**	**$10,009**
Personnel Costs	$16,592	$11,090	$9,490	$8,878
Professional Development	$214	$162	$157	$132
Non-Personnel Costs	$850	$643	$609	$599
Technology	$400	$400	$400	$400
Other Programs				

The base costs for elementary schools range from $10,009 to $12,295; for K-8 schools, which is a much smaller setting of only 90 students, it is $18,016. These differences reflect the differing economies of scale in settings based on size.

Table A5.10b
Middle School Base Costs Identified by Colorado PJ Panels

Enrollment	225 Students	450 Students	735 Students
School-level Costs, Base	**$11,282**	**$9,183**	**$8,818**
Personnel Costs	$9,809	$7,740	$7,428
Professional Development	$146	$146	$121
Non-Personnel Costs	$928	$897	$869
Technology	$400	$400	$400
Other Programs			

The base cost at the middle school level ranges from $8,818 to $11,282. These costs are lower than those at the elementary school level, largely driven by the larger class sizes of 25:1 at the secondary level compared to the elementary level.

Table A5.10c
High School Base Costs Identified by Colorado PJ Panels

Enrollment	40 Students	200 Students	400 Students	800 Students	2,000 Students
School-level Costs, Base	**$29,963**	**$12,840**	**$10,085**	**$9,189**	**$8,198**
Personnel Costs	$28,157	$11,181	$8,563	$7,701	$6,850
Professional Development	$303	$197	$171	$146	$120
Non-Personnel Costs	$1,504	$1,062	$952	$942	$827
Technology	$400	$400	$400	$400	$400

The high school-level base cost ranges from $8,198 to $29,963. There is a large range between small ($12,840) and very small ($29,963) districts because while very small districts only serve 40 students, they still need to provide similar educational opportunities for their students as larger districts. High school base costs are higher than middle school base costs due to additional support needed at the high school level for staff such as postsecondary guidance counselors and workforce opportunity coordinators.

Tables A5.11a-b show the additional costs above the base for identified special needs students including at-risk and ELL students.

Table A5.11a
School-level Costs for At-risk Students Identified by Colorado PJ Panels

		Elementary			
District Size	**Very Small**	**Small**	**Moderate Small**	**Moderate Large**	**Large**
25% Concentration	$4,508	$3,021	$3,049	$3,049	$3,167
50% Concentration	$6,223	$3,727	$3,640	$3,640	$3,640
75% Concentration	$7,880	$6,388	$5,428	$5,428	$5,008
		Middle			
District Size	**Very Small**	**Small**	**Moderate Small**	**Moderate Large**	**Large**
25% Concentration	*	$3,089	$3,089	$3,136	$3,031
55% Concentration	*	$3,665	$3,665	$3,665	$3,670
75% Concentration	*	$5,069	$5,069	$4,480	$4,387

High School					
District Size	Very Small	Small	Moderate Small	Moderate Large	Large
25% Concentration	$3,139	$3,398	$3,398	$3,398	$2,031
55% Concentration	$3,841	$4,924	$4,781	$4,746	$3,524
75% Concentration	$8,136	$5,863	$4,858	$4,784	$3,462

**Included in the Elementary numbers is the K-8 school in the Very Small District*

For at-risk students, the identified per-student amounts were consistent across school levels, reflecting similar interventions at all grade levels. Additionally, the per-student increase from 55% concentration to 75% concentration is higher across elementary and middle school for at-risk students than the per-student increase from 25% concentration to 55% concentration.

Table A5.11b

School-level Costs for ELL Students Identified by Colorado PJ Panels

Elementary					
District Size	Very Small	Small	Moderate Small	Moderate Large	Large
WIDA 1&2	$ 5,771	$4,447	$3,571	$3,571	$3,854
WIDA 3&4	$4,142	$3,930	$2,789	$2,789	$3,001
WIDA 5&6	$1,329	$1,140	$729	$729	$708
Middle					
District Size	Very Small	Small	Moderate Small	Moderate Large	Large
WIDA 1&2	*	$6,624	$6,624	$6,624	$6,535
WIDA 3&4	*	$3,809	$3,809	$2,859	$2,746
WIDA 5&6	*	$1,593	$1,593	$1,276	$889
High School					
District Size	Very Small	Small	Moderate Small	Moderate Large	Large
WIDA 1&2	$23,754	$11,491	$7,731	$6,227	$6,227
WIDA 3&4	$7,928	$1,993	$1,993	$1,993	$1,993
WIDA 5&6	$0	$1,993	$1,993	$1,993	$1,993

**Included in the Elementary numbers is the K-8 school in the Very Small District*

Table A5.11b examines ELL costs per student. Looking at the per student cost estimates, students at lower WIDA levels require more funding than those at higher levels due to the additional supports that panelists felt were necessary for improving language acquisition. Costs are frequently highest at the high school level, and all three WIDA levels show an increase in costs as schools get smaller because panelists wanted to ensure a minimum level of service for students in smaller schools.

Panelists also identified the district-level resources needed to support schools. Table A5.12 presents the district-level cost figures for the base and the additional amounts for students with additional needs.

Table A5.12
District-level Costs Identified by Colorado PJ Panels

District Size	Very Small	Small	Moderate Small	Moderate Large	Large
District Enrollment	130	600	1,750	6,250	13,590
Base	$9,278	$6,663	$4,181	$2,741	$2,102
At-Risk	$0	$0	$0	$0	$0
ELL	$1,585	$1,270	$1,151	$742	$468

The additional district-level base cost ranged from $2,102 to $9,278. The cost of providing additional support and services at the district level for students with additional needs was between $468 and $1,588 for ELL students. Panelists included all the resources for at-risk students at the school level rather than adding to the district level.

Professional Judgment Total Base Costs and Weights

Combining the school and district-level costs by district size, the study team calculated a single school-level base cost figure for each district. To do this, the study team used school-level cost figures for each grade configuration and the distribution of students at each grade level. The study team then added district-level costs to develop total base costs and weights for each identified student population. These figures are shown in Table A5.13.

Weights represent the resources needed above the base for student and district characteristics. For example, if the base cost for a student is $10,000 and the additional needs related to at-risk are $3,000, then the at-risk weight is 0.30. The district would, therefore, receive a total of $13,000 to provide an adequate education for that student.

Table A5.13
Professional Judgment Total Base Cost and Additional Weights

District Size	Very Small	Small	Moderate Small	Moderate Large	Large
Base	$30,944	$18,892	$14,786	$12,607	$11,280
Weights					
At-Risk					
25% Concentration	0.14	0.23	0.28	0.29	0.29
55% Concentration	0.18	0.26	0.32	0.35	0.37
75% Concentration	0.26	0.26	0.40	0.42	0.44
ELL					
WIDA 1&2	0.42	0.44	0.45	0.46	0.49
WIDA 3&4	0.27	0.25	0.32	0.32	0.33
WIDA 5&6	0.08	0.15	0.17	0.16	0.15

As shown in Table A5.13, the per-student base cost rises from a low of $11,280 in the largest district to $30,944 in the very small district. At-risk weights are the lowest at the 25% concentration, ranging from 0.14 to 0.29. The 50% concentration weights range from 0.18 to 0.37, and the 75% concentration weights range from 0.26 to 0.44. All the weights are lowest in the very small district and rise in the larger districts. The ELL WIDA 1&2 weight ranges from 0.42 to 0.49; WIDA 3&4 weight ranges from 0.25 to 0.33, and WIDA 5&6 weight ranges from 0.08 to 0.17.

Section A: Instructions to Colorado Professional Judgment Panel Members

The work you are doing today is part of the Colorado Input-Based Financial Adequacy Study. An input study focuses on identifying the resources necessary to allow students, teachers, schools, and districts to meet state requirements and goals. The Professional Judgement (PJ) approach relies on your professional experience to identify the resources needed so that all students, schools, and districts can fulfill all state standards and requirements. Below, you will find several instructions to help you in this process. When creating representative schools, it is important to remember that you are not being tasked to build your "Dream School." Instead, you are being asked to identify the resources needed to meet the specific standards and requirements that the state expects students, schools, and districts to fulfill. You should allocate resources as efficiently as possible without sacrificing quality.

1. You are a member of a panel that is being asked to design how programs and services will be delivered in representative school and district settings. These panels are being used to identify the resources that schools with a particular set of demographic characteristics should have in order to meet a specific set of "input" requirements and "output" objectives.

2. Previously, eleven professional judgment panels were convened to address: (1) elementary schools; (2) middle schools; (3) high schools; (4) English learners; (5) At-risk; (6) Very Small District; (7) Small District; (8) Moderate Small District; (9) Moderate Large District; (10) Remote; (11) CFO. Each panel discussed more than one representative school for that grade configuration of varying size, and addressed resources needed to serve all students ("base" resources).

4. The characteristics of each representative school(s) are identified, including: (1) grade span; (2) enrollment; (3) the proportion of at-risk students (based on those students eligible for free/reduced price lunch); and (4) the proportion of EL Students.

5. The "input" requirements and "outcome" objectives that need to be accomplished by the representative school(s) and district(s) are those required by the state. These requirements or objectives can be described broadly as education opportunities, programs, services or as levels of education performance. You will be provided a short summary of state expectations and performance standards; it is not meant to be exhaustive of all requirements that the state requires schools and districts to fulfill, but instead should be considered a refresher or reminder. As well as consider the impacts of COVID and the Budget Stabilization Factor [i](BSF).

6. In designing the representative school(s), we need you to provide some very specific information so that we can calculate the cost of the resources that are needed to fulfill the indicated requirements or objectives. The fact that we need

that information should not constrain you in any way in designing the program of the representative school(s) and district(s). Your job is to create a set of programs, curriculums, or services designed to serve students with particular needs in such a way that the indicated requirements/objectives can be fulfilled. Use your experience and expertise to organize personnel, supplies and materials, and technology in an efficient way you feel confident will produce the desired outcomes.

7. For this process, the following statements are true about the representative school(s) and the conditions in which they exist:

Teachers: You should assume that you can attract and retain qualified personnel and that you can employ people on a part-time basis if needed (based on tenths of a full-time equivalent person).

Facilities: You should assume that the representative school has sufficient space and the technology infrastructure to meet the requirements of the program you design.

Revenues: You should not be concerned about where revenues will come from to pay for the program you design. Do not worry about federal or state requirements that may be associated with certain types of funding. You should not think about whatever revenues might be available in the school or district in which you now work or about any of the revenue constraints that might exist on those revenues.

Programs: You may create new programs or services that do not presently exist that you believe address the challenges that arise in schools. You should assume that such programs or services are in place and that no additional time is needed for them to produce the results you expect of them. For example, if you create after-school programs or pre-school programs to serve some students, you should assume that such programs will achieve their intended results, possibly reducing the need for other programs or services that might have otherwise been needed.

Section B: Review of Key Standards and Requirements in Colorado

What follows is a number of standards and requirements for Colorado students, schools and districts, including some recent updates. This list is not exhaustive of all requirements that the state requires schools and districts to fulfill, but should be considered a refresher or reminder. All language is taken directly from the Colorado Department of Education's website (www.cde.state.co.us) and the available materials it provides.

Instructional Time[1]

Each public school shall be scheduled to provide for at least one thousand fifty-six hours if a secondary school pupil or nine hundred sixty-eight hours if an elementary school pupil during each school year; except that in no case shall a school or schools be in session for fewer than one hundred sixty days without the specific prior approval of the commissioner of education. Each local board of education shall provide for the adoption of a district calendar (and individual school calendars, where appropriate) that provides the minimum number of student contact days and instructional hours required of each school within the district.

Content Standards[2]

In 2008, Colorado passed legislation (Senate Bill 08-212) that requires the State Board of Education to adopt content standards that prepare high school graduates for the 21st century workforce and for active citizenship. The same law was amended in 2019 to require a revision to approximately one-third of the Colorado Academic standards beginning in 2022 and an additional one-third every two years thereafter.

The most recent iteration of the standards in the 2020 Colorado Academic Standards (CAS) was approved by the State Board of Education in spring 2018 (the implementation of the 2020 CAS science standards was postponed until the 2021-22 school year). 2020 CAS areas include:

- Drama and Theatre Arts
- Comprehensive Health
- Computer Science
- Dance
- Drama
- Mathematics
- Music
- Physical Education
- Reading, Writing and Communicating
- Science
- Social Studies
- Visual Arts
- World Languages

School districts must ensure their standards - at minimum - meet or exceed the state standards. In addition to the requirement that students meet these content standards, students must also (to the extent practicable) develop and demonstrate essential skills for success in professional life in these areas:

- **Entrepreneurial:** critical thinking and problem solving, creativity and innovation, inquiry and analysis, and risk taking.
- **Personal:** self-awareness, initiative and self-direction, personal responsibility and self-management, adaptability and flexibility, and perseverance and resilience
- **Civic/Interpersonal:** collaboration and teamwork, strong communication skills, global and cultural awareness, civic engagement and strong character.
- **Professional:** task and time management, career awareness, information literacy, perseverance and resilience, productivity and accountability, self-advocacy, and leadership

Assessments[3]

The state administers its end-of-year assessments, the Colorado Measures of Academic Success, or CMAS, to measure students' mastery of the content standards in English language arts, math, and science**.** The assessments are designed to be administered on the computer; however, in 2015, the state legislature passed a law allowing districts to request paper versions of the tests. CMAS requirements by grade are:

- Students in grades three through eight take the CMAS tests in math and English language arts.
- Students in fifth, eighth and 11th grades take the CMAS science assessments.

Multilingual learners in the third and fourth grades who are identified as Non-English Proficient (NEP) or Limited English Proficient (LEP) may take the Colorado Spanish Language Arts assessment in place of the English language arts assessment. Additional assessments include the PSAT 9th and 10th grade and SAT in the 11th grade. Assessments for School Readiness and the READ Act are noted separately in the appropriate section.

Accountability[4]

Colorado's education accountability system is based on the belief that every student should receive an excellent education and graduate ready to succeed. The accountability system consists of local, state, and federal processes:

- **Local accountability** is driven by locally elected boards and reflects locally held values. Boards oversee superintendent and district policies.
- **State accountability** is informed by the Education Accountability Act of 2009 and by rules set by the Colorado Board of Education. This policy context drives the creation of performance frameworks, public reporting, improvement planning, performance watch, accreditation contracts, accountability committees, supports and interventions, and several state awards programs.

- **Federal accountability** is informed by the Every Student Succeeds Act (ESSA) and the approved Colorado state plan. The state plan establishes the criteria to identify schools on improvement.

Educator Effectiveness[5]

SB 10-191 requires annual evaluations for all principals/assistant principals, teachers and specialized service professionals. These annual evaluations are based upon statewide quality standards defining what it means to be an effective teacher, principal or specialized service professional, as well as student learning/outcomes over time. As of July 2013, all Colorado districts and BOCES were required to have implemented an evaluation system that aligns with the educator quality standards and the State Board Rules. Districts will provide assurance that they are implementing the state model system or a locally developed system that meets all statutory and regulatory requirements; assurances will be collected annually.

Principals/assistant principals, teachers, and specialized service professionals earn non-probationary status after three consecutive years of demonstrated effectiveness. Individuals in these job classifications lose non-probationary status after two consecutive years of less than effective ratings. Starting in the 2023-24 school year, updates to educator evaluations in Colorado are the result of the Kindergarten through Twelfth Grade Licensed Personnel Performance Evaluations Act, Senate Bill 22-070, which was passed and signed into law during the 2022 legislative session. Senate Bill 22-070 directed CDE to develop and provide guidance and support for the following areas:

Update the composition of final effectiveness ratings, by shifting composition of final effectiveness ratings from 50% professional practices and 50% measures of student learning/outcomes to 70% professional practices and 30% MSL/MSO.

Refine aspects of the MSL/MSO portion of an educator's final effectiveness rating, including: collective measure(s) within the MSLs/MSOs cannot exceed 10%; collective measure(s) within the MSLs for teachers and principals can only use data based on the performance of students enrolled at their school, and any educator who is new to a district/BOCES cannot have data from before they were employed used in the collective measure(s) of their MSL/MSO.

Develop and make available an evaluation process for educators rated Highly Effective for three consecutive school years.

Develop and make available new rubrics for licensed personnel in a limited number of specialized teacher or principal roles.

Develop and require training for evaluators of licensed personnel –provided or approved by CDE.

Adjust the timing for reporting of final effectiveness ratings (FERs).

Elementary Level Specific Requirements

School Readiness[6]

In 2008, the Colorado General Assembly passed Senate Bill 08-212, known as the Preschool through Postsecondary Alignment Act or Colorado's Achievement Plan for Kids (CAP4K). CAP4K legislation requires every child in state funded kindergarten programs to have an individual readiness plan (IRP) to support the school readiness and success for each child. Individual learning plans are required to be: (1) based on standards; (2) used to monitor progress toward school readiness; and (3) informed by a State Board of Education approved school readiness assessment tool. If a student is identified as having a significant reading deficiency, the student's READ plan is to be created as a component of the student's IRP.

The State Board of Education approved assessment tools determined to be valid, reliable and research-based instruments for assessing kindergarten school readiness and informing individual readiness plans; required assessment areas include:

- Physical Well-Being and Motor Development
- Social and Emotional Development
- Language and comprehension development
- Cognition
- General Knowledge

The school readiness assessment is administered to each student enrolled in a publicly funded kindergarten within the first sixty days of the school year. Districts determine the initial 60-day assessment window in accordance with their individual student start dates. School readiness assessments are not to be used to deny a student admission or progression to kindergarten or first grade.

Beginning in the 2021-2022 academic year, the kindergarten school readiness collection format changed to reflect the State Board of Education's decision to include named domains to the reporting requirements. The State Board of Education updated the approved list of assessments in June 2023; the approved assessment list includes: Acadience Math K-6, BRIGANCE Early Childhood Screens III, COR for Kindergarten, Desired Results Developmental Profile-Kindergarten, DIAL-4 Developmental Indicators for the Assessment of Learning, FastBridge earlyMath, FastBridge earlyReading, FastBridge SAEBRS, GOLD®, ISIP Math Assessment and North Carolina KEA.

Districts are also granted the following flexibilities for assessing students:

- If a READ Act reading assessment is administered within the first sixty days of the school year, the district is not required to administer the literacy component of the school readiness assessment.

- Districts may choose to assess additional areas and/or items of learning and development.
- Districts may choose to continue to monitor a student's progress toward demonstrating school readiness by administering an approved school readiness assessment multiple times over the course of the school year.

READ Act[7]

The Colorado Reading to Ensure Academic Development Act, known as the Colorado READ Act, was passed by the Colorado Legislature in 2012, giving the state the guiding philosophy, structure, and resources to ensure children are reading at grade-level by the time they enter fourth grade. The READ Act has since undergone various updates to help improve reading outcomes in Colorado. Requirements of the READ Act include:

- **Development of READ Plans:** The READ Act requires the creation and implementation of an individual intervention plan, called a READ plan, for students identified with a significant reading deficiency. The law outlines specific components that must be included in a READ plan to ensure the effectiveness of the intervention strategies, but each READ plan must be tailored to meet the individual needs of each student.
- READ Plan Implementation: Throughout the READ plan implementation process, decisions should be made collaboratively between school personnel and parents. Parents should receive regular, ongoing updates from the student's teacher concerning results of the intervention instruction and the student's progress in achieving reading competency. The student's teacher must review the READ plan at least annually and update or revise the plan as appropriate to facilitate the student's progress in demonstrating reading competency. Although READ plans are established in grades K-3, a READ plan remains in place until he or she achieves grade level competency.
- Advancement of Students with Significant Reading Deficiencies: the READ Act provides guidance for advancing students with significant reading deficiencies. It gives parents the option to choose retention as an intervention strategy for students who are significantly below grade level. For students completing third grade, the superintendent can make the final decision for advancement.
- District Reporting Requirements: the READ Act requires districts to report specific student-, school- and district level data to CDE to determine and report the number of students identified with significant reading deficiencies and their progress.
- Accountability And Improvement Planning: Districts and schools will be held accountable for student progress in the District/School Performance Frameworks and are expected to use this data to inform the development and implementation of their Unified Improvement Plans.
- State Supports for Effective Implementation: the Early Literacy Fund provides districts with per-pupil funding to help meet the needs of students with significant reading deficiencies. Per-pupil funds may be used to provide full-day kindergarten, scientifically or evidence-based interventions, summer school and/or tutoring services.

Secondary Level Specific Requirements

CAP4K also included requirements about postsecondary and workforce readiness (PWR). To be postsecondary and workforce ready Colorado high school graduates are expected to demonstrate the knowledge and skills (competencies) needed to succeed in postsecondary settings and to advance in career pathways as lifelong learners and contributing citizens. Under the umbrella of PWR are several other legislative requirements and initiatives (individualized career and academic plans, graduation requirements, ASCENT, concurrent enrollment, and other PWR programs) that will be described in further detail in the following sections.

Individual Career and Academic Plan (ICAP)[8]

Originally required as part of legislation in 2009, and ICAP requirements went through a "refresh" in 2014. ICAP is also a tool that reflects how a student's PWR is achieved, accomplished and understood, which begins in ninth grade as an annual process (schools can voluntarily choose to begin ICAP and encompasses individual/self-discovery, career exploration, academic planning and personal financial literacy. Further, an ICAP is:

1. An expectation for high school graduation beginning in the 2014-15 academic year with graduation guidelines
2. A key element of PWR that many districts and high school reference as a tool within their unified improvement plan (UIP)
3. Required for all students and reinforced by programs, including concurrent enrollment, Accelerating Students through Concurrent Enrollment (ASCENT) and initial career and technical education (CTE)
4. Connected with the Colorado Academic Standards through the academic and 21st century skills, components.
5. Embedded in multiple educator effectiveness rubrics as a student artifact and educator process
6. Benchmarked by employers; companies across Colorado continually reinforce their high expectations of student's ability to articulate their transferable skills
7. Connected with individualized education programs (IEP), advanced learning plans (ALP) and career and technical education and integrated with students' industry career pathways

Each student's ICAP can be in an electronic or paper format and should be saved with the student's record.

Graduation Guidelines[9]

Graduation Guidelines are designed to help students and their families plan for success after high school. Graduation guidelines begin with the implementation of ICAP; Essential Skills; and Colorado Academic Standards for all content areas, including: one course in Civics, and by July 2023, one course that incorporates Genocide and Holocaust studies. Students choose from a "menu of options" - embedded in each school district's graduation requirements - to demonstrate their readiness for career, college, and the military, based on at least one measure in Reading, Writing, and Communicating, and one measure in Mathematics.

School districts may offer some or all the state menu options, may raise a cut score on an included assessment and may add graduation requirements in other content areas. Districts also have the authority to provide accommodations to students in meeting the college and career demonstrations necessary to earn a standard high school diploma for: English learners, gifted students and students with disabilities.

Advanced Placement		
Reading, Writing and Communicating 2	**Mathematics** 2	**AP exams** test students' ability to perform at a college level. Districts choose which AP exams will fulfill this menu option. Scores range from 1 to 5 (highest).

ASVAB	
Reading, Writing, Communicating, and Mathematics 31 on the AFQT	The Armed Services Vocational Aptitude Battery (ASVAB) is a comprehensive test that helps determine students' eligibility and suitability for careers in the military. Students who score at least 31 on the AFQT are eligible for service (along with other standards that include physical condition and personal conduct). Students who take the ASVAB are not required to enlist in the military.

Concurrent Enrollment		
Reading, Writing and Communicating Passing grade per district and higher education policy	**Mathematics** Passing grade per district and higher education policy	**Concurrent enrollment** provides students the opportunity to enroll in postsecondary courses, simultaneously earning high school and college credit. School districts and institutions of higher education each determine passing grades for credit and concurrent enrollment. An eligible concurrent enrollment course is 1) the prerequisite directly prior to a credit-bearing course or 2) a credit-bearing course, and 3) governed by a district-level cooperative agreement or MOU. Districts choose which courses will fulfill the option.

District Capstone		
Reading, Writing and Communicating Individualized	**Mathematics** Individualized	**A capstone** is the culminating exhibition of a student's project or experience that demonstrates academic and intellectual learning. Capstone projects are district determined and often include a portfolio of a student's best work.

Industry Certificate		
Reading, Writing and Communicating Individualized	**Mathematics** Individualized	**Industry certificates** are credentials recognized by business and industry. They are district determined, measure a student's competency in an occupation, and they validate a knowledge base and skills that show mastery in a particular industry.

International Baccalaureate (IB)		
Reading, Writing and Communicating 4	**Mathematics** 4	**IB exams** assess students enrolled in the official IB Diploma Programme. Districts choose which IB exams will fulfill this option. Scores range from 1 to 7 (highest).

SAT - Scores updated for SAT (2016)		
Reading, Writing and Communicating 470	**Mathematics** 500	**The SAT** is a college entrance exam. The SAT includes sections on reading, writing and math. The highest possible score for each section is 800.

Collaboratively developed, standards-based performance assessment		
Reading, Writing and Communicating State-wide scoring criteria	**Mathematics** State-wide scoring criteria	For this option, students use an authentic demonstration of academic knowledge and Essential Skills through the creation of a complex product or presentation.

See menu below.

Diploma Endorsements

Postsecondary and Workforce Readiness (PWR) Diploma Endorsement.[10] In order to be eligible for the PWR Diploma Endorsement, students demonstrate readiness for career and college by meeting all of the following criteria: (1) meeting or exceeding district-determined graduation expectations, including a one semester course (minimum) of Civics; (2) meeting at least one of the following assessments for English AND for Math in the table below; (3) completing a minimum of 100 documented hours in a work-based/experiential learning experience (which can include volunteer experiences, job shadows, internships, externships, and/or apprenticeships that are aligned with the student's ICAP); (4) completing a coherent pathway sequence of courses as determined at the district level, with a GPA of 3.0 or higher; and (5) completing a Capstone or Industry Certification that demonstrates the student's learning related to their pathway.

Measure	Proposed PWR Endorsed Diploma Criteria - English	Proposed PWR Endorsed Diploma Criteria - Math
ACCUPLACER	80 Reading *or* 95 Sentence Skills	85 Elementary Algebra
ACT	18	22
ACT Work Keys	Silver	
AP	3	3
ASVAB	50 AFQT	
Concurrent Enrollment	Passing grade of C or higher in credit bearing college level course	Passing grade of C or higher in credit bearing college level course
IB	4	4
SAT	480	530

Seal of Biliteracy.[11] A seal of biliteracy is a credential given by a Colorado school or district recognizing students who have studied and attained proficiency in two or more languages by high school graduation. To receive the seal of biliteracy, a student must:

- Demonstrate proficiency or higher in English by completing all of the English Language Arts (ELA) course work required for graduation with an overall grade point average of at least 3.0 in the required ELA courses AND one of the following requirements: (1) scoring 470 or higher on the SAT section of "Evidenced-Based Reading and Writing;" (2) Scoring 25 or higher on ACT both in English and Reading; (3) scoring 3 or higher on the Advanced Placement (AP) English Language and Composition or the AP English Literature and Composition exam; or (4) scoring 4 or higher on the English A, English Literature A or English A1 of the International Baccalaureate exam; AND
- Demonstrate proficiency or higher in a World Language (WL) by completing one of the following requirements: (1) scoring 3 or higher on World Language Advanced Placement exam; (2) scoring 4 or higher on World Language International Baccalaureate exam: (3) successfully completing a 4-year high school course of study of a single World Language with an overall grade-point

average of at least 3.0: or (4) achieving a passing score on nationally recognized test (World Language AP test, CDE identified summative test in WL that is comparable in rigor to the AP test; LEA-created test or body of evidence that demonstrates knowledge of the WL can be accepted if AP and CDE-approved test not available.

Postsecondary and Workforce Readiness Programs

Career and Technical Education.[12] Expanding pathways from high school to postsecondary opportunities is essential for preparing students for success after high school. CTE programs help students develop the knowledge, skills, and abilities necessary to be postsecondary and workforce ready. CDE's Postsecondary Workforce Readiness team partners with Colorado Community College System (CCCS) to provide support and resources for K-12 CTE programs. The six CTE Career Clusters Include: (1) Agriculture, Natural Resources, and Energy, (2) Engineering, Technology, and Media Arts, (3) Skilled Trades and Technical Sciences, (4) Business, Marketing, Entrepreneurship, Finance, and Public Administration; (5) Hospitality, Human Services, and Education, and (6) Health Science, Criminal Justice, and Public Safety.

Concurrent Enrollment.[13] In May 2009, the Colorado State Legislature passed HB09-1319 and SB09-285 ("Concurrent Enrollment Programs Act") to broaden access to and improve the quality of concurrent enrollment programs, improve coordination between institutions of secondary education and institutions of higher education, and ensure financial transparency and accountability. In order to comply with this legislation, districts are required to:

- Enter into a cooperative agreement with a qualified institution of higher education to operate a concurrent enrollment program.
- Reimburse concurrent courses at the in-state ("resident") community college tuition rate and all concurrently enrolled students will be classified as Colorado residents for tuition setting purposes.
- Allow students to concurrently enroll into any career and technical education course, certificate program, community college course and traditional college course, at a qualifying institution.
- Ensure that all college credit hours earned concurrently apply toward the students' high school graduation requirements as defined in the students' academic plan.

ASCENT Program.[14] Additionally, the legislation described in the prior section created the Accelerating Students through Concurrent Enrollment (ASCENT) program which would allow eligible students to be retained for a "5th year" in high school during which they can take classes at a qualified postsecondary institution. In order to be eligible for the ASCENT program, students must meet the following requirements: have an ICAP in place, have completed or are on schedule to complete at least 9 credit hours (semester hours or equivalent) of postsecondary course work prior to the completion of twelfth-grade year; is not in need of basic skills coursework as defined by the Colorado Commission on Higher Education's remedial education policy; has been selected for participation in the ASCENT program by a high school principal or equivalent school administrator; has satisfied the minimum prerequisites for the course before enrollment in the course; and has not previously participated in ASCENT.

As a result of the passage of the Public School Finance bill (HB22-1390), significant changes were made to the ASCENT and Concurrent Enrollment programs that went into effect after June 30, 2022. These changes included that: (1) the cap of 500 ASCENT slots statewide was removed and any eligible student may participate in ASCENT (so therefore no ASCENT allocation model); (2) the number of required postsecondary credit hours to be eligible was reduced from 12 credit hours to 9 credit hours; (3) process for funding was changed; and (4) LEPs can no longer require repayment from students who do not complete concurrent enrollment courses or earn a failing grade (including courses taken in concurrent enrollment, ASCENT, etc.).

Other programs. There are several other postsecondary and workforce readiness programs that districts may choose to engage in and receive funding for, including: Career Development Incentive Program (CDIP), Innovative Learning Opportunities Pilot (ILOP) Program, Rural Coaction Grant Program, John W. Buckner Automatic Enrollment in Advanced Courses Grant program, Accelerated College Opportunity Exam fee Grant Program (AP/IB Exam Fee Program), School Counselor Corps Grant Program, Early College High Schools, P-TECH, and Teacher Recruitment Education and Preparation (TREP) Program.

Requirements for Special Education Students[15]

To comply with the federal Individual's with Disabilities Education Act (IDEA), a free appropriate public education is available to all children with disabilities residing in the State between the ages of 3 and 21. Additional requirements include, but are not limited to:

- All children with disabilities residing in the State, including children with disabilities who are homeless or are wards of the State and children with disabilities attending private schools, regardless of the severity of their disabilities, and who are in need of special education and related services, are identified, located, and evaluated, and receive needed special education and related services.
- To the maximum extent appropriate, children with disabilities, including children in public or private institutions or other care facilities, are educated with children who are not disabled, and special classes, separate schooling, or other removal of children with disabilities from the regular educational environment occurs only when the nature or severity of the disability of a child is such that education in regular classes with the use of supplementary aids and services cannot be achieved satisfactorily
- Personnel are appropriately and adequately prepared and trained, including that those personnel have the content knowledge and skills to serve children with disabilities
- All children with disabilities are included in all general State and districtwide assessment programs, with appropriate accommodations and alternate assessments where necessary and as indicated in their respective IEPs.

Individualized Education Program (IEP). Every child with a disability who attends public school and receives special education and related services must have an annually updated IEP, which is a document uniquely designed for one specific student, with the intention of improving educational results for that child. Each IEP must be created in compliance with the Individuals with Disabilities Education Act (IDEA) and, in Colorado, the Exceptional Children's Education Act (ECEA).

Requirements for English Learners[16]

English Language Proficiency Act. On May 21, 2014, Colorado's Governor signed HB14-1298 that repealed and re-enacted with amendments to the English Language Proficiency Act (ELPA). The re-enacted ELPA provides funding for Colorado districts with eligible English learners (ELs). Per ELPA, local education providers, or local education agencies (LEAs), must provide evidence-based English language proficiency, or English language development (ELD) programs for English learners to enable them to develop and acquire English language proficiency while achieving and maintaining grade-level performance in academic content areas. The state and LEAs must enhance all educators' effectiveness in supporting English language development and in enabling English learners to achieve and maintain grade-level performance in academic content areas and ensure that English learners are postsecondary and workforce ready at graduation. Under ELPA, LEAs must:

- Follow State guidance to identify English learners
- Report and certify through the Student October Pupil Enrollment collection the numbers and proficiency levels of identified English learners in the district and the number of ELs who have exited from the ELD program
- Administer and provide evidence-based English language development programs for identified English learner students while also providing access to grade-level content
- Provide professional development to all staff members supporting English learners to enhance their abilities to provide English language development and access to grade-level content

Requirements for Gifted Students[17]

Under the Exceptional Children's Education Act (ECEA) districts are required to provide education services for gifted students who are between the ages of four and twenty-one whose abilities, talents, and potential for accomplishment are so exceptional or developmentally advanced that they require special provisions to meet their educational programming needs. Area(s) of giftedness include: (1) General Intellectual Aptitude; (2) Academic Aptitude: Reading, Writing, Mathematics, Science, Social Studies, or World Language; (3) Talent Aptitude: Visual Arts, Performing Arts, Musical, Dance, Psychomotor Abilities, Creative or Productive Thinking, or Leadership Abilities. Administrative Units (AUs) are strongly encouraged to include universal screening in identification procedures.

Advanced Learning Plans (ALPs).[18] Starting in kindergarten through high school, students identified as gifted will have an Advanced Learning Plan (ALP). The ALP is a written record of a student's body of evidence, strengths, learning goals, and programming that supports a meaningful education necessary for the continuous development and growth of gifted and talented students. For high school students, the ALP may be combined with an Individual Career and Academic Plan (ICAP) if all contents of the ALP are inclusive in the ICAP, including achievement and affective goals.

Section C: Professional Judgement Participants

Panelist Name	School District
Elementary School Panel	
Kahle Charles	St. Vrain Valley Schools
Kevin Coughlin	Colorado Springs School District 11
Emma Hartmann	Jefferson County School District R-1
Mary Miller	Sargent School District
Mara Romero	Rocky Ford School District R-2
Middle School Panel	
Silas Atkins	Boulder Valley School District RE-2
Wendy Birhanzel	Harrison School District 2
Ny Cahill	Jefferson County School District R-1
Marty Gutierrez	Adams 12 Five Star Schools
Wes Paxton	Jefferson County School District R-1
High School Panel	
Philip Qualman	Eagle County School District
Scott Siettmann	Delta County School District 50J
Sharon Stanford	Sangre de Cristo School District RE-22J
Haley Summers	Sargent School District
Addie Wallace	Las Animas School District
Amber Willson	Denver Public Schools
At-Risk Panel	
Charlotte Ciancio	Mapleton Public Schools
Kellie Moore	Harrison School District 2
Michelle Patterson	Northeast Colorado BOCES
Kendra Villarreal	Greeley-Evans School District 6
Joy Werner	Center Consolidated School District 26JT

English Language Learner Panel	
Elizabeth Bauer	West Grand School District 1-JT
Amanda Clayton	Adams 12 Five Star Schools
Rachael Hager	27J School District
Angela Valdez	Harrison School District
Veronica Wilder	Mapleton Public Schools
Michelle Wilson	Alamosa School District RE-11J
Very Small District Panel	
Greg Edson	Weldon Valley School District RE-20J
Kim Jenkins	Campo School District RE-6
Chris Locke	Kim RE-88 School District
Frank Reeves	Otis School District R-3
Sabra Sowell-Lovejoy	Campo School District RE-6
Small District Panel	
Kirk Henwood	South Routt School District RE-3
Stephanie Hund	Southeast BOCES
Shawn Randel	Akron School District R1
Cory Scheffel	Salida School District
Chris Selle	Meeker School District RE-1
Kermit Snyder	Rocky Ford School District R-2
Moderate Small District Panel	
David Blackburn	Salida School District
Shelby Chase	Bennett School District 29J
Brian Childress	Weld County School District RE-1
Gabe Futrell	Monte Vista School District C-8
Ken Haptonstall	Colorado River BOCES
Eric Lind	Platte Valley School District RE-7
Moderate Large District Panel	
Alisa Mavrotheris	Adams 12 Five Star Schools
Laurie Rossback	Durango School District 9-R
Bill Summers	Canon City Schools
George Welsh	San Luis Valley BOCES
Remote District Panel	
Carly Daniel	Holyoke School District
Heather Day	Fremont RE-2 School District
Tamara Durbin	Northeast BOCES
Nicole Neufeld	Center Consolidated School District 26JT
Leslie Nichols	Gunnison Watershed School District
Kim White	Silverton School District 1

Statewide Panel	
Jeremy Burmeister	Platte Valley School District RE-7
Katie Gumnic	West Grand School District 1-JT
Kelly Hillbrand	Garfield School District RE-2
Megan Oleson	Fountain-Fort Carson School District 8
Lisa Yates	Buena Vista School District
CFO Panel	
Ciara Bartholomew	South Routt School District RE-3
Katie Hechavarria	Denver Public Schools
Gina Lanier	Adams 12 Five Star Schools
Jonathan Levesque	Littleton Public School
Tia Mills	Gunnison Watershed School District
Maria Ramthun	De Beque School District 49JT
Christine Reich	Telluride School District
Nikki Schmidt	Weld RE-4 School District

Section D: Salaries by Position

Table A6.5

2023-24 Average Salary by Position

Position	Certified or Classified	Average Salary
Principal	Certified	$112,033
Assistant Principal	Certified	$92,735
Teacher	Certified	$54,463
Instructional Coach	Certified	$62,495
Substitute Teacher	Certified	$53,463
Counselor	Certified	$63,919
Nurse	Certified	$53,463
Instructional/Supervisory Aide	Classified	$23,145
Library Media Specialist	Certified	$66,833
School Secretary/Clerical	Classified	$36,584
Custodian	Classified	$36,000
Maintenance Worker	Classified	$60,000
Grounds Maintenance	Classified	$37,431
Superintendent	Certified	$145,368
Business Manager	Classified	$81,845
Director – Personnel/HR	Classified	$81,984
Asst. Supt. of Instruction	Certified	$142,946
Director of Student Services	Certified	$91,266
Director of Assessment	Certified	$95,570
Director of Technology	Classified	$93,530
Director of O&M	Classified	$86,155

Secretary/Clerical	Classified	$49,008
Network/Systems Supervisor	Classified	$93,530
School Computer Technician	Classified	$26,117
Psychologist	Certified	$49,133

To estimate total compensation, the model uses the following benefit rates:

- Social Security: 0% because Colorado education employees do not participate in this federal program.
- Medicare: 1.45% of salary
- State retirement: 21.4% for both certificated and classified staff
- Workers' compensation: 0.8%
- Unemployment insurance: 0.4%
- Medical, dental and eye insurance: $14,905 per employee which is an estimated average of a single, 2-person and family plan. This is provided to every employee in the EB model.

Appendix Six: An Evidence-Based Approach to Identifying an Adequate Spending Level in Colorado

CHAPTER 1

Introduction

Using the Evidence-Based (EB) Model, this document provides a set of recommendations Colorado can use to determine an Adequate Expenditure Per Student figure and related student weights for students from low-income backgrounds, for English language learning (ELL) students, and for students with mild and moderate disabilities. This figure would allow each "normal" size school to offer students an equal opportunity to achieve the state's curriculum [1] and performance standards. Accompanying this report is a Microsoft Excel-based simulation that shows how all the EB recommendations can be combined to estimate the Adequate Expenditure Per Student figure, as well as additional dollar per student figures and/or weights for at-risk students, ELL, and students with mild/moderate disabilities. The simulation also allows users to modify any specific EB elements to produce alternative estimates per student cost figures.

For the past 26 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, as states have adopted college and career ready standards for reading/language arts, mathematics, and science; and as the social and emotional conditions of children have changed, the EB model has been updated to address the changing environment and more rigorous expectations of K-12 schools and students attending them.

Organization of the Report

Two chapters follow this introductory chapter. Chapter 2 describes the school improvement model that supports 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, rural, and 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. Table A6.1 lists all the EB elements and their values for the core EB model as of 2024. These elements include class size, extra help for struggling students, professional development (PD), 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.

[1] The state of Colorado does not have a statewide curriculum, it set standards and districts chose curriculum.

Chapter 4 provides the estimated EB-determined Adequate Expenditure Per Student figure using the accompanying Excel-based simulation. This chapter describes how the Adequate Expenditure Student figure is used to identify weights at-risk students, ELL students, and students with mild and moderate disabilities.

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

In terms of the overall costs of using the EB model to determine adequate school funding, 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. [2] The school cases that we studied at that time deployed strategies aligned with the EB model and generally produced significantly more student achievement. [3] 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 states and lower in high spending states. Nevertheless, it is our professional position that if Colorado provided school funding at the level of the EB model and if Colorado's schools used the resources in the model as indicated in Chapter 3, student achievement in Colorado would rise substantially. The following chapter describes the high-performance school reflected in the EB school funding model.

Chapter 2: The Evidence-Based School Improvement Model

While this report intends to identify the array of educational goods and services that would allow Colorado's schools to provide each student an equal opportunity to meet the state's student performance standards, i.e., to identify an Adequate Expenditure Per Student figure, this chapter provides an overview of how schools have incorporated and deployed the strategies and resources provided by the EB funding model into a cohesive school improvement model. The funding model reflects the strategies and practices of large numbers of schools across the country that have used it to significantly increase student performance and reduce achievement gaps linked to demographics. Although we cannot claim a direct link between funding and student performance, the EB model is designed to identify resources a high-performance school needs to provide every student with robust opportunities to meet college and career ready standards; performing to those standards would represent substantial movement of the student achievement needle.

The core elements of the EB model have not changed over the past 20 years. Moreover, over those two decades, several of the key elements of the model have been supported by randomized controlled trial (RCT) research, the gold standard of research. As a result, we are more confident today that the EB model provides a cost-based set of resources schools need to dramatically improve the performance of all students, and to reduce achievement gaps linked to demographics.

No matter what course of studies a high school student completes, college prep or career tech, Colorado's students are expected to achieve college and career-ready standards to be competitive after

[2] Odden, Picus, & Goetz, 2010
[3] Odden 2009, 2012, Odden & Picus 2020

high school or college in today's global, knowledge-based economy. This includes at-risk students, ELLs, 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 perform to these rigorous standards. We note that the model equally values career-ready and college ready standards, particularly given the increased need for skilled individuals in non-college, technical careers.

This chapter provides a more general description of the school improvement strategies that represent the foundation of the EB model and how schools across the country have used the key resource elements to increase student performance.

The High-Performance School Model Embedded in the Evidence-Based Approach to School Finance Adequacy

Odden and Picus developed the EB approach to link strategies and resources in high performance schools to state school funding formulas, a goal long sought by policy analysts, legislators, and school leaders. Over the past two decades, Odden and Picus have used the EB model to conduct adequacy studies in over 20 states. The EB model relies on a school improvement model that allocates resources for educational strategies. Current educational research finds that such strategies are linked to improvements in student learning. More details on the EB model can be found in the sixth edition of our school finance text and on our website. [4]

The model relies on two major types of research:

1. Reviews of research evidence on the effects of student achievement on individual educational strategies provided by the EB model. This evidence has been strengthened in recent years by the growing number of RCTs conducted on the various elements included in the EB model.

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 (see case studies). [5]

The EB school improvement model includes multiple educational programs and strategies that, if implemented 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. [6] The Ten school improvement strategies underpinning the approach include:

[4] Odden & Picus, (2020); or see the *State Studies* tab of the *Resource* section of our website (www.picusodden.com)
[5] See case studies at www.picusodden.com
[6] Blankstein, 2010, 2011; Chenoweth, 2007, 2009; Hoyer, 2020; Odden, 2009, 2012; Duncan & Murnane, 2014; Petrilli et al., 20 njh 22

1. Analyzing student data to become deeply knowledgeable about performance issues and to understand the nature of the achievement gaps in the school. The test score analysis first includes analysis of state test results and then, over time, uses benchmark and short cycle assessments (sometimes called formative 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% 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 often sunset their previous curriculum and replace it with a different, more rigorous, and research-proven, effective curriculum. Over time, they often create their own specific view of the effective instructional strategies needed to deliver that curriculum and expect all teachers to use those school-based instructional strategies.

4. Investing heavily in teacher PD that includes intensive summer institutes and longer teacher work years. Successful schools provide resources for trainers and, most importantly, fund instructional coaches in all schools. These schools also provide time during the regular school day and week for teacher collaborative work groups to use student data and standards-based curriculum to improve instruction.

5. Providing extra help for struggling students and, with a combination of local, state, and federal Title 1 funds, providing some combination of tutoring in 1:1, 1:3, or 1:5 tutor-student ratio formats. Increasingly high performing schools provide high dosage tutoring that includes extended school days, summer school and English language development for all ELL students.

6. Creating smaller classes in early elementary years, often lowering class sizes to 15 students in grades kindergarten through three, 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 can include 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. This also includes student-free time for teachers to work in collaborative teams to create standards-based curriculum units and the instructional strategies to implement them. Schools also protect instructional time for core subjects, especially reading and mathematics.

8. Providing strong leadership support through 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 PD, 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.[7] Combined, our analysis of current research and our cases identify a set of resources that we have concluded are adequate for schools and districts to produce large gains in overall student achievement and thus make substantial progress towards the student achievement goals of most states, including those in Colorado.

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 significant student performance gains should follow if such funds are provided and used to implement these effective and research-based strategies.

Three Tier Approach

The EB model's design reflects the Response to Intervention (RTI) model, which 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 PD 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 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 instructional resources, triggered by at-risk and ELL student counts, for tutoring, extended-day, summer school, additional student support and ELL 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, which get many modestly struggling students back "on track," and thus reduce the number and percentage of students needing special education services; and
- Tier 3 includes all special education services.

The extra program elements included in the core EB model provide a robust set of resources to provide extra instructional time for struggling students, resulting in the overall number of students needing special education resources being significantly reduced

[7] See Cases of Improving Schools in the Resource section of our website: www.picusodden.com

Chapter 3: Using the Evidence-Based Model to Identify an Adequate Expenditure Per Student Level

Introduction

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

1. Staffing for core programs, which include full-day preschool and 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, PD, instructional materials and supplies, benchmark and short cycle assessments, computers and other technology, and extra duty/student activities.
3. Central office 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 student 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 Medicare (Colorado educators do not participate in Social Security and have a more robust state retirement program).

Before providing the summary of the EB formulas and elements, we discuss three more general issues necessary to understand how we proceed from school and district level resources to per student funding figures: a) student counts, b) prototypical schools and districts, and c) effect sizes.

Student Counts

The EB model recommends that states use an Average Daily Membership (ADM) student count to distribute general aid. Colorado follows a variation of this practice, using a Funded Pupil Count that is based on the count of students on a particular date in the fall [8]. The student count also includes students who are enrolled in online programs or for a fifth year of high school while also enrolled in a higher education program. Further, to address the fiscal challenges caused by enrollment declines, the state allows districts to use the greater of a two-, three-, four-, or five-year average of the fall student count. The latter also reflects recommendations of the EB model. This report uses the Colorado Funded Student Count to determine the adequate basic expenditure per student but provides for both a full-day kindergarten and preschool program.

The model also needs a measure of the number of students from at-risk backgrounds to trigger at-risk specific resources. For this study we will use Colorado's definition of at-risk students used in the state's

[8] Colorado count day is October 1st but districts can count students in attendance during a 10 window

school funding formula.[9] At present, this is defined as eligibility for free and reduced-price lunches as counted on October 1 of each year. Districts are allowed to use the proportion of free and reduced-price lunch students in grades one through eight multiplied by the district's enrollment if it produces a larger number than the actual count to accommodate the frequent fall off in the percentage of high school students because they elect not to participate in the school lunch program.

Beginning in FY25, Colorado will rely on a new at-risk measure. As established by House Bill 23-1202, a district's at-risk count will be based on:[10]

- A district's percentage of students certified as eligible for free lunch based on receipt of public benefits (SNAP, TANF, Food Distribution Program on Indian Reservation) or categorical eligibility (foster, homeless, migrant, runaway, or Head Start), supplemented by the direct certification of students participating in Medicate or Children's Basic Health Plan; and
- A neighborhood socioeconomic status index that weighs a student's needs based on at least five socioeconomic status neighborhood factors linked to each student's census block group.

We will rely on Colorado for the appropriate at-risk counts in developing the EB cost estimates.

The EB model also includes a count of 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 Colorado to not only collect an ELL student count, but also the number of non-ELL at-risk students; all ELL students trigger tutoring, extended-day, summer school, and additional student support resources in the EB model. In addition, all non-ELL at-risk students trigger the tutoring, extended-day, summer school and additional student support but not the ELL resources. The goal is to enable teachers to provide a robust range of extra help resources to all ELL and at-risk students but using unduplicated counts of those students.

Prototypical Schools and Districts

A key component of the EB model, the way it could be used in Colorado and the way it is used in other states to estimate an adequate "foundation" expenditure per student 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 uses specific sizes of schools and districts to enable the prototypes to indicate the relative level of resources in schools and districts. Although our modeling is based on these prototypes, this does not imply Colorado, 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. Few states have a specific policy on school size, though some – including New Jersey, North Dakota, and Wyoming, use prototypical school sizes to

[9] Legislative Council Staff, 2024
[10] Legislative Council Staff, 2024: p 12

develop and/or operate their funding formula. Several other states include “ideal” size configurations for different levels of schools in their facility guidelines, a practice that can create 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 shows that school units of roughly 400 to 600 elementary students and between 500 and 1,000 secondary students are the most effective and most efficient.[11]

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 to 500 student range, and for high schools it was in the 600 to 900 range. In sum, the research suggests that elementary school *units* be in the range of 400 to 500 students and that secondary school *units* be in the range of 500 to 1,000 students. In a 2024 international study of these issues using more complicated non-linear statistical analyses, Antoniou, Alghamdi & Kawai (2024) came to similar conclusions about optimum school size and the effects on student learning.

The Evidence-Based Model’s Prototypical School Sizes

The EB approach follows this research by identifying resources for prototypical elementary, middle, and high schools with ADM of 450, 450, and 600, respectively. We also note that in the late 1990s, the New American School designs were nearly all based on a school size of about 500 students.[12] Moreover, many of the high performing charter schools in charter school networks are of the same approximate size, including Achievement First, Aspire, Green Dot, Harmony, IDEA, KIPP, and Noble.

The EB model uses these prototypes to indicate the relative level of resources in schools, as well as to calculate an Adequate Expenditure Per Student figure for Colorado. 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 Colorado and other states are smaller (and even larger) than these prototypical school sizes, these prototypical sizes can still be used to turn all the school and district based EB model elements into a new base per student figure, as the new base per student 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 Colorado’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 Colorado’s larger districts and

[11] Hanover Research, 2015; Lee & Smith, 1997; Lee & Loeb, 2000; Leithwood & Jantzi, 2009; Raywid, 1997/1998; Ready & Lee, 2004
[12] Odden, 1997

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 A6.1 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 Colorado 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 Adequate Expenditure Per Student figure.

If preschool is included in the elementary protype, it would increase the size of the elementary school by the number of preschool students. In this study, we will provide an adequate base expenditure per student for a separate preschool of 150 students, and an additional adequate base per student figure for grades K-12. Districts could decide on whether to merge preschools into their elementary schools, provide them as stand-alone entities, or subcontract to other private or public institutions.

Effect Sizes

In reviewing the evidence supporting each EB model 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 SD or from the 50th to the 83rd 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 SD. Benchmarks for understanding the significance of effect size were established in 1969, [13] positing 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 and sometimes statewide, effect sizes have been smaller. [14] Moreover, 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 RCTs 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

[13] Cohen, 1969
[14] Kraft, 2020

test outcomes. Readers of this document are encouraged to consider these benchmarks in assessing the significance or importance of the various research impacts reported on the elements of the EB model.

2024 Core EB Colorado Recommendations

Figures A6.1 and A6.2 offer a graphic approach to understanding the structure of the Colorado EB model. Figure A6.1 displays the five major expenditure categories included in the EB model, and Figure A6.2 offers a graphic display of how all the components of the EB model fit together. Following the two figures, Table A6.1 provides a detailed summary of the core resources included in the estimated base per student expenditure level estimated for 2024 using the EB model for Colorado.

Figure A6.1
Five Major Elements of the EB Model

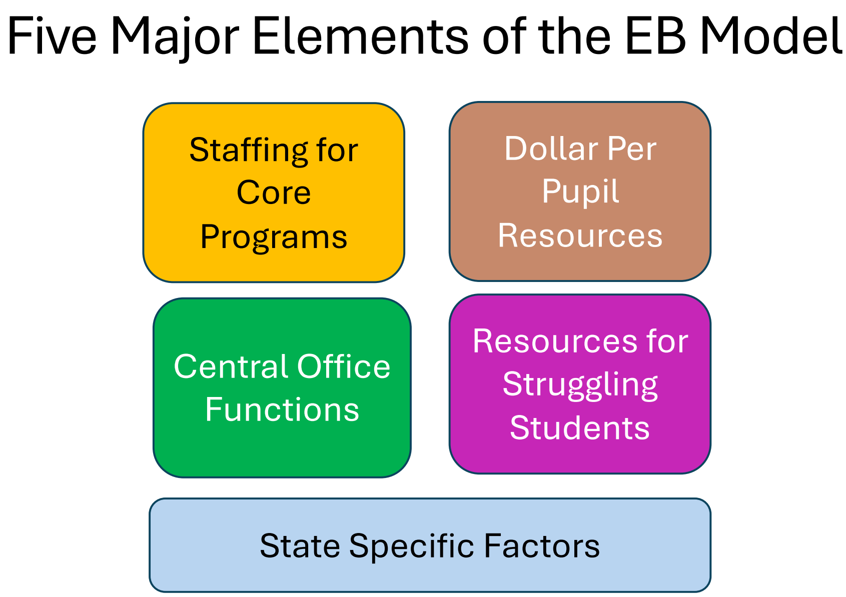


Figure A6.2

Detailed Components of the Colorado EB Model

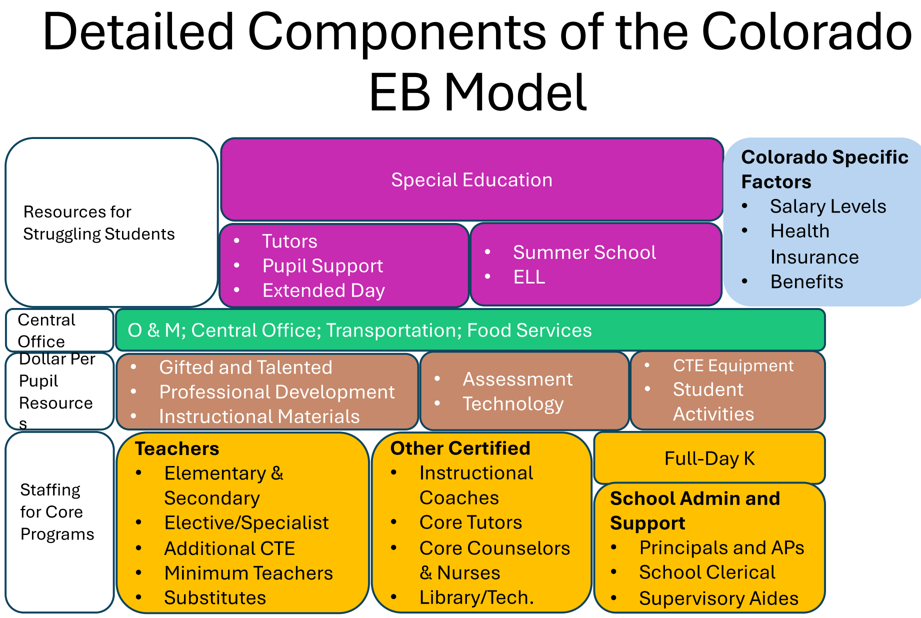


Table A6.1
Summary of 2024 Colorado Evidence-Based Model Recommendations

Model Element	2024 Evidence-Based Recommendation
Staffing for Core Programs	
1a. Preschool (Pre-K)	Full-day pre-k classrooms staffed at a class size of one teacher and one aide for every 15 students
1b. Full-Day Kindergarten	Full-day kindergarten program. Each K student counts as one student 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: 33.33% of core high school teachers
5. Instructional Facilitators/ Coaches	One 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 at-risk and ELL student counts in Element 21)
7. Substitute Teachers	Five percent of core and elective teachers, instructional coaches, tutors (and teacher positions in additional tutoring, extended-day, summer school, ELL, and special education)
8. Core Student Support Staff, Core Guidance Counselors, and Nurses	One guidance counselor position for every 450 grade K-5 students One guidance counselor position for every 250 grade 6-12 students One nurse position for every 450 K-8 students and one nurse position for every 600 9-12 students (Additional student support resources are provided based on at-risk and ELL students in Element 22)
9. Supervisory and Instructional Aides	Two aide positions for each prototypical 450-student elementary and middle school Three aide positions for each prototypical 600-student high school
10. Library Media Specialist	One library media specialist position for each prototypical school
11. Principals and Assistant Principals	One principal position for the 450-student prototypical elementary school One principal position for the 450-student prototypical middle school One principal position and one assistant principal position for the 600-student prototypical high school

12. School Site Secretarial and Clerical Staff	Two secretary positions for the 450-student prototypical elementary school Two secretary positions for the 450-student prototypical middle school Three secretary positions for the 600-student prototypical high school
Dollar Per Student Resources	
13. Gifted and Talented Students	$25 per student
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 $156 per student for trainers (In addition, PD resources include instructional coaches [Element 5] and time for collaborative work [Element 4])
15. Instructional Materials	$256 per student for instructional and library materials $60 per student for each extra help program triggered by at-risk and ELL students as well as special education
16. Short Cycle/ Interim Assessments	$25 per student for short cycle, interim and benchmark assessments
17. Technology and Equipment	$250 per student for school computer and technology equipment
18. Extra Duty Funds/Student Activities	$360 per student for co-curricular activities including sports and clubs for grades K-12
Central Office Functions	
19. Maintenance and Operations	Separate computations for custodians, maintenance workers and groundskeepers, $1 per gross square footage (GSF) for materials and supplies, and $350 per student for utilities
20. Central Office Personnel/ Non-Personnel Resources	Eight professional and 17 classified positions for a prototypical 3,900-student Central office. Additionally, $450 per student is provided for misc. items such as Board support, insurance, legal services, etc.
Resources for Struggling Students	
22. Tutors	One tutor position for every 100 ELL students and one tutor position for every 100 non-ELL at-risk students
23. Additional Student Support Staff	One student support position for every 100 ELL students and one student support position for every 100 non-ELL at-risk students
24. Extended-Day	One teacher position for every 120 ELL and one teacher position for every 120 non-ELL at-risk students
25. Summer School	One teacher position for every 120 ELL and one teacher position for every 120 non-ELL at-risk students
26.Staff for ELL Students	In addition to tutors, extra student support, extended-day, and summer school, noted above, one ESL teacher position for every 100 ELL students

27. Special Education	8.1 positions for every 100 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. This equates to approximately one position for every 141 students. ○ 1.0 psychologist positions for 1,000 students (included in the Central Office) This recommendation results in the following resources at prototypical schools: ○ 3.20 special education positions for every 450-student elementary school ○ 3.20 special education positions for every 450-student middle school ○ 4.25 special education positions for every 600-student high school 100% state funding for services for students with severe and profound disabilities, minus federal Title VIb funds, capped at two percent of all students
28. Career-Technical Education (CTE)	$10,000 per CTE teacher for specialized equipment
Staff Compensation Resources	
29. Staff Compensation	For salaries: Colorado statewide average for all EB staff positions For benefits: we added state retirement, health insurance, Medicare, workers compensation and unemployment insurance

2024 Core EB Colorado Staff Recommendations

This section addresses staffing for core programs, which include full-day preschool and 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 secretarial and clerical staff.

1a. Full-Day Preschool

Research shows that high-quality preschool, particularly for at-risk students, significantly affects future student academic achievement as well as other desired social and community outcomes. [15] Indeed, these longitudinal studies show that at-risk students who experience a high-quality, full-day preschool program perform better in learning basic skills in elementary school, score higher on academic goals in middle and high school, attend college at a greater rate, and as adults, earn higher incomes and engage in less socially undesirable behavior. In a long-term study of the High/Scope Perry Preschool Program

[15] Barnett, 1995, 1998, 2011; Camilli et al., 2010; Lynch, 2007; Pianta et al., 2012; Reynolds et al., 2001; Slavin, Karweit, & Wasik, 1994

found that adults at age 40 who were enrolled in the program had higher earnings, were more likely to hold a job, had committed fewer crimes, and were more likely to have graduated from high school than adults who did not attend preschool. [16]

Nearly all the longitudinal studies of preschool programs have relied on data from three preschool programs that meet the standards now promulgated by the National Institute for Early Education Research (see below): the High-Scope Perry Preschool Program, the Carolina Abecedarian Project, and the Chicago Child-Parent Center Program. These results reinforce the finding that the most robust impacts of pre-k programs are those from high-quality programs.

Further research shows that over time, there is a return of eight to ten dollars for every one dollar invested in high-quality preschool programs. [17]

Since these early studies, several states have created statewide preschool programs, and many studies of these programs seem promising. A 2003 study of state-funded preschool programs in six states: California, Georgia, Illinois, Kentucky, New York, and Ohio, found that children from lower income families start catching up to their middle-income peers when they attend a preschool program. [18] A 2007 study showed that preschool programs in New Jersey's urban districts had not only significant short-term cognitive and social impacts, but also long-term, positive impacts on students who enrolled in them, closing the achievement gap by 40% in grade two for a two-year preschool program. [19] Vermont's 2017 evaluation found that its preschool program enacted into law in 2014 produced promising impacts, with greater impacts on literacy than math, but also noted that not all districts had implemented preschool programs and not all programs were effective. Atteberry et al. (2019) found that Denver's full-day preschool program had significantly greater impacts on child readiness for kindergarten than half-day programs. Reynolds et al. (2023) found that Chicago's long-running preschool program had positive impacts on grade three test scores in reading and math, with the caveat that full-day programs had significantly greater impacts than part-day programs, and that program quality impacted both initial and long-term impacts. Berne et al. (2024) found that Michigan's "transitional kindergarten" program for four-year olds, a preschool program by another name, had significant and positive impacts on student performance in grade three reading and mathematics.

Other recent studies of state preschool programs have reached less optimistic findings. Carr et al., (2021) found no reliable effects of participation in a North Carolina preschool program for children attending elementary schools with average levels of quality. Durkin et al. (2022), in a random controlled trial of Tennessee's pre-k program, found negative impacts on students in grades three through six.

Maloy, Gardner and Darling-Hammond (2019) caution readers about the alleged modest or lack of impact of many recent evaluations of state preschool programs. First, the authors note that the

[16] Schweinhart et al., 2005
[17] Barnett, 2000, 2007; Barnett & Masse, 2007; Karoly et al., 1998; Reynolds & Temple, 2008; Reynolds et al., 2011
[18] Jacobson, 2003
[19] Frede et al., 2007

"comparison group" needs to be assessed with critical eyes. The logical comparison is to students who experience no preschool program, when substantial impacts are usually produced, rather than to students experiencing a different preschool program, when impacts are modest or non-existent. The authors also note that low-quality preschool programs rarely produce substantial impacts; studies showing little if any positive impact of low-quality programs should be interpreted to mean that low-quality preschool programs have little effect, not that all preschool programs have little impact.

These findings suggest that attention to quality is key as preschool programs get scaled up across states. The National Institute for Early Education Research (NIEER) has established ten quality benchmarks to identify program quality. [20] Its ten "high quality" preschool program standards, all of which can be attained by the EB model's preschool and related resources, include: [21]

1. Comprehensive learning standards;
2. Teachers with a bachelor's degree;
3. Teachers with specialized training in early childhood;
4. Assistant teachers with a Child Development Associate credential or the equivalent;
5. Teacher professional development of at least 15 hours per year;
6. Maximum class sizes of 20 or less;
7. Staff to child ratios of 1:10 or better;
8. Vision, hearing, health screening, and referral and support services;
9. At least one meal per day provided; and
10. Site visits to ensure program quality.

The dilemma, however, is that as of 2020-21, the NIEER found that only six programs in five states met the ten NIEER program quality standards. [22] One reason quality is in short supply is that state funding for preschool programs has rarely been adequate and has stayed relatively constant for the past several years.

Nevertheless, only high-quality preschool programs produce positive impacts, and the type of staff employed in those programs is critically linked to program quality. [23] Therefore, including preschool students in a district's student count for state aid purposes is the most straightforward way to fund preschool services. This approach assumes preschool providers pay salaries based on the program's school district salary schedule, or a salary consistent with the state's average teacher salary. In this way, preschool providers can recruit highly qualified teachers for all preschool programs.

In sum, high quality preschool, offered for a full day and taught by fully certified and trained teachers using a rigorous but appropriate early childhood curriculum can provide initial effects of 0.9 standard deviation. By themselves, pre-k programs can reduce achievement gaps linked to race and income by half. The effect of preschool programs can be enhanced if followed by high quality education

[20] Friedman-Krauss, 2023
[21] See https://nieer.org/yearbook/2022
[22] Friedman-Krauss et al., 2023
[23] Camilli et al., 2010; Whitebrook, 2004

programming in the elementary grades, particularly kindergarten through grade three, resources for which are provided by the EB model.

Furthermore, there is increasing recognition that preschool should be provided for all students. Research shows that this strategy produces significant gains for children from middle-class backgrounds and even larger impacts for students from lower-income backgrounds. [24]

Despite the importance of preschool, most state school finance systems focus on children aged 5–17. This is largely a function of most state constitutional education clauses that are aimed at that age group. Nevertheless, we would strongly encourage all states to include preschool in their education policies because of the substantial and long-term impacts of the program for all children, particularly those from lower-income backgrounds.

The EB model provides one teacher and one aide position for every 15 preschool students. These staffing resources then function with all other school staff to trigger elective, professional development, and other school wide resources, as discussed below. This allows elementary schools to fully integrate the pre-k program into the school and to create an early childhood teacher team of preschool, kindergarten, and grade 1 teachers.

2024 EB Recommendation: Fund full-day preschool programs by providing one teacher and one teacher aide for every 15 preschool students and provide all the other program elements for elementary school students.

1b. 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. [25] 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, an RCT found the effect of full-day versus half-day kindergarten to be about +0.75 standard deviations. [26] 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.

These findings were supported by research using data from the Early Childhood Longitudinal Study which found that students who experience a full-day kindergarten program, versus students who experience only a half-day, perform better in reading and mathematics, [27] and that the impact continues

[24] Barnett, Brown, & Shore, 2004
[25] Cooper et al., 2000, 2010; Fusaro, 1997; Gullo, 2000; Slavin, Karweit & Wasik, 1994
[26] Elicker & Mathur, 1997
[27] Walston & West, 2004

into higher elementary school grades.[28] Studies also find that full-day kindergarten positively impacts students' social and emotional skills.[29] as well as easing the transition into upper grades.[30]

Research in the past several years has reinforced these findings. Hahn et al.'s 2014 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. 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. 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. 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. In 2024, Illinois became the most recent state to mandate that all districts provide a full-day kindergarten program.

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.

2024 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/history, 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.[31] The Tennessee STAR Study remains the primary evidence on the impact of small classes today, 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 three.[32] The study found students in the small

[28] Plucker et al., 2004
[29] Cryan, 1992
[30] Elicker & Mathur, 1997
[31] Mosteller, 1995
[32] Finn and Achilles, 1999; Word et al., 1990

classes of 15 (not a class of 30 with an instructional aide or two teachers) achieved 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.[33] The same research showed a regular class of 24 to 25 students with a teacher and an instructional aide *did not* produce a discernible positive impact on student achievement,[34] 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.[35] 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.[36]

Although some argue the impact of the small class sizes in the Tennessee study was derived primarily from kindergarten and grade one, Konstantopoulos and Chung (2009) found that not to be the case, concluding that the evidence showed that the longer students were in the small classes, i.e., in kindergarten, grades one, two, and three, the greater the impact on grades four through eight achievement. They concluded that the full treatment, small classes in all the first four grades, had the greatest short and long-term impacts.

Studies of several statewide programs find similar effects of class size reductions in elementary schools, including the Wisconsin program that provided extra dollars for schools to lower class size in kindergarten through grade three to 15 students.[37] Though the Wisconsin study was a quasi-experimental design, and not an RCT, it is viewed as a solid study showing positive impacts of a statewide reduction in elementary class size.[38] Indeed, Figlio, and Schanzenbach (ND), citing not only the Tennessee and Wisconsin programs, but also studies of elementary class size reduction in several countries around the world, argue that the evidence is unequivocal that small class sizes in elementary schools produce higher levels of student achievement. They also argue that the benefits of class size reduction, including increased wages in later years, outweigh the high costs of such programs.

However, some studies indicate, not only for class size reduction but also for other new programs, that statewide implementation is not as effective as the initial experiments show. The implication is that states should think seriously about how to structure the implementation of new funds from adequacy studies, particularly funds to reduce class sizes, rather than just providing the dollars to schools without any conditions. To be effective, class size reduction programs need to be implemented with careful

[33] Gerber, Finn, Achilles, & Boyd-Zaharias, 2001; Finn, 2002; Grissmer, 1999; Krueger, 2002; Mosteller, 1995; Nye, Hedges, & Konstantopoulous, 2002
[34] Gerber, Finn, Achilles, & Boyd-Zaharias, 2001
[35] Finn, Gerber, Achilles & J.B. Zaharias, 2001; Konstantopoulos & Chung, 2009; Krueger, 2002; Nye, Hedges & Konstantopoulos, 2001a, 2001b
[36] Krueger & Whitmore, 2001
[37] Cho, Glewwe & Whitler, 2012; Molnar, 1999
[38] Schanzenbach, 2010, 2011

attention to increased staffing to ensure that quality teachers are hired to provide instruction in the additional and smaller classrooms.[39]

Some policy analysts argue that when school funding is tight, the costs of class size reduction might not be worth it.[40] Others suggest funds for class size reduction might produce larger impacts if states/districts used them to recruit and retain more effective teachers.[41] Both comments have merit. But an adequacy study addresses the issue of how much money is needed, not how to use limited funding, so the EB includes resources for small classes in the early elementary grades as such programs produce large increases in student learning. We urge states and districts to use all EB model staff resources to recruit, train and retain effective staff in all areas.

Studies on class size use different analytic methods, reaching varying conclusions about the benefits, costs, and policy implications of the impact of class size on student,[42] with which we concur. As a result, class size likely makes a difference, but the few RCT studies of this important topic have only focused on elementary classes in grades Kindergarten through grade three, with the recommendations centering on class sizes of approximately 15 students with one teacher (and not class sizes of 30 with an aide or two teachers) through grade three.

2024 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.

Since most of the research on the effects of class size has been conducted at the early elementary level, evidence on the most effective class sizes in grades four through twelve is harder to find. Although many professional judgment panels in several states have recommended secondary class sizes of 20, no individual in a panel we have conducted cited research or best practices to support proposals for secondary class sizes that small. Further, literature reviews rarely find positive impacts of secondary school class size reduction.[43] Citing a few studies, Whitehurst and Chingos (2011) argued there might be a modest linear relationship between improving student performance secondary class size when it drops from between 25 and 30 students to 15. Our view of this evidence is that the gains identified were modest at best and insufficient to make an EB model recommendation for small secondary class sizes.

[39] Jepsen & Rivkin, 2009
[40] Barnum, 2022; Whitehurst & Chingos, 2011
[41] Hanushek, 2002
[42] Hanushek, 2002; Krueger, 2002; Schanzenbach, 2020
[43] Washington State Public Policy Institute, 2013

Further, most analysts argue that the evidence on small secondary class sizes is insufficient to recommend small secondary class sizes. [44]

To develop the EB model, we sought 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 slightly above 25 students in core classes [45]. Nearly all comprehensive school reform models of the late 1990s New American Schools initiative were developed on the basis of a class size of 25 students, [46] a conclusion on class size reached by the dozens of experts who created these whole-school design models. Many charter school models have similar class sizes, including, for example, Achievement First, Aspire, Green Dot, IDEA, KIPP and Noble.

2024 EB Recommendation: Secondary core class sizes, grades 6-12 of 25.

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 students 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 teachers was separated into two groups: core and elective teachers. In other states and school districts, there can be even more confusion. These states report "student teacher ratios" that are computed by dividing the number of students 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 "student teacher ratio" of 12, but average class sizes are higher because the number of students was divided by all certified staff, not just core teachers. These figures are often confusing because staffing ratios, student/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 core class size of 15 or 25, with other instructional and certified staff resources provided in addition to core teachers. To demonstrate the difference, imagine a school with 450 students. If the school has 30 certified staff members, the student teacher (or more accurately student/staff) ratio is 15:1, but if twelve of the instructional staff members are not core teachers (e.g., they teach electives, are instructional coaches or have other responsibilities), there are only 18 core teachers and the average core class size actually would be 25, not the 15 that was reported. For this reason, the EB model makes a clear distinction between staffing ratio, student/teacher ratios and class size. The intent is to provide positions for actual core class sizes of 15 in kindergarten through grade three and 25 in higher grades. In the example above, assuming the core class size goal is 25, there would be 18 core teachers, and the school would receive additional resources for elective teachers, instructional coaches, and other certificated staff such as counselors and tutors.

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[44] Figlio & Schanzenbach, ND; Schanzenbach, 2020
[45] NCES, 2022
[46] Odden, 1997; Stringfield, Ross & Smith, 1996

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 core topics. The April 2017 issue of *Phi Delta Kappa* discusses many issues related to the importance of art and music for our public schools.

The second purpose of providing elective teachers is to allow schools to design schedules that provide student-free time during the school day for all teachers, core and elective, for them to collaborate on instructional plans, participate in professional development activities and otherwise plan for class instruction. Teachers need some student-free time during the regular school day to work collaboratively and engage in job-embedded professional development.

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, assuming a day is divided into six one-hour periods. 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.

An additional 20% of staff are 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 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 33.33% 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 33.33% 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.

The EB staffing recommendation for high schools is sufficient for high schools to provide all students with a rigorous set of courses throughout grade nine through twelve. It allows for an appropriate number of credits required for high school graduation and provides sufficient course taking opportunities for students to be admitted into any post-secondary institution in the country.

Most school districts today require a seven-and-a-half-hour workday for teachers. Instruction usually comprises five hours of this time, and lunch 30 minutes, leaving 120 minutes for student arrival and departure and possible teacher collaborative time. A seven-and-a-half-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.

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.[47] Teacher-led collaborative teams have been identified as keys to improving student performance in several of our school case studies and case studies provided by others.[48]

Other research confirms these case study findings. Labeling teacher collaboration "peer learning," economists Jackson and Bruegmann (2009) found that such teacher collaborative activities were related to student learning gains. 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 their schoolwide improvement strategies, and that a key condition was ensuring that the school schedule provided regular, reliable meeting times for teams. 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 produced substantial achievement gains. In an RCT, 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 higher student achievement.

Such activities can have other positive spill-over impacts. Using a database like the Miami-Dade database, 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 effectiveness can be enhanced when the system strategically ensures that each teacher team has at least one highly effective teacher as a member.

In summary, there is wide-ranging research from scholars across the country documenting how teacher collaborative teams can work during the regular school to improve instructional strategies that boost student learning. To provide this time during the regular school week and day requires a combination of core and elective teachers, resources provided by the EB model.

With this combination of core and elective teachers, Boudett and Steele (2007) provide several examples of how data-based decision-making teacher groups can be organized and scheduled in schools. Levenson and James (2023) take these suggestions a step further and provide multiple specific

[47] DeFour, 2015

[48] See case studies at www.picusodden.com; Chenoweth, 2007, 2009

ways elementary, middle, and high schools can schedule time during the regular school day to enable such collaborative planning, as well as to provide extra help periods for struggling students. Short and Hirsh (2022) embed these activities into a change process in how teacher teams can function to improve instructional practice focused on implementing new standards-based curriculum programs.

In addition to allowing for collaborative teacher time, Grissmer et al. (2023) show how one comprehensive elementary school model, Core Knowledge, has produced large gains in student performance. The Core Knowledge model includes the broad curriculum required by a liberal arts program, which requires both core and elective teachers to fully implement that curriculum. In RCT, the results showed the Core Knowledge programs increased student achievement in grades three through six in reading, mathematics and science.

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 purpose of which is to identify and implement the instructional practices needed to implement new, standards-based curriculum programs and dramatically improve student learning.

<u>Number of Elective Teachers</u>

The current EB model provides an additional 20% 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 33.33% of the number of core teachers.

Under the EB model, the 20% formula provides an additional 5.2 full-time equivalent (FTE) positions for the prototypical 450 kindergarten through grade five elementary school, 3.6 FTE positions for the prototypical 450 grade six through eight middle school, and the 33.33% formula provides an additional 8.0 positions for the prototypical 630 grade nine through twelve student high school.

In totaling the core and specialist teachers from the recommendations above, the total core and elective teaching staff for prototypical schools is 31.2 FTE for a 450-student elementary, 21.6 FTE for a 450-student middle school, and 32 FTE for a 600-student high school.

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

2024 EB Recommendation: Provide 33.33% elective/specialist teachers over core for high schools and 20% for elementary and middle schools.

5. Instructional Facilitators/Coaches

Instructional coaches, or instructional facilitators (IF), coordinate the instructional program and most importantly provide the critical ongoing instructional coaching and mentoring the professional development literature shows is necessary for teachers to improve their instructional practice.[49] This means instructional facilitators spend the bulk of their time with teachers, modeling lessons, giving feedback to teachers, working with teacher collaborative teams, and helping teachers to improve instruction.

Some instructional coaches may also function as school technology coordinators, providing 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 role is more curriculum oriented, and different from school computer technicians who provide ongoing maintenance and updating of school-based computer operating and curriculum systems.

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 (Arkansas, New Jersey, Washington, Wyoming, and, to a modest degree, North Dakota) explicitly provide resources for school-based instructional coaches. Most comprehensive school designs,[50] and Evidence-Based Adequacy 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. Technology school designs recommend at least 0.5 FTE as the site's technology expert.[51] 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.[52] 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, with an effect size of 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.[53] A related study found that coaches provided as part of a data-based decision-making initiative also improved both teachers' instructional practice and

[49] Cornett & Knight, 2008; Crow, 2011; Garet, Porter, Desimone, Birman, & Yoon, 2001; Joyce & Calhoun, 1996; Joyce & Showers, 2002; Knight, 2017
[50] See Odden, 1997; Stringfield, Ross & Smith, 1996
[51] See Stringfield, Ross, & Smith, 1996
[52] Joyce & Calhoun, 1996; Joyce & Showers, 2002
[53] Lockwood, McCombs, & Marsh, 2010

student achievement. [54] A study published two years later reached the same conclusions about coaching as part of a program to improve reading. [55]

Positive impacts of coaching are not limited to reading instruction and achievement, however. Indeed, an RCT of coaching found significant, positive impacts in the form of student achievement gains across all four core subject areas: mathematics, science, history, and language arts. [56] A follow up study with a larger sample of schools and students found similar, large gains, with effect sizes of 0.22. [57]

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 Preschool through grade five elementary reading programs. [58] The bulk of the 60 studies were conducted within the past 10 to 15 years, many with experimental designs that allowed for causal implications. Cohen et al.'s (2021) review reached similar conclusions about the effectiveness of coaching.

Recent research findings suggest that there is promise in constructing a comprehensive instructional coaching program that uses both individual coaches and online platforms. For example, Kraft and Balzar found similar levels of effectiveness for coaching whether it was provided in person or via video technology. Allen et al. (2011; 2015) found similar results in two studies of a web-based coaching system, and Knight et al. (2018) found that an online coaching system had positive impacts on teachers' instructional practice as well as student test scores.

Kraft, Blazar & Hogan (2018) further describe various kinds of instructional coaching practices and discuss how coaching fits into the core elements of overall professional development (discussed more below in the professional development section). Knight (2018, 2021), one of the countries' leading experts on instructional coaching, provides design principles as well as multiple strategies of effective instructional coaching. Booker & Russel (2022) also provide design principles for recruiting, training, and implementing instructional coaches.

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 out 0.7 to 1.4) and that the percentage of districts with no such staff declined from 20% to 7%. In 2015-16, the National Center for Education Statistics found that 66% of schools, or nearly 60,000 schools, had subject matter specialists or instructional coaches, most in reading, math and science. [59] In a more recent survey, NCES found that 59% of American schools have at least one instructional coach (see Table

[54] Marsh, McCombs & Martorell, 2010
[55] Coburn & Woulfin, 2012
[56] Allen et al., 2011
[57] Allen et al., 2015
[58] Kraft, Blazar & Hogan, 2018
[59] U.S. Department of Education, 2015-16

A6.2), 18% have two coaches, and 11% have more than two instructional coaches. [60] The percentages vary by region but more than 50% of all schools in every region have at least one instructional coach.

Table A6.2
Percentage of Instructional Coaches in American Public Schools: 2023-24

	Zero Coaches	One Coach	Two Coaches	More than Two Coaches
All public schools	41%	30%	18%	11%
Northeast	43%	22%	20%	15%
Midwest	44%	33%	13%	10%
South	32%	32%	24%	11%
West	47%	31%	12%	10%

Source: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, School Pulse Panel 2021–22, 2022–23, and 2023–24.

Though instructional coaching positions are provided as full-time equivalent positions by the EB model, schools could divide the responsibilities across several individual teachers. For example, the three 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% of their time as a coach, perhaps in one curriculum area such as reading, math, science, social studies and technology, and 50% of their time as a classroom teacher or tutor.

The staffing for instructional coaches recommended by the EB model, combined with the additional elements of professional development discussed below, is the best way to make Tier 1 instruction (in the RTI framework) as effective as possible. It provides a foundation for effective instruction for everyone, including students who struggle to learn to proficiency.

2024 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

As the discussion in this section demonstrates, the most powerful and effective extra help strategy for supporting students struggling to meet state standards is tutoring. Prior to 2015, we recommended allocating tutors to schools solely based on the number of at-risk students, with a minimum of one tutor position for each prototypical sized school. Since then, recognizing today’s more rigorous curriculum and student performance standards as well as student learning loss from COVID-19, we find that all schools, even those with no at-risk students (as measured by ELL and free and reduced lunch (FRL) eligibility) have some percentage of struggling students that need Tier 2 extra help resources. As a result, we

[60] U.S. Department of Education, School Pulse Panel, 2023-24

augmented the EB model to provide one core tutor position for each prototypical school as well as additional tutors based on ELL and at-risk student counts (Element 21).

For decades, research on both individual and small group tutoring (five maximum) provided by licensed teachers found significant, positive impacts on student achievement. [61] Students who must work harder and need more assistance to achieve proficiency levels especially benefit from preventative tutoring. [62] 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 with an average of about 0.75. [63] Two 2017 meta-analyses of the impact of tutoring found similarly high effects, the former with an average effect size of 0.37. [64] A July 2020 meta-analysis of tutoring effects also concluded that tutoring had impressive effects on student learning as did a 2021 meta-analysis of tutoring in mathematics. [65] The Nickow et al. (2020) comprehensive literature review found that tutoring effects were largest for reading in elementary schools and for mathematics in secondary schools when provided by professionals rather than volunteers, and when provided during the regular school day, not after school. Tutoring ELLs in a specific literacy intervention in early elementary school can also produce large positive impacts on English literacy. [66]

Most recently, analysts have argued that high dosage tutoring has the most impact on student achievement and has been scaled up successfully in several school districts. [67] Recent college graduates with specific content expertise who are trained in tutoring strategies provide the tutoring to groups of students, three to five maximum, usually for one period every day of the week.

The impact of tutoring programs depends on how they are staffed and organized, their relation to the core program, and tutoring intensity. Researchers have found greater effects when the tutoring includes the following: [68]

- Professional teachers as tutors, or trained college graduates who are experts in a subject matter;
- Tutoring provided to students on a one-to-one basis or in a small group with a maximum of five;
- Tutors trained in specific tutoring strategies;
- Tight alignment to the regular curriculum and to the specific learning challenges with appropriate content specific scaffolding and modeling;
- Sufficient time for the tutoring during the regular school day;
- Tutoring provided at least three times a week for 45–55-minute sessions; and

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[61] Cook et al., 2015; Elbaum; Elbaum, Vaughn, Hughes & Moody, 2000; May et al., 2013, Nickow, Oreopoulos, & Quan, 2020; Shanahan, 1998; Wasik & Slavin, 1993
[62] Cohen, Kulik, & Kulik, 1982
[63] Cohen, Kulik & Kulik, 1982; Nickow, Oreopoulos, & Quan, 2020; Shanahan, 1998; Shanahan & Barr, 1995; Wasik & Slavin, 1993
[64] Fryer et al., 2017; Dietrichson et al., 2017
[65] Nickow, Oreopoulos, & Quan, 2020; Pelligrini et al., 2021
[66] Borman et al., 2024
[67] Cohen, 2024
[68] Cohen, Kulik, & Kulik, 1982; Farkas, 1998; Shanahan, 1998; Wasik & Slavin, 1993; Fryer et al., 2017; Gordon, 2009; Kraft & Falken, 2021

- Highly structured programming, both substantively and organizationally.

Although most past research focused on individual tutoring, schools can also deploy tutoring resources for effective 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) showed 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. [69] More recent tutoring efforts have deployed what is called high dosage tutoring, which includes groups of four to five students with a trained tutor meeting three to five times during the week. [70]

One-to-one tutoring could be reserved for the students with the most severe learning difficulties, scoring at or below the 20th or 25th 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 high dosage tutoring in Section 21.

Though most studies of tutoring focused on elementary reading, several effective secondary reading interventions have been developed and should be considered by schools; the resources to deploy them are included in the EB funding model. [71] Further, a 2014 randomized control study found substantial positive impacts of a tutoring program for adolescents in high-poverty schools if it was combined with counseling. [72] This dual approach is made possible in the EB model as it includes the additional non-academic student support resources (see Element 22 discussion).

In the past decade, several online tutoring programs have been studied. A 2016 meta-analysis of an intelligent, or computer-based, tutoring program found that the average effect size was 0.66 across multiple subjects, increasing student performance from the 50th to the 75th percentile, although the effect varied by type of tutoring. [73] Place et al. (2023) identified several virtual tutoring programs for mathematics that were effective. Ready et al. (2024) describe a 12-week cluster RCT of BookNook, a virtual tutoring platform focused on reading, and found it produced positive impacts. Robinson et al. (2024), in a randomized controlled trail, found a virtual tutoring program successful in boosting the reading performance of students in kindergarten through grade two. These studies show that there is promise that tutoring provided by online programs can be effective in both reading and mathematics. Sal Kahn, creator of the Kahn Academies, argues that AI could be the "silver bullet" for education and tutoring strategies. [74] However, schools are cautioned to find online tutoring programs that have evidence of their effectiveness. As a further caution, Kraft and Lovison (2024) found that an online

[69] See also Elbaum, Vaughn, Hughes & Moody (1999) for a meta-analysis of the impacts of small group tutoring.
[70] See Kraft & Falken, 2021.
[71] Scammacca, Roberts, Vaughn & Stuebing, 2015
[72] Cook et al., 2014
[73] Kulik & Fletcher, 2016
[74] Barnum, 2024

tutoring program for middle school mathematics worked better in a one-to-one rather than a one-to-three format.

While tutoring and other extra instructional help interventions are often provided only for reading, math interventions are also needed for struggling students and have similar positive impacts when provided (Schwartz, 2024). The EB model provides sufficient tutoring resources to provide extra help in both reading and mathematics, particularly given the additional tutoring resource in Element 21.

With the drop in student performance during the COVID-19 pandemic as well as the more rigorous college and career standards that preceded them, educators have argued that substantial numbers of students need extra help. In 2015, we increased the tutor resources in the EB model from just those triggered by at-risk and Ell student counts to provide one core tutor/Tier 2 intervention position for each prototypical school. We continue that addition now that COVID-19 has furthered the need for tutoring help. We encourage schools to implement high dosage tutoring as one of the most effective tutoring strategies. The support the EB model provides beyond the first tutor per prototypical school is discussed again in Element 21 below.

2024 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 ten days of substitute teachers per teacher. Assuming a 200-day work year for teachers, the EB model provides an additional five percent of all teachers (about ten days) as resources for substitute teachers. This approach does not mean each teacher is provided ten substitute days a year; it means the model provides a "pot" of money approximately equal to ten substitute days per year for all teachers, to be used for covering 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).

The category of 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 five 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, if that number exists.

2024 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, a school's staff must include school counselors and nurses, as well as other student support staff including social workers, psychologists, family liaison persons, etc. This section addresses just core school counselors and nurses. Additional student support staff provided based on counts of struggling students (ELL and at-risk 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 Colorado, all worsened by the COVID-19 pandemic. Sparks (2019) reported that there were nearly 1.36 million homeless children attending schools in 2017, a rapid rise over the previous decade. The National Center for Homeless Education estimated that approximately 1.28 million students experienced homelessness during the 2020-21 school year, a slight reduction from 2017. [75] The Colorado Coalition for the homeless estimated that in 2023, about 18,000 children, or approximately two percent of Colorado's 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% of children who experienced homelessness were proficient in reading and just 25% were proficient in math. [76] Homeless students graduate from high school at lower rates than students from low-income households who are not homeless. [77] The same study also identified a graduation rate of 64% for homeless students compared to an average of 77.6% graduation rate among other low-income students and a national average of 84.1% 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. While some of these maladies are a result of social media bullying, 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

[75] Data on students experiencing homelessness included in this report are collected by the U.S. Department of Education through the EDFacts Initiative. To learn more about the EDFacts Initiative, visit https://www2.ed.gov/about/inits/ed/edfacts/index.html.
[76] Keierleber, 2019
[77] U.S. Facts Team, 2023

incidence for school-aged children significantly above the general population. These trends also hold in Colorado. [78]

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. In 2019, the suicide rate for Colorado young people aged 15 to 24 at 21.8 per 100,000 population, was twice the national rate of 10 per 100,000 population. [79]

The COVID-19 pandemic focused more attention on these social and emotional issues. Norman (2022) identified increases in students' social, emotional, and behavioral issues after COVID-19. Williams and Drake (2022) documented worsening health and physical issues, delayed vaccinations, decreased access to dental care, adolescent increases in stress, eating disorders, drug overdose, self-harm, and a decrease in social interaction and mental health, all leading to social and emotional issues complicating learning as students entered the 2022-23 school year.

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

Haidt (2024) has authored a book on how the current culture in America, including smart phones and technology platforms such as Facebook, Twitter and Tik Tok, have damaged the country's youth. He argues that these technologies expose children and teenagers to a series of adult experiences that they are not prepared to handle and has led to rising episodes of mental illness among the youth of our country. Whether one accepts his main arguments about the pernicious impacts of these technologies, the problematic conditions of children documented are nevertheless alarming. He documents the rising incidence of mental crises among adolescents from 2010 to 2015, in the United States as well as many other countries. He goes on to show that the incidence of depression in girls rose 145% to nearly 30% from 2010 to 2020, and 161% to about 12% for boys over the same time period. He further documents a similar rise of mental illness over the same time period for college students, and well as steep increases in anxiety for young people. Linked to these issues are hikes in suicide rates for both boys and girls and an increase in emergency room visits by girls for self-harm, e.g., cutting themselves. Though Haidt attributes much of these mental issues to Facebook and mobile phones, his documentation of these

[78] https://www.americashealthrankings.org/explore/measures/Depression_a/vt
[79] https://www.americashealthrankings.org/explore/measures/teen_suicide/VT

psychological issues is sobering. It is schools that are now dealing with the fall out of these issues, all of which were exacerbated by the isolation of children during the Pandemic.

The implication of the declining conditions of school-aged children is that schools need more counselors, nurses, psychologists, and perhaps even mental health providers. Underscoring Haidt's data, Peterson (2022) reports that since COVID-19, 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 (ASCA) of one counselor for every 250 students, the ratio used in the EB model. 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). [80] These data show that the EB model's counselor, psychologist and nurse recommendations are crucial to student learning and wellbeing, as are the additional student support staff described in Element 22 below and which are triggered by at-risk student counts. It is possible that even this level of mental health professionals will be inadequate. In response to this growing need, we recommend that rather than increase EB model allocations, these staff should be provided by the state and county social services and medical and health departments unless a state adopts a specific policy to incorporate them into the education system.

<u>Counselors</u>

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

- Apply academic achievement strategies;
- Manage emotions and apply interpersonal skills; and
- Plan for post-secondary 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; and
- Data analysis to identify student issues, needs, and challenges.

Research shows that well designed and implemented counseling programs can have significant and positive impacts on student learning, including progress through elementary, middle, and high school,

[80] https://www.nasn.org/

graduation from high school, and postsecondary enrollment. Carrell and Carrell (2006) found that counselor-to-student ratios closer to those suggested by ACSA, one counselor for every 250 secondary students, reduce disciplinary referrals and the effect is larger for low income and minority students. 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 ASCA produced significantly higher elementary student proficiency rates in math and English/language arts than schools that did not. Carrol and Hoekstra (2013) found that increasing the number of counselors significantly improves boys' academic achievement, with the increases equivalent to increasing teacher quality by an effect size of 0.3. Studies in Connecticut, Indiana and New York found that school counselor programs that reflected the 1:250 ratio of ASCA had significant, positive correlations with lower high school student absenteeism and higher SAT math, verbal and writing scores. [81]

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. [82] Carey & Dimmitt (2012) identified the specific counselor activities that led to improved student performance. Davis, Davis, and Mobley (2013) show how specific counselor actions can enhance school offerings of and effective minority participation in AP classes. Castlemen and Goodman (2018) found causative evidence that an intensive college counseling program in Massachusetts targeted to lower income students increased those students' selection of four-year colleges that were less expensive and had higher graduation rates than alternatives students otherwise chose.

In synthesizing the research on counselor effectiveness, Meyers and Bell (2023) concluded that counselor staffing closer to the ASCA ratios does improve student academic and performance outcomes. In sum, schools that have counselor ratios at or better than the 1:250 figure can produce multiple positive impacts on students, including increased achievement on state and local assessments and more success in postsecondary schools.

As a cautionary note, Mulhern (2022), who studied the causal effects of counselors on Massachusetts high school students, found that counselors have varying impacts on students in terms of graduation rates, college selection, and persistence. Though, overall, she found that counselors have positive impacts on these variables, she argued that providing effective counselors is more important than just providing more counselors.

Meyer and Bell (2023) report that 30 states mandate counselors for secondary students and that emerging research shows that secondary school counselors can have significant impacts on students, including more success in postsecondary school. The EB model uses the standards ASCA that

[81] Parzych, Donohue, Gaesser, Chiu, 2019
[82] Bruce, Getch, & Ziomek-Daigle, 2009; Leon, Villares, Brigman, Webb, & Peluso, 2011

recommend one counselor for every 250 secondary (middle and high school) students. [83] 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.

Brown and Knight (2024) provide a comprehensive description of the history of school counselors, the linkage of school counselor ratios to student performance, and the wide disparity in student-to-counselor ratios across the county, particularly for schools with large concentrations of at-risk students. They argue that enhanced funding for school counselors, akin to those recommended by the EB model, is needed everywhere, with even more funding for schools with larger numbers of at-risk students.

While fewer states today require counselors in elementary schools, a growing number of schools in states that do not require counselors at the elementary level have begun to employ them. Meyer and Bell (2023) report that 23 states mandate counselors for elementary students. Further, they identify research that finds that increasing counselors in elementary schools positively impacts student behavior and academic outcomes. 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, there are multiple programs and strategies that are known to be effective in improving students' social-behavioral competence and mental health. [84] 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 student support staff triggered by at-risk student 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 student support staff today's schools need to address the rising incidences 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, the EB model initially provided core school nurses at the rate of one nurse position for every 750 students. [85] But after working in multiple states and interreacting with dozens of educator panels, we have increased the nurse allocation to one school nurse for every prototypical elementary, middle and high school, with additional student support staff provided by ELL and at-risk 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.

[83] https://www.schoolcounselor.org/
[84] Mehta, 2020; Durlak et al., 2011; Sheridan et al., 2019
[85] https://www.nasn.org/

2024 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 students. Provide 1.0 school nurse position for every prototypical elementary, middle, and high school.

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 to 500 students.

However, research does not support the use of instructional aides to improve student performance. As noted above (Element 2), the Tennessee STAR study, which produced solid evidence through field-based RCTs that small classes work in elementary schools, also produced evidence that instructional aides in a regular-sized classroom do not add significant instructional value, i.e., do not positively impact student achievement. [86]

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 grade 1. Neither study supports the typical use of instructional aides as general teacher helpers; both find that aides have a smaller impact than a licensed teacher. Nickow et al. (2020) also found that paraprofessionals, appropriately trained and supervised, can provide effective tutoring instruction, but their impacts are less than those of teachers. An even better approach is that of high dosage tutoring which uses trained, college graduates (so not the non-college graduate that is the typical paraprofessional) with a subject matter major to provide tutoring to small groups of students for three to five periods every week.

[86] Gerber, Finn, Achilles & Boyd-Zaharias, 2001

2024 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. We note that EB supervisory aides are not meant to provide instruction but to relieve teachers from non-teaching duties such as hall patrol, lunchroom monitoring, etc.

10. Librarians and Librarian Media/School Computer Technicians

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

The following section 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. 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.

<u>Librarians</u>

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. Most 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.[87] 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 in state reading assessments.[88] Each state examined the issue differently, but library staffing and the number of operating hours were generally associated with higher academic outcomes.

Statewide studies across the following decade also found that school libraries and certified 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.[89] Lance and Schwarz (2012), in a study of the impact of certified librarians in Pennsylvania, came to the same conclusion and argued that results of 22 other studies documented the positive impact of certified librarians on student performance.

In a meta-analysis of multiple studies, Wine (2020) found that most studies found a positive impact of certified librarians on student performance, with effect sizes ranging from 0.03 to 0.25. She concluded that research finds that full time certified librarians have a positive impact on both students' reading and mathematics achievement scores.

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 grade 4 reading scores on the National Assessment of Educational Progress (NAEP) than states that lost librarians.[90] Related research emphasizes that the role 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.[91]

Libraries must be adequately staffed and open to 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

[87] American Association of School Librarians, 2014
[88] Rodney, Lance & Hamilton-Rennell, 2003; The Michigan study found that a school librarian, whether certified or not, was associated with better low-income student achievement, but having a certified librarian was associated with higher achievement gains.
[89] Lance & Hofschire 2012; Coker, 2015; Scholastic, 2016; Curry & Kachel, 2018
[90] Lance & Hofschire, 2012
[91] Lewis, 2016; Reed, 2018; U.S. Department of Education, 2017

both the elementary and secondary levels. [92] 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 seems 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 data from the 2020-21 school year, NCES (2022) found the average number of school librarians/media staff was 0.9 FTE across all schools. For elementary schools with less than 150 students, the average number of librarians/media staff was 0.6. As the number of students in an elementary school increased to 750 students and higher, the average number of librarians only grew to 0.9 FTE. While the student population more than tripled, total librarians only increased by approximately 50%. In middle and high schools, however, schools of all sizes, except those with less than 150 students, had about one librarian/media staff, and larger schools hired additional librarian/media aides rather than additional librarians. The data implies 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, except for very large secondary schools. These practices suggest that providing a full-time librarian for each of the EB prototypical schools, all of which are under 750 students, would follow average national practice.

2024 EB Recommendation: Provide one librarian position for each prototypical elementary, middle, and 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 strips 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 connecting 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.

[92] NCES, 2013

For teachers and other staff to take full advantage of the benefits technology can provide, they need to feel support is nearby 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 ten 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.

2024 Evidence-Based recommendation: Provide four 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.

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. Studies by the Chicago Consortium on School Research (e.g., Gordon & Hart, 2022) agree with these findings. The Wallace Foundation's work on how principals lead and manage schools for success today extend these findings and contextualizes them to the changes that have occurred in the principalship over the past ten years: increasing numbers of female principals, a decline in the years of experience of principals, and the changing demographics of students and teachers. [93] Theoharis (2024) reaffirms these conclusions with a series of case studies showing how principals lead and manage schools to improve learning conditions for all students, which leads to improved student performance and reduced achievement gaps.

Neumerski (2012) and Sebastian, Huang, & Allensworth (2016) review 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. Their studies identify ways the multiple roles play 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) 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). In a review of numerous studies of the impact of principals on student learning, Grissom, Egalite, & Lindsay (2021) find that the effect of a principal at the 75th percentile of effectiveness is as great as that of a teacher at the 75th percentile. The implication is that principals can have large impacts on student learning but that they need a high level of skills and competencies to produce those effects. 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.

[93] Grissom, Egalite, & Lindsay, 2021

There is no research evidence on the performance of schools without a principal. The fact is that essentially all schools have a principal. All comprehensive school designs, all prototypical school designs from all professional judgment and Evidence-Based studies around the country, and nearly all charter schools include a principal for every school unit. [94]

2024 Evidence-Based recommendation: The EB model provides one principal position for all prototypical schools. The EB model also provides one 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.

2024 Evidence-Based Recommendation: Provide two 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

A complete analysis of educational adequacy should include 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.

[94] Aportela, Picus, Odden & Fermanich, 2014

Research shows that developing the potential of gifted and talented students requires:

- Efforts to discover the gifted and talented students, including specific efforts to identify the talents 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 teacher training in how teachers can work effectively with talented learners.

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

Providing services for gifted and talented students has become controversial across the country. One major controversy seems to be over the demographics of enrollments in specialized schools in urban and suburban districts, which often have a lower percentage of low income and minority students than the broader population. Further, in many districts there is a disinclination to provide services for the gifted, on the assumption that doing so detracts from providing extra help for struggling students. The EB model recognizes the need to provide extra services for students with high levels of gifts and talents, but in a way that all such students, including those from low income and minority backgrounds, have access to such services.

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% of respondents reported that African American and ELL students were still underrepresented in gifted education; over 50% of respondents felt the same was true for children from lower income backgrounds as well as for children with disabilities. [95] The results suggest the country, and likely Colorado, still has a long way to go to meet the needs of all gifted children, especially these subgroups. [96]

The implication is that schools must use multiple strategies to identify students with gifts and talents, including particular attention to identifying gifted students from low income and minority backgrounds. 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. [97]

[95] Mitchell, 2019
[96] Harwin, 2019
[97] Struck, 2003

Access to Curriculum

Overall, research shows curriculum programs specifically designed for gifted and 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.[98] 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,[99] scientific understanding of variables,[100] and problem generation and social studies content acquisition.[101]

Access to Acceleration

Because academically gifted and talented students learn quickly, one effective option for serving them is acceleration of the curriculum. Many educators and members of the public believe acceleration 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.[102] In some cases, acceleration refers to 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,[103] including AP classes.[104] 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,[105] even though talented students have mastered 40 to 50% 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.[106] Curriculum and instructional adaptations require the support of a specially trained coach at the building level, which could be embedded in the

[98] Gallagher, 2002
[99] VanTassel-Baska et al., 1996; VanTassel-Baska et al., 2002
[100] VanTassel-Baska et al., 1998
[101] Gallagher & Stepien, 1996
[102] Southern, Jones, & Stanley, 1993
[103] Gallagher, 1996; Kulik & Kulik, 1984
[104] Bleske-Rechek, Lubinski, & Benbow, 2004
[105] Harwin, 2019
[106] Hansen & Feldhusen, 1994

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, [107] 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. [108] 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. [109] A 2016 meta-analysis 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. [110] Most of these studies focused on specific gifted and talented programs.

Redding & Grissom (2022) identify several more recent studies using large scale databases, including the Early Child Longitudinal Study, which find mixed, if any, positive impacts of gifted and talented services on student performance. The "issue" with these studies is that they rarely analyze specific gifted and talented programs but use a variable in the dataset that represents whether a student has participated in a gifted and talented program. The problem is that there is no definition of gifted and talented programs, nor indicators of what participation means, which could be from a few hours of enrichment a month to acceleration in a content area over an entire year. Thus, we view these kinds of studies with some skepticism, as nearly all studies of specific gifted and talented interventions find significant and positive impacts.

Practice Implications

At the elementary and middle school levels, 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 each time period than other students. When the pull out and acceleration approach is not possible, an alternative is to have gifted students skip grades to be exposed to accelerated instruction. Research shows that 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 Advanced Placement (AP) and the International Baccalaureate (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).

[107] Delcourt, Lloyd, Cornell, & Goldberg, 1994
[108] Gallagher, 1996; Kulik & Kulik, 1984; Kulik & Kulik, 1992
[109] Field, 2007
[110] Steenbergen-Hu, Makel & Olszewski-Kubilis, 2016

Future-Ed has outlined an approach to gifted and talented that can be adopted with all the resources provided by the EB model.[111] Some of the programmatic approaches require extended-day and summer school programming, resources provided by the EB model. Tyre's (2024) report outlines three very different approaches to providing programs for the gifted, all of which can be implemented with EB resources.

<u>A Broader Approach to Giftedness</u>

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 students, minority students, ELL students, 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 unanticipated side effect of excluding children from non-white, non-middle-income backgrounds, as well as ELL students or students with disabilities.

Renzulli (2019) and Renzulli & Reis (2021) support a different kind of gifted assessment that considers 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. Renzulli Learning is a program that responds to a wide variety of giftedness.

The program's cost is modest. In early 2024, we contacted the leaders of Renzulli to understand its costs. Our understanding is that $15 per student would cover the cost of the Renzulli Learning program. Renzulli also offers professional development, and its online professional development offerings have

[111] Tyre, 2024

become popular. If a figure of $25 per student were included in the EB model, all districts would be able to allow interested gifted, talented, and otherwise creative students to sign up for this program and provide some professional development for teachers. [112]

> *2024 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 $25 per student, which would enable all districts to access Renzulli Learning. By being available online, Renzulli Learning is especially appropriate for the country's, and Colorado's, many rural and isolated schools.*

14. Intensive Professional Development

Professional development includes several important components. This section describes the specific dollar resource recommendations the EB model provides for professional development. In addition to the resources listed here, professional development includes the instructional coaches described in Element 5 and the student-free time provided by the provisions for elective or specialist teachers in Element 4. This enables teachers to engage in a range of collaborative activities focused on implementing standards-based curriculum programs and the instructional practices needed for implementation success. Research shows professional development that includes teacher collaboration leads to improved teacher knowledge and instructional effectiveness. [113] Those staff positions are critical to an adequate professional development program along with the resources identified in this section.

Better and more systemic deployment of effective instruction, and related state and local policy supports, are key aspects of an education system that improves student learning. [114] To effectively implement today's more rigorous curriculum standards, all school faculty members need ongoing professional development. Improving curriculum and teacher effectiveness through high quality professional development is arguably one of the most important strategies for enabling students to perform to high standards. [115]

Thus, all the instructional resources included in the EB model need to be transformed into high quality instruction to increase student learning. [116] 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, sheltered-English for teaching ELL students, embedding technology into the curriculum, and elective teachers as well. In addition, all beginning teachers need intensive professional development, first in classroom management,

[112] https://renzullilearning.com/
[113] Weddle, 2022
[114] Masters, 2023; Odden, 2011; Raudenbusch, 2009; Rowan, Correnti, & Miller, 2002; Sanders & Rivers, 1996
[115] Short & Hirsh, 2022
[116] Chetty, Friedman, & Rockoff, J., 2014; Cohen, Raudenbush, & Ball, 2002; Hill & Papay, 2022; Short & Hirsh, 2022

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.[117] Effective PD 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,[118] identified six structural features of effective professional development:[119]

1. 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.

2. The duration of the activity, including the total number of contact hours participants are expected to spend on 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.

3. 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.

4. 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 problems students typically have when learning the content, and effective instructional strategies linking the two. The content focus today should emphasize the content for Colorado’s curriculum standards. Further, the most effective professional development is structured around teachers’ developing standards-based curriculum units that they all implement in their classrooms.[120]

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[117] See Crow, 2011; Cohen et al., 2021; Didion et al., 2020; Guskey, 2010; Joyce & Showers, 2002; Kraft, Blazar, & Hogan, 2018; Lynch et al., 2019; Miles, Odden, Fermanich, & Archibald, 2004; Odden, 2011b; Short & Hirsh, 2022; Sims et al., 2022

[118] See Crow, 2011; see also Darling Hamond et al., 2017

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

[120] Short & Hirsh, 2022

5. 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 coaches. [121]

6. The degree to which the activity promotes coherence in teachers' PD, 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 connecting 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 – ten 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-focused professional development emphasizes subject matter knowledge, insights into how students learn that subject, and the 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 PD includes groups of teachers in a school, who work together to implement new strategies, engage in data-based decision making, and build a professional community. [122]

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 PD opportunities should be given as part of implementing new curriculum and instructional approaches, today focusing on Colorado'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 PD strategies require some amount of administration, materials and supplies, and miscellaneous financial support for travel and fees. Both the above

[121] See Joyce & Showers, 2002
[122] Carlson, Borman & Robinson, 2011

programmatic features and the specifics of their cost implications are helpful to comprehensively describe specific PD programs and their related resource needs.

In a 2016 review of the research on effective PD, 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 PD program is usually stronger in the year following the program and the impact can increase even after that. [123] Her review only included 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 PD 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.

We also refer readers to three documents that provide more detail on how to use the EB identified resources to design and implement all the elements of an effective teacher professional development system. [124] These new documents provide more details about the design of an effective teacher learning system. The Short and Hirsh article outlines the professional learning processes essential for implementing new, more rigorous curriculum programs into each phase of the "change process," guiding teachers from their current practices to the instructional strategies needed to effectively implement this advanced curriculum.

In support of these findings, we reference an important 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 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 PD 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.

[123] See Horn, 2010 and Allen et al., 2011, 2015
[124] Hill & Papay, 2022; Short & Hirsh, 2022: Masters 2022

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 $156 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).

2024 Evidence-Based recommendation: Provide 10 days of student-free time for training embedded in salary levels and $156 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.[125] 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.[126] State textbook adoption cycles tap state level expertise to periodically review textbooks and their alignment with state curriculum standards and provide districts with expert analysis on the appropriateness of the wide variety of textbooks and related instructional materials for use by schools.

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

[125] Bentley, 2019; Fletcher, Schaffhauser, & Levin 2012
[126] Education Commission of the States, 2022; Kaufman & Doan, 2024

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. [127] These cycles range from five to seven years. Unfortunately, Colorado 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 school level 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 larger, 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 aids, 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% premium.

Unless Colorado 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 continuous moves 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, and which are needed to implement science-based reading programs across all subject areas. Thus, the EB model has

[127] Education Commission of States, 2022

provided $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 allow the purchase of instructional materials that are best organized to support the teaching strategies needed. This funding level also allows 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 would 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 is understood that textbook selection substantially determines the specific curriculum a school will teach, and 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 on 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. The What Works Clearinghouse provides evidence-based guidance for how various subjects can be taught at different school levels and identifies research-based effective curriculum programs. [128]

Further, having a content-rich curriculum across all core areas is increasingly seen as a key to higher levels of student performance. [129] Put differently, a school's curriculum program is not a neutral element of schools, it is a critical element that plays a significant role in what students will learn. Research on the impact of the Core-Knowledge comprehensive school model documents the positive impact of a knowledge-rich curriculum program. [130]

Reading is a special issue. There is nearly universal agreement that reading is key to learning in all subject areas. But despite broad agreement on the recommendations of the 2000 National Reading Panel that provide the outlines for a science-based reading program, [131] studies and surveys over the years 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

[128] https://ies.ed.gov/ncee/wwc/
[129] Davidson, 2024
[130] Grissmer et al., 2023
[131] National Institute of Child Health and Human Development, 2000

well as recommended by mentors, coaches, professional groups and teacher training institutions. [132] Lucy Calkins, one of the country's leading experts in reading education, 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. [133] Moreover, the need for schools to use a science-based approach to reading has been discussed in several articles in *Education Week*, *The New York Times*, and even *The Economist* (2021).

Schmoker (2019) 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 element of science-based reading instruction: whole-class direct instruction, even when educators agree with those practices. The culprit: multiple-ability level 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.

Relatedly, 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) Effective 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.

To spur the use of science-based reading programs, states are creating statewide initiatives to help teachers, schools and districts adopt and implement science-based reading programs. [134] Mississippi, Tennessee, North Carolina, and Arkansas have been leading these state efforts. These state programs include curriculum materials, summer training institutes, ongoing professional development with instructional coaches, and extra-help strategies to help struggling students perform to grade level standards. Massachusetts, New York, and Maryland are the most recent states to launch science-based

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[132] 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.
[133] Education Week, 2020
[134] Olson, 2023

reading initiatives. [135] Moreover, teachers and their unions have concluded that it is critically important for districts and schools to adopt elementary reading materials that allow teachers to implement a science-based reading program. [136]

Similar pedagogical advice applies to 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 at-risk and ELL backgrounds. Pedagogy also matters for mathematics programs and instructional practices. Many effective schools have used textbooks that integrate problem solving with concept instruction together with an emphasis on arithmetic basics. Further, a 2015 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. [137] The fact is that some instructional materials are more effective with some 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.

Library Materials

The National Center for Education Statistics (2015) reports that the average national expenditure for library materials in SY 2011-12 was $16 per student, excluding library salaries. These are the most recent figures reported by NCES. 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 databases that provide more reliable data and information than they might identify only on easily available websites. Electronic database 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 three to ten dollars per database per year per student.

Using these two cost estimates, library materials and databases, to adequately meet the needs of school libraries, we have previously recommended funding of $40 per student for library materials, databases, and electronic services. Adding this $40 per student to the $170 per student amount for instructional materials brings the earlier total to $210 per student for instructional and library materials. Inflation since 2015, when we last updated the library, databases, and electronics services costs, has been 30%, which increases those costs to $52 per student. Inflation since 2020, when we last estimated the instructional materials cost, has been 20%, which brings the instructional materials figure to $204, leading to a 2024 estimated cost of these items $256 per student.

[135] Schwartz, 2024
[136] See for example, Moats, 2020
[137] Morgan, Farkas & Maczuga, 2015

2024 Evidence-Based recommendation: Provide an amount for instructional and library materials equal to $256 per student. Also, provide an additional $60 per student for each student eligible for the five extra help programs discussed below.

16. Short-Cycle/Interim Assessments

Nearly all states administer summative assessments in the spring of each school year. [138] 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. [139] 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. [140] As a result, data-based decision making has become a central element of schools moving the student achievement needle. [141]

Research on data-based decision making has documented significant, positive impacts on student learning. For example, a 2011 RCT of such efforts 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); the late Richard DuFour (2015), one of the country's experts on teacher collaborative work using student data; and the Carnegie Corporation (Short & Hirsh 2022), 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:

1. State summative assessments
2. Benchmark assessments
3. Short cycle assessments
4. Formative assessments

[138] Education Commission of the States, 2020
[139] DuFour, 2015; DuFour et al., 2010; Hamilton et al., 2009; Steiny, 2009
[140] Boudett, City & Murnane, 2007
[141] Odden, 2009, 2012

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, 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, which 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 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, an online, computer adaptive system that provides data in reading/ literacy and mathematics for grades preK-12. [142] Many Reading First schools and many schools we have studied use the Dynamic Indicators of Basic Early Literacy Skills (DIBELS). [143] Fast Bridge is a third example of a short-cycle assessment. The NWEA MAP program, used by numerous states and districts across the country, has been expanded to provide short-cycle assessment data. These examples include screeners for both reading and

[142] www.renaissance.com
[143] Odden & Archibald, 2009; Odden, 2009

mathematics. The Galileo Assessment system as well as the Diagnostic Reading Assessment (DRA) are further examples of these needed assessments.

The costs of these assessments are modest and have changed very little over time. The EB model provides $25 per student for such assessment capabilities. This capacity enables teachers to obtain interim assessments for PLCs, screeners, progress-monitoring, and/or overall instructional improvement. This figure also allows for some provider professional development.

2004 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, and many colleges, universities and businesses 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. [144] Infusing technology and online teaching into traditional schools can provide individualized learning and move the teacher into the role of an instructional coach. [145] Research shows technology engages students and can be effective in schools with high concentrations of lower income and minority students. [146] 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 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 today, Colorado 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.

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[144] Whitmire, 2014
[145] See Gray & Lewis, 2021; Odden, 2012
[146] U.S. Department of Education, 2017; Whitmire, 2014

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 demands 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. In early 2024, we checked with our expert on technology costs, Dr. Scott Price, who stated that the $250 per student figure is still accurate, though districts are spending more on data security than in the past.

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; and
- 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 computing power or memory. For school districts that value increasing student access to technology, the purchase of these lower-cost devices provides an opportunity to lower student-to-computer ratios. Indeed, many districts purchased Chromebooks to provide students with the technology needed to engage in online learning during COVID-19.

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 an opportunity for districts 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 become comfortable using 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 the above factors, 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 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 guarantee 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.

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 becomes 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 increased, older network devices, with speeds of 100 megabits, have been replaced with one gigabit or even 10 gigabit devices that cost the same as 100-megabit devices years ago. If Colorado 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 2024 EB model recommendation for technology remains at $250 per student unless Colorado decides to move to a one-to-one ratio. The dilemma is that in a survey of districts, Bushweller (2022) found that 90% of districts provide computers for every student at the secondary level and 84% provide them for each elementary student, largely because of equipping students with computers during COVID-19. So, the education system has shifted to a one-to-one computer to student ratio.

Still, the research on student impact is inconclusive. Bebell. & O'Dwyer (2010) found that the effectiveness of one-to-one programs depended on whether the initiatives were accompanied by sufficient professional development, which too often was missing. Zheng et al., (2016) found in a research review that one-to-one computer ratios produced significant effects in English, writing, math, and science. Using TIMSS data, Karlsson (2020) found that computer use in schools did not positively impact grade 4 school performance. Johnson et al. (2022) found that online education during COVID-19 was too often ineffective. Finally, Goldhaber et al. (2023) found that the more schools used remote and hybrid teaching during COVID-19, the more students fell behind, suggesting that the education system still has work to do to make one-to-one computer to student ratios lead to higher levels of student learning. Finally, Johnson et al., (2023) in a review of the effectiveness of online learning, concluded that more "structure" is needed to validly assess the impact of online or one-to-one computer situations, including:

- A consistent use of terms to identify the various types of interventions;
- The degree to which the contextual conditions necessary to make such approaches effective are present (e.g., prepared educators, technology access, programs linked to student needs, etc.); and
- The degree to which the instructional conditions that support student learning in settings with comprehensive use of computers are present.

Considering these mixed research conclusions, our view is that the effectiveness of one-to-one computer initiatives remains inconclusive, even though such an approach has been adopted by many schools and districts.

Thus, the EB model does not currently recommend a one-to-one computer to student ratio; we believe such a decision should be a state policy decision, and if a state decided to move in this direction, we would recommend structuring implementation with sufficient ongoing professional development to ensure strong learning gains. In our 2020 Wyoming recalibration report, [147] we estimated that moving to a one-to-one computer system, using mainly Chromebooks, would cost about $350 per student. This cost would nearly double if the district used more costly desktop or laptop computers instead.

2024 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. If the decision were made to move to a one-to-one computer system, the $250 figure would need to be increased by $100 a student to $350.

18. Extra Duty Funds/Student Activities

Elementary, middle, and high schools typically provide an array of non-credit producing afterschool 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 asked high school seniors about their participation in high school activities including school newspaper, yearbook, music, performing arts, athletics, academic clubs, student government, and other school activities. [148] Student respondents indicated 38% participated in athletics, followed by other school activities at 32% and music and performing arts at 24%. Female students participated in other school clubs at a rate of 40%, athletics 31% and music and performing arts 30%. Male students participated in activities as follows: athletics 46%, other social clubs 24%, music and performing arts 18%, and other activities 12%. Other than athletics, female students participated in activities at higher rates than male students.

About a decade later, Knop and Siebens (2018) used U.S. Census data to estimate the percentage of children aged six 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 seven percentage points from 35% to 42%. Between 1998 and 2014, participation in clubs declined from 35% to 28%. Participation in lessons remained about 30% over these years. Children in poverty were less likely to participate in these three extracurricular activities.

The Census updated these figures in 2022. [149] Mayol-Garcia (2022) shows that the percentage of children participating in sports grew between 1998 and 2020, with a higher percentage (44) of boys participating in sports compared to 31% of girls. By contrast, the report shows that 29% of girls participated in clubs

[147] See www.picusodden.com, *State Studies* under the *Resources* section
[148] Aud et al., 2012
[149] Mayol-Garcia, (2022)

or took lessons in music, dance, etc., compared to just 24% of boys. All these percentages dropped for children from lower income families. The report also cites several studies that show, overall, that participation in such non-academic activities is linked to higher academic performance, greater academic aspirations, strong self-esteem and resilience and lower levels of risky behavior.

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, [150] although too much extracurricular activity can be a detriment to academic learning. [151] 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 influenced 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. [152]

In addition, a U.S. Census Report found that that children tend to have higher levels of school engagement when involved in one or more activities, like sports, lessons, or clubs. [153] The report found that 42% of children who took lessons (e.g., music, dance, etc.) were highly engaged compared to 33% 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, greater engagement in extra-curricular activities produces greater overall engagement in schools that in turn leads to better student academic performance and lower school drop-out rates.*

Thus, the positive impact of student extra-curricular activities on student performance is 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,

[150] Feldman & Matjasko, 2005
[151] Committee on Increasing High School Students' Engagement and Motivation to Learn, 2004; Steinberg, 1996, 1997
[152] Barron, Ewing & Waddell, 2000; Eoide & Ronan, 2001; Stevenson, 2010
[153] Knop & Siebens, 2018

vote in national and regional elections and volunteer at a higher rate. [154] Despite the many positive impacts on academic achievement of students engaging in extracurricular activities. Balaguer et al. (2022) caution that the specifics of impact depend on gender, age, duration, and breadth of extracurricular activities. Some activities benefit girls more than boys, some activities have positive impact in early adolescence but negative impacts in later adolescence, etc. The implication is that schools should seek to tailor extracurricular activities to each student individually and not assume a "one size fits all."

During the past several years, the EB model developed in other states has allocated between $200 and $314 per student for student activities, including intramural sports. These figures generally are in line with the average amounts spent on such activities in many states. [155] However, our research has not found a common model for allocating state support for student activities.

Thus, in our most recent adequacy study in Wyoming we developed sports and activities prototypes for the EB model's prototypical 450-student middle school and 600-student high school. [156] The prototypes produced a figure of $600 per student for the high school and $322 per student for the middle school. Averaging these figures by weighing them for the different numbers of grade levels covered, together with $25 for elementary school, produced an overall figure of $284 per student, well within the EB model's figure of $300 per student. [157] Assuming inflation of 20% since 2020, this figure would be $360 today.

2024 Evidence-Based recommendation: Provide $360 per student for extra duty funds and extracurricular activities.

Central Functions

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

19. Maintenance and Operations

The computation of maintenance and operations costs is complicated by the lack of a strong or consistent research base. Some school finance models allocate a percentage of current expenditures to maintenance and operations. 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. Part one reviews the literature on the linkage between facilities and student performance. The next part addresses professional standards in staffing for maintenance and operations.

[154] Zaff et al., 2003
[155] Odden & Picus, 2020
[156] See www.picusodden.com
[157] Odden & Picus, 2020

Review of Literature on Maintenance and Operations

The evidence linking the maintenance and operations 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, a rational argument is that 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 and Lemasters (1996) reviewed over 200 studies seeking to find a linkage between the conditions of school facilities and student academic performance. Unfortunately, their review found no consistent connections. Nevertheless, several years later Earthman (2002) underscored the importance of school facility conditions, noting at the time that researchers had consistently found a deficit of between five 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 learning environment of students.

Similar work, completed by The Tennessee Advisory Commission on Intergovernmental Relations, showed a statistically significant relationship between the condition of a school or classroom and student achievement. [158] 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. (2023) 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 et al. (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

[158] Young et al., 2003

relationship was found. Similarly, Brooks and Weiler (2018) in a specific study in Colorado found little or no link between facilities conditions as determined by a Colorado School Facilities Index and student scores on Colorado summative state tests. Although these findings do 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 staffing standards to address this challenge.

Professional Standards for Maintenance and Operations Staff

Drawing on professional standards in the field, we have developed a cost basis for staffing maintenance and operations. [159] The discussion below uses these standards to identify 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 frontline employees who often interact with teachers and students daily. Custodians are also often responsible for ensuring that major mechanical equipment within the facility runs well and identifying appropriate services to make repairs when needed.

Zureich (1998) developed staffing 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 and are as follows:

- One custodian for every 13 teachers;
- One custodian for every 325 students;
- One custodian for every 13 classrooms;
- 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.

[159] Odden & Picus, 2020

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 staffing 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.
3. A public formula used by Florida to suggest maintenance and operations staffing for schools.

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:

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

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 GSF of the building. It then takes 80% 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 maintenance response activities. Individual maintenance worker accomplishment associated with core tasks are: [160]

- 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.

Standards for maintenance workers for instructional facilities are as follows:

- Calculated based on four factors:
    - An initial 1.10 maintenance worker FTE;
    - One maintenance worker for every 60,000 allowable educational GSF at factor of 1.2;
    - One maintenance worker for every 1,000 School ADM at factor of 1.3; and
    - 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 produced a modestly higher number of maintenance workers in a recent state adequacy study; it provides modestly fewer workers for the prototypical district. We also assume that the maintenance worker FTEs determined based on a district's total allowable educational GSF for schools are sufficient to service all buildings in a district, both educational and non-educational.

[160] Zureich, 1998

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

- One Maintenance FTE for every 45,000 sq. ft; and
- 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 the standard recommended by Zureich (1998). In our search for how other states provide 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. [161] This, too, is a district level function. We have estimated that an elementary school needs 62 days per year 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; and
- 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 which is simpler than the EB model:

- Total acreage divided by 40;
- Add one FTE; and
- Plus, one FTE per 500,000 GSF of athletic fields.

[161] Mutter & Randolph, 1987

This formula produces more groundskeeper positions than the EB model, but we see no compelling rationale to adopt it for Colorado, and thus retain the historical EB standard.

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 student for utilities. The latter is an approximation that should be addressed in more detail by a cost factor study as utility costs vary substantially across Colorado'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. [162] 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 with 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 the six grades (K-5) has five classrooms of 15 students, each in grades Kindergarten through grade three (300 students) and three classrooms of 25 students each in grades four and five (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 in elementary, 900 in middle, and 1,200 in 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

[162] Honig et al., 2010

the average secondary school 488 student. [163] At the same time, these figures might seem large to some small districts and schools in Colorado. However, 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 the University of Southern California relied on professional judgment panels to estimate adequate central office staffing for a prototypical school district. That research addressed the issue of 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 eight professional staff (superintendent, assistant superintendent for curriculum, business manager, directors of human resources, student 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. [164] 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 several 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,

[163] NCES, 2018
[164] Educational Research Services, 2009

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 A6.3).

Table A6.3
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. Instruction	1	
Director of Student 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**

2024 Evidence-Based recommendation: Central Office Personnel:8.0 professional and 17.0 classified positions. Non-Personnel Resources: $450 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 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 at-risk students (the latter being Colorado's at-risk student counts). The goal is to ensure that the unduplicated count of both ELL and at-risk students serves as proxies to trigger these additional resources. [165]

The EB model provides substantial additional resources for struggling students, as indicated by these two student counts: tutors, student 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 they have been identified as a student with a disability or not, is to provide adequate resources for all struggling students, with or without a diagnosed disability, and to reduce overtime any over identification of students with disabilities.

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

21. Tutors

The first strategy to provide extra help for struggling students is tutoring, 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 at-risk students.

Section 6 above provided the general evidence for tutors as a very effective strategy for helping struggling students achieve higher performance standards. Although the bulk of the evidence addressed one-to-one tutoring, Section 6 also addressed research on small group tutoring, up to groups of five 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 in part led

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

some analysts to identify and then conduct research on the impact of a new form of tutoring, called High Dosage Tutoring (HDT).

HDT uses one person to tutor one, two or up to five students at a time for one period a day and usually for five days a week. This is substantially more time than the traditional 20 to 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-19. [166] 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) and Makori, Burch, and Loeb (2024) outline how the country could scale up a HDT program; the concepts and ideas these analysts put forth could also be adopted by a state, such as Colorado.

Research suggests this HDT approach has larger effect sizes than found in the studies of more traditional tutoring programs described above. [167] Guryan et al.’s (2021) RCT 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. Cortes, Loeb, and Robinson (2024) document the impressive results of a scalable, high dosage tutoring program for reading in elementary schools. The Illinois Tutoring Initiative (2024) found that students who received high dosage tutoring made significantly larger gains in reading and mathematics during the 2022-23 school year than those who did not receive tutoring. Importantly, the evaluation also found that students with disabilities and ELL students who experienced tutoring produced even larger gains in reading and math scores, on both the Illinois state test and local assessments.

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 factors, 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 Colorado should seriously consider.

[166] See also Barshay, 2020
[167] (See Baye et al., 2019; Cook et al., 2015; Freyer, 2016; Fryer & Noveck, 2017

2024 Evidence-Based recommendation: Provide one teacher tutor/Tier 2 interventionist position for every 100 ELL and non-ELL at-risk 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 Student Support

Core student 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 student support staff, which include additional school counselors, as well as social workers, family liaison staff, and psychologists. Students' social and emotional conditions worsened during COVID-19, further bolstering the need for those services in many schools. Complementing the core school counselor and nurse positions, the EB model provides additional student support positions at the rate of one position for every 100 at-risk students, non-ELL at-risk, and all ELL students.

ELL students and students from low-income backgrounds, and many other students traumatized by the COVID-19 pandemic, 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. Research shows that schools with a higher concentration of at-risk students often have fewer and often less supportive school/family/community interactions. [168] As a result, 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 student support staffing resources based on the counts of ELL and non-ELL at-risk student counts.

In the late 1990s, and early 2000s, various comprehensive school designs suggested multiple ways schools could provide more intensive family and student outreach programs. [169] More recently, the Ed Trust and The National Association for Community and Family Engagement have provided guidelines for designing and implementing effective school, community, and family engagement programs. In terms of the level of resources, the more disadvantaged the student body is, the more comprehensive the strategy needs to be, a reality recognized by the EB model's resources for these activities.

According to the Ed Trust, effective school, family, and community engagement can improve student attendance, boost student academic performance, incentivize more robust career aspirations, reduce mental health issues and dropout rates, and, when done at the early elementary grades, can be more strongly correlated with student academic success than family income. [170] As we describe below, there are many ways schools can ensure that students, families, and communities remain engaged, including home visits and community walks. Meaningful engagement, at its core, is about building personal relationships, trust, and mutual respect among students, educators, families, and communities.

[168] Wriston & Duchesneau, 2024
[169] Stringfield, Ross, & Smith, 1996; for further discussion, see Brabeck, Walsh, & Latta, 2003
[170] Wriston & Duchesneau, 2024

Although there are multiple ways schools can and often do 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. [171]

At the secondary level, the goal of parent outreach programs is to have parents learn about what they should expect from 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. 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. If either an average score on an end-of-course examination or a cut-score on a comprehensive high school test is required for graduation, they too should be discussed. 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. [172]

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 fundraising 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. [173]

Given the changes in how students are assessed and graded, another important school outreach activity includes strategies for how to communicate grades and student assessment results to parents, and how parents can support students in response to those data. [174] Most parents are familiar with the typical letter grades of A, B, C, D and F, but reporting student scores relative to various level of performance, Basic, Proficient and Advanced, in relation to a variety of curriculum standards, and linking that to the old letter grades or college admission requirements, is not straight forward and needs careful attention, definition, and planning.

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[171] Steinberg, 1997
[172] Kirst & Venezia, 2004
[173] Smith, 2021
[174] Levitan & Munyan-Penne, 2024

For actionable guidance on how educators can create strong school, family, and community partnerships, schools can reference a series of guidebooks created by the Alliance for Resource Equity: [175] a partnership between the Ed Trust and Education Resource Strategies. The Alliance provides multiple tools for using school dollars in the most effective and efficient manner. The guidebooks they have developed provide concrete suggestions for creating effective school and family partnership and engagement strategies, but also have suggestions for creating effective, equitable and mission driven school cultures. The resources needed to deploy these strategies are provided in the EB model.

Moreover, 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, earlier 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 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, 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, a percussor to improved student academic performance. [176] The program adds a caseworker, often trained in social work, to a school's student 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 student support resources.

These additional student support staff can also be used to provide some of the mental health services educators in several states increasingly argue that 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 was the increasing need for staff to meet the social, emotional, and mental health 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

[175] https://educationresourceequity.org/
[176] www.communitiesinschools.org

students and their families cope with a wide range of challenges, including mental health challenges. Levenson (2017) identifies ten best practices schools can deploy to provide a range of social and emotional supports for students, all of which can be provided by the student support resources provided by the EB model, found in both the core student support resources and the additional resources provided by at-risk student counts.

2024 Evidence-Based recommendation: Provide one additional student support position for every *100 ELL and every 100 non-ELL at-risk students.*

23. Extended-Day Programs

At both elementary and secondary school levels, some struggling students are likely to benefit from afterschool 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 afterschool programs yield numerous improvements in academic and behavioral outcomes (Fashola, 1998; Posner & Vandell, 1994; Vandell, Pierce & Dadisman, 2005; Peterson & Vandell, 2021).

In 2005, the evaluation of the 21st Century Community Learning Centers Program, an RCT, cast some doubt on these positive findings. [177] Though hotly debated, the initial results indicated that for elementary students, extended-day programs did not appear to produce measurable academic improvement. Critics of this study argued the control groups had higher pre-existing achievement, which reduced the potential for finding program impact. [178] 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. However, subsequent analyses of the 21st Century learning centers found that, over a multiple year period, it produced significant, positive impacts on student academic performance. [179]

Studies of two statewide programs, one in Massachusetts and the other in Florida, found extended-day programs had modest or no significant effects on student academic programs. [180] But, Auger, Pierce & Vandell (2013) found that participation matters, and that low-income students who participated consistently in an afterschool elementary program caught up to other students in 5th grade mathematics. Kraft (2015) describes how individual tutoring programs in extended-day programs can have significant impacts on student learning. In a review of the effect of extended-day programs, McCombs et al., (2017) further support the efficacy of afterschool programs as well as the key structural elements discussed below. The study concluded that academically oriented afterschool programs positively impact student performance in the subjects addressed. Vandell et al. (2022) found that

[177] James-Burdumy et al., 2005
[178] See Vandell, Pierce & Dadisman, 2005
[179] Peterson, 2013; Weiss, 2013
[180] Checkoway et al., 2013; Folsom et al., 2017

students participating in high quality afterschool programs combined with participation in extracurricular activities were reported by teachers have higher academic performance, work habits, and task persistence, and less aggression. In sum, multiple studies and several 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 afterschool programs. [181] Both program quality and student attendance impact result; students who regularly attend academically oriented afterschool programs experience the largest positive academic results.

Further, guidance from the U.S. Department of Education (ED) for evidence-based uses of ESSER III (COVID-19) funds identify structured afterschool programs, like those that have the features identified below, as one such program. In a related handbook, Peterson and Vandell (2021) further review the substantial evidence of the impact of afterschool programs on student academic learning and identify the structural features of the afterschool programs that work. Those structural features are very similar to those the EB model has identified for several years. These conclusions and recommendations further support the EB model's afterschool resources.

Afterschool, 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 afterschool programs effective:

- Staff qualifications and support: staff training in child or adolescent development, afterschool 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., having students engage 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; and with parents and community); and
- 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 for all school prototypes to meet these structural supports. The resources can 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.

[181] Vandell et al., 2020; Wu, 2020

Because not all at-risk students will need or will attend an afterschool program, the EB model provides extended-day resources for half of the at-risk students in a school. This reflects a need and participation rate identified by Kleiner, Nolin, and Chapman (2004). More recent data generally confirm the assumption that not all students who need an afterschool program will attend one. NCES (2023) found that 64% of schools across the country provided afterschool programs with academic emphasis. Licensed teachers tended to work in the programs. The study also found, however, that only about 22% of students eligible for the programs participated in them, although the study did find that the participation rate was slightly higher for students in urban schools serving students of color.

The EB model provides for a year-long afterschool program. It provides resources for a fully certified teacher to serve 15 at-risk students each day for two hours and pays an additional 25% of the salary. 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% FTE) a day. Simplified, the formula equates to one teacher position for every 120 at-risk students.

2024 Evidence-Based recommendation: Provide one extended-day teacher position for every 120 ELL and every 120 non-ELL at-risk students. Provide more resources as student participation on afterschool 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 this additional time. [182] Providing additional time to help all students master the same content is an initiative that is grounded in research. [183] It should be noted that 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. [184] 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. [185] 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 has been a consensus for decades that what happens (or does not happen) during the summer can significantly impact the achievement of students from low-income and at-risk

[182] Borman, 2001
[183] National Education Commission on Time and Learning, 1994
[184] Cooper, Nye, Charlton, Lindsay, & Greathouse, 1996
[185] Cooper et al., 1996

backgrounds. [186] Summer school programs were identified as one evidence-based use of ESSER III funds to help students regain learning loss from COVID-19. [187]

A meta-analysis of 93 summer school programs found the average student in summer programs outperformed about 56 to 60% of similar students not receiving the programs. [188] However, the certainty of these conclusions was compromised because only a small number of studies used random assignment, and program quality varied substantially. [189]

RCTs of summer school reached more positive conclusions about how summer programs can positively impact student learning. [190] 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. 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. [191] 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. A more recent meta-analysis of summer programs that specifically addressed math achievement found positive impacts on student performance. [192]

Researchers noted several program components related to improved achievement effects for summer program attendees, including: [193]

- Early intervention during elementary school;
- A full six- to eight-week summer program;
- A clear focus on mathematics and reading achievement, or failed courses for high school students;
- Small-group or individualized instruction;
- 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 promises for improving the achievement of at-risk students and closing the achievement gap. For example, Kim and Quinn's (2013) meta-analysis of 41 school- and home-based summer school programs found students in kindergarten through grade eight 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. Browne (2019) found that voluntary summer school

[186] See Heyns, 1978
[187] Peterson & Vandell, 2021
[188] Cooper, Charlton, Valentine, & Muhlenbruck, 2000
[189] Borman, Rachuba, Hewes, Boulay & Kaplan, 2001; Borman & Boulay, 2004
[190] Borman & Dowling, 2006; Borman, Goetz & Dowling, 2009
[191] Augustine et al., 2016
[192] Kraft et al., 2021
[193] Browne, 2016-17; McCombs et al., 2011; Peterson & Vandell, 2021; Pitcock & Seidel, 2015

programs in five large districts, with class sizes of 15 that provided both academics and enrichment increased student test scores the next year 20 to 25% of the typical annual gain for frequent attenders but smaller gains for those students who were not frequent attenders. About 60% of program participants were frequent attenders. One implication is to enhance strategies to get more students to attend summer school more often. Borman et al. (2020) found similar significant impacts on students' reading performance for a replicable summer reading program, Kids Read Now, 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 these points. [194] The book describes what is known about learning loss over the summer and what can be done to prevent it. The authors' suggestions for how to structure effective summer school programs echo the recommendations above. [195]

Callen et al., (2023) studied the impact of summer programs in several school districts that were created as a strategy to improve learning loss caused by the COVID-19 pandemic. The findings were modest: small impacts on mathematics performance but no impact on reading. However, the study included students who attended for just one day as well as those who attended for the entire summer school period; clearly, those who barely attended would be unlikely to have improved math or reading achievement. The programs themselves also varied, from providing only a small amount of academic instruction to providing several hours a day of academic instruction. Students who received little academic instruction, even with high attendance, would not likely improve achievement scores substantially. In other words, the study did not assess the impact of structured summer school programs in the districts. The study could more appropriately be termed a study of "natural variation" in summer school experiences, and "natural variation" studies usually produce modest, if any, positive results. The findings from this study should not be interpreted to mean summer school programs do not work, but rather, to work, summer school programs need the core elements discussed above: a six to eight-week program, several hours a day of academic instruction, and high student attendance.

In 2018, the National Academy of Sciences convened a panel of top experts to review the evidence of the impacts of summer experiences on child and adolescent development. [196] Their first conclusion was quite definitive: summer experiences, appropriately designed, have significant effects on cognitive, social, and physical development. The second conclusion was that summer experiences were unequally distributed and that children from low-income backgrounds were most in need of such experiences. Further, guidance from the ED for evidence-based uses of ESSER III (COVID-19) funds identify summer school programs, like those that have the features identified above, as one such program. In a related handbook, Peterson and Vandell (2021) further reviewed the substantial evidence of the impact of summer school programs on student academic learning and identified the structural features of the

[194] Alexander, Pitcock & Boulay, 2016
[195] Lynch and Kim (2017) report that an RCT of an *online* summer school program for mathematics had no impact on student learning but could not determine whether it was the online curriculum itself, or some other programmatic element – like monitoring of students engaging in the online instruction – that diminished the impact.
[196] National Academy of Sciences, 2019

summer school programs that work. Those structural features are very similar to those the EB model has identified for several years. These conclusions and recommendations further support the EB model's summer school resources.

Because summer school can produce powerful impacts, the EB model provides resources for summer school for classes of 15 students for 50% of all at-risk students in all grades K-12. More recent data generally confirm the assumption that not all students who need a school program will attend them. NCES (2023) found that 78% of schools across the country provided summer school programs with academic emphasis in summer 2023. Licensed teachers tended to work in the programs. The study also found that only about 19% of students who had the opportunity to attend the programs did so, although the participation rate was slightly higher for students in urban schools serving students of color.

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% of annual salary or 4.0 FTE teachers per 120 at-risk students (recall that only half of the 120 students are estimated to enroll in summer school). This position is paid at the rate of 25% of the annual teacher salary. Simplified, the formula equates to one full time teacher position for every 120 at-risk, ELL and non-ELL at-risk, 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 these services as well as the additional ELL resources discussed in the next section. Further, these additional instructional resources are supplemented by additional student support staff as well (Element 22).

2024 Evidence-Based recommendation: Provide one summer school teacher position for every 120 ELL and for every 120 non-ELL at-risk students.

25. English Language Learner (ELL) Students

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: to provide access to mainstream, grade-level content, and to promote the development of English language proficiency, including the academic language specific to the content area. [197]

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, ELL classes, PD for teachers to

[197] The Education Alliance, 2020

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 ELL teachers in addition to the at-risk resources for tutors, student support, extended-day, and summer school for all ELL students. 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 student support, one teacher position for every 120 ELL students for summer school, one teacher position for every 120 ELL students for extended-day programming, and in addition, 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.

Strong ELL programs work, whether the approach is structured English immersion or initial instruction in the native language, often called bilingual education. [198] Bilingual programs have been studied intensively. A best-evidence synthesis of 17 studies of bilingual education found ELL students in bilingual programs outperformed their non-bilingual program peers. [199] Using studies focused primarily on reading achievement, the authors found an effect size of +0.45 for ELL students. A 2011 RCT also produced strong positive effects for bilingual education programs, but concluded the language of instruction was less important than the approaches taken to teach reading. [200]

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 student support. The positive impacts of a recent random controlled trial of a Spanish literacy tutoring program reinforces this assertion. [201]

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. Even if teachers could be found with such language proficiency, it would be illogical to use a bilingual approach if there were multiple non-English languages spoken by students in the class, the situation in most schools today. Consequently, many schools have adopted the Sheltered English approach, and the EB model argues that all schools with ELL students should adopt the Sheltered English approach. Thus, the EB model uses the Sheltered English model for estimating ELL resources in schools.

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

[198] Clark, 2009
[199] Slavin & Cheung, 2005
[200] Slavin et al., 2011
[201] Borman et al., 2024

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. [202] 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 for all students, particularly non-ELL, at-risk students. [203] 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 two decades 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. 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. [204]

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. [205] This research suggests ELL students need (and the EB model provides):

- 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;

[202] See Echevarria, Vogt, & Short, 2017 for more detail
[203] Odden & Picus, 2018
[204] District Management Group, 2020
[205] Gandara & Rumberger, 2008; Gandara, Rumberger, Maxwell-Jolly, & Callahan, 2003

- 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. 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 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 professional development 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 academics, regular English, and content-related academic English. The EB model addresses this need by ensuring the ESL resources triggered by ELL counts are in addition to other Tier 2 intervention resources including tutoring, student 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 student 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.

2024 Evidence-Based recommendation: One position for every 100 ELL students. Note this is in addition to the tutoring, student 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. [206] Many mild and moderate

[206] See Levenson, 2012

disabilities, particularly those associated with students learning to read, are correctable through strategic early intervention (resourced by the extra help resources of the EB model) 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 two 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. [207] The bulk of the April 2017 issue of *Educational Leadership* provides this argument in a more advocacy-oriented manner and 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 have documented that through a series of intensive instructional interventions (e.g., pre-k, small classes, rigorous reading curriculum, one-to-one tutoring), nearly 75% of struggling readers identified in kindergarten and grade 1 can be brought up to grade level without the need for placement in special education. [208] Other studies have noted decreases in disability labeling of up to 50% with interventions of this type. [209]

That is why the EB recommendations for extended learning opportunities (Elements 21, 23 and 24) are so important. They, along with core tutoring and student support services, are the series of service

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[207] Frattura & Capper, 2007
[208] Borman & Hewes, 2003; Landry, 1999; Slavin, 1996
[209] Levenson, 2011; Madden, Slavin, Karweit, Dolan, & Wasik, 1993; Slavin, 1996

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, ED encouraged states and school districts to abandon the IQ-achievement discrepancy model and adopt Response to Intervention (RTI) models, also discussed above, based on research findings. [210] 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. [211]

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 one-to-one tutoring;
- Progress monitoring during interventions; and
- Fidelity measures. [212]

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

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[210] Donovan & Cross, 2002; Lyon et al., 2001; President's Commission on Excellence in Special Education, 2002; Stuebing et al., 2002
[211] Mellard, 2004
[212] Mellard, 2004

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. [213] 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 be 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 this trend will likely continue in the future. To make the provision of services to these children cost-effective, it would make sense to explore the 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 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 one-to-one 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 one-to-one to individual students. [214] 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, implying that the use of paraprofessionals generally as well as in the one-to-one context should be discouraged and implemented only when absolutely needed. [215] In a recent publication, Giangreco (2021) argues that it is important to determine

[213] See Fletcher, 2010 and Gottfried, 2014
[214] Giangreco, 2015; Shultz et al., 2015
[215] Giangreco et al., 2005

teacher roles before assigning paraprofessional roles (TAs in his work) for special education services, and further suggests that TAs be assigned to teachers rather than individual students.

These arguments are also reflected in the most recent Picus and Odden comprehensive study of services provided to students with disabilities in Wyoming. [216] This study also found heavy use of paraprofessionals and 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.

Putting all these general conclusions into practice, Levenson (2020) and the District Management Group (2020) suggest six major emphases to make special education services for students with mild and moderate disabilities work to produce greater academic performance:

1. Focus on student outcomes, which means using progress monitoring to make sure all services produce student results and changing those services if results are not produced.
2. Make core instruction as effective as possible, which also is an EB model tenet. Effective core instruction is the foundation upon which effective extra help resources as well as special education services are based.
3. Ensure that all students can read, also aligned with the EB model. Reading is the pathway to academic learning and students who cannot read will have difficulty learning any subject.
4. Provide extra instructional time during the regular school day to all struggling students every day, resources for which are provided by the EB model.
5. Ensure that content staff provide interventions and other supports. Math teachers should provide extra help in math, reading teachers in reading, etc. Content expertise trumps more general special education endorsements.
6. Use paraprofessionals for health, safety, and behavioral needs or students, NOT academic needs.

<u>Census Approach to Funding</u>

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 (apart from basic education funding), as these students are not found proportionately in all districts. This is the catastrophic funding for school districts that provides

[216] District Management Group, 2020

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. 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 census approach works best when districts and schools have the robust set of additional resources to serve struggling students that the EB model provides before those students need an IEP.

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; and
- 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% of an average of 16% incidence of students with disabilities could be serviced by the EB model's extra help resources: core tutors and school counselors as well as additional tutors, student support, extended-day, summer school and ESL resources. This would bring the percentage of students needing and triggering additional special education resources to 12%.

Mild and Moderate Disabilities

At an incidence rate of 12%, it would be reasonable to assume that one to two percentage points of that total would be for children with severe and profound disabilities. That would leave ten 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. There is no national legal requirement for service loads nor, 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 of state practice. If the incidence of such students is ten percent, that means about ten 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 ten, by the service load for a teacher, which is 20). In other words, one special education teacher would be needed for every 200 students, or five positions for every 1,000 students.

Nathan Levenson (2011, 2012, 2020), 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 five 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, 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 is skeptical about co-teaching. Such an approach rarely works, DMG argues, and when it does it is twice as expensive.

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

Related Services

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

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 grade one students, 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 covered to two percent of students in the district.

2024 Evidence-Based Recommendation for Special Education:

- *8.1 positions for every 100 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. This equates to approximately one position for every 141 students.*
  - *1.0 psychologist positions for 1,000 students (included in the Central Office)*
- *This recommendation results in the following resources at prototypical schools:*
  - *3.20 special education positions for every 450-student elementary school*
  - *3.20 special education positions for every 450-student middle school*
  - *4.25 special education positions for every 600-student high school*
- *100% state funding for services for students with severe and profound disabilities, minus federal Title VIb funds, capped at two percent of all students*

28. Career Technical Education (CTE)

The EB model provides extra CTE resources based on 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 (Voc-ED), 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 their 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 school, 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. 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 did not primarily attract low-achieving students, as has some have suggest 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 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 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. [217] 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 negligible, making cost effective calculations even better.

For years, we have identified Project Lead the Way (PLTW) as a nationally prominent example of high quality CTE education. [218] 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 experiences 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.

PLTW 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

[217] See also Dougherty, Gottfried & Sublett, 2019
[218] www.pltw.org

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, computer science, and biotechnology, that students can look forward to pursing in more depth in high school and beyond. 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 four computer science courses. [219] 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., architecture, civil engineering, and bio-technical engineering) provide students with career and college readiness competencies in engineering and science. Students need to take math through Algebra 2 as prerequisite 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. In a recent multiple year study of PLTW in Missouri, Nomi et al. (2024) found that PLTW had a positive impact on students majoring in STEM programs in postsecondary programs.

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. However, a review conducted for a Wisconsin school finance adequacy task force 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). [220] These conclusions generally were confirmed by cost analyses we have conducted of Project Lead the Way for Wyoming. The Washington State Institute for Public Policy found that PLTW produces benefit-cost ratios above seven, meaning that for every dollar invested in the program, $7 of benefits were produced. [221]

[219] www.pltw.org
[220] Phelps, 2006
[221] 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. 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 online format so it 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, the EB funding model provides sufficient resources for high quality CTE programs. [222] All these cost figures, except for the $10,000 per CTE teacher, can be covered by the core EB provisions.

2024 EB Recommendation: Provide $10,000 for each CTE teacher – one in each prototypical high school.

29. Alternative Schools

We have not included a discussion of alternative schools in this report, but the EB model in other states has included an Alternative School Model that provides one assistant principal position and one teacher for every seven alternative school students, plus related resources, up to a maximum of 56 students. [223] This approach produces an extra weight for alternative school students of about 0.67. This formula also works for providing "welcome centers" for ELL students who are recent immigrants and refugees, who lack traditional education programming and need a transition program to help them accommodate themselves into the demands of a regular school day and program.

After the Professional Judgement Panels, the recommendations in Table 3.1 will be finalized and Chapter 4, which estimates the adequate expenditure per student figure and related student weights, will be drafted.

CHAPTER 4: Professional Judgement Panels

An important component of the Evidence-Based (EB) model is to ask panels of education professionals to participate in Evidence-Based Professional Judgment (EBPJ) Panels. We conducted a total of five EBPJ Panels with a total of 26 participants between August 30 and September 27, 2024. A list of the EBPJ participants is included in Appendix A. Prior to our meetings, which lasted between four and five hours,

[222] Sawchuk, 2020
[223] See Odden & Picus 2020

we asked participants to review a draft of this report and to review a video outlining the theory behind the EB approach and how the EB model allocates resources to schools and districts. [224]

The purpose of these panels was to review the core recommendations of the EB model and consider how those recommendations reflect education needs in Colorado. The panels were conducted online, and we relied on the support of the Colorado Department of Education to recruit participants as outlined in the RFP and our proposal. At each panel we sought a wide cross-section of school, district, and community participants including:

- Teachers (including special education and English Language teachers);
- Counselors ;
- Tutors;
- School psychologists;
- Site administrators;
- District administrators;
- School board members; and
- Other community members as appropriate

The findings and recommendations from these panels were used to examine how the EB recommendations would work in Colorado. Panel recommendations are presented in three sections below by the individual model elements described in Chapter 3. We have organized the elements into the following categories:

- Elements where panelists agreed with EB recommendations;
- Elements where panelists suggested modifications to the EB model with which we agree and have modified the model; and
- Elements where the panelists suggested changes and we have not changed the model's elements – in these cases we provide our rationale for not modifying the EB model

All five panels were conducted by Lawrence Picus of Picus Odden & Associates and Kim Curtis of Activate Research. Following each meeting, we synthesized the information shared with us and used those findings to adopt the EB model to the specific needs of Colorado's education system. This chapter summarizes the findings from the panels and describes how parts of the model were modified based on the panel recommendations.

Areas Where the Panelists Agreed with the EB Recommendations

1b, 2 and 3. Elementary and Secondary Core Staffing

Most PJ panelists expressed enthusiasm for the class sizes proposed by the EB model. Many panelists, particularly those from larger districts, noted that their school and district's class sizes were larger than the EB model, particularly for grades kindergarten through grade three where the EB model proposes class sizes of 15 students. For example, one school district representative noted that her district's grade

[224] Video available at https://drive.google.com/drive/u/0/search?q=video

cap was 28 for second and grade three classes and 31 for grade four and five classes. Two panelists noted their opinion that class sizes of 15 may be too small for schools that utilize a pull-out instructional model. They stated a preference for class sizes of approximately 20 students. Apart from one teacher from a small, rural district, panelists either embraced or did not comment upon the EB model's proposed class size for upper elementary and secondary students.

Panelists overwhelmingly viewed smaller class sizes as benefiting students and teachers alike. As one panelist noted, even the most talented teachers struggle with large class sizes. However, panelists expressed a variety of concerns regarding the ability of Colorado to implement smaller class sizes. For example, some panelists noted that it was increasingly difficult to recruit and hire teachers. Other panelists highlighted how the need to increase teacher salaries contributed to larger class sizes by limiting funds available to pay for additional teaching positions.

When informed that the EB model did not include teacher aides, panelists advocated to include aides for the following reasons: 1) to increase safety by having two adults in the classroom; 2) to help manage an increase in the number of students struggling with behavioral regulation in the post-COVID-19 learning environment; and 3) to help manage large class sizes. However, panelists generally agreed that the reduction in class size proposed by the EB model could theoretically reduce the need for classroom aides and agreed that funding teachers would be "money better spent" because para-educators are there to "plug holes."

4. Elective Teachers

Overall, panelists agreed that the EB model's allocation for elective teachers was either on par with or more generous than what their districts' schools currently receive. Two panelists expressed concern that the EB model's 20% allocation for middle schools would not adequately support many Colorado school districts' increasingly "robust" middle school CTE programs given that these courses often limit class size due to safety concerns. These panelists pushed back on the EB model's assumption that current CTE course offerings for secondary school students are less vocational and thus able to support class sizes of approximately 25 students. They noted that courses in cosmetology, construction, and welding are still common and even modern courses such as cybersecurity require close teacher supervision. In addition to concerns over funding for CTE courses, another panelist expressed concern that the EB model's allocations for elective teachers might hinder the ability of small schools and school districts to sufficiently staff elective courses.

5. Instructional Coaches

Panelists expressed strong support for instructional coaches and a belief in coaches' ability to improve teacher effectiveness and raise student performance. They enthusiastically embraced the EB model's instructional coach staffing allocation and highlighted that it was significantly more generous than their district's current staffing allocations for this position. Many panelists described coach-to-student ratios that were far higher than the EB model's proposal, with some panelists noting that their schools or districts had either very limited or even no coaching. These panelists described how budget cuts had led their districts to restrict coaching positions to select types of schools (e.g., Title I schools or secondary schools) or eliminate the position outright. Three panelists suggested that the EB model allocate coaches based on staff counts rather than student counts given that the position is staff-facing rather than student-facing.

6. Core Tutors

No suggested changes.

7. Substitute Teachers

A few panelists expressed their concern that the EB model's allocation for substitute teachers was potentially too low given Colorado's new family medical leave act (FMLA). This law requires teachers to exhaust all their employer-provided leave before the FMLA leave can begin. Panelists feared that this requirement would increase the number of teacher absences that substitutes must cover in the coming years.

The EB model's response to this new issue is that the new family and medical leave act is, in fact, a benefit and, most appropriately, should be costed and included in benefits. The funds generated could then be used to cover the substitutes needed for this benefit.

8. Nurses

Citing students' increased need for in-school nursing care, two panelists expressed concern that the EB model's nursing allocation was low, particularly at the elementary school level where the EB model proposes one nurse for every 450 students. One of these panelists suggested that a health aide be added to the prototypical allocation to help ease the burden on school nurses. Another panelist described his district's innovative use of health clerks to perform specific delegated tasks to compensate for the lack of full-time school nurses. In the main, the panelists agreed that schools should have at least one licensed RN nurse.

9. Supervisory and Instructional Aides

Panelists recognized the value of supervisory and instructional aides. They did not have any recommendations for modifications to the EB's suggested allocation.

10. Library Media Specialist

No suggested changes.

12. Secretarial and Clerical Staff

The topic of secretarial and clerical staff allocations under the EB model did not generate significant conversation among panelists. One panelist characterized the EB model's allocations as "appropriate."

14. Intensive Professional Development

Panelists responded positively to the EB model's proposed allocations for intensive professional development. Panelists believed that setting aside 10 days of student-free time to receive professional development was adequate. They also enthusiastically embraced the $156 per student allocation for trainers to receive professional development from "experts" and "the people who wrote the book" and thus avoid relying on the “dangerous” train-the-trainer model that can water down the effectiveness of professional development.

15. Instructional Materials

No suggested changes.

16. Short-Term Interim Assessment

No suggested changes.

18. Extra Duty/Student Activity Funds

The topic of extra duty/student activity funds did not generate significant conversation among panelists. Those panelists that did comment supported the EB model’s allocation and felt it was appropriate.

19. District Expenses - Maintenance and Operations

The topic of district maintenance and operations did not generate significant conversation among panelists. One panelist suggested that the EB model’s maintenance and operations formula take the age of buildings into account given the impact of a building’s age on maintenance and repair expenses.

22-26. Resources for Struggling Students (Tutors, Student Support Positions, Extended-Day, Summer School, ELL)

Overall, PJ panelists enthusiastically supported the EB model’s inclusion of resources for struggling students. One central office employee from a high-poverty district deemed the EB model’s allocations “exactly the type of resources that my district’s students need to make achievement gains.” An instructional coach from an elementary school with a high concentration of ELL and at-risk students characterized the EB model’s staffing numbers as “incredible.”

There were disagreements concerning the Model’s allocation for ELL students, and those issues are discussed below.

28. Career and Technical Education

PJ panelists expressed divided opinions on the adequacy of the EB model’s allocation for CTE. Two panelists characterized the model’s $10,000 per CTE teacher allocation as “great” and “absolutely amazing.” However, three panelists advocated for increasing the allocation due to recent “dramatic” increases in the cost of raw materials such as gas for welding. One panelist suggested that the EB model allocates funding on a per student rather than a per-teacher basis given that resource costs are associated with the number of students taking the courses. But overall, the panelists accepted the EB CTE recommendations especially considering the Model’s provisions for professional development and computer technologies.

Areas Where the Panelists Suggested Changes to the EB Recommendations and We Have Modified the EB Model

There are four areas where the panelists suggested changes to the EB model and we have modified the Colorado version of the model to include those changes: core student support, assistant principals, computer technologies, and costs of school meals.

8. Core Student Support – Counselors and Other Student Support Staff

Many panelists initially responded that the core student support allocation provided by the EB model was too low, given the increased need for student support services in the post-COVID-19 learning environment. Concern was prevalent at the elementary school level where panelists indicated that schools frequently staff both a traditional guidance counselor and a socio-emotional learning (SEL) specialist. According to panelists, these two positions provide different but “critical” student services that should not be conflated.

One panelist expressed his opinion that the student support allocation to elementary school students should be one student support position for every 225 to 250 students. Another panelist noted that this ratio was in keeping with what the American School Counselor Association proposes for elementary schools.

When panelists learned that the core student support position would be augmented through additional funding for at-risk and ELL students, they largely agreed that core student support funding, together with the additional staff generated by at-risk and ELL student counts, would generally be sufficient. However, some panelists noted that student behavioral issues and mental health needs also exist in schools with low levels of at-risk and ELL students, that student emotional and behavioral issues have increased almost exponentially during the past several years and were “turbo-charged” by COVID-19, suggesting staff to deal with those issues could be shortchanged by the EB model.

Based on these concerns, we enhanced the EB model’s core student support staff. The EB model originally provided one counselor for every prototypical elementary school. However, post-COVID-19, teachers report increased incidences of student absenteeism, student mental health issues, and student behavioral issues. Nearly all PJ panels raised concern about the EB allocation level and argued that schools needed additional staff to address student needs in these areas. In response, we enhanced the model to provide an additional 0.5 student support position for each prototypical elementary and middle school, and an additional one student support position for each prototypical high school. Schools will have the flexibility to allocate these resources for the type of core student support that best meets their students’ needs (e.g., social workers, psychologists, and behavioral specialists).

11. Principals and Assistant Principals

Among those PJ panelists that commented on the topic, a clear majority critiqued the EB model’s lack of assistant principals at the elementary and middle school levels. These panelists viewed the presence of assistant principals as “critical” and “a must,” and advocated for at least one assistant principal for each prototypical elementary school and either one or two assistant principals for each prototypical middle school.

Panelists viewed assistant principals as essential because they: 1) assist the principal with parent and community outreach and communication efforts; 2) help to oversee school safety and discipline measures; 3) provide instructional leadership and help school staff analyze student data; 4) assist with district, state, and federal reporting requirements; and 5) conduct staff evaluations.

While some panelists agreed with the EB model's rationale that principal workloads can be reduced when student-facing staffing is augmented, others cited Colorado-specific regulations that prevented school site administrators from delegating multiple time-consuming tasks. Most notable among these is the requirement that only licensed administrators can conduct annual school staff evaluations. One principal from a K-8 school remarked that she conducts 80 staff evaluations each year, while another noted that she is responsible for conducting 90 annual staff evaluations. This administrator commented that "there aren't enough hours in the day" for a single principal to stay on top of staff evaluations and effectively carry out all his or her other required administrative responsibilities.

Though we remain confident that one principal and the multiple instructional coaches provided by the EB model provide sufficient management and instructional leadership staff for schools, the Colorado panels raised three major Colorado specific issues that require additional administrative staff: 1) the state's evaluation system that permits only licensed administrators to observe all teachers multiple times a year, requiring large amounts of time; 2) the need to have someone at the school to monitor and organize extensive testing systems throughout the school year; and 3) the need to create additional 504 plans (formal support plans provided by schools for students with disabilities) for testing modification and other needs that do not require IEPs. Because of these state requirements, we enhanced the model to include an assistant principal in each of the prototypical elementary and middle schools, and an additional assistant principal in the prototypical high school.

17. Technology and Equipment

Among those panelists that commented on the EB model's proposed technology and equipment allocation, all thought the model's $250 per student allocation was too low. Panelists cited their district's one-to-one status; associated expenses such as computer/charger repair and replacement, software, and technology support; and a new statewide mandate requiring that all school communications comply with the Americans with Disabilities Act (ADA) as reasons for their concern. Panelists suggested that the existing EB allocation be replaced with a per student technology allocation ranging from $350 per student to $450 per student to support a one-to-one student to computer ratio.

Nearly all Colorado districts have moved to one-to-one computers in the post-COVID-19 era. Students currently use computers for multiple purposes, including completing homework assignments and logging on during snow days or other days when schools are closed. In response, we have increased the model's per student allocation for computer technology and equipment from $250 to $350, which, under our costing approach, covers the fiscal needs of having one computer for each student.

20. Central Office Miscellaneous Funding

The topic of central office miscellaneous funding did not generate significant conversation among panelists. The one panelist that did comment on the EB model's allocation in this area stated his belief that the $450 per student for miscellaneous expenses such as board support, insurance, and legal services was significantly higher than what his district currently allocates.

However, we understand that Colorado now requires schools to provide school meals for all students, and that federal funds do not cover all the costs of doing so. While the core EB model does not include funds for school meals, we estimate the additional cost to cover what Federal funds do not cover to be approximately $100 a student. Therefore, we have increased the EB model's allocation for central office miscellaneous funding from $450 per student to $550 per student.

Areas Where the Panelists Suggested Changes to the EB Recommendations and We Have Not Modified the Model

There are four areas where the panelists suggested changes to the EB model where we did not think changing the model was needed: gifted and talented education, central office staffing, resources for ELL students, and special education.

13. Gifted and Talented Education

PJ panelists overwhelmingly argued that the EB model's allocation for gifted and talented services was low. Multiple panelists highlighted the time burden associated with developing and updating advanced learning plans (ALPs) for Colorado students identified as gifted at both the elementary and secondary levels. Panelists noted that teachers must meet with gifted students and their parents yearly to complete this state-mandated document which they described as similar to an IEP for special education students. At the elementary level, panelists expressed concern that the EB allocation did not generate sufficient resources to fund a dedicated gifted and talented resource teacher, which they viewed as essential to meeting both the academic and social emotional needs of gifted and talented students. Further, they cited the EB model's allocation as "wholly insufficient" in helping to make up for the state's current gifted education categorical funding shortfall that one panelist estimated at $26 million.

We understand these comments in part because it seems most districts in Colorado provide gifted and talented programs via a pull-out approach and special activities for such students. Our position is that this approach, while popular, is costly and has modest impacts. As the section on gifted and talented education argues, the most effective programs for gifted students place those students in one class and accelerate their instruction. This can include advancing students by a grade at the elementary level, or at the secondary enrolling them in post-secondary programs. All of these strategies have larger effects than the pull-out approach and are generally low or no cost. The EB model provides sufficient funds for an online gifted and talented experience that is effective and modest in cost.

20. District Expenses - Central Office Staff

Four PJ panelists commented on the EB model's central office staff funding allocation. One panelist with significant experience working as a director of finance and operations in rural school districts commented that the allocation of eight professional staff for a prototypical 3,900-student central office was too low. He believed that the EB's prototypical professional staffing level (8 positions) would be necessary to operate the central office of a 2,000-student district. Conversely, panelists representing large school districts expressed the sentiment that the EB model allocation for central office staff was either generally in line with or more generous than their district's current central office staffing allocation.

We have tested the EB model's central office staffing in several states with a range of school district enrollments and found the staffing model to be adequate, if not more than adequate, for districts of 3,900 to 4,000 students, larger districts, and smaller districts with half the students and thus half the central office staff. Thus, we are reluctant to enhance central office staffing.

22-26. Resources for Struggling Students (Tutors, Student Support Positions, Extended-Day, Summer School, ELL)

Panelist comments largely focused on the EB model's proposed allocation for just ELL teachers. Among those that commented, opinions regarding the allocation's sufficiency were divided. Some thought the allocation of one teacher position per 100 ELL students was a "bit low," while others called it "sufficient," particularly given the inclusion of an ELL tutor. Multiple panelists noted that the services required by ELL students varied across student populations and over time. For example, secondary ELL students tend to require more support than early elementary students given both the length of time it takes to reach fluency and Colorado's requirement that ELL secondary students must take core content assessments within two years of enrollment. Additionally, students transitioning from non-English proficient status to limited-English proficient status require fewer services. For these reasons, panelists suggested that the EB model weigh ELL allocations based on service level intensity. Finally, one panelist suggested that the EB model provides a base ELL allocation for small schools given that there is an increasing need for ELL services in Colorado's small, rural districts.

For ELL students, the EB model provides not just one ELL teacher for every 100 students, but also one tutor for every 100 ELL students, one student support staff for every 100 ELL students, as well as extended-day and summer school staff. These staff resources are sufficient to serve the needs of ELL students. Further, the EB model posits that all teachers should be trained in sheltered English so they can teach regular classes with ELL students in them but teach content and the English language at the same time. It is our judgment that the EB model's resources and educational strategies are adequate for ELL students.

27. Special Education

Citing current state shortfalls in special education categorical funding, panelists strongly supported the EB model's approach to funding education for students with severe and profound disabilities. Among those PJ panelists that commented, the majority characterized the EB model's district and school allocations for special education services as "light." However, a sizable minority of participants considered the allocation to be sufficient for their district's needs but cautioned that special education needs can vary significantly across schools and districts.

Much of the panelists' concerns focused on the expense of providing occupational therapy, physical therapy, and speech and hearing services to students. Panelists highlighted two specific issues: 1) the large numbers of students in their districts that receive these services; and 2) the fact that these services are particularly expensive to procure given that districts often must contract out for the work. Panelists also expressed concern that the EB model's allocation did not take into consideration the significant amount of paperwork and other time-consuming activities involved in the provision of special education services such as the requirement that students' individual education plans (IEPs) must undergo an annual review.

Regarding modifications to the EB model's special education allocation, two panelists suggested that the EB model include a small baseline amount dedicated to the identification of special needs among students. They argued that the work of identifying special needs students requires a level of "collaboration, time, and resources" that is currently not available in most schools.

As the project's special education report concludes, many of the problems associated with special education are due to ineffective organization of the administration of special education and the types of educational strategies provided. With restructuring, both can be streamlined. In addition, the rising percentage of students needing special education resources in Colorado can be stemmed by the robust resources for struggling students, which when used in other contexts have reduced the incidence of students with a specific disability. Finally, any issues with providing related services for OT and PT, for example, should be addressed by assessing the service loads the EB model uses for such services. No panel member suggested any service level change and the project's special education report concluded that the service levels are appropriate. Thus, we have not altered the EB model's special education recommendations.

Final Professional Judgement Panel Enhanced EB Model Recommendations

Table A6.3 displays the final EB model elements as modified by input from the Professional Judgement Panels convened to review and critique the EB model. The changes we have made to the EB model are displayed in red.

Table A6.4:
Summary of 2024 Colorado Evidence-Based Model Recommendations

Model Element	2024 Evidence-Based Recommendation
Staffing for Core Programs	
1a. Pre-k	Full-day pre-k classrooms staffed at a class size of one teacher and one aide position for every 15 students
1b. Full-Day Kindergarten	Full-day kindergarten program. Each K student counts as 1.0 student 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 positions Middle Schools: 20% of core middle school teachers positions High Schools: 33.33% of core high school teachers positions

Model Element	2024 Evidence-Based Recommendation
5. Instructional Facilitators/ Coaches	One 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 at-risk and ELL student counts in Element 21)
7. Substitute Teachers	Five percent of core and elective teachers, instructional coaches, tutors (and teacher positions in additional tutoring, extended-day, summer school, ELL, and special education)
8. Core Student Support Staff, Core Guidance Counselors, and Nurses	1.5 counselor/student support staff position for every 450 grade K-5 students One counselor position for every 250 grade 6-12 students and an additional 0.5 support staff position for the 450-student middle school and an additional 1.0 student support staff position for the 600-student high school One nurse position for every 450 K-8 students and one nurse position for every 600 9-12 students (Additional student support resources are provided based on at-risk and ELL students in Element 22)
9. Supervisory and Instructional Aides	Two aide positions for each prototypical 450-student elementary and middle school Three aide positions for each prototypical 600-student high school
10. Library Media Specialist	One library media specialist position for each prototypical school
11. Principals and Assistant Principals	One principal position and one assistant principal position for the 450-student prototypical elementary school One principal position and one assistant principal position for the 450-student prototypical middle school One principal position and two assistant principal positions for the 600-student prototypical high school
12. School Site Secretarial and Clerical Staff	Two secretary positions for the 450-student prototypical elementary school Two secretary positions for the 450-student prototypical middle school 3 secretary positions for the 600-student prototypical high school
Dollar Per Student Resources	
13. Gifted and Talented Students	$25 per student

Model Element	2024 Evidence-Based Recommendation
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 $156 per student for trainers (In addition, professional development resources include instructional coaches [Element 5] and time for collaborative work [Element 4])
15. Instructional Materials	$256 per student for instructional and library materials $60 per student for each extra help program triggered by at-risk and ELL students as well as special education
16. Short Cycle/ Interim Assessments	$25 per student for short cycle, interim and benchmark assessments
17. Technology and Equipment	$350 per student for school computer and technology equipment
18. Extra Duty Funds/Student Activities	$360 per student for co-curricular activities including sports and clubs for grades K-12
Central Office Functions	
19. Maintenance and Operations	Separate computations for custodians, maintenance workers and groundskeepers, $1 per gross square footage (GSF) for materials and supplies, and $350 per student for utilities
20. Central Office Personnel/ Non-Personnel Resources	Eight professional and 17 classified positions for a prototypical 3,900 student Central office. Additionally, $450 per student is provided for misc. items such as Board support, insurance, legal services, etc. and an additional $100 per student to cover mandated school meals
Resources for Struggling Students	
22. Tutors	One tutor position for every 100 ELL students and one tutor position for every 100 non-ELL at-risk students
23. Additional Student Support Staff	One student support position for every 100 ELL students and one student support position for every 100 non-ELL at-risk students
24. Extended-Day	One teacher position for every 120 ELL and for every 120 non-ELL at-risk students
25. Summer School	One teacher position for every 120 ELL and for every 120 non-ELL at-risk students
26. ESL staff for English Language Learner (ELL) Students	In addition to tutors, extra student support, extended day, and summer school, noted above, one ESL teacher position for every 100 ELL students

Model Element	2024 Evidence-Based Recommendation
27. Special Education	• 8.1 positions for every 100 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. This equates to approximately one position for every 141 students. ○ 1.0 psychologist position for 1,000 students (included in the Central Office) • This recommendation results in the following resources at prototypical schools: ○ 3.20 special education positions for every 450-student elementary school ○ 3.20 special education positions for every 450-student middle school ○ 4.25 special education positions for every 600-student high school 100% state funding for services for students with severe and profound disabilities, minus federal Title VIb funds, capped at two percent of all students
28. Career-Technical Education (CTE)	$10,000 per CTE teacher for specialized equipment
Staff Compensation Resources	
29. Staff Compensation	For salaries, Colorado statewide average for all EB staff positions For benefits: we added state retirement, health insurance, Medicare, workers compensation and unemployment insurance.

Chapter 5: Calculating the Adequate Base Per Student Figure and Student Weights

INTRODUCTION AND OVERVIEW

Using the Evidence-Based (EB) Model, this report provides a set of recommendations Colorado can use to determine an Adequate Base Per Student figure and related student weights for students from at-risk backgrounds, for ELL students. and for students with mild and moderate disabilities. This figure would allow each "normal" size school to offer students an equal opportunity to achieve to the state's curriculum and performance standards.

The EB model is one of four approaches that are used to identify adequate spending levels for public schools. The EB model identifies all the elements high performing elementary, middle, and high schools need to provide every student with an equal opportunity to learn to the state's curriculum and performance standards. In addition, the model provides resources for central office administration, and the operation and maintenance of school buildings. The model does not include funds for transportation, a full food services program, or capital construction. More specifically, as Chapter 3 shows, drawing upon a wide variety of research on individual programs, including more recently randomized controlled trial research, the EB model includes recommendations for the following elements:

1. Staffing for core programs, which include full-day pre-school and 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 office 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 student 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 Medicare (Colorado educators do not participate in Social Security and have a more robust state retirement programs).

Undergirding our recommendations, case studies conducted by Picus Odden & Associates in past studies in other states, as well as similar case studies conducted by many other researchers, show how the resources identified can be deployed into a comprehensive set of school improvement strategies that dramatically improve student academic achievement and reduce demographic-linked achievement disparities.

Furthermore, the EB model's specific recommendations for staffing and dollar per student resources not only allow schools and districts to create and implement effective core instructional programs but are also adequate to provide the robust additional services needed by students struggling to achieve standards. These additional resources are triggered by at-risk and ELL student counts and enable schools and districts to provide extra help for those struggling students so that many do *not* need special education services. Those resources also function to stem the rising tide of students in Colorado who are being identified as needing special education services, helping to contain the costs of special education programs.

Put differently, the schools that we and others have studied have boosted student performance by deploying strategies closely aligned with those embedded in the EB model. These practices bolster our claim that if such funds are provided and used to implement effective and research-based strategies, significant student performance gains should follow, and special education costs should decline.

The core EB model recommendations, as revised based on feedback from Colorado educators and summarized in Table A6.4, were the result of five educator review or professional judgement panels that were asked to consider the adequacy and appropriateness of the EB model in the Colorado context. As the revised numbers and ratios in Table A6.4 indicate, we made four important changes to the core recommendations to reflect specifics of the Colorado education context.

Estimating a New Base Per Student Figure and student weights

To estimate an adequate Base Per Student figure using the EB model and its Colorado modified recommendations, we developed an Excel-based simulation that takes all of the EB model's recommendations, applies them to prototypical elementary, middle, and high schools, as well as the district central office, and produces an Evidence-Based Base Per Student figure, as well as student weights for special education, at-risk students, and English Language Learners. These figures and weights can be used in the state's funding formula to generate an adequate level of school resources for each school district in Colorado. The model uses the state's basic student count as well as its at-risk and ELL student counts. To produce the EB model's Base per student figure, the Excel simulation uses the core numbers and ratios provided in Table A6.4 and applies them to a prototypical school district of 3,900 students organized into four prototypical 450-student elementary schools, two prototypical 450-middle schools, and two prototypical 600-student high schools.

Personnel costs are critical to making these estimates. We used staff, salary, and benefits data provided by the Colorado Department of Education and analyzed by our partner APA and Associates. To convert the more detailed staffing data provided by the Department into the categories needed for our analysis, in some instances several staff categories were merged into one consolidated category and the estimated salary computed as a weighted average of the included staff categories. Since the department did not have salary information for maintenance and operations staff, we used data from a combination of the web sites of Indeed, Talent.com, ZipRecruiter, and Salary.com to produce rough estimates of median Colorado salaries for maintenance staff (plumbers, carpenters, electricians, custodians, and grounds keepers). Table A6.5 shows the salary data used to develop our estimates of an adequate Base Per Student figure for Colorado.

TABLE A6.5
2023-24 AVERAGE SALARY BY POSITION

Position	Certified or Classified	Average Salary
Principal	Certified	$112,033
Assistant Principal	Certified	$92,735
Teacher	Certified	$54,463
Instructional Coach	Certified	$62,495
Substitute Teacher	Certified	$53,463
Counselor	Certified	$63,919
Nurse	Certified	$53,463
Instructional/Supervisory Aide	Classified	$23,145
Library Media Specialist	Certified	$66,833
School Secretary/Clerical	Classified	$36,584
Custodian	Classified	$36,000
Maintenance Worker	Classified	$60,000
Grounds Maintenance	Classified	$37,431
Superintendent	Certified	$145,368
Business Manager	Classified	$81,845
Director – Personnel/HR	Classified	$81,984
Asst. Supt. of Instruction	Certified	$142,946
Director of Student Services	Certified	$91,266
Director of Assessment	Certified	$95,570
Director of Technology	Classified	$93,530
Director of O&M	Classified	$86,155
Secretary/Clerical	Classified	$49,008
Network/Systems Supervisor	Classified	$93,530
School Computer Technician	Classified	$26,117
Psychologist	Certified	$49,133

To estimate total compensation, the model uses the following benefit rates:

- Social Security: 0% because Colorado education employees do not participate in this federal program.
- Medicare: 1.45% of salary
- State retirement: 21.4% for both certificated and classified staff
- Workers' compensation: 0.8%
- Unemployment insurance: 0.4%
- Medical, dental and eye insurance: $14,905 per employee which is an estimated average of a single, 2-person and family plan. This is provided to every employee in the EB model.

With these compensation and benefit figures, the adequate **EB model Base Per Student figure** is estimated to be **$11,387**.

Assuming **50% of eligible ELL students participate** in afterschool and summer school programs, the **ELL extra weight is 0.38** ($4,366/$11,387) for ELL students.

If 100% of eligible ELL students participate in afterschool and summer school programs, **the ELL extra weight is 0.51**, which is $5,818/$11,387.

Assuming **50% of eligible at-risk students participate** in afterschool and summer school programs, the **at-risk extra weight is 0.30** ($3,435/$11,387) for ELL students.

If 100% of eligible ELL students participate in afterschool and summer school programs, **the at-risk extra weight is 0.43**, which is $5,8/$11,387.

For students with **mild and moderate disabilities, the combined extra weight** is estimated to be **0.60**, which is $6,780/11,387. The chapter in the final report on special education that is part of the overall study disaggregates this figure into separate weights for students with mild disabilities and students with moderate disabilities.

The EB model recommends that the state provides 100% of the costs of providing services for students with severe and profound disabilities, which is estimated to be two percent of the total student population. The cost of this recommendation is provided in the special education report.

With these compensation and benefit estimates, the EB model's per student figure for a **full-day pre-k program** for both three- and four-year old children is $16,292, which compared to the Base per student figure of $11,387, produces a **pre-k weight of 1.43**.

It is important to remind readers that the Excel-based simulation model can be used to model alternative Base per student figures, by changing parameters, such as alternative class sizes, for each grade or providing alternative staffing levels for other positions in a school or district. When used to do so, a revised base per student cost estimate will result, along with new estimates and weights for ELL students, non-ELL at-risk students, special education, and pre-k.

Appendix A

Participants in the Colorado Evidence-Based Professional Judgment Panels

A total of 26 individuals participated in the professional judgment (PJ) panels and are identified below. We want to thank all of them for their time reviewing the report and video and for their thoughtful recommendations.

Name	School District
Mark Rydberg	Colorado Department of Education
Erika Fiorenzza	Adams County School District 12
Meggan Sponsler	Greeley-Evans School District 6
Mandy Larson	Greeley-Evans School District 6
Beth Niznik	Boulder Valley School District
Paula Battista	Adams County School District 12
Kristin Shapiro	Freemont RE-2 School District
Tony Czech	Greeley-Evans School District 6
Lisa Webster	Summit County School District
Katie Gumnic	West Grand School District
Erin Turman	Greeley-Evans School District 6
Anthony Charterina	Weld RE-4 School District
Kellie Moore	Harrison School District 2
Lara Wiant	Jefferson County School District
Tamara Durbin	Northeast BOCES
Amy Heinsma	Weld RE-4 School District
Nicole Stewart	Greeley-Evans School District 6
Nicole Rajpal	Boulder Valley School District
Jen Rios-Alers	Greeley-Evans School District 6
Jennie Todd	Adams-Arapaho School District 28J
Kim Silva	Weld RE-6 School District
Mike Heil	School District 49
Jinny Jensen	Greeley-Evans School District 6
Robin Murray	Greeley-Evans School District 6
Tom Gribble	Greeley-Evans School District 6
Mary Parker	Jefferson County School District

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(*Indicates Peer reviewed Study)

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Appendix Seven: Colorado Funding for Special Education

Methodology

As part of Colorado's Input-Based Financial Adequacy Study, New Solutions K12 hosted interviews and focus groups with stakeholders from across the state. The stakeholders included superintendents and special education directors from small, medium, and large Board of Cooperative Educational Services (BOCES) and Administrative Units (AUs), as well as special education advocates and experts from charter school associations and the Center for Learner Equity.

Representatives from the following districts and BOCES were interviewed:

Table A7.1
List of Districts and BOCES Interviewed

Names of Districts and BOCES	
Adams County School District	Thompson School District
Dever County 1 School District	Centennial BOCES
Colorado Springs 11 School District	Colorado River BOCES
Jefferson County RE-1 School District	Mountain BOCES
Kim School District	Northwest BOCES
Pueblo County 70 School District	Northeast BOCES
Rocky Ford School District R2	

These discussions provided an understanding of how districts are serving students with disabilities and what challenges the current funding formula presents for special education. The goal of the conversations was to understand whether special education funding is equitable, sufficient, and transparent.

Additional research was also conducted to ensure a comprehensive understanding of special education funding and expenditures in Colorado, including looking at current statewide and federal special education funding, AU special education enrollments, AU special education spending, and current special education practices in the state. Key insights were incorporated from the Special Education Finance Advisory Committee (SEFAC) 2022-23 Annual Report as well as the impacts of recently passed legislation, including SB22-127, SB23-099, and HB24-1448, which address special education funding reforms in the state. Resources from the Colorado Department of Education (CDE), American Institutes for Research (AIR), the Center for Learner Equity, and EdBuild were consulted as well as work by experts in school finance and policy.

Based on research, interviews and focus groups with stakeholders, and the experiences of special education experts and advocates, the following areas were explored:

- Current special education funding levels and means statewide;
- Adequacy and transparency of current special education funding;
- Implications for AUs of current special education funding;
- Comparison of alternative state funding models; and
- Recommendations for Colorado's special education funding formula.

Chapter 1: Current Levels, Means, and Transparency of Funding Special Education Statewide

Current Special Education Funding in Colorado

At the state level for special education, Colorado provides additional funding under the Exceptional Children's Educational Act (ECEA), which supplements base funding by allocating resources specifically for students with disabilities. These funds are allocated through a tiered system based on the severity of disabilities and the number and needs of students with Individualized Education Plans (IEPs). The formula uses the actual count of students with disabilities that were reported to the U.S. Department of Education from December 1 in the *prior fiscal year*. The more students with IEPs in a district, the more funding it receives. Funds are distributed through AUs, which can be a school district, BOCES, or a combination of school districts.

Currently, an AU receives funding for their special education students through a tiered approach, with each tier building on top of the other. The tiers are Tier A, Tier B, and Tier C.

Tier A is funded first and provides a fixed amount of $1,750 per student with a disability.

Tier B funding is based on each AU's proportion of students identified with one or more specific, more significant disabilities relative to the total number of students statewide with these disabilities. The disabilities for Tier B funding include:

- Visual impairment, including blindness;
- Hearing impairment, including deafness;
- Deaf blindness;
- Serious emotional disability;
- Autism spectrum disorders;
- Traumatic brain injury;
- Multiple disabilities; and
- Intellectual disability.

The amount of funds available for Tier B is dependent on the amount remaining after Tier A has been funded. The funds are distributed to AUs based on their proportion of students in the Tier B categories.

In school year 2022-23, Tier B funding was $4,348 per student.[1] State statute allows up to $6,000 per student for eligible Tier B students. As of 2024-25, Tier A and Tier B funding amounts must increase by inflation according to legislation[2] passed by the Colorado General Assembly in 2022. Given that the amount of funds available for Tier A and Tier B combined is fixed, the actual amount of funding for Tier B is variable and is often less than the $6,000 cap per student.

Colorado also provides supplemental funding to districts for students who require exceptionally high-cost services. High-cost, or Tier C, reimbursement is funded through a $4 million fund managed by SEFAC that allocates funds for in-district services and out-of-district placements ($2M for in-district, $2M for out-of-district).

Tier C, or high-cost funding, is awarded through a voluntary application process for funds from the SEFAC, considering an AU's ability to finance high-cost programs. The eligibility threshold for reimbursement is $40,000 per student for high-cost, out-of-district placements and $25,000 per student for high-cost, in-district placements. Applications for high-cost funding are funded based on two criteria:

1. Costs must be greater than in-district and out-district services thresholds; and
2. Districts are ranked and prioritized based on financial impact, i.e., the district's annual expenditures for a student's special education program, less applicable revenues, and the percentage those expenditures represent the district's audited total expenses.

This funding is intended to offset the financial burden of providing intensive services, such as one-on-one aides, specialized equipment, or intensive near full-day special education support.

School districts rely on federal, state, and local revenue to pay for total special education costs. Currently, state and federal funding in Colorado does not fully cover the cost of special education; therefore, districts are required to make up for the shortfall. According to SEFAC's 2022-23 Annual Report, the total cost of special education spending in Colorado in 2021-22 was about $1.2 billion. School districts had to cover 65% of this, or a total of about $800 million, from their own district budgets due to unfunded expenditures for special education.

[1] The Special Education Fiscal Advisory Committee et al., 2024

[2] HB-1294

Table A7.2
Special Education Funding Shortfall 2021-22 School Year

Total Special Education Spending	**$1,231,349,774**
State Funding	
Tier A	$132,875,000
Tier B	$80,204,593
Tier C	$4,000,000
Other state funding**	$35,826,042
Subtotal State Funding	**$252,905,635**
Federal Funding	**$179,199,757**
Total State and Federal Funding	**$432,105,392**
Shortfall Covered by District Budgets	**$799,244,382**

**Other state funding includes: Child Find ($2,886,287), Educational Orphans ($163,486), Preschool SPED from Finance Act ($32,776,269) (The Special Education Fiscal Advisory Committee et al., 2024).

It's important to note that a new funding formula (not specific to just special education) is being phased in over the next six years under HB24-1448. The new formula includes several updates to better address individual district characteristics and increase support for rural schools, at-risk students, English language learners, and special education students.

Under this legislation, student weights for special education will be set at 25%, an increase from previous allocations. Once fully funded, an additional $240 million will be allocated in the formula for special education students. These adjustments are expected to drive more resources to districts that historically lacked sufficient funding.

While these changes represent a positive step toward expanding special education funding and addressing disparities across districts, the new formula will not bridge the substantial funding gap. The shortfall of nearly $800 million between allocated funding and expenses covered by districts underscores the ongoing need for more robust financial support to meet the true costs of special education in Colorado.

Understanding Special Education Funding Adequacy, Transparency, and Implications

The study team hosted interviews and focus groups with stakeholders from across the state. The stakeholders included superintendents and special education directors from small, medium, and large BOCES and AUs, as well as special education advocates and experts from charter school associations and the Center for Learner Equity.

These discussions provided an understanding of how districts serve students with disabilities and what challenges the current funding formula presents for special education. The conversations aimed to understand whether special education funding is equitable, sufficient, and transparent.

Special education funding is insufficient to cover the costs of services for students with disabilities.

Although AUs, through school districts or BOCES, are mandated federally by the Individuals with Disabilities Education Act (IDEA), and from the state level with ECEA, to identify and deliver special education services to students with disabilities (between the ages of three and 21), current funding does not fully cover the cost of special education.

The combined base and tier funding amounts are too low to adequately cover the required resources, services, and unanticipated costs. As noted above, AUs spend nearly $800 million more than they receive for special education services.

Several factors contribute to this gap between special education funding and special education costs:

Student Counts

Underfunding of special education is exacerbated by the fact that funding allocations are based on the prior year's student counts, while the number of students with disabilities in Colorado has been steadily increasing over the past few years. This increase in students with disabilities follows a similar national trend: nationwide, there are more students with disabilities now than at any time in the past.[3] The lag in calculating special education enrollment and associated costs does not account for these increases in special education enrollment.

Unexpected Costs

The current formula does not include any provisions for funding unexpected costs that can arrive during the school year, such as transportation, specialized equipment, legal fees, or students with significant needs enrolling in an AU during the school year. In outlier cases, a single new family can increase costs midyear by $100,000 or more, which is substantial for all districts, particularly small or even mid-sized districts.

Inflation

The Bureau of Labor Statistics inflation calculator[4] suggests that the current $6,000 cap for Tier B calculated in 2006 would be equivalent to nearly $9,000 in today's economy.[5] Even if the cap for Tier B increases now that the tiered funding is indexed to inflation, there is no assurance that districts will receive funds at the cap. In fact, history suggests otherwise. With a $6,000 cap in 2021-22, Tier B funding

[3]

[4] *CPI Inflation Calculator*. (n.d.). https://data.bls.gov/cgi-bin/cpicalc.pl

[5] The Special Education Fiscal Advisory Committee et al., 2024

was $3,387 per student. The average excess cost for a special education student, above the general education cost, in fiscal year 2021-22 in Colorado was $11,369.[6]

High-Cost Reimbursements

High-cost reimbursement, or Tier C funding, meant to provide additional support for students with the most severe needs, is also considered insufficient and inequitable. Respondents stated that its complexity, impact-based calculation, and threshold requirements often leave larger and more resource-intensive districts without sufficient support. Larger districts often face higher expenses and find it challenging to access Tier C funding. Smaller, rural districts, on the other hand, tend to have more success securing these funds due to lower numbers, higher costs, and thus, greater impact per student.

Additionally, district audits are required as part of the high-cost reimbursement applications. These are costly and time-consuming, and there are often not enough auditors in the state to complete them in time to submit an application. If audits are not done, the district cannot apply for reimbursement.

Section A of this appendix summarizes the 2021-2022 Tier C applications received and funded.

Windshield Time

Many small and rural districts noted that finding, hiring, and retaining enough high-quality related services staff locally to support their special education students can be challenging. This includes roles such as speech language pathologists, counselors, occupational therapists, and physical therapists. Most of these districts instead have turned to hiring sub-contracted part-time staff who often have to travel long distances to get to each school, with some schools on the hook to pay for travel costs such as drive time and even overnight accommodations in some cases. This approach can lead to higher costs for these districts compared to districts that can hire these roles locally.

While it is a standard solution amongst small and rural districts, hiring sub-contracted related services staff who must travel a long way to visit the school is not the only solution. Over the past decade, and especially since the COVID-19 pandemic, the availability of tele-support programs for schools has skyrocketed. Leveraging telehealth options for roles such as speech-language pathologists and counselors can reduce or eliminate the need to hire subcontractors with extensive travel time in these roles. Research shows that telehealth for services like speech therapy or mental health counseling is just as effective as in-person support for students and often comes at a fraction of the cost.

However, OT and PT services can be more difficult to provide virtually, so there may still be a small incremental cost for rural districts due to the extensive drive times for these roles.

Each of these factors contributes to and underscores a substantial funding shortfall in Colorado's ability to pay for the educational needs of students with disabilities. Schools and districts must compensate for this shortfall by reallocating general education funds, cutting other programs, or seeking additional

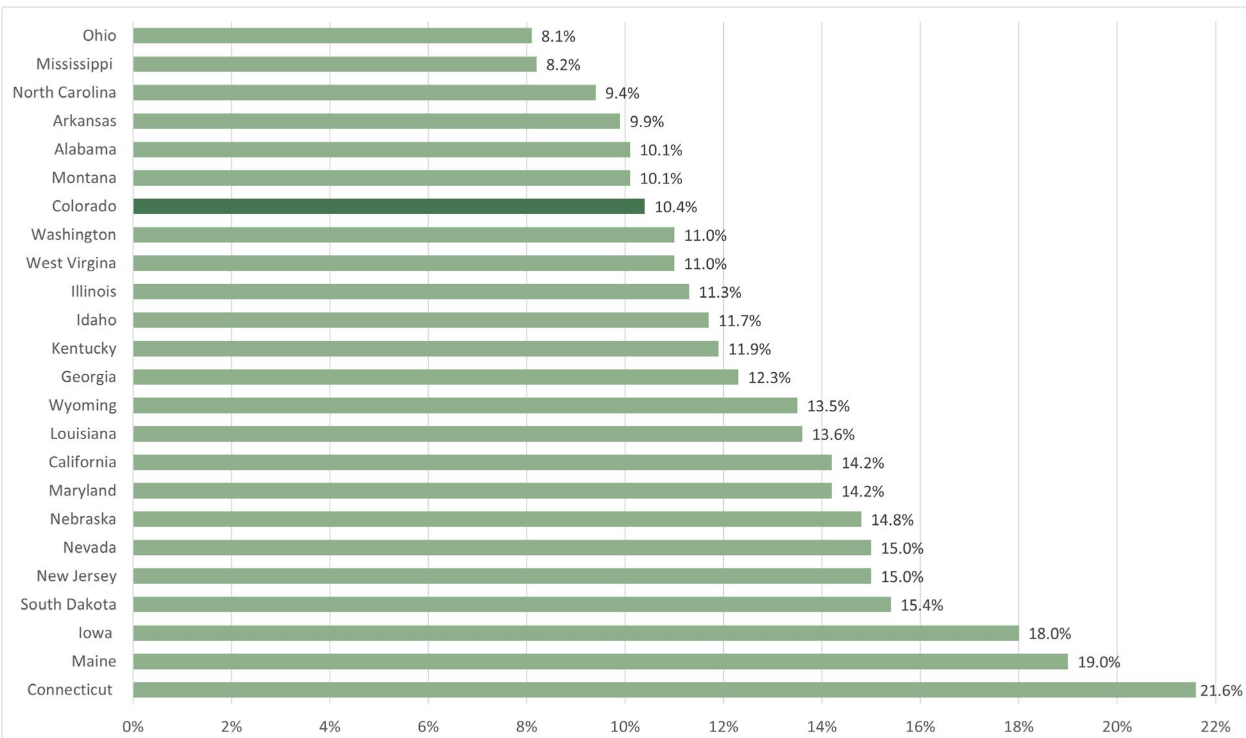
[6] The Special Education Fiscal Advisory Committee et al., 2024

funding. With the number of students with disabilities steadily increasing, this gap in funding further exacerbates challenges, leaving districts scrambling to meet growing needs with limited or decreasing resources.

This underfunding not only places significant financial pressure on districts, but also threatens the ability of schools to provide the legally mandated support services and accommodations required by students with disabilities under IDEA.

Based on a recent state-to-state comparison, as seen in Table A7.3, Colorado spends a lower-than-average portion of its education spending on special education, despite having a slightly below average percentage of students identified as special education.[7]

Table A7.3
The proportion of State Education Expenditures on Special Education[8]



Low funding for special education can also lead to lower than typical identification of students with special needs. Determining who has a disability is part science, but also partially subjective, especially for students with mild disabilities. Low special education funding, with districts having to "rob Peter to

[7] National Center for Education Statistics. (2024). Students With Disabilities. *Condition of Education*. U.S. Department of Education, Institute of Education Sciences., https://nces.ed.gov/programs/coe/indicator/cgg.
[8] Roza, M., Cicco, M., Dhammani, A., & Anderson, L. (2024, August 1). *A fresh look at SP Ed Spendning*. Edunomics Lab, Georgetown University.

pay Paul" – i.e., utilize general education funds for special education, can create incentives to have more restrictive identification practices.

Colorado identifies fewer students for special education than the average state. According to the National Center for Education Statistics (2021-22), the national average identification rate was 15.0%, whereas the Colorado identification rate was 12.0%. This represents approximately 27,000 students that might have been identified if Colorado had the national average identification rate.

Special education funding has low transparency and limited predictability.

According to respondents, special education funding in Colorado lacks transparency because of its unpredictability and inconsistency across districts and AUs. Several factors at each of the tiers contribute to this perspective:

Tier A funding is easily known, but it lags by a year.

The current funding system is reactive rather than proactive as funding lags behind the actual needs of students since it is based on prior-year data. Rapid changes in student enrollment or the severity of disabilities cannot be well accounted for. Districts struggle to forecast their budgets accurately, forcing them into an unpredictable financial landscape where they must constantly adjust or cover costs with insufficient resources.

Tier B funding is not easily predicted since the cap is not a good indicator of actual funding.

While state statute allows up to $6,00 per student for eligible Tier B students, Tier B funding was $4,348 per student in 2021-22.[9] AUs cannot use the Tier B cap as an accurate indicator of how much funding they will actually receive.

Tier C funding is not easily predicted as the reimbursement process is unclear and inconsistent for many AUs.

While schools have a solid general understanding of how Tier A and B funding works, high-cost reimbursement for Tier C funding remains unclear to many outside of fiscal advisory committees, making it challenging for districts to understand how funds are allocated, and even harder to know how much reimbursement will be received. Over half of the applications for high-cost reimbursement do not receive any funding,[10] and schools shared that they often do not receive a response as to why the application did not receive funding.

While some wealthier districts might be better able to offset funding shortfalls with local revenues, low-income districts struggle to provide basic services for students with disabilities. This creates disparities in services and outcomes for students with disabilities across the state.

[9] The Special Education Fiscal Advisory Committee et al., 2024
[10] The Special Education Fiscal Advisory Committee et al., 2024

In Colorado, districts shoulder most of the financial risk for the unpredictable nature of special education costs.

An essential and unique aspect of special education spending, unlike general education spending, is that it cannot be as easily predicted, forecasted, or budgeted. For example, an AU can budget for 100 elementary teachers and hire only 100 elementary teachers. If a few more students enroll, it is not required to add more classroom teachers. It can choose to stick to its budget.

Federal regulations for special education services do not allow districts to spend only what they budgeted. If an IEP team assigns an additional paraprofessional, the district must hire the aide. If more speech services are required than budgeted staff can provide, contracted services or additional staff must be hired. If an IEP team determines a student is best served out-of-district, then the district must pay the added cost, even if it is not in the budget.

Colorado's funding approach for students with disabilities has shifted much of the financial risk away from the state and onto school districts. The risks come in a few forms:

- If the number of students with disabilities increases, the state reduces Tier B payouts and the districts must cover the shortfall;
- If costs increase midyear, the district covers all the shortfall for the year; and
- If costs for severe needs students increase (and the number of students with severe needs has been increasing nationwide over the last decade[11]), districts take on this risk as well. For districts that receive little to no Tier C, they shoulder all the added costs, and even AUs that receive Tier C must wait a year for reimbursement.

While other states often take on a larger share of the costs for high-cost students, Colorado limits state funding by allocating a predetermined amount, forcing districts to absorb any additional expenses from costs or enrollment growth. This places a significant and growing burden on districts as the number of high-cost students grows.

The funding formula and state special education guidance are "practice neutral" and do not encourage adopting best practices for raising achievement.

The Colorado education funding formula is practice neutral, as it does not incentivize the adoption of teaching and learning best practices for students with disabilities.

This neutrality means that the formula provides equal base funding regardless of how effectively a district implements evidence-based instructional practices or supports for students with disabilities. As a result, schools are not incentivized to adopt innovative or proven approaches that can enhance students' learning outcomes.

[11] Riser-Kositsky, M. (2024, July 22). Special Education: Definition, Statistics, and Trends. *Education Week*. https://www.edweek.org/teaching-learning/special-education-definition-statistics-and-trends/2019/12

Additionally, the formula creates a significant divide between general education and special education supports, reinforcing a separation rather than promoting integrated or inclusive approaches that align with best practices for students with disabilities.

Lack of sufficient special education funding has resulted in pressure on general education services.

Respondents shared that when special education funding is insufficient, schools and districts are forced to dip into their general funds to cover the gap, which creates a ripple effect across the entire school budget. As general funds are typically allocated for broader school operations and general education programs, diverting money to cover special education needs can lead to significant cuts in general education programming. This often results in fewer resources for general classroom instruction, extracurricular activities, and support services, ultimately diminishing the quality of education for all students.

Fulfilling the legal mandate to provide adequate special education and maintain robust general education programming creates tension and a challenging balancing act for schools in an already tight funding environment.

"*When you can't provide a service during the school year, you're spending money in the summer. You're not getting out of providing the service – it's just costing you more to do it in the summer because you end up having to hire agencies or contractors to do it." - Superintendent*

The lack of sufficient special education funding and the required increased spending from the general fund has reportedly resulted in fewer professional development opportunities for special education or general education staff, districts unable to fill retirements or vacancies, and overworked special education staff.

With shortages in specialized service providers, districts have increasingly hired external contractors, (e.g., psychologists or speech therapists). They cannot afford to hire full-time positions for these roles and instead hire them at hourly rates, which can be cost-inefficient in the long run.

Charter school reimbursement is a complicated process that lacks transparency and has created a great deal of friction. "It's like the wild, wild west."

High-cost reimbursement for charter schools is a complex and often contentious process that requires charter schools to seek financial support from their authorizing district rather than directly applying for state funds. This process can come with delays, bureaucracy, and a lack of transparency over how and when funds are distributed and managed, making it difficult for charters to plan and budget effectively.

Charters lack control over funding unless their district has a fee-for-service model, which is more transparent as it allows schools to choose from menus and opt-in to specific services (e.g., personnel, transportation, equipment). However, there is ambiguity in how a charter is assigned a fee-for-service model or an insurance model and how the decision is made at the district level.

Under the insurance model, the authorizing district acts as an insurance provider, pooling funds from state and federal sources to cover high or excess costs. Charters pay into this system, and when the cost of special education services for an individual student exceeds a certain threshold, they can apply for reimbursement from the district. Some charter leaders shared that authorizing districts do not always provide a breakdown of the costs and services charged to the charter, and charters reported often feeling as though they were being overcharged (e.g., high prices or being charged for services they did not use). According to some respondents, if disputes arise, the only way to see the numbers is to lodge a formal complaint and sue the district.

The insurance model assumes that the district can manage these funds equitably. Still, many charters argue that the lack of transparency and control makes it challenging to ensure they receive a fair share of the available funding. In the long run, this can discourage charter schools from enrolling students with higher-cost disabilities, as the financial risks associated with delayed or insufficient reimbursements can be substantial, and the incentives are few.

Addressing the Unique Challenges of Small and Rural Districts

Many small and rural districts shared that they feel the current formula is particularly inadequate for districts like theirs as it does not account for the additional costs a small district may incur to provide special education supports. While it is true that small and rural districts have unique challenges in supporting special education students that can lead to higher costs, the new formula addresses many of these concerns directly. Shifting to best-practice special education models can also help to alleviate this concern.

Higher than average special education costs for small districts typically stem from three main sources:

1. Windshield Time

Many small and rural districts noted that finding, hiring, and retaining enough high-quality related services staff locally to support their students can be challenging. This includes roles such as speech-language pathologists, counselors, occupational therapists, and physical therapists. Most of these districts instead have turned to hiring sub-contracted part-time staff who often have to travel long distances to get to each school, with some schools responsible for travel costs such as drive time and even overnight accommodations. This approach can lead to higher costs for these districts compared to districts that can hire these roles locally.

While it is a standard solution amongst small and rural districts, hiring sub-contracted related services staff with extensive travel is not the only solution.

Over the past decade, and especially since the COVID-19 pandemic, the availability of tele-support programs for schools has skyrocketed. Leveraging telehealth options for roles such as speech-language pathologists and counselors can reduce or eliminate the need to hire subcontractors with extensive travel time in these roles. Research shows that telehealth for services like speech therapy or mental health counseling is just as effective as in-person support for students and often comes at a fraction of the cost.[12]

However, occupational therapy and physical therapy services can be more difficult to provide virtually, so there may still be a small incremental cost for rural districts due to the travel for these roles.

2. High Needs Student Costs

High needs students are often the most expensive to support, and these costs can be especially difficult to manage in a small district where there are not economies of scale. This means high needs students are often more expensive to serve in small communities than in a larger district.

The recommended formula suggests that 100% of the costs for high needs students are covered for all AUs. This means small districts would not be affected by the higher costs of serving their neediest students since 100% of the costs would be covered by the state.

3. Special Education Staffing Costs

Due to the smaller number of students served, small districts do not always need full-time special education staff in every school and staff are often shared across multiple schools. This can lead to some lost efficiencies due to the drive time needed to share staff between schools. For example, a 1.0 FTE special educator may be split between two schools where they serve as a 0.4 FTE in each school with 0.2 of their FTE lost to travel time.

While these additional costs would not be directly addressed in the new special education formula, they would be addressed in the additional funding these districts are getting from the small community factor in the general funding formula. It is worth noting that no state in the country currently includes a small community factor in the special education portion of the funding formula.

A well-structured state funding formula ensures that every district, regardless of size, has the resources to support all its students with special needs. By focusing on the intensity of need rather than rigid disability categories and offering real-time financial flexibility, Colorado can create a more equitable system that works for both schools and students.

Chapter 2. Comparison of Alternative State Funding Models

Due to the absence of federal requirements on how to cover special education costs, 50 states have developed 50 different and constantly evolving ways to determine how much funding should be provided for special education programming and how costs should be shared between the state and local districts.

Recent research into special education funding nationwide highlights how Colorado's approach to special education funding disproportionately shifts the financial burden of high-cost students onto local

[12] Guglani, I., Sanskriti, S., Joshi, S. H., & Anjankar, A. (2023). Speech-Language Therapy Through Telepractice during COVID-19 and its Way Forward: A scoping review. *Cureus*. https://doi.org/10.7759/cureus.44808

school districts and shifts the risk for increased costs to districts, which is not the case in many other states.[13]

Colorado's approach does not adjust for growing enrollment or the rising costs associated with students who require more intensive support. This results in districts having to cover excess costs, creating significant fiscal strain, especially for districts with limited resources. However, some other states assume a greater share of the costs for high need students through direct funding or reimbursement models, which mitigates the financial risk for districts and ensures more equitable support across schools.

Regardless of the specific funding model, states attempt to optimize three critical variables related to providing and funding special education services:

- **Total Cost -** How can a state manage the total cost of its special education programming while ensuring adequate resources are provided to local districts?
- **Identification Rates for Students with Disabilities** - How can a state discourage the over-identification of students with disabilities but not discourage identifying 100% of students who need and deserve an IEP?
- **Allowable Expenditures** - How can a state ensure that special education resources are put towards high-quality, effective programming?

Funding Models

Although each state's approach to special education funding is unique, funding models fit into four general categories based on how funding levels are determined and the mechanisms by which funds are disbursed to specific districts. This framework for special education funding models draws on the work of the 2019 National Education Policy Center report. As the report notes, no single model is the best; the unique needs and strategies of states drive the structure of their funding models and each model has different benefits and drawbacks. However, lessons can be drawn from the various models to understand why strategies were employed and whether they were effective in producing desired outcomes elsewhere.

A summary of each of the four funding models is listed below.

1. Formula-Based

Formula-based funding is the most common model for special education funding, where allocations are determined by multiplying the proportion of students with disabilities by an estimated additional cost

[13] Kolbe, Tammy. (2019). *Funding Special Education: Charting a Path that Confronts Complexity and Crafts Coherence*. National Education Policy Center, University of Colorado Boulder. Available at: https://nepc.colorado.edu/publication/special-ed

per student. States refine these calculations using factors like disability type or educational settings, and generally employ one of three mechanisms: single-weight, multiple-weight, or resource-based formulas.

Single-Weight Formulas

States assign a specific weight or flat grant amount based on the estimated additional cost of educating students with disabilities.

In Oregon's single-weight formula, for instance, districts receive double the base funding per student with disabilities. Still, funding is capped at 11% of total enrollment to prevent overidentification of students with disabilities.

Base Funding Allocation	$4,500
Total Students with Disabilities	x 1,000
Total Special Education Allocation	$4,500,000

Multiple-Weight Formulas

States assign a set of specific weights or dollar amounts according to the type of disability a student may have or based on their required educational setting to create a more tailored funding allocation per district. For instance, New Mexico uses four disability categories, which link to funding weights that increase for more resource-intensive disabilities. Arizona employs a more complex system, with over 12 different weights related to disability type.

In New Mexico, students with disabilities are classified into four categories based on the severity of the disability. Those categories are then assigned a resource weight consistent with estimated costs associated with providing services. The more severe the need is, the more resources are provided. The allocation for a district is calculated by taking the total number of students within each category and multiplying by the corresponding weights, then taking the sum of the subtotals for each category.

Resource-Based Formulas

States determine the needed resources (e.g., staffing, materials) for a district using established staffing and resource ratios. States then allocate resources to districts based on their identified population of students with disabilities.

Tennessee funds special education through its Basic Education Program (BEP) formula, which consists of 45 components deemed necessary for a school district to provide a basic level of education, including special education. The total number of students with disabilities in a district determines its total resource allocation based on pre-established resource requirements.

Tennessee calculates a dollar amount based on the total number of students with disabilities in a district and the various resource ratios, using an average salary for personnel positions. Regardless of the calculated allocation, Tennessee will provide a base funding threshold to districts for special education.

The advantages and drawbacks of formula-based funding models ultimately depend on the context of the state for which they were devised. Broadly, a commendation for this model is that it attempts to calculate the necessary resources for providing special education services by incorporating an estimation of the per student excess cost of special education services. However, there is a dearth of research related to what constitutes an appropriate amount of funding for special education and even less research on how much is spent on special education from all federal, state, and local governments. The broad variation between states in multipliers, weights, and per student flat grants indicates this lack of consistency.

In theory, formula-based models allow districts to receive resources commensurate with the needs of the students they serve.

Additional student weights attempt to add more precision. In some cases, additional weights and metrics can lead to funding models becoming byzantine, overcomplicating how districts receive and ultimately utilize resources.

2. Stipulated Appropriation

Under this funding model, states stipulate a specific funding appropriation for special education programming based on various factors, such as historical spending, projected need, or available funds. States then disburse funds to districts and schools through several types of mechanisms that follow a similar pattern to formula-based models. The primary mechanisms include flat grants, needs-based calculations, and census block grants. Like formula-based models, stipulated appropriation models take a more top-down approach to determining the total funding obligation for the state.

Census Block Grants

Montana funds special education using a census-based system, which assumes that a standard proportion of a district's student population will require special education services. The total funding obligation for special education is distributed through the following ratios, as seen in Table A7.4.

Table A7.4
Montana Funding Obligations through Ratios

Category	Ratio
Instructional Block Grant	52.5%
Related Services Block Grant	17.5%
Reimbursement of Local Districts	25.0%
Special Education Cooperatives and Joint Boards for Administration and Travel	5.0%

One of the advantages of a stipulated appropriation model is that a state can manage the total cost of its special education services. While state governments likely engage their constituents and use formulae to determine the most appropriate funding amount, they are ultimately capping their total funding obligation. Once the funding obligation is set, states utilize mechanisms similar to formula-based models to ensure that resources are provided to districts in an equitable fashion based roughly on the level of student needs.

It should be noted that limiting the state's funding obligation can risk under-supporting special education programming. Many states, including Montana and Wyoming, will regularly conduct independent studies of the cost of providing an "adequate" education, including special education, to ensure appropriate funding levels. States will also augment their funding models with opportunities for reimbursement if a district or school encounters a student with extraordinarily high needs.

Again, it is important to note that while a *state* can limit what is provided for special education spending, a *district* cannot legally limit its special education spending. IEP teams are precluded from making cost or availability of funds a factor in determining what services to provide. When special education spending exceeds state and federal funding, local or general-purpose, state dollars will be used.

In practical reality, three things tend to happen when available special education dollars do not meet the full cost of providing special education services:

1) General education services are reduced;
2) IEP teams unconsciously set services roughly in line with available funding; and
3) More cost-effective practices become the norm.

3. Cost Reimbursement

Under a reimbursement model used in Wyoming, states will reimburse some percentage of the total special education costs by pre-established allowable expenditures. Often, states will set a limit on the total statewide funding obligation based on historical spending or some other calculation. Reimbursement rates vary nationwide, from 26.79% of local spending in Wisconsin to up to 100% of local spending in Wyoming. In many cases, states will provide a contingency reimbursement fund if a student with extraordinarily high needs moves into a district.

Partial-Reimbursement

Nebraska uses a typical partial-reimbursement model for funding special education in which the state Department of Education reimburses 57.5% of allowable costs associated with special education programming. For example, if a district's special education costs totaled $2 million, the state would reimburse that district $1.15 million in the subsequent school year.

The state does not establish an aggregate statewide funding cap or institute a cap on funding tied to the identification rate of students with disabilities.

Reimbursement models are fairly straightforward in how they disburse resources to districts in support of special education programming. The rate at which a state will reimburse districts varies considerably between states, ultimately impacting the amount the local district would be responsible for covering. One fundamental assumption of reimbursement models is that special education costs will remain relatively consistent from year to year. This assumption is largely fair; however, it disadvantages small districts in which small changes in special education enrollment can enormously impact the special education budget.

4. Contingency or High-Cost Reimbursement

The other model for special education funding is a contingency or high-cost reimbursement model in which states will cover up to 100% of the educational costs for students with extraordinarily high or "excessive" costs, typically designated as a certain percentage above the average per-student cost. Most states use this model in conjunction with one of the other three models to protect individual schools and districts from overly burdensome costs in a given school year. Generally speaking, one to three percent of all students (10-15% of students with disabilities) have high needs. Not all of these high needs students might have needs that hit the high-cost threshold. While outliers, a small number of high needs students can cost over $100,000 a year to serve. In more extreme but not unheard-of cases, a single family can move into a district and require $250,000 or more of services each year.

<u>High-Cost & Single Student Weight</u>

In Oregon, the state will provide additional funding through a partial reimbursement model for students with disabilities whose approved special education costs exceed $30,000. This mechanism ensures that districts are not unfairly encumbered as students with less common, extreme needs emerge within a district.

High-Cost & Census-Based

Massachusetts will reimburse highly cost-intensive students up to 75% of special education costs in excess of four times the state per student foundation budget. Massachusetts created additional conditions that must be satisfied for a district to access resources, noting that additional funds are part of an “extraordinary relief” program that supports districts whose special education expenses see at least a 25% annual increase. Similarly, Vermont will reimburse districts for students with costs exceeding $60,000 per fiscal year.

<u>High-Cost</u>

Connecticut only reimburses its high-cost students with disabilities, leaving the remainder of special education funding to come from other sources. The state provides funding if a student's costs exceed 4.5 times the average per student expenditure, provided that available appropriations allow for the disbursement of funds.

How a state integrates a high-cost or contingency funding model is primarily based on the context of its other funding mechanisms. In general, contingency funding models are appropriate to address the uneven distribution of high need students across districts. In some situations, extraordinarily high costs can place districts in financial risk if they are not prepared to support such students. Contingency funding models are a relatively fair method in dispersing the inordinate costs of high need students across a state. Funding is not unlimited, however, and many states will impose restrictions on how much they will reimburse, either by setting specific caps or creating an application process so that the state Department of Education can methodically distribute resources to districts in need.

Chapter 3. Recommendations for Colorado's Special Education Funding Formula

Foundations for an Adequate Funding Formula

When structuring the state funding formula for special education, there are several foundational principles to consider to ensure equity, adequacy, and transparency in the end result. A strong special education funding formula does several things:

1. **Acknowledges that special education and general education dollars do not work in silos**. A well-designed funding formula recognizes that all students, including students with disabilities, receive the base funding amount per student and that students with disabilities can and should benefit from general education dollars. Many of the best teaching and learning practices for supporting students without disabilities are also best practices for supporting students with mild-to-moderate disabilities. Students with disabilities, for example, should receive reading support from a general education reading specialist who is not funded by special education dollars.

2. **Covers the total incremental cost of providing special education services statewide.** The amount provided should fully cover the incremental costs of providing special education services to all students who need it statewide, while ensuring cost effective best practices are encouraged. The financial risk for special education services should not be placed on schools and districts.

3. **Provides transparency, consistency, and the ability to forecast.** Schools must be able to predict their funding to plan their budgets effectively, especially as the costs of supporting special needs students can change yearly and throughout the year.

4. **Allows for real-time adjustments.** It is unrealistic to think that every special education need can be predicted at the start of the school year based on last year's information. Incorporating a mechanism for real-time adjustments to cover unexpected costs during the year (e.g., for new students transferring in, unexpected upticks in enrollment, etc.) is essential to prevent shortfalls, particularly in smaller districts where a few high-cost cases could overwhelm the budget.

5. **Reflects the critical importance of high-cost reimbursement for schools.** An efficient and effective high-cost reimbursement process is critical. When districts cannot predict their reimbursements or are not always granted full reimbursement, many are hesitant to apply or forced to shoulder the financial load themselves. Reimbursements are critically important for smaller schools whose budgets can be disproportionately affected by a single costly case.

A Need-Based Weighted Approach

The most efficient and effective approach for structuring a special education formula is to assign weights based on the intensity of need. Simply put, some students have small needs for incremental services, others have greater needs, and a few have very significant needs. The number of each type of student in an AU can vary; thus, funding allocations should vary based on these differing needs.

Unfortunately, the federal disability category is not an excellent proxy for level of need. Many formulas that assign weights by disability category ignore the fact that these categories can overlap, are often ambiguous, and a single category can include students with mild, moderate, or severe needs.

In one school, a student might be identified as having Other Health Impairments (OHI), but across town in a different school, that same student would have been identified with Specific Learning Disability (SLD).

Even within a single disability category, the needs of the students can vary widely. For example, the cost of supporting a student on the Autism spectrum can range from $2,000 to $100,000 annually, depending on the intensity of their needs. Assigning one fixed weight to a category like Autism Spectrum Disorder does not reflect this range. Funding should be driven by the actual services required based on the intensity of student needs, not by predefined disability categories.

Measuring Intensity of Need

There are three possible options for measuring the intensity of need for a special education funding formula.

1. **Tracking Actual Service Costs**: Districts can track the services provided for each student with an IEP to determine the total cost (or approximate cost) of special education services. This involves factoring in hours of service, group size, and cost per hour based on staff salaries and other expenses.

2. **Service Hours**: Student need can be measured based on the person-hours of special education services they receive on a weekly basis based on their IEP, and then creating buckets or tiers of service hours each with their own weight.

3. **Educational Environment**: Schools can look at students' educational environment and level of integration into the general education setting as a useful proxy for measuring the intensity of need. Students would be grouped using the existing educational environment categories (i.e., separate school, in regular education >80% of the time, 79% - 40%, and <40%), and each group would be assigned a relevant weight.

For any of these options for measuring intensity of need, it can be advantageous and cost neutral statewide to have separate weights for students with mild disabilities versus those with moderate disabilities.

The EB model calculates funding for students with mild or moderate special needs based on the incremental costs to provide best practice special education services, robust general education supports in core instruction, and and effective Tier 2 intervention. The model also assumes that 10% of all students statewide have a mild or moderate disability. The special education study team's analysis validates this methodology and calculations. The 10% identification rate also aligns with current trends and practices in the state based on current special education enrollment as reported by the state.[14]

The category "mild and moderate" covers a wide range of students, and some districts, especially small districts, may have an above-average number of students with moderate special needs, while others may have fewer than average. This can create financial hardships for those with more students with greater special needs.

While the combined incremental cost is $6,780 per student with a mild or moderate disability, we recommend two weights for this category of student:

- Mild disability incremental cost of $4,996; and
- Moderate disability incremental cost of $12,490.

7.5% of all students would be expected to have a mild disability, and 2.5% of all students would be expected to have a moderate disability. Both models calculate a total incremental cost to serve students with mild-to-moderate disabilities of approximately $600 million.

Formula Weights

The funding model should provide additional funds based on the number of students with either a mild disability or a moderate disability in the amounts of $4,996 and $12,490 respectively, up to statewide caps of 7.5% and 2.5% of total ADM.

Covering the Costs of Students with Severe Needs

As the EB model recommends, a strong system should fully reimburse the cost of serving students with severe special needs, including transportation. These students represent large per-student costs, and their numbers vary from district to district. Even a handful of new students can create significant

[14] The Special Education Fiscal Advisory Committee et al., 2024

financial hardship for small districts. It is more reasonable for the state to take this risk as it is better positioned to manage the costs.

The EB model assumes two percent of all students meet the definition of students with severe needs, and this aligns with national trends and the special education study's research as well.[15] The EB model caps such reimbursement at two percent of ADM and assumes that incremental spending on students with severe needs is roughly equal to spending for students with mild-to-moderate special needs. Our analysis confirms these assumptions. There is no available data, to our knowledge, that breaks out Colorado spending for students with severe needs separate from other students with special needs.

Currently, just over two percent of all students are served in out-of-district schools in the state. In the best practice model, this figure would be closer to 1.6% out-of-district and 0.4% in district-run substantially separate programs. In rural and small districts, the two percent figure is reasonable, but in larger districts, somewhat less than two percent has been achieved in other states.

The study team anticipates that the total cost of serving students with severe special needs would be $676,000,000, slightly more than that for students with mild-to-moderate special needs.

It is worth noting that current funding provides minimal support for students with severe needs with nearly all the risk on the districts. Tier C reimbursement, which addresses these high-cost students, is currently only $4 million, or just six percent of the total estimated cost.

If the state takes on the role of funding high needs students, it should and could also take on a larger role in negotiating statewide rates for out-of-district programs and supporting the expansion of shared and in-district programs, which are less costly, more inclusive options for students.

Comparison of Models

The following table outlines the forecasted costs based on each model as well as the current funding and current statewide spending. Both the EB and study team's models use the assumptions and methodology, and any differences are due to rounding. Both models assume about 880,000 students statewide.

[15] [15] National Center for Education Statistics. (2024). Students With Disabilities. *Condition of Education*. U.S. Department of Education, Institute of Education Sciences.

Table A7.5

Comparison of Funding Formulas, Current Funding, and Statewide Spending (approximate)

<table>
<tr><th>SPED Category</th><th># of Students (%)</th><th>EB Model Forecasted Costs</th><th>SPED Study Forecasted Costs</th><th>Current State Funding</th><th>Current Statewide Spending</th></tr>
<tr><td>Mild</td><td>66,000 (7.5%)</td><td rowspan="2">$596,640,000</td><td>$329,736,000</td><td rowspan="2">$213,080,000</td><td rowspan="3">$1,231,350,000</td></tr>
<tr><td>Moderate</td><td>22,000 (2.5%)</td><td>$274,780,000</td></tr>
<tr><td>Large</td><td>17,600 (2.0%)</td><td>N/A</td><td>$676,000,000</td><td>$4,000,000</td></tr>
<tr><td>Total</td><td>105,600 (12%)</td><td>$596,640,000</td><td>$1,280,516,000</td><td>$430,000,000</td><td>$1,231,350,000</td></tr>
</table>

*Includes additional state funding for Child Find ($2,886,287), Educational Orphans ($163,486), and Preschool SPED from Finance Act ($32,776,269), as well as federal funding ($179,199,757)

Current funding for special education, including federal funding, is about $430 million. This includes funding to cover students with severe needs. This leaves a substantial shortfall in funding compared to both models' projections and the current level of spending by districts statewide.

Both models also reflect the importance of supporting and funding best practices that will improve outcomes for students with disabilities. Research shows that how resources are spent is equally as important as the total amount spent.[16] Decades of research have highlighted specific best practices that are highly effective for raising achievement for students with mild and moderate disabilities, including:

- A Focus on High-Quality Core Instruction;
- Additional Time for Learning ; and
- The Importance of Content-Strong Teachers.

The EB model and the special education study team's recommendations have been intentionally designed to support these best practices. The EB model allocates funds for instructional coaching, a proven method for enhancing the quality of core instruction. Additionally, it funds teachers' dedicated planning time, allowing for more cohesive and refined instruction, benefiting both general and special education students.

EB and the special education study team's models also allocate significant funding for general education interventions, including reading teachers, which supports high-quality core instruction for all students. The models also incorporate funding sufficient intervention staff to provide extra-time intervention for all students who need it, including students with disabilities, to ensure they have extra time to learn yet-to-be-mastered skills and content. Importantly, the models prioritize certified teachers over paraprofessionals for intervention support, which ensures that students who are struggling academically receive support from educators with strong content expertise.

[16] Hawkins, B. (2024, August 6). Researchers: Higher special education funding not tied to better outcomes. *The 74*. https://www.the74million.org/article/researchers-higher-special-education-funding-not-tied-to-better-outcomes/

Both models reflect the importance of implementing special education best practices to help all students thrive and were designed to be able to fully fund these practices.

Implications for a New Funding Model Structure

Funding for students with disabilities is currently protected by Amendment 23 to the Colorado Constitution as it is included as one of the categorical programs for which total funding must increase each year by at least the inflation rate. Many in the state worry that any change to the special education funding formula may jeopardize this constitutional protection and risk special education funding decreasing in future years due to budget constraints.

While the current formula does have the protection of Amendment 23 to guarantee that special education funding levels cannot decrease year over year, it has not historically led to high levels of special education funding. As noted in this report, AUs still cover roughly 65% of special education costs out of their own budgets.

Additionally, federal Maintenance of Effort (MOE) rules under IDEA require that states must maintain the same level of state funding for special education services each year as they did the previous year. In other words, states cannot reduce the amount they spend on special education which ensures that funding for services to students with disabilities is consistent and not decreased over time.

Disability categories, as used in Colorado's current special education formula, are not the most effective or fair way to fund special education. Importantly, federal MOE rules make any meaningful reduction in state funding unlikely, even with the transition to a new formula that may not be fully protected under Amendment 23.

Section A

Tier C: 2021-2022 High-Cost Reimbursement Summary

In-district applications and funding:

- 18 of 64 AUs submitted high-cost applications for in-district services
- 161 individual in-district applications were submitted across these 18 AUs
- 4 AUs received funding for all or some of the applications submitted
- 81 of 161 applications (50%) were funded with the $2 million appropriated for in-district applications

Out-of-district applications and funding

- 11 of 64 AUs submitted high-cost applications for out-of-district services
- 67 individual out-of-district applications were submitted across these 11 AUs
- 10 AUs received funding for all or some of the applications submitted
- 32 of 67 applications (48%) were funded with the $2 million appropriated for out-of-district applications

Total

The total non-funded amount across all AUs was $4,582,114 (The Special Education Fiscal Advisory Committee et al., 2024).

Section B: Special Education Panelists

Participant Name	School District/Affiliation
Jocelyn Aldridge	Centennial BOCES
Jon Paul Burden	Mesa County Valley School District 51
Kaci Coats	Collaborative for Exceptional Education
Heidi Derr	Adams County 14 School District
Tamara Durbin	Northeast BOCES
Ken Haptonstall	Colorado River BOCES
Lazlo Hunt	Thompson School District
Courtney Lincoln	Northwest BOCES
Chris Locke	Kim RE-88 School District
Alex Medler	Center for Learner Equity
Maria Messer	Jefferson County School District R-1
Lauren Rhim	The Center for Leaner Equity
Julie Rottier-Lukens	Denver Public Schools
Jennifer Sedaghat	Weld RE-4 School District
Deirdre Shearer	Colorado Springs School District 11
Kermit Snyder	Rocky Ford School District R-2
Susan Udenberg	Mountain BOCES

Appendix Eight: Cost of Living Adjustment

Introduction

States utilize cost adjustments in school finance formulas to account for differences in districts' costs. The adjustments primarily focus on the differences in personnel cost and help to equalize purchasing power across different districts to support the ability to hire necessary staff. There are three basic cost adjustment approaches that are used as part of school funding formulas: Hedonic wage indices, cost of living indices, and comparable wage indices.

When identifying an adjustment to include in a formula, states need to decide on what cost differences need to be addressed, the availability of data to identify these differences, the level of difficulty to update any adjustment, and the way to apply the factors derived from a specific approach. As outlined in Table A8.1, thirteen states currently utilize a cost adjustment as part of the states' school finance formula.

In this study, the study team first examines the approaches that have been developed and which states currently use these adjustments. Then Colorado's current approach is examined, including identifying the philosophy of the state's adjustment. The comparable wage for the teacher index is discussed and modeled for Colorado, including a comparison of the results with Colorado's current approach. Next, the study team examines alternative approaches to acknowledging differences in the costs of goods that districts may face. Finally, the study team recommends an alternative cost adjustment approach for Colorado.

Approaches and Use in States

The three approaches have different philosophical basis, utilize different data, and require different levels of effort to update in a timely manner.

Table A8.1
Regionalization Approaches by State

Index	States that Utilize
Cost-of-living	Colorado Wyoming
Hedonic Wage	Alaska Maine Texas Wyoming
Comparable Wage	Illinois Florida Maryland Massachusetts Missouri New Jersey New York Virginia Maryland

Hedonic Wage Index

Hedonic wage indices are calculated by breaking down variations in current wages due to several different identifiable variables. As a result, hedonic wage indices can capture variation due to geographic location characteristics and student characteristics.[1] A regression analysis divides the observed variation in teacher salaries into two groups. The first are factors that can be attributed to the school district's control (i.e., teacher demographics, teacher assignments), and the second are factors that are not attributed to the school district's control (i.e., cost of living). Following Chambers (1998), a hedonic wage index for teachers is created by estimating the following equation:

$$LnTeacherSalary_i = \beta_T T_i + \beta_D D_S + \beta_C C_S + \beta_G G_i + \varepsilon_i$$

In this equation,

- The dependent variable is the natural log of a teacher's annual salary;
- Ti is a vector of characteristics of teachers (the most commonly included are gender, race, education, certifications, experience, and any other available measures of teacher quality, such as measures of effectiveness or test scores);
- DS is a vector of discretionary cost/working condition variables in district S (such as class size);
- CS is a vector of uncontrollable cost/working condition variables in district S (the most commonly included are the percentages of high-need or at-risk students);
- GS is a vector of characteristics for the region that teacher lives and works in (such as housing prices and area amenities like weather, crime or population density); and
- εi is an idiosyncratic error term.

The resulting coefficients are then used to predict a wage for an average teacher (with state average values of the variables in Ti) in each district, holding the discretionary cost variables constant.[2]

There are benefits to this approach as the model will be able to estimate the impacts of specific variables that may be of interest to the state, such as the impact of student characteristics on teacher wages for a given district. However, the ability to estimate the impacts of these district-specific variables also raises concerns about validity. As the model uses directly observed teacher salaries, which are subject to district control, any variation in teacher salaries due to variables that are not specifically included in the model will either (1) be relegated to the error term (and thus left out of the resulting index values), or (2) create bias (potentially of unknown direction and size) in the coefficients of included variables.[3]

Additionally, while the equation above reflects the variables most often used, ultimately, the variables included are up to the discretion of the analyst creating the index, and in an effort to provide a more precise index, the model will likely become larger and more complex. This creates challenges for maintaining and updating the model over time, given the statistical complexity as well as the data requirements. It's likely that the data required must be gathered from multiple sources and, sometimes, can only be gathered through individual data requests. There

[1] APA, Nevada School Finance Study
[2] Ibid
[3] Ibid

is also a chance that data will either stop being collected or that specific variables will change or be defined differently by the collecting agency.[4]

While Maryland utilized a hedonic wage approach for many years, it recently moved to a comparable wage index (CWI) in part due to the high level of effort required to update the hedonic model. To estimate the original indices, the research team compiled data from Maryland State Department of Education (MSDE) district demographic files; MSDE staff data files; MSDE certification data files and certification testing files; the Bureau of Labor Statistics; Maryland Department of Labor; National Oceanic and Atmospheric Administration; Maryland State Police; Public School Construction Program; decennial Census of Population and Housing; State Department of Assessment and Taxation; and individual districts. Estimating the full index required collecting updated data from all these different sources, some of which were difficult to access or required submission of individual requests for data. The 2016 report, in which new recommendations were made for a CWI approach, noted that it is "much easier to update and keep current". [5]

Additionally, in Texas, the current Cost of Education Index (CEI) attempts to adjust for varying economic conditions across the state, based mainly on the size of the district, the teacher salaries of neighboring districts, and the percentage of low-income students in the district in 1989–90. The index has not been updated since then.[6]

Cost of Living (COL) Adjustment

Currently utilized only in Colorado and Wyoming, a cost of living (COL) adjustment is created by computing the price of goods associated with a given location. The primary good included is housing costs, but other goods, such as transportation, services, and taxes, are often included as well. While this approach has the benefit of being straightforward to calculate and update over time, it also presents several drawbacks. Most notably, this approach needs to consider the amenities in the area that may impact wages needed to attract and retain workers. [7] As a result, a COL adjustment based primarily on housing and other consumer costs will tend to overestimate the wage differential needed to attract and retain school employees in locations with high COL and underestimate it in locations with low COL.[8]

Comparable Wage Index (CWI)

The most common approach states currently utilize is a Comparable Wage Index (CWI). CWIs capture regional salaries of professionals comparable to educators but not educators to understand the differences in costs for school districts to pay teachers in each jurisdiction. By only including workers comparable to teachers and not teachers themselves, the CWI seeks to isolate this observed wage variation from district-made decisions.

While some states may rely on publishing common datasets to utilize directly within their formula, other states have created their own CWIs. Florida, for example, has leveraged academic expertise to create a Florida-specific

[4] Ibid
[5] APA, A Comparable Wage Index for Maryland
[6] https://tea.texas.gov/finance-and-grants/state-funding/additional-finance-resources/other-school-finance-topics/cei-one-pager-2017-10.17.2018.pdf
[7] APA, Nevada School Finance Study
[8] Ibid

CWI, the Florida Price Level Index (FPLI). This comparable wage index (an index of the price of labor) is created using wage data by county (Florida's counties are coterminous with school districts) and detailed occupations.[9]

CWI Strengths

- A CWI measures costs that are beyond the control of school district administrators;
- No risk that a CWI confuses high-spending school districts with high-cost school districts;
- Appropriate regardless of the competitiveness of teacher labor markets. If a lack of competition in the teacher market distorts teacher compensation patterns, then cost indexes based on teacher compensation will be biased, but a CWI will not;
- A CWI reflects differences in amenities and the COL. As such, it is a more complete price index than the COL indices; and
- COL indices like the Wyoming COL Index have been criticized for overestimating labor costs in locations where attractive amenities make it desirable to live and work.

CWI Weaknesses

- The CWI is a labor cost index, and labor cost is only part of the total cost of education;
- The labor cost model underlying any CWI presumes that workers are mobile. If moving costs or other barriers to moving slow worker migration, then "labor cost may temporarily diverge from what would be expected given local amenities and the local COL";
- CWI is constructed assuming that educators and the non-educator population under analysis are comparable with respect to their tastes for amenities and the COL. If comparability breaks down, then a CWI becomes a poor proxy for the cost of educator labor; and
- A CWI is based on local labor markets, not school districts. It is not designed to capture variations in cost across school districts within a single labor market, such as those cost differences that might be attributable to working conditions in specific school districts.

Comparable Wage Index for Teachers (CWIFT)

Most states that use a cost adjustment use CWI adjustment, and many school finance experts believe that the CWI is the best current approach. The National Center for Education Statistics (NCES) has created CWI approaches since 2006 and in 2025 released the Comparable Wage Index for Teachers (CWIFT). The CWIFT is designed to identify geographic variation in wages for college-educated workers outside the education field after controlling for job-related and demographic characteristics. It measures wage and salary differences for college graduates, using an analysis modeled after the baseline analysis used to construct the original CWI.

There are some notable differences between the CWIFT and the original CWI, with the topic covered in detail in the technical paper for the CWIFT.[10] CWIFT uses data from the American Community Survey (ACS), which differs from the baseline CWI data source (the 2000 Census). This switch provides data that the federal government

[9] 2023 Florida Price Level Index, 2023fpli
[10] American Community Survey Comparable Wage Index for Teachers (ACS-CWIFT), American Community Survey Comparable Wage Index for Teachers (ACS-CWIFT)

updates annually and expands the number of local labor markets from 800 to 1,570. The CWIFT provides a readily updated dataset publicly available for use by any state. [11]

NCES representatives characterize CWIFT as the "next generation" of CWI, which is, by definition, substantially similar to the original CWI methodology.[12] Although there is an "experimental" descriptor on the CWIFT website, that terminology is an institutional label that prevents its interpretation as universal and absolute for various federal data applications. However, the label should not be interpreted as completely disqualifying for the CWIFT's consideration in this context. NCES does not consider CWIFT a research and development project any longer, with the publication of the data set nearly every year.

A CWIFT factor is identified for each district in Colorado, but the figure shows the factor in relationship to the national average. The figures can be adjusted to make them more Colorado specific including rebasing based on Colorado's CWIFT average or to have the lowest Colorado CWIFT figure as 1.0, similar to the rebasing work done for the 2025-26 COL factors described above. Section B of this Appendix shows the current COL factor, the 2025-26 COL factor, the raw CWIFT figure, and the statewide average rebased CWIFT factor.. This shows that current factors range from 1.0 to 1.65, while 2025-26 factors will range from 1.0 to 1.23. Raw CWIFT factors range from 0.8 to 1.06 with most Colorado districts below 1.0 CWIFT factors. When rebased to Colorado figures, the range is 0.91 to 1.20.

The study team modeled the impact of the adjustments based on the 2025-2026 proposed formula for the CWIFT figures adjusted to the Colorado context. Utilizing this model, the current 2025-2026 approach will result in roughly $1.45 billion in cost-of-living factor funding. The Colorado average adjustment would result in $653M in funding if factors are applied both above and below 1.0 and $698M in funding if only factors above 1.0 are utilized.

[11] Ibid
[12] Afton Partners, Report on the Comparable Wage Index Component of Illinois' Evidence-Based Funding Formula

Table A8.2: Cost Adjustment Distribution by Size Quintile

Size Groupings	Total Funding Amount by COL Factor HB24-1448	% of total adjustment	Total Funding Amount by CWIFT Rebased to State Avg. (Over 1 applied)	% total adjustment	CWIFT LEA Rebased to State Average Above and Below Applied	% total adjustment
Smallest	$3,850,796	0.3%	$325,841	0.0%	$(1,448,951)	-0.2%
Smaller	$9,165,894	0.6%	$1,194,806	0.2%	$(2,447,549)	-0.4%
Mid-Size	$26,294,403	1.8%	$4,800,511	0.7%	$(1,075,181)	-0.2%
Larger	$100,943,097	6.9%	$22,099,191	3.2%	$7,904,768	1.2%
Largest	$1,312,509,137	90.3%	$670,373,205	95.9%	$650,150,893	99.6%
Total	$1,452,763,327		$698,793,554		$653,083,979	

Table A8.2 shows how the distribution cost adjustment funds by size group between the three alternatives. The HB24-1448 adjustment allocates 90.3% of funding to the largest districts. Using the CWFIT rebased for the Colorado average but only applying factors above one, total funding decreases but it is redistributed more to the largest districts. All other district size groupings lose at least half of their overall share, with smaller districts dropping by a third. This redistribution is even greater when the CWIFT is applied both above and below one, with the smallest three size groupings all having a loss of funding and the largest districts receiving 99.6% of the total adjustment.

Colorado's Current Adjustment

Currently, the state uses a COL adjustment constructed by tabulating the cost of a specified collection of goods and services used by consumers in each community in the "market-basket" approach. Differences among communities in the cost of a basket of consumer goods and services capture differences in the COL.[13] Per CO Code § 22-54-104 (2023), "The COL factor allowed for each district pursuant to this paragraph… **reflects the differences in the costs of housing, goods, and services among regions in which districts are located. Such factor does not reflect any annual increase in the costs of housing, goods, and services caused by inflation**." The 2024-25 school year is the last year the current cost adjustment approach will be used in Colorado, with changes to how the factor is applied being implemented for the 2025-26 school year.

[13] Options for Updating Wyoming's Regional Cost Adjustment, Options for Updating Wyoming's Regional Cost Adjustment

The State undertakes a COL factor study every two years to create an index for each district in Colorado. The process begins by assuming that a family in District A buys the same things as family in District B and determining the difference in cost to buy those things in each district. Below is an overview of the process:

For the 2023 Colorado School District Cost of Living Study, our family (i.e., "benchmark household") is a family of three people with a total household income of $63,822, which is the average salary of a Colorado teacher with a bachelor's degree and ten or more years of experience.

1. We assume that the benchmark household purchases the same goods and services as a typical family of that size and income, according to the national Consumer Expenditure Survey (CES) conducted by the Bureau of Labor Statistics (BLS).
2. We select a variety of specific items to represent spending categories. For example, we select a banana to represent purchases of fruits and vegetables. These items comprise our market basket.
3. Then we collect prices for the items in the market basket from businesses or service providers (such as a utility) in each district.
4. We then account for geographic patterns in which people shop for retail items in the market basket, which may be in their own district or in different districts.
5. Based on where people typically shop, and how much items cost in each place, we determine how much each district's residents typically pay for the total market basket. This allows us to compare how expensive it would be for the benchmark family to live in each district. [14]

A district's COL is generated based on the composite cost of living level of where its staff live. It is not a COL adjustment of the costs districts face but an examination of the cost of living of staff for each district. This is an important distinction, as other cost adjustment approaches try to measure the costs districts face for personnel. Colorado's current approach does not focus on the costs of goods or services faced by districts.

Each district is assigned a COL factor with no district receiving a factor below 1.0. Current adjustments range from 1.0 to 1.65. The adjustment is applied to only part of a district's costs, those estimated to be related to personnel costs. The current adjustment generates about $1.5 billion in funding in the system or 16.1% of total funding.

Beginning in 2025-26, the state's approach to COL will be adjusted slightly. The general approach to identifying district COL factors will remain the same. Changes include rebasing the adjustment to the lowest COL district, the estimate for personnel/non-personnel costs will no longer be used and the COL factor will be applied directly, and the COL factor will be capped at no more than 1.23. If fully implemented, the new approach would generate about $1.4 billion dollars in funding.[15]

Appendix 8 Section A shows how the current 2024-25 adjustment impacts districts in Colorado based on different demographic factors. On average, the COL factors are higher in cities and suburbs and lower in towns and rural areas. Districts with higher percentages of at-risk students have lower factors on average. When looking at the

[14] Corona Insights, 2023 Colorado School District Cost of Living Analysis
[15] HB24-1448

components of the current adjustments, personnel in rural/smaller settings face higher costs of goods, while personnel in urban settings have higher housing costs.

Adjusting for Districts' Cost of Goods and Services

In the study team's input adequacy study work, it was frequently mentioned that many districts face much higher costs of goods and services due to locale or setting. The current COL approach examines the costs of goods and services for personnel, but not for districts themselves. CWI adjustments also do not make these adjustments. While hedonic models can make these adjustments, as noted previously, the data burdens are high.

One approach developed in Nevada, the NCEI, is a composite factor based on two elements. The first, is the CWI for the percentage of district funding spent on wages and the second is a cost of goods measure, based upon Bureau of Economic Analysis (BEA) regional price parities (RPPs) "goods" Index, for the remaining non-wage portion of district funding, i.e. the regional cost differences in school districts associated with purchasing goods. [16]

Public School Finance Task Force

In 2023, a Public School Finance Task Force was convened to examine and make recommendations to the Colorado State Legislature concerning the state's school finance formula. The specific charge was to improve the formula by making it simpler, less regressive, more adequate, understandable, transparent, equitable, and student-centered.[4] The task force focused on six specific areas of the formula, one of which was the COL factor. This work was focused on making findings and recommendations regarding the recalibration of the COL factor, capping the COL factor, or alternative methods to account for the COL, including through categorical funding.[5]

As part of reviewing the COL factor, the task force analyzed the current impacts of the factor on the overall funding formula and distribution of funds to districts across the state. For FY24-25, including the COL factor, $1.5 billion in total program funding, or 16.1% of total program funding, will be allocated to Colorado districts. The task force noted that eliminating the COL factor would directly impact personnel cost factors since the COL is only applied to the portion of the base related to personnel. Additionally, eliminating the COL factor would mean that the size factor would be the only formula component to increase the base amounts provided to districts, ultimately decreasing the minimum funding per pupil. The project team completed a similar analysis of the COL factor, which can be found in Section B of this Appendix.

The Public School Finance Task Force reviewed and discussed possibly utilizing the CWIFT as part of their COL analysis. Ultimately, task force members "expressed support for recommending the legislature fund the identification of a new measure that better accounts for differences in educational costs but expressed uncertainty about the experimental nature of CWIFT and the lack of familiarity with the metric concerning Colorado-specific differences".[17]

[16] APA, Nevada Cost of Education Index (NCEI)
[17] S.B. 23-287 Public School Finance Task Force Report

Recommendation

Considering and evaluating a new approach first requires identifying the costs the approach should adjust for and then determining the best approach to meet those needs. Ideally, the chosen approach would have a low data burden, be transparent, and be predictable. The above sections outline each approach based on the methodology used to create each adjustment, and as such, those takeaways are primarily rooted in economic theory. This is important to keep in mind, particularly as the methodology likely directly impacts implementation, as is the case with the statistical complexity of a hedonic wage index.

However, it's also important to acknowledge that those takeaways are only beneficial so long as the costs the adjustment is accounting for are aligned with the intent of what the state is looking to solve. For example, if a state is looking for a cost adjustment that will take their specific district characteristics into account as they relate to wages, a CWI will not be able to do this, and therefore, any economic theory that may support a CWI over a HWI becomes less relevant as the desired intent of the adjustment is not aligned with the CWI approach. Below, the study team has summarized the pros and cons of each approach as they relate to the findings of this study and, ultimately, the broader Colorado context.

Table A8.3
Pros and Cons of each Approached Related to Colorado

Approach	Pros	Cons
Status Quo Cost of Living	• Maintains consistency in approach and transparency in methodology. • Straightforward to implement and update. • Requires no changes to legislation.	• Economic theory considers this approach inferior to a CWI. • Does not account for the cost of goods and services districts face. This is particularly important in the Colorado context as smaller, more rural districts often face higher costs but generally have lower COL. • Does not account for amenities that impact wages and, ultimately, a district's ability to attract and retain staff. The study team's community engagement highlighted the importance of teachers across all respondent types and locale types. High-quality teachers were consistently ranked as one of the most valued resources in a school and areas where additional funding should be targeted. Additionally, increased compensation was one of the highest-ranked ESSER investments to sustain.
Hedonic Wage Index	• Able to estimate the impacts of specific variables that may be of interest to the state, such as the impact of student characteristics on teacher wages for a given district.	• Statistically complex to develop, maintain, and update. • Data requirements can be onerous and often require requests and coordination across multiple agencies. • Agencies data collection methodologies and calculations may change over time, impacting the ability to update. • Would require updating CO legislation.
CWIFT	• "Next generation" of CWI[18] • Readily available and updated dataset, with consistent and transparent methodology. • Viewed as superior by economic theory in comparison to COL.	• Labor cost index based on local labor markers rather than school districts. • Does not account for the cost of goods and services districts face. This is particularly important in the Colorado context as smaller, more rural districts often face higher costs, but generally have lower COL. • Would require updating CO legislation.

[18] Although there is an "experimental" descriptor on the CWIFT website, that terminology is an institutional label to prevent its interpretation as universal and absolute for various federal data applications.

Approach	Pros	Cons
State Specific CWI	• Measures costs that are beyond the control of school districts. • Can account for more state specificity than a traditional CWI, as with Florida’s FPLI. • Viewed as superior by economic theory in comparison to COL.	• Potential to be statistically complex to develop, maintain, and update depending on factor specification. • Data requirements could be onerous and require requests and coordination across multiple agencies. • Would require updating CO legislation.
Composite Factor	• Utilizes CWI and “goods” index. • Measures costs that are beyond the control of school district administrators. • Can account for both labor costs and cost of goods in a given district. • Viewed as superior by economic theory in comparison to COL.	• “Goods” indices may not be available for all Districts, as with the BEA regional price parities in Nevada. • Would require updating CO legislation.

Based on the findings across all components of this study, the study team's recommendation is for Colorado to move forward with the development of either a state specific CWI or a composite factor. Both options benefit from utilizing a CWI, which economic theory considers the superior approach and is the primary approach other states use. Additionally, each of these options provides the opportunity to develop a factor that leads to the specific needs of Colorado rather than utilizing an approach that is not fully applicable given the state context. This would also address one of the primary concerns of the School Finance Task Force's concerns with utilizing the CWIFT, as it lacked "Colorado-specific differences". [19]

Given the current adjustments' large impact on funding, it is important to note that any changes will likely have considerable impacts on districts, as modeled in Appendix B. Therefore, the study team would recommend that the state consider a change with the adjustment when also implementing a new funding formula overall. This would help ensure that any dollars freed as a result of this change would be available for all students or through other targeted funding.

[19] S.B. 23-287 Public School Finance Task Force Report

Section A: FY23 Cost of Living (COL) Factor Analysis

Current Cost-of-living Factor Overview

	Cost-of-living (Based FY23 on Funding Calculations Data)
Average	1.169
Median	1.167
Min	1.015
Max	1.65

Variation of Cost-of-living by District Size

District Size	Average Cost-of-living Factor (Based on FY23 Funding Calculation Data)	Count of Districts
Very Small	1.12	52
Small	1.16	61
Moderate Small	1.20	25
Moderate Large	1.22	20
Large	1.19	10
Very Large	1.24	10

Breakdown of Districts by Cost-of-living Quartiles and NCES Code

Quartiles of Cost-of-living	City	Suburb	Town	Rural
1	1	1	2	41
2	0	2	13	30
3	8	5	11	21
4	6	11	8	18

Variation of Cost-of-living (Based on Funding Calculations) by NCES Code (Simplified)

NCES Code	Average Cost-of-living Factor (Based on Funding Calculations Data)	Count of Districts
Rural	1.15	110
Town	1.20	34
Suburb	1.21	19
City	1.21	15

Variation of Cost-of-living by % FRL Quintiles

Quintiles of %FRL	Average Cost-of-living Factor (Based on Funding Calculations Data)	Count of Districts
1	1.22	31
2	1.19	35
3	1.13	33
4	1.16	35
5	1.14	32

**Districts are grouped into quintiles based on how their % FRL ranks compared to the rest of the districts. Districts with higher % FRL populations are grouped in correspondingly higher quintiles.*

Variation of Average Teacher Salary by Cost-of-living Quartiles

Quartiles of Cost-of-living	Average Teacher Salary	Average K-12 Membership	Count of Districts
1	$45,148.71	290	45
2	$50,480.97	1403	45
3	$55,302.35	4952	45
4	$63,753.95	12945	43

**Districts are grouped into quartiles based on how their cost-of-living factor ranks compared to the rest of the districts. Districts with higher cost-of-living factors are grouped in correspondingly higher quartiles.*

Summary Statistics on Average Cost-of-living Projections from Corona Market Rate Study

	Housing Costs	Transportation Costs	Good & Services	Taxes & Other	Cost-of-living
Average	$16,797.57	$11,751.17	$17,732.53	$13,667.65	$59,948.53
Median	$15,685.00	$11,653.00	$17,568.00	$13,684.00	$59,690.00
Min	$10,477.00	$9,978.00	$15,448.00	$10,978.00	$52,110.00
Max	$45,454.00	$14,907.00	$20,421.00	$13,736.00	$88,305.00

Variation of Cost-of-living Factors (Housing, Transportation etc.) by District Size

District Size	Average Housing Costs	Average Transportation Costs	Average Goods & Services	Average Taxes & Other	Average Cost-of-living	Count of Districts
Very Small	$13,719.33	$11,868.75	$17,761.25	$13,684.00	$57,033.02	52
Small	$15,947.35	$11,689.70	$17,732.91	$13,684.47	$59,054.07	61
Moderate Small	$19,227.85	$11,695.85	$17,958.80	$13,548.70	$62,430.85	25
Moderate Large	$21,372.13	$11,730.13	$18,138.94	$13,684.00	$64,924.69	20
Large	$19,481.56	$11,619.89	$17,532.22	$13,684.00	$62,317.33	10
Very Large	$22,382.44	$11,805.00	$16,551.89	$13,692.78	$64,431.33	10

Variation of Cost-of-living Factors (Housing, Transportation etc.) by NCES Code

Quartiles of Cost-of-living	Average Housing Costs	Average Transportation Costs	Average Goods & Services	Average Taxes & Other	Average Cost-of-living	Count of Districts
Rural	$15,224.33	$11,859.78	$17,813.26	$13,684.00	$58,581.04	110
Town	$18,342.89	$ 11,324.07	$18,189.54	$13,587.36	$61,443.32	34
Suburb	$20,572.24	$11,838.24	$17,000.94	$13,686.65	$63,097.71	19
City	$20,360.86	$11,723.86	$17,130.21	$13,688.36	$62,902.79	15

Variation of Staff Turnover FY22-23 by Cost-of-living Quartiles

Quartiles of Cost-of-living	Staff Turnover FY22-23	Count of Districts
1	28%	45
2	21%	45
3	24%	45
4	23%	43

Section B: Alternative Factor Comparison to FY23 Cost of Living

Cost-of-living	Overall	Rural	Town	Suburb	City
Average	1.17	1.15	1.20	1.21	1.21
Median	1.17	1.15	1.18	1.22	1.21
Min	1.02	1.02	1.08	1.12	1.07
Max	1.65	1.59	1.65	1.25	1.27
Count of Districts Above Average	86	46	11	12	10

CWIFT LEA Original	Overall	Rural	Town	Suburb	City
Average	0.88	0.87	0.88	0.95	0.94
Median	0.89	0.86	0.86	0.96	0.91
Min	0.80	0.80	0.80	0.81	0.82
Max	1.06	1.02	1.06	1.04	1.05
Count of Districts Above Average	92	45	16	10	6

CWIFT LEA (Rebased to Average)	Overall	Rural	Town	Suburb	City
Average	1.00	0.98	0.99	1.07	1.07
Median	1.00	0.97	0.97	1.09	1.03
Min	0.91	0.91	0.91	0.91	0.93
Max	1.20	1.15	1.20	1.17	1.19
Count of Districts Above Average	90	45	16	10	6

Appendix C: Further detail on other state funding formula regionalization approaches

State	Approach	Description
Massachusetts	CWI	The wage adjustment factor (WAF) gives a district credit for having higher school costs if it is located in a geographic area where average wages are higher than in other areas of the state. The wage factor is calculated using the latest available average wage data supplied by the state's Department of Employment. The factor reflects a town's own average but is more weighted to the average of the labor market area (LMA) where the town is located. There are real differences in these averages, which represent the combined total for all industries both private and public.
Missouri	CWI	Dollar Value Modifier (DVM) is an amount which represents an index of the relative purchasing power of a dollar based on regional wage ratios. Districts in areas with higher wage rates receive additional funding.
Florida	CWI	The Florida Price Level Index (FPLI) was established by the Legislature as the basis for the District Cost Differential (DCD) in the Florida Education Finance Program (FEFP). The FPLI is a comparable wage index representing the relative cost of personnel among Florida's school districts. The FPLI is based on data for hundreds of occupations across Florida's 67 counties collected by the Florida Department of Economic Opportunity's Bureau of Workforce Statistics and Economic Research as part of the U.S. Bureau of Labor Statistics' Occupational Employment and Wage Statistics survey (OEWS).
New Jersey	CWI	The Geographic Cost Adjustment (GCA) is used to account for cost differences across New Jersey. Each district's adequacy budget is first calculated based on mean salaries and the average cost of other resources. The GCA is then applied to each district's adequacy budget to account for the variation in salaries between counties.
New York	CWI	Regional Cost Index (RCI): The regional cost index, calculated by the State Education Department, is generated following a wage-based methodology. It is based on median salaries in 59 professional occupations (excluding education-related ones). Index values range from 1.000 for North Country/Mohawk Valley counties to 1.425 for New York City and Long Island. The regional cost indices are based on a Regents' study of median salaries for 59 professional, non-teaching occupations in nine labor force regions.
Virginia	CWI	The Composite Index determines a school division's ability to pay education costs fundamental to the Commonwealth's Standards of Quality (SOQ) with local funds. The Composite Index is calculated using three indicators of a locality's ability to pay (1) True value of real property (weighted 50 percent), (2) Adjusted gross income (weighted 40 percent), (3) Taxable retail sales (weighted 10 percent). Each locality's index is adjusted to maintain an overall statewide local share of 45 percent and an overall state share of 55 percent.
Illinois	CWI	The Comparable Wage Index was built into Illinois' EBF formula as a measure of regional variations in salaries. A district's initial adequacy target base is

		multiplied by the CWI regionalization factor to produce a district's final adequacy target.
Maryland	HWI	The Maryland State Department of Education chose to move forward with the calculation of the comparable wage methodology as an option for updating the Geographic Cost of Education Index. This report presents comparable wage indices for professional and non-professional workers, which are then combined into an overall index that can be applied to the base foundation amount (analogous to the GCEI currently in use). One of the advantages of the comparable wage approach over the hedonic method is that it is much easier to update and keep current. However, any update will necessarily mean slight changes in the index values, and although these changes will be smaller if the index is updated each year than if it updated less frequently, any changes will translate into changes in revenue for districts that can be politically controversial. This report provides an example of a way to smooth the year-to-year changes so that such changes are minimized as much as possible
Wyoming	CLI + HWI	The Wyoming Regional Cost Adjustment (RCA) which only applies to the salary components of the school funding model, is an amalgam of two alternative labor cost indices—the Wyoming Cost-of-Living Index (WCLI) and the Wyoming Hedonic Wage Index (HWI). Both labor cost indices are constructed so that the state average has an index value of 100. Locations where labor costs are 10% above the state average have an index value of 110 while locations where labor costs are 10% below the state average have an index value of 90. The WCLI is updated biannually, but the Wyoming HWI has not been updated since 2005.
Alaska	HWI	Cost factors are specific to each school district and will range from 1.000 to 2.116. The department monitors the district cost factors and submits a report to the legislature on January 15 every other fiscal year, beginning in FY01.
Maine	HWI	The final step to creating per pupil rates is the adjustment for labor market differences by regions across the state. The adjustments may either lower or increase the allocation obtained by adding salary/benefits and per pupil allocations. These adjusted allocations are then divided by the average attending pupils to obtain a per pupil rate for elementary and secondary students.
Texas	HWI	The concept of adjusting education funding for variations in cost began in a 1984 special session with the creation of the Price Differential Index. The State Board of Education (SBOE) was directed to create a replacement for this temporary index and undertook this in 1987, but the study was moved to the Legislative Education Board (LEB) and the Legislative Budget Board (LBB) in 1989. The Foundation School Fund Budget Committee adopted rules based on research by LEB and LBB in 1991.The current CEI attempts to adjust for varying economic conditions across the state, based mainly on the size of the district, the teacher salaries of neighboring districts, and the percentage of low-income students in the district in 1989–1990. The index has not been updated since that time. (2018)

Appendix 9
Comparison of Total Program Funding Amounts

		New Model	1448 Fully Funded	1448 Implementation	Current
0010	MAPLETON 1	$116,190,372	$90,081,320	$82,755,959	$81,147,953
0020	ADAMS 12 FIVE STAR SCHOOLS	$597,066,940	$469,458,200	$449,433,323	$445,037,619
0030	ADAMS COUNTY 14	$100,550,973	$80,165,832	$73,473,343	$72,004,260
0040	SCHOOL DISTRICT 27J	$381,595,080	$291,172,822	$277,844,869	$274,919,220
0050	BENNETT 29J	$26,692,774	$22,084,996	$19,313,195	$18,704,750
0060	STRASBURG 31J	$21,061,402	$16,345,298	$14,250,844	$13,791,086
0070	WESTMINSTER 50	$134,996,935	$103,088,219	$99,056,000	$98,170,879
0100	ALAMOSA RE-11J	$36,653,015	$27,030,502	$24,782,863	$24,289,478
0110	SANGRE DE CRISTO RE-22J	$7,445,262	$4,996,374	$4,601,960	$4,515,382
0120	ENGLEWOOD 1	$37,576,967	$28,295,379	$26,809,620	$26,483,477
0123	SHERIDAN 2	$20,295,788	$14,115,225	$13,476,255	$13,335,994
0130	CHERRY CREEK 5	$759,395,267	$600,963,853	$590,911,926	$587,972,066
0140	LITTLETON 6	$183,308,621	$149,029,782	$145,757,823	$145,032,659
0170	DEER TRAIL 26J	$9,369,463	$6,419,498	$5,862,775	$5,740,568
0180	ADAMS-ARAPAHOE 28J	$691,670,943	$511,664,143	$488,101,030	$482,928,639
0190	BYERS 32J	$109,154,658	$73,354,351	$70,581,124	$69,972,367
0220	ARCHULETA COUNTY 50 JT	$27,827,126	$21,522,609	$19,583,921	$19,158,355
0230	WALSH RE-1	$5,055,887	$3,722,438	$3,445,170	$3,384,306
0240	PRITCHETT RE-3	$1,648,181	$1,593,801	$1,364,910	$1,314,665
0250	SPRINGFIELD RE-4	$7,222,424	$4,893,347	$4,427,015	$4,324,650
0260	VILAS RE-5	$5,835,520	$4,108,315	$3,859,078	$3,804,367
0270	CAMPO RE-6	$1,562,673	$1,521,316	$1,298,283	$1,249,325
0290	LAS ANIMAS RE-1	$18,753,290	$12,406,375	$11,864,816	$11,745,937
0310	MC CLAVE RE-2	$6,231,636	$4,389,034	$3,977,838	$3,887,575
0470	ST VRAIN VALLEY RE 1J	$460,396,097	$359,474,609	$354,156,987	$352,395,012
0480	BOULDER VALLEY RE 2	$393,980,032	$317,164,131	$314,888,387	$313,321,778
0490	BUENA VISTA R-31	$17,495,484	$12,818,261	$11,776,262	$11,547,531
0500	SALIDA R-32	$24,307,938	$18,884,901	$16,817,369	$16,363,521
0510	KIT CARSON R-1	$2,910,842	$2,296,380	$2,169,710	$2,141,905
0520	CHEYENNE COUNTY RE-5	$5,241,670	$3,806,348	$3,635,213	$3,597,646
0540	CLEAR CREEK RE-1	$12,491,064	$9,019,855	$8,208,594	$8,030,512
0550	NORTH CONEJOS RE-1J	$18,624,317	$13,547,471	$12,153,230	$11,847,177
0560	SANFORD 6J	$10,150,537	$6,546,170	$5,894,872	$5,751,904
0580	SOUTH CONEJOS RE-10	$5,229,879	$3,866,099	$3,620,150	$3,566,162
0640	CENTENNIAL R-1	$4,917,285	$3,722,881	$3,479,665	$3,426,276
0740	SIERRA GRANDE R-30	$8,072,539	$5,393,418	$4,806,101	$4,677,177
0770	CROWLEY COUNTY RE-1-J	$9,148,979	$6,212,844	$5,528,379	$5,378,131
0860	CUSTER COUNTY SCHOOL DISTRICT C-1	$8,095,586	$5,595,590	$5,041,127	$4,919,416
0870	DELTA COUNTY 50(J)	$68,229,142	$51,644,399	$49,832,350	$49,434,584
0880	DENVER COUNTY 1	$1,382,558,998	$1,054,197,906	$1,010,442,168	$1,000,837,250
0890	DOLORES COUNTY RE NO.2	$6,556,411	$4,728,778	$4,420,353	$4,352,650
0900	DOUGLAS COUNTY RE 1	$868,454,990	$705,380,086	$703,192,539	$699,694,068
0910	EAGLE COUNTY RE 50	$102,093,847	$87,224,505	$81,296,480	$79,995,207
0920	ELIZABETH SCHOOL DISTRICT	$44,649,623	$38,720,228	$34,818,644	$33,962,199
0930	KIOWA C-2	$8,284,800	$5,504,555	$5,241,226	$5,183,422

		New Model	1448 Fully Funded	1448 Implementation	Current
0940	BIG SANDY 100J	$8,169,501	$5,616,541	$5,207,216	$5,117,364
0950	ELBERT 200	$6,843,612	$4,763,798	$4,581,393	$4,541,353
0960	AGATE 300	$2,049,422	$1,755,814	$1,721,085	$1,712,523
0970	CALHAN RJ-1	$10,385,787	$6,924,434	$6,387,327	$6,269,426
0980	HARRISON 2	$200,310,640	$150,764,996	$145,438,182	$144,268,882
0990	WIDEFIELD 3	$141,747,622	$109,236,126	$102,879,705	$101,484,393
1000	FOUNTAIN 8	$115,833,475	$88,643,273	$84,067,057	$83,062,521
1010	COLORADO SPRINGS 11	$407,910,951	$308,644,995	$297,437,319	$294,977,097
1020	CHEYENNE MOUNTAIN 12	$51,341,950	$42,069,703	$40,774,822	$40,490,580
1030	MANITOU SPRINGS 14	$21,094,628	$15,293,050	$14,860,008	$14,764,950
1040	ACADEMY 20	$361,001,182	$288,111,811	$286,145,466	$284,721,857
1050	ELLICOTT 22	$18,294,294	$13,490,634	$12,072,205	$11,760,842
1060	PEYTON 23 JT	$12,389,755	$8,778,342	$8,012,961	$7,844,951
1070	HANOVER 28	$7,239,121	$5,126,961	$4,729,860	$4,642,691
1080	LEWIS-PALMER 38	$86,743,888	$71,900,921	$70,221,232	$69,852,519
1110	FALCON 49	$494,540,926	$366,228,418	$354,983,493	$352,515,095
1120	EDISON 54 JT	$2,089,717	$1,830,534	$1,924,639	$1,915,064
1130	MIAMI/YODER 60 JT	$10,594,849	$7,278,210	$6,328,654	$6,120,215
1140	CANON CITY RE-1	$51,055,691	$38,978,833	$36,374,175	$35,802,420
1150	FREMONT RE-2	$23,480,248	$17,551,924	$15,449,120	$14,987,529
1160	COTOPAXI RE-3	$4,607,335	$3,749,316	$3,500,839	$3,446,295
1180	ROARING FORK RE-1	$97,408,798	$82,116,671	$76,425,071	$75,175,695
1195	GARFIELD RE-2	$69,319,964	$58,948,918	$52,620,948	$51,231,882
1220	GARFIELD 16	$22,055,084	$15,724,616	$14,705,101	$14,481,305
1330	GILPIN COUNTY RE-1	$9,157,037	$6,142,514	$5,911,167	$5,860,383
1340	WEST GRAND 1-JT	$10,161,031	$7,254,184	$6,443,313	$6,265,317
1350	EAST GRAND 2	$21,834,369	$18,587,132	$15,424,978	$14,730,847
1360	GUNNISON WATERSHED RE1J	$31,807,611	$29,098,965	$24,470,379	$23,454,348
1380	HINSDALE COUNTY RE 1	$2,198,680	$1,846,546	$1,848,085	$1,838,891
1390	HUERFANO RE-1	$11,191,931	$6,965,621	$6,486,641	$6,381,500
1400	LA VETA RE-2	$5,820,870	$4,316,799	$3,853,827	$3,752,199
1410	NORTH PARK R-1	$4,158,351	$3,331,787	$3,226,710	$3,203,644
1420	JEFFERSON COUNTY R-1	$1,066,712,946	$854,668,892	$835,246,659	$830,983,242
1430	EADS RE-1	$5,581,115	$3,988,321	$3,689,227	$3,623,572
1440	PLAINVIEW RE-2	$5,304,383	$3,985,930	$3,626,286	$3,547,339
1450	ARRIBA-FLAGLER C-20	$4,565,021	$3,462,148	$3,164,452	$3,099,104
1460	HI-PLAINS R-23	$3,286,353	$2,611,304	$2,401,367	$2,355,283
1480	STRATTON R-4	$5,785,165	$4,207,530	$3,826,775	$3,743,195
1490	BETHUNE R-5	$3,196,829	$2,425,983	$2,363,591	$2,349,895
1500	BURLINGTON RE-6J	$15,914,298	$9,889,691	$9,026,342	$8,836,827
1510	LAKE COUNTY R-1	$18,288,309	$13,022,241	$11,727,908	$11,443,786
1520	DURANGO 9-R	$85,658,476	$69,341,936	$66,493,531	$65,868,271
1530	BAYFIELD 10 JT-R	$22,116,250	$16,795,347	$15,827,622	$15,615,195
1540	IGNACIO 11 JT	$15,765,278	$11,123,073	$10,288,372	$10,105,145
1550	POUDRE R-1	$474,555,662	$368,238,187	$362,660,672	$360,856,390
1560	THOMPSON R2-J	$216,935,026	$166,587,180	$161,317,067	$160,160,213
1570	ESTES PARK R-3	$18,525,047	$13,213,197	$12,634,407	$12,507,356

		New Model	1448 Fully Funded	1448 Implementation	Current
1580	TRINIDAD 1	$16,944,524	$10,865,448	$10,539,497	$10,467,947
1590	PRIMERO REORGANIZED 2	$6,558,936	$4,599,209	$4,240,404	$4,161,642
1600	HOEHNE REORGANIZED 3	$7,539,464	$4,765,886	$4,632,735	$4,603,506
1620	AGUILAR REORGANIZED 6	$3,478,096	$2,710,153	$2,491,879	$2,443,965
1750	BRANSON REORGANIZED 82	$7,515,368	$5,163,769	$4,876,672	$4,813,651
1760	KIM REORGANIZED 88	$1,490,141	$1,516,517	$1,238,392	$1,177,340
1780	GENOA-HUGO C113	$5,991,021	$4,318,906	$3,982,353	$3,908,475
1790	LIMON RE-4J	$11,054,813	$7,329,025	$6,397,335	$6,192,818
1810	KARVAL RE-23	$1,578,984	$1,579,692	$1,328,757	$1,273,673
1828	VALLEY RE-1	$31,359,105	$22,524,738	$21,356,904	$21,100,551
1850	FRENCHMAN RE-3	$5,415,575	$4,001,178	$3,744,824	$3,688,551
1860	BUFFALO RE-4J	$8,255,677	$5,235,612	$5,005,347	$4,954,801
1870	PLATEAU RE-5	$5,219,496	$3,870,668	$3,659,427	$3,613,057
1980	DE BEQUE 49JT	$4,863,000	$3,616,299	$3,439,413	$3,400,585
1990	PLATEAU VALLEY 50	$8,168,706	$5,255,685	$4,951,350	$4,884,545
2000	MESA COUNTY VALLEY 51	$316,431,551	$227,254,113	$229,627,992	$228,485,564
2010	CREEDE SCHOOL DISTRICT	$3,504,317	$2,748,068	$2,685,025	$2,671,186
2020	MOFFAT COUNTY RE:NO 1	$32,215,196	$24,562,072	$21,801,407	$21,195,407
2035	MONTEZUMA-CORTEZ RE-1	$41,240,121	$31,608,999	$28,723,424	$28,090,005
2055	DOLORES RE-4A	$14,082,977	$9,639,473	$8,690,679	$8,482,407
2070	MANCOS RE-6	$11,910,491	$8,225,664	$7,133,163	$6,893,346
2180	MONTROSE COUNTY RE-1J	$93,449,044	$74,673,003	$69,111,901	$67,891,171
2190	WEST END RE-2	$6,481,198	$4,683,456	$4,469,298	$4,422,287
2395	BRUSH RE-2(J)	$25,685,201	$18,678,139	$17,267,479	$16,957,822
2405	FORT MORGAN RE-3	$55,980,932	$43,573,151	$39,810,093	$38,984,056
2505	WELDON VALLEY RE-20(J)	$5,504,977	$4,028,568	$3,930,662	$3,909,171
2515	WIGGINS RE-50(J)	$16,871,697	$12,964,784	$11,168,977	$10,774,775
2520	EAST OTERO R-1	$25,984,195	$17,797,259	$16,733,249	$16,499,686
2530	ROCKY FORD R-2	$14,021,439	$8,724,463	$8,466,319	$8,409,653
2535	MANZANOLA 3J	$5,320,955	$3,778,153	$3,706,073	$3,687,635
2540	FOWLER R-4J	$9,223,090	$6,144,068	$5,524,185	$5,388,113
2560	CHERAW 31	$6,065,807	$4,057,203	$4,023,886	$4,003,866
2570	SWINK 33	$7,996,822	$4,848,143	$4,869,193	$4,844,969
2580	OURAY R-1	$4,465,054	$3,633,509	$3,702,160	$3,683,741
2590	RIDGWAY R-2	$7,646,312	$5,529,270	$5,221,510	$5,153,953
2600	PLATTE CANYON 1	$14,360,638	$10,608,081	$9,726,216	$9,532,636
2610	PARK COUNTY RE-2	$11,787,263	$8,542,092	$7,434,656	$7,191,560
2620	HOLYOKE RE-1J	$12,718,174	$8,342,678	$7,495,172	$7,309,134
2630	HAXTUN RE-2J	$7,479,215	$4,995,971	$4,502,515	$4,394,195
2640	ASPEN 1	$24,075,267	$19,842,246	$23,689,719	$23,571,860
2650	GRANADA RE-1	$5,578,154	$4,081,140	$3,742,090	$3,667,665
2660	LAMAR RE-2	$26,386,663	$18,287,227	$17,121,271	$16,865,330
2670	HOLLY RE-3	$6,997,865	$4,739,800	$4,238,128	$4,128,005
2680	WILEY RE-13 JT	$6,762,841	$4,416,196	$4,191,061	$4,141,641
2690	PUEBLO CITY 60	$233,760,692	$171,589,847	$167,200,592	$166,237,097
2700	PUEBLO COUNTY 70	$162,677,677	$121,993,508	$115,172,091	$113,674,706
2710	MEEKER RE1	$14,289,873	$10,080,389	$8,818,377	$8,541,350

		New Model	1448 Fully Funded	1448 Implementation	Current
2720	RANGELY RE-4	$11,288,821	$7,383,216	$6,457,003	$6,253,688
2730	DEL NORTE C-7	$9,524,083	$6,362,478	$5,772,967	$5,643,563
2740	MONTE VISTA C-8	$19,360,961	$13,143,637	$12,216,838	$12,013,394
2750	SARGENT RE-33J	$7,790,797	$4,995,760	$4,791,997	$4,747,269
2760	HAYDEN RE-1	$9,709,233	$7,027,877	$6,322,779	$6,168,002
2770	STEAMBOAT SPRINGS RE-2	$38,914,173	$33,967,944	$31,673,520	$31,169,866
2780	SOUTH ROUTT RE 3	$8,124,633	$5,847,359	$5,378,334	$5,275,378
2790	MOUNTAIN VALLEY RE 1	$5,447,797	$4,014,374	$3,695,622	$3,625,652
2800	MOFFAT 2	$5,507,891	$4,187,510	$4,156,346	$4,135,667
2810	CENTER 26 JT	$14,166,256	$9,493,048	$8,198,671	$7,914,540
2820	SILVERTON 1	$2,475,175	$2,060,142	$1,994,496	$1,980,086
2830	TELLURIDE R-1	$15,119,456	$12,193,687	$13,191,626	$13,125,996
2840	NORWOOD R-2J	$4,909,621	$3,780,241	$3,733,972	$3,715,395
2862	JULESBURG RE-1	$15,176,840	$10,088,568	$9,349,740	$9,187,558
2865	REVERE SCHOOL DISTRICT	$3,831,947	$2,915,100	$2,792,384	$2,765,446
3000	SUMMIT RE-1	$55,004,196	$47,921,285	$43,962,275	$43,093,224
3010	CRIPPLE CREEK-VICTOR RE-1	$8,131,599	$5,534,124	$4,954,955	$4,827,820
3020	WOODLAND PARK RE-2	$28,883,890	$22,551,625	$21,618,519	$21,413,691
3030	AKRON R-1	$10,303,797	$6,711,471	$6,010,348	$5,856,443
3040	ARICKAREE R-2	$2,577,037	$2,091,210	$2,031,368	$2,018,232
3050	OTIS R-3	$5,844,121	$4,203,366	$3,956,118	$3,901,844
3060	LONE STAR 101	$3,738,891	$2,894,516	$2,829,614	$2,815,367
3070	WOODLIN R-104	$2,288,759	$1,890,235	$1,799,129	$1,779,130
3080	WELD COUNTY RE-1	$30,301,267	$24,608,143	$21,088,825	$20,316,291
3085	EATON RE-2	$32,606,794	$24,747,722	$23,496,844	$23,222,262
3090	WELD COUNTY SCHOOL DISTRICT RE-3J	$42,637,587	$36,871,338	$31,405,225	$30,205,346
3100	WINDSOR RE-4	$117,855,305	$93,059,405	$93,267,014	$92,802,999
3110	JOHNSTOWN-MILLIKEN RE-5J	$58,208,825	$47,122,548	$44,911,038	$44,425,584
3120	GREELEY 6	$381,165,575	$280,039,335	$265,482,378	$262,286,948
3130	PLATTE VALLEY RE-7	$20,316,272	$15,308,742	$13,593,087	$13,216,480
3140	WELD COUNTY S/D RE-8	$38,521,850	$29,414,762	$27,499,884	$27,079,545
3145	AULT-HIGHLAND RE-9	$18,927,900	$14,506,155	$12,747,768	$12,361,780
3146	BRIGGSDALE RE-10	$4,822,067	$3,559,550	$3,485,698	$3,468,356
3147	PRAIRIE RE-11	$4,608,667	$3,592,769	$3,454,266	$3,423,863
3148	PAWNEE RE-12	$1,946,765	$1,629,690	$1,600,114	$1,592,153
3200	YUMA 1	$17,787,867	$11,357,920	$11,018,484	$10,943,974
3210	WRAY RD-2	$17,162,028	$11,816,990	$10,629,733	$10,369,115
3220	IDALIA RJ-3	$4,272,782	$3,319,182	$3,295,579	$3,279,183
3230	LIBERTY J-4	$1,752,542	$1,563,593	$1,537,587	$1,529,938