Education Finance in Vermont: Analysis and Recommendation

PROPOSAL

October 3, 2025

Submitted to:
Julia Richter
Vermont Legislative JFO
1 Baldwin Street
Montpelier, Vermont 05633
JFORFP@leg.state.vt.us

Submitted by:
American Institutes for Research®
1400 Crystal Drive, 10th Floor
Arlington, VA 22202

Technical Contact:
Drew Atchison
Principal Researcher
Email: datchison@air.org

Contractual Contact:
Celinett Rodriguez
Senior Contracts and Grants Specialist
Email: AIRproposals@air.org

Dun and Bradstreet Number: 04-173-3197
Unique Entity ID: MCN6J5L6M3T4
Tax Identification Number (TIN): 25-0965219

AIR®
Advancing Evidence.
Improving Lives.

Contents

Exhibits

October 3, 2025

Julia Richter
Vermont Legislative JFO
1 Baldwin Street
Montpelier, Vermont 05633
JFORFP@leg.state.vt.us

AIR®
Advancing Evidence.
Improving Lives.

Headquarters
1400 Crystal Drive, 10th Floor
Arlington, VA 22202-3289
+1.202.403.5000
AIR.ORG

RE: Response to Request for Proposal: Education Finance in Vermont: Analysis and Recommendation.

Dear Ms. Richter:

The American Institutes for Research® (AIR®) is pleased to submit its proposal to the Vermont Legislative Joint Fiscal Office (JFO) in response to RFP *Education Finance in Vermont: Analysis and Recommendation*.

Providing an education system that ensures all students are afforded the opportunity for educational success requires a fair and efficient education funding system. AIR is a nationally recognized research and technical assistance organization with a long record of evaluating state education finance systems for the purpose of informing and improving state school funding policy.

The assembled AIR study team has deep expertise generating the evidence states need to develop and implement effective school funding formula. In our recent work, we have honed our analytic approach, using the most current methodologies to generate policy-relevant findings and recommendations. Of note, our team recently conducted studies of state education funding formulas examining the cost of providing an adequate education in Colorado, Delaware, Ohio, Oregon, and New Hampshire. Members of the study team also led Vermont's 2019 *Study of Pupil Weighting Factors*. As such, we have both broad expertise in school funding policy and nuanced understanding of the Vermont context.

The AIR team also has experience in evaluating the cost of education for specific student populations for state funding policy, including students with disabilities. We recently completed a study examining Washington state's policies for funding special education, as well as a study to develop cost-based weights for students with disabilities in Ohio. AIR also leads the landmark national study of special education spending for the U.S. Department of Education.

Taken together, the AIR team has unparalleled methodological and content expertise for evaluating state funding formulas, along with a deep understanding of the funding policy in Vermont. Our goal is to provide the state with the most useful information guided by rigorous analyses to generate clear, evidence-informed, actionable recommendations regarding the funding formula.

Please direct contractual questions about this proposal to Celinett Rodriguez, senior contracts and grants specialist, at AIRproposals@air.org. For technical questions, please contact Dr. Drew Atchison, principal researcher, at datchison@air.org.

Thank you for your consideration.

Sincerely,

[redacted]

Chad Duhon
Vice President
Education Systems

Background and Experience

The State of Vermont, through Act 73 of 2025, has taken an important step toward modernizing its education funding system by adopting a cost-factor foundation formula. Before this new formula can be implemented, the Legislature has requested additional analyses to determine whether further refinements are needed. Specifically, the Vermont Legislative Joint Fiscal Office (JFO) has been charged with examining the base spending amount and student weights**,** assessing how to incorporate needs-based weights for students receiving special education services, identifying the most appropriate approach to funding career and technical education (CTE)**,** and considering other potential adjustments, such as suitable geographic measures of sparsity and grade-level cost differences between elementary and secondary students**.**

The American Institutes for Research® (AIR®) is uniquely positioned to provide the analyses and recommendations envisioned under Act 73. Our team combines unparalleled expertise in Vermont's education funding system—having conducted the cost function modeling that underpins both the current and revised formulas—with deep knowledge of Act 73's financing structures and origins. Nationally, AIR has led adequacy and cost studies in multiple states, developing base funding amounts and student weights through advanced cost function analyses, and bringing specialized expertise in special education finance, career pathways, and CTE. We also bring credibility as a nonpartisan research organization with a long record of delivering independent, objective studies that inform policymaking and supporting states in designing, updating, and implementing education funding policy.

In the sections that follow, we provide additional detail about: (1) AIR's background and experience**,** highlighting the team's expertise and our experience working with states nationwide to develop and refine their education finance policies; (2) our proposed project plan**,** including our proposed approach, timeline, and analytic methods; (3) the data sets and models we will employ; (4) professional references that demonstrate our successful execution of similar work; and (5) our proposed pricing structure.

Organizational and Study Team Experience

AIR, headquartered in Arlington, Virginia, is one of the world's leading behavioral and social science research, evaluation, and technical assistance institutions. Since 1946, AIR has applied rigorous research to the most pressing challenges in education, health, and the workforce in the United States and around the world. Our work helps leaders, policymakers, and practitioners at the highest levels and on the ground understand what is working and translate evidence into action, ensuring that all students have access to a high-quality, effective education tailored to their specific needs. With a staff of more than 1,200, we bring together interdisciplinary teams to provide comprehensive and targeted services, and we tailor every engagement to client needs and expectations.

AIR has extensive experience conducting school finance studies across the country and in Vermont, providing policymakers with rigorous, evidence-based analyses to guide funding reform (see Exhibit 1 for relevant experience on areas of focus for this study). We have conducted more than 25 school finance studies in states, including Vermont, to evaluate and

improve K–12 funding systems with a focus on fairness, adequacy, and efficiency in education funding. Alongside this extensive experience, AIR brings unparalleled expertise in special education funding and policy—leading the current *National Study of Special Education Spending* (NSSES) and the previous *Special Education Expenditure Project* (SEEP) for the U.S. Department of Education and conducting some of the most rigorous state-level special education cost studies undertaken, most recently in Ohio and Washington. In addition, AIR brings extensive expertise in workforce development and career pathways, with a team that includes recognized leaders in career and technical education (CTE) and alternative pathways to work. This combination of expertise in school finance, special education, and workforce development uniquely positions AIR to provide Vermont with comprehensive, evidence-based analyses to guide the refinement of its foundation formula.

Over the past decade, Vermont has consistently drawn on the expertise of this team to inform education policy and practice (a sample of our work in Vermont is described in Exhibit 2). In partnership with the University of Vermont, we conducted Vermont's 2019 *Pupil Weighting Study* (Kolbe et al., 2019),[1] providing the cost function analyses that generated the empirical evidence ultimately used to inform Act 73 and the adoption of a cost-factor foundation formula. We also work closely with the Vermont Agency of Education (AOE) as a trusted technical assistance provider for its special education policies and programs—supporting the state through the *Center for IDEA Fiscal Reporting* (CIFR) and the *National Center for Systemic Improvement* (NCSI). Additional collaborations include supporting the evaluation, implementation, and coaching of educators as part of the *State Systemic Improvement Plan* and evaluating *Early Multi-Tiered System of Support* (MTSS) implementation in partnership with AOE and the Pyramid Model Consortium. These long-standing partnerships have provided us with a deep understanding of Vermont's education finance landscape, data systems, and policy context, ensuring that the proposed study is firmly grounded in the realities of implementation.

AIR is dedicated to conducting objective, evidence-based analyses that inform policy and practice. For more than 75 years, AIR has built a reputation for independence, providing rigorous research and technical assistance that helps policymakers navigate complex issues without advancing any advocacy agenda. In Vermont and across the country, AIR has demonstrated the ability to operate independently from interest or advocacy groups involved in education financing and policy, ensuring that findings and recommendations are guided solely by empirical evidence and the needs of policymakers. Tammy Kolbe will serve as a senior advisor and task leader for the study in her role as an independent researcher with AIR. Her work on this project is separate from her service on Vermont's state board of education. AIR will use a robust set of project management practices and quality assurance protocols to ensure the study is conducted objectively and to the highest standards of quality. AIR's independence, combined with the team's deep subject-matter expertise, positions AIR as a trusted partner to the JFO in carrying out the analytic work envisioned under Act 73.

[1] AIR was a key subcontractor on this study. In addition, Tammy Kolbe, the principal investigator on the study from the University of Vermont, is now at AIR and is the proposed lead of the special education weight design task and is a study advisor on the Vermont education policy context.

Exhibit 1. Selected AIR Research on Topics Relevant to the Proposed Study

Topic and Focus	Setting/Summary	Key Personnel Also on Proposed Study Team	Year	Citation/Link
Using a cost function to develop cost-based formula weights	Colorado adequacy study	Atchison, Levin, & Baker	2025	Atchison et al., 2025
	Oregon adequacy study	Levin, Brooks, Baker, & Kolbe	2025	Brooks et al., 2025
	Ohio economic disadvantage study	Levin, Atchison, Brooks, & Baker	2025	Levin et al., 2025
	Delaware adequacy study	Atchison, Levin, & Baker	2023	Atchison et al., 2023
	New Hampshire adequacy study	Atchison, Baker, Kolbe, & Levin	2020	Atchison et al., 2020
	Study of pupil weights in Vermont's school funding formula	Kolbe, Baker, Atchison, & Levin	2019	Kolbe et al., 2019
Determining the cost of and identifying spending on special education	Ohio special education adequacy study	Levin, Atchison, & Kolbe	2022	Danks et al., 2022
	Washington special education funding and spending	Kolbe & Atchison	2024	Project Page
	National Center for IDEA Fiscal Reporting	Pfannenstiel	Ongoing	Project Page
	National Center for Systemic Improvement	Pfannenstiel	Ongoing	
	National Study of Special Education Spending	Kolbe, Atchison, & Brooks	Ongoing	Project Page
	Special Education Expenditure Project		2001	Project Page
Career and technical education	*Pathways to Work Evidence Clearinghouse 2.0*	Kolbe & Levin	Ongoing	Project Page
	Career and Technical Education Research Network		Ongoing	Project Page
	Cost of non-degree workforce credentials	Kolbe	Ongoing	

Exhibit 2. Selected AIR Studies Conducted in Vermont

Topic and Focus	Setting/Summary	Year	Citation/Link
School finance and adequacy	Study of Pupil Weights in Vermont's School Funding Formula	2019	Kolbe et al., 2019
	Study of Vermont State Funding for Special Education	2017	Kolbe & Killeen, 2017
AIR work with Vermont AOE, districts, and schools through the federal Region 1 Comprehensive Center (MA, ME, NH, VT)	Developing Implementation Guidance and Supports for the Early Literacy Blueprint	2024	Project Page
	Using GIS Mapping to Build and Strengthen Coherent Systems of Student Support	Ongoing	Project Page
	Educator Preparation Program Literacy Syllabi Review	Ongoing	Project Page
	Supporting Vermont's Districts to Implement Local Literacy Plans	Ongoing	Project Page
Evaluation of state initiatives	Vermont Enhancing Education Through Technology Statewide Evaluation	2011	Margolin et al., 2011

Team Qualifications

Our proposed study team is an interdisciplinary group that brings together decades of expertise in school finance, special education, and the cost of education programming across various settings. In addition to prior work on Vermont's education finance system, team members have collaborated for many years on studies examining how the cost of an adequate education varies by student needs, program type, and learning environment. This long history of working together ensures both methodological rigor and seamless coordination.

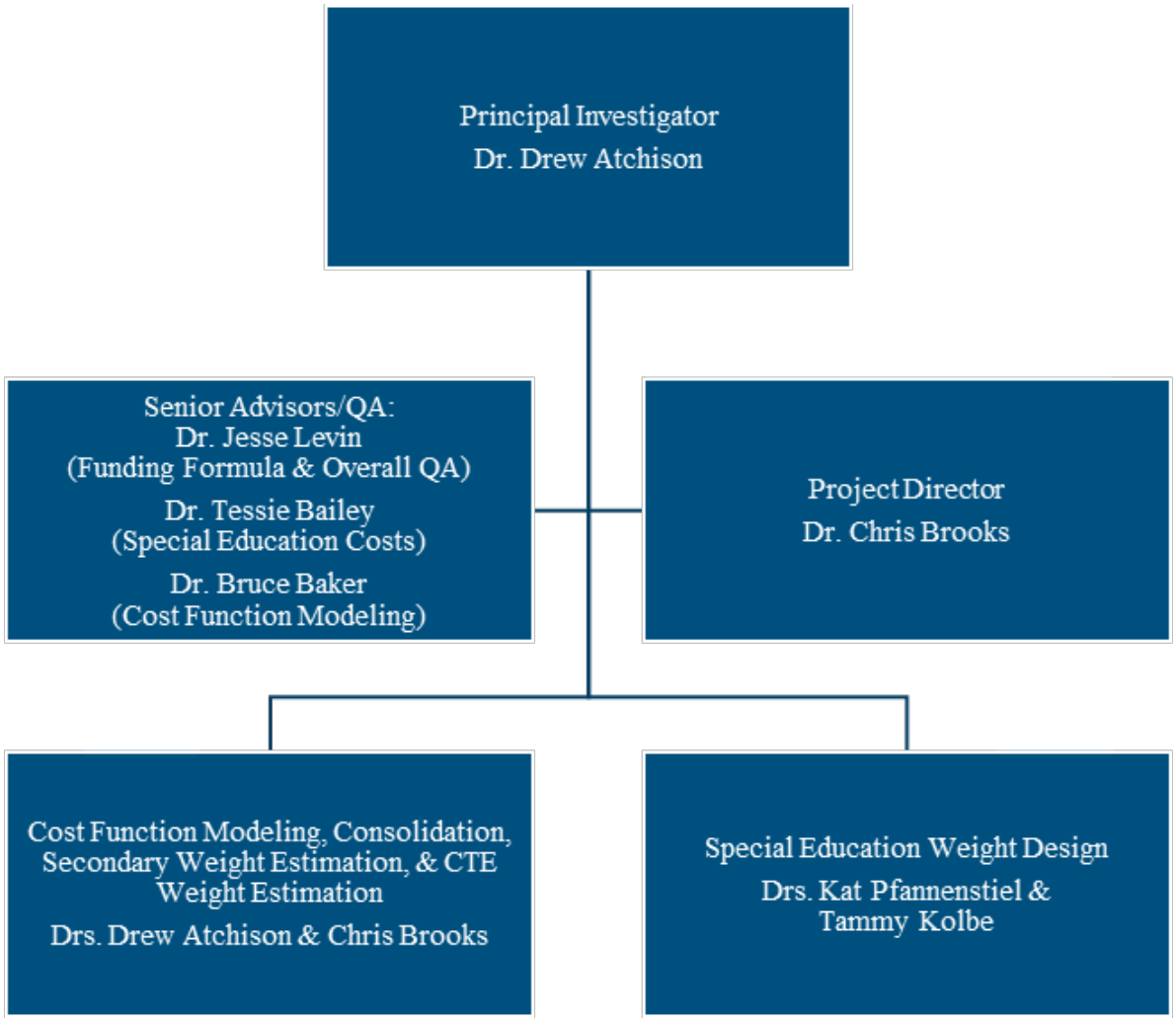
This study will be led by one of the most qualified teams in the nation to conduct education finance analyses and refine state funding formulas. Dr. **Drew Atchison** will serve as principal investigator; he is a nationally recognized expert in education finance and cost function modeling and was part of the 2019 team that conducted Vermont's pupil weighting study. Most recently, he has led studies examining funding adequacy and the design of education funding formulas in Colorado, Delaware, and New Hampshire. Dr. **Christopher Brooks** will serve as project director applying his expertise in project management, education finance, and cost function modeling, having recently directed the study of Oregon's education funding system. Atchison and Brooks will co-lead the cost-function task and several of the subtasks that stem from the cost-function results.

Dr. **Tammy Kolbe** will lead the special education weight design task and is the leading national expert in special education finance. In addition, Kolbe will advise the study team with respect to the state's education policy context as a Vermont resident with deep expertise of education policy within the state. Dr. **Kathleen Pfannenstiel** will co-lead the special education weight design task, contributing deep expertise in special education policy and practice, as well as deep knowledge and experience with Vermont's special education system.

Dr. **Jesse Levin** will serve as quality assurance reviewer; with more than 25 years of experience leading school finance studies across the country, he also contributed to Vermont's 2019 pupil weighting study. Dr. **Tessie Bailey** will serve as a senior advisor for the study's special education cost component. She is a national expert in special education law and policy and regularly consults with states and districts regarding the design and implementation of special education programming. Bailey leads AIR's PROGRESS Center, which helps provide resources, information, and support regarding the development of high-quality individualized education programs (IEPs). AIR's study team will be supported by Dr. **Bruce Baker** from the University of Miami, one of the nation's preeminent scholars in the fields of education finance, design of state funding formulas, and the cost of providing an adequate education. In addition to the study leadership, the team will be supported by several research staff, who will help with data collection and analysis tasks.

Exhibit 3 illustrates key project leadership roles and the organizational structure of the study team. Full biographies for each team member are provided in Appendix A.

Exhibit 3. Project Leadership and Proposed Roles



Project Plan

In this section, we describe our project plan, including how we will address the topics within the Scope of Work, the timeline and deliverables, and our approach to project management and quality assurance.

Response to Scope of Work

We propose to support JFO with developing recommendations for the five undertakings identified by Act 73, and described in the Scope of Work, as well as training JFO and AOE staff on the methodological approach we use to estimate an appropriate base funding amount and weights.

Analysis Plan

The Education Cost-Function Model as a Unifying Approach

Ideally, state education funding formulas are grounded in rigorous research regarding the cost of providing a high-quality education. In the case of a foundation formula, the base funding amount and pupil weights should work together to describe the amount of funding required to provide a high-quality education, where the base describes the minimum cost for students without additional needs served in the lowest-cost educational contexts and the weights describe additional costs for various factors that increase the cost of providing education, including student needs, scale of operations, and other geographic or contextual cost factors.

Estimating a base funding amount and weights should take place within a unifying framework such as an education cost-function model. In particular, estimating a base funding amount and weights depends on how a model is specified and the nuanced operationalization of the variables included in the models. As an example, imagine two competing models for estimating the base and weights. The first model estimates a weight for free- or reduced-price lunch (FRL) of 0.8, meaning students eligible for or receiving FRL cost an additional 80% above the base cost. A second model is identical but also includes a weight for students who experience homelessness. In this model, the estimated weight for homeless students is 1.3 and the weight for FRL is 0.6. In this case, it makes sense that including a weight for homeless students reduces the weight for FRL because both FRL and homelessness are measures of economic disadvantage, and some of the cost assigned to FRL from the first model is accounted for in the weight for homeless students in the second model. Although the weight for FRL changes between the first and second models, the weight in both models is appropriate and valid; however, it is only appropriate and valid when applied within the context of the model that it is estimated.

Put simply, a foundation formula should not be created by piecing together funding parameters estimated through separate independent approaches, as the resulting estimates of funding formula elements may be incompatible. Instead, a unifying approach is required to ensure that the estimation of the base and weights occurs within a model that accounts for the full set of factors included and the potential relatedness and overlap between factors.

We propose to use a cost-function model as the unifying approach to estimating a base funding amount and pupil weights for Vermont's cost-factor foundation formula. Education cost-function

analysis is a statistical approach to examining the amount of funding required to allow all schools or districts the opportunity to meet a target level of educational outcomes, while accounting for the unique needs and contexts in those schools or districts. The education cost-function approach was used in Vermont's *Pupil Weighting Factors Report* (Kolbe et al., 2019), which was conducted by members of the proposed study team and was updated in a limited fashion by Kolbe and Baker (2025) in a memo to the Vermont Legislative Joint Fiscal Office. [2] Importantly, both the original study and the update show that the approach works and results in logical cost differentials that can be used in the design of education funding formulas.

Our proposed approach is grounded in the most rigorous conceptual and empirical research on school funding, and AIR is recognized as the **national leader in cost-function modeling**. Members of our study have advanced the application of this methodology and led the field in applying it to designing state funding formulas, including Vermont's model. This experience positions us to provide the JFO with analyses that are both empirically sound and practically useful, as well as to train JFO staff on its future application in Vermont.

In applying the cost-function approach, we follow a set of best practices that have been developed in our work with other states and established peer-reviewed literature. In line with this work:

- the dependent measure is current operating expenditures per pupil;
- student outcome measures are treated as endogenous and instrumented using measures of the competitive context within which districts operate; and
- inefficiencies in spending are addressed by including controls for variations in fiscal capacity and local public monitoring.

The AIR team is also the first to apply the education cost function using school- versus district-level data, which allows the approach to be used in states that contain small numbers of districts.[3]

The approach we take to cost-function modeling is both valid and methodologically rigorous, reflecting years of peer-reviewed scholarship in cost-function estimation by Duncombe, Yinger, and colleagues (e.g., Duncombe, 2002; Duncombe et al., 2003; Duncombe & Yinger, 1999, 2004, 2011). Our own work applying the education cost-function approach in Vermont also has been published in highly regarded peer-reviewed journals (Kolbe et al., 2021), underscoring

[2] This update was limited to incorporating more recent data but did not modify the underlying models to incorporate recent improvements in modeling and communicating the results. These improvements are described in a subsequent subsection.
[3] An important decision is whether to model education cost functions at the school or district level. Although the district is generally considered the locus of much of the decision-making around budgeting and education finances, educational services and the generation of educational outcomes typically occur in schools. Another advantage of school-level modeling is practical. There are more schools than districts and more variation in student needs and educational outcomes across schools than across districts. As such, particularly in small states, estimating education cost-functions at the school level is advantageous. When estimating school-level cost-function models, we allocate district level spending to schools such that the sum of spending within schools in a district is approximately the same as overall district spending. By doing so, cost estimates from a school-level model can be aggregated to the district. In other words, regardless of whether the education cost-function is modeled at the school or district level, we can apply the results of the model to the district level and generate state funding formula that distributes funding to districts.

AIR's unique expertise in this area and our ability to deliver analyses that meet the highest scientific and policy standards.

Recent Improvements to the Education Cost-Function Approach

In the years since the Vermont pupil weighting study, the AIR study team has taken steps to improve and refine our approach to estimating education cost-function models. These refinements of our approach constitute improvements both in the models themselves and in communicating the model results, including:

- Incorporating multiple outcomes in addition to assessment scores. For example, a recent study in Colorado accounted for graduation and dropout rates as well as attendance and truancy rates.
- More intentional evaluation of existing student outcomes in reference to state goals to determine an appropriate outcome target for use in estimating costs.[4]
- Adjusting estimated weights to account for federal and other categorical funding streams that would not be represented in the main funding formula.
- Analyses and simulations to more clearly show how a modeled funding formula will affect funding levels for certain types of schools and districts compared to how funding is currently distributed.

We will update the education cost-function analyses used in the original 2019 study and the recent update of the model to implement these improved practices and incorporate the most up-to-date data possible.

Strengths and Limitations of the Education Cost-Function Approach

A key strength of the education cost-function approach is that it makes use of the empirical relationship between spending, outcomes, and cost factors. In other words, it is based on actual data and observed relationships. By contrast, other approaches may rely on the assumptions of educational practitioners about what it takes to appropriately educate different types of students in different contexts but are not grounded in empirical data.

A second key strength is that the education cost-function approach includes data on most schools or districts within the actual context of a given state, meaning that the results are representative of the variety of different contexts that occur within the state where we are conducting the study. By contrast, other approaches, such as the evidence-based (EB) approach, may rely on data that are not reflective of the actual educational context of Vermont, making the generalizability of the

[4] One of the key decisions in an education cost-function model is at what level to set the outcome target. Through examination of the state's existing outcome data as well as the state's educational goals and the state's outcomes relative to other neighboring states (e.g., National Assessment of Educational Progress results), we can make an informed judgment as to whether the state's existing outcomes levels, on average, could reasonably be considered adequate. If the conclusion is that the state's existing outcomes are not adequate, we can use the state's goals to inform what level of outcomes would potentially be considered adequate and set an appropriate outcome target. One of the advantages of the education cost-function model is that we can show how cost varies when setting different outcome targets. As such, in cases where the adequacy target is higher than the state's current outcome, we typically model multiple outcome targets consisting of the state average outcome target and at least one higher outcome target to show the difference in cost modeled at different outcome targets.

results questionable. In a state with such a unique educational and geographic context as Vermont, ensuring that the results are applicable within that context is paramount.

A challenge with applying the education cost-function approach is that estimating cost differentials relies on the existence of high-quality data and sufficient variation across schools within the data elements for which cost differentials are estimated. This challenge poses issues for estimating nuanced cost categories that may apply only to a small number of students. For example, estimation of cost differentials for specific categories of students with disabilities or for groups of English learners (EL) differentiated by proficiency levels using the education cost-function approach may be challenging. However, we can use supplemental analyses or existing research on cost differences for certain groups of students to fill in some of the gaps, while capitalizing on the strengths of the education cost-function approach and using the approach as a unifying model to anchor our estimates of a base and weights.

Estimating a Base Funding Amount and Weights for Vermont

Using the cost-function model, we will project the cost required for attaining a given level of outcomes, accounting for the level of student needs and other cost factors for each district or school.

From the projected costs, we subtract funding/spending that would not be incorporated into a funding formula. For example, we subtract the share of the costs that would be expected to be paid for using federal funding sources. Likewise, states may elect to fund certain services, such as transportation, through a separate formula and as a result this spending also should not be considered in the model's projected costs. We will work with JFO to carefully consider what funding streams and associated spending should be included in the main foundation formula governing unrestricted funding allocations (i.e., the base funding amount) and what should be funded separately as categorical programs. For those spending categories that are considered categorical, we will subtract the associated funding amounts to come up with target funding amounts for each school or district that consist of what would reasonably be allocated through a foundation formula.

We will use the projected costs (after subtracting dollars that would not be subject to the main state funding formula) for each district or school as the dependent variable in a simpler weights estimation regression model that incorporates only the cost factors that would likely be used as weights in a funding formula as predictors. Using the simpler weights regression model, we then will estimate base spending levels and funding weights for each student need and district or school characteristic included in the model. The weights included in the final model will be those that are both practical for inclusion (in that the data are or can be made public and are updated on a regular basis) and result in meaningful differentiation of funding across districts. When making our recommendations, we will examine the R^2 value from the weight estimation model to ensure

that the weighting factors included in the final model do a sufficient job in describing the variation in costs.[5]

The base and weights from the final model (representing a formula) then will be used to calculate the amount of funding that will be provided to schools or districts through the formula. Specifically, the base and weights represent the collection of funding parameters for a formula that allocates state funding fairly and will provide an adequate opportunity for all students to achieve the set outcome level, accounting for differences in students' backgrounds, circumstances, as well as the educational contexts in which they learn.

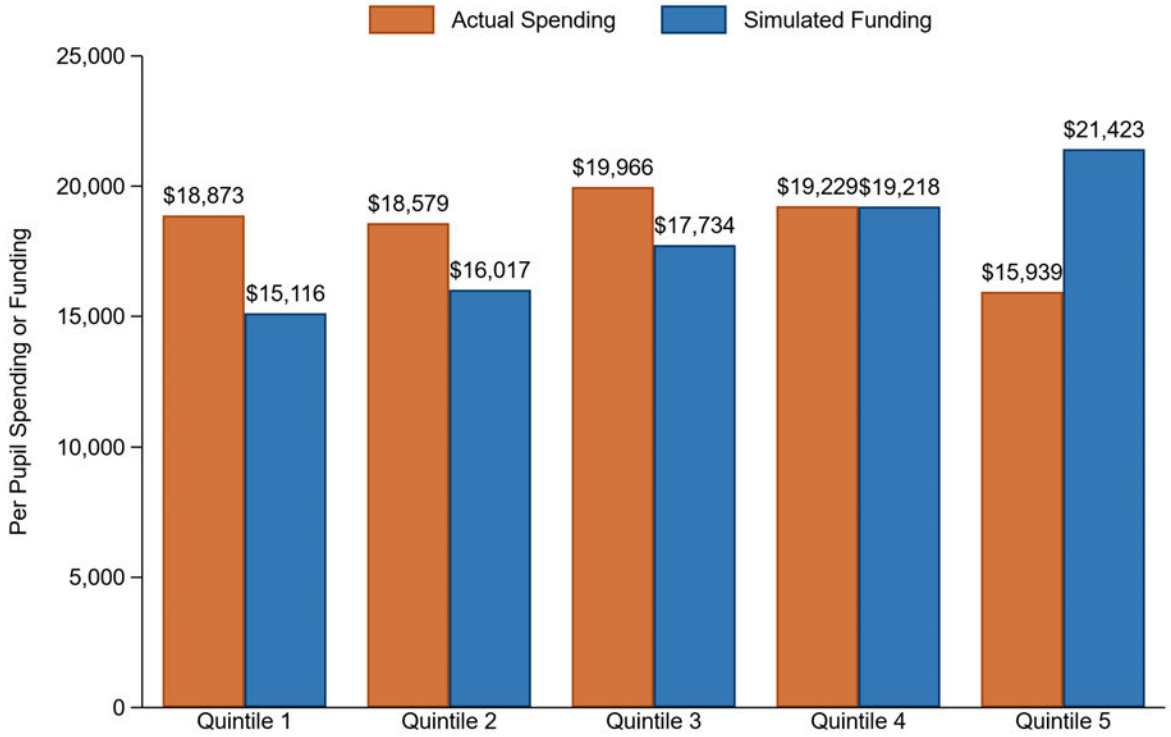
Comparing Cost-Based Funding to Actual Spending

Given the complexity of education cost-function modeling, we recognize the need to convey the results and the implications of the results clearly and in ways that are easy to understand. For instance, the study team will use the base and weights derived from the weight estimation to compare projected adequate funding to existing funding amounts. The findings from this comparative analysis will help guide our study recommendations. Exhibit 4 provides an example data display from the New Hampshire study (Atchison et al., 2020). In the exhibit, we show actual spending and simulated funding based on the estimated base and weights across New Hampshire school districts by free or reduced-price lunch quintile. As demonstrated, there is a nonsystematic relationship between school district poverty rates and actual spending, with the highest poverty districts having the lowest spending, reflecting the disconnect between school funding policy and student needs in New Hampshire. In contrast, the pattern of simulated funding shows a clear relationship between district poverty and education funding, whereby the highest poverty districts are provided with the most funding.

We will conduct similar analyses across multiple cost factors (e.g., ELs, students with disabilities) to help communicate the implications of a funding formula change for schools and districts with varying characteristics. In addition, we will show the projected funding under the recommended formula changes for each district in Vermont in comparison to their actual spending.

[5] In particular, an R^2 value less than 0.85 suggests the selected weights are explaining less than 85% of the cost variation, and that we may have omitted an important weighting factor. Our weight estimation models often have R^2 values well above 0.9. The flexibility of our approach, in estimating a main cost-function model and then a secondary weight estimation model, means that we can explore alternative versions of the weight estimation model including or excluding different weighting factors. However, the final weighting factors must do a sufficient job of differentiating funding based on cost differences.

Exhibit 4. Per-Pupil Actual Spending and Simulated Funding by Free or Reduced-Price Lunch Quintile in New Hampshire



Note. From Atchison et al. (2020), Equity and Adequacy of New Hampshire School Funding: A Cost Modeling Approach. Quintiles were calculated at the district level based on free or reduced-price lunch (FRL) rates. Each quintile represents approximately 20% of the districts in the state (31–33 districts are in each quintile). Quintile 1 represents districts with the lowest FRL rates; Quintile 5 has the highest FRL rates. Averages within quintiles are weighted by enrollment. Calculations are based on data from the New Hampshire Department of Education, 2018–19.

Addressing the Topics in the Scope of Work

We will use the education cost-function model as the central analytic framework to generate overall cost targets for each school or district. We then will conduct supplemental analyses to address the five additional issues described in the Scope of Work. When the supplemental analyses are separate from the education cost-function approach—for example, to estimate more detailed special education weights—we will align the results with the cost-function model benchmarks to determine how the base amount and other weights should be adjusted.

a. Updating special education weights in the cost-factor foundation formula created in Act 73 to move from special education weights based on disability categories to a reliance on the provision of special education services.

A key challenge in implementing Vermont's new cost-factor foundation formula is how to provide supplemental funding for students who receive special education services. Act 73 assigns pupil weights through need-based tiers, with each tier defined by a student's primary disability category as a proxy for the level of services required and their associated costs. This approach is consistent with how most states design need- or cost-based weights, which typically

group students by primary disability. The Legislature, however, asked JFO to examine whether Vermont should instead use the types or quantities of services a student receives as the basis for the needs-based tiers, as a smaller number of states have done by linking funding either to the time students spend in different settings (e.g., Iowa, Texas, Washington) or to the minutes and intensity of services provided (e.g., New Mexico, Tennessee).

Developing weights based on the services students receive or the minutes of service provided will require careful attention to three key considerations.

- **Cost-based estimation:** Like all other weights in the formula, supplemental funding for special education must be grounded in actual costs—that is, it should reflect the cost of providing the services students are entitled to under their individualized education programs (IEPs). However, the field lacks rigorous cost estimates tied to placement or service minutes. Instead, existing special education cost studies, in Vermont and nationally, have examined costs based on students' primary disability categories. Developing cost-based weights for Vermont would therefore require generating new evidence that links costs directly to the provision and intensity of services, independent of a student's disability classification.
- **Implementation feasibility:** One reason many states continue to use primary disability as a proxy for need is that this information is required to be reported under the federal Individuals with Disabilities Education Act (IDEA) and documented in students' IEPs. Because it does not require new or additional reporting, using student disability classification in state funding formula avoids placing added burdens on districts and schools. By contrast, a system based on service delivery or minutes of services would need careful design to avoid significant new reporting requirements or excessive burdens, such as those created under past Vermont policies that required districts to keep detailed time logs for each student.[6]
- **Avoiding incentive effects:** The Legislature's request reflects concerns from the field that tying funding to disability categories—even when grouped into need-based tiers—may create incentives for districts to classify students into higher-need categories to generate more funding. In truth, all special education funding systems carry some potential for incentive effects, and any recommendation for a service-based approach will need to account for this reality (Kolbe & Dhuey, 2021; Kolbe, 2021). Particular care is required when linking funding to placement or to the services a student receives, since federal law explicitly prohibits such mechanisms. Under IDEA, state funding systems "shall not" result in placements that violate requirements for serving students with disabilities in the least restrictive environment (§ 1412(a)(5)(B)(i), U.S. Code Title 20). Funding approaches cannot create conditions that undermine a child's right to a free appropriate public education (FAPE) based on their unique needs as described in the IEP.

We propose to partner with the PROGRESS Center, a national technical assistance center operated by AIR and funded by the U.S. Department of Education, to develop cost-based estimates for special education that are grounded in service delivery rather than disability categories.[7] The PROGRESS Center was established in response to the *Endrew F.* decision to

[6] Eliminating the burden associated with keeping and then reporting detailed time logs was a key goal of Vermont's Act 173, which previously revised the state's special education funding formula and moved the formula from a reimbursement to a census-based funding model.
[7] For more information on AIR's PROGRESS Center, see: https://promotingprogress.org/home.

help educators design high-quality IEPs that ensure students with disabilities FAPE and these students can make meaningful academic progress. As part of its work, the Center already has developed a robust database of best practices and model IEPs that reflect the services students with a wide range of needs should receive. Leveraging this federal investment provides Vermont with access to a nationally vetted evidence base, reduces costs to the state, and ensures that the proposed methodology aligns with IDEA and best practice in special education.

Our proposed approach will proceed in six steps:

1. **Develop model IEPs:** We will first construct a set of hypothetical student profiles with different disabilities and representing a broad spectrum of service needs. Drawing on the PROGRESS Center's best practices work, we then will develop model IEPs for each hypothetical student, ensuring they specify the types and intensity of services that students with similar needs should receive to make appropriate progress.
2. **Vet with Vermont practitioners:** We will convene a panel of experts, including special education professionals from across the state and parent/family representatives (e.g., Vermont Special Education Advisory Panel). This panel will review the model IEPs—particularly the services and supports recommended by best and evidence-based practices—to ensure they reflect Vermont's context and priorities.
3. **Cost out the IEPs:** We will apply a resource-cost modeling approach—the method used in national special education cost studies (i.e., *Special education Expenditure Project* and *National Study of Special Education Spending*), and other rigorous state-level special education cost studies (e.g., Ohio)—to estimate the cost of implementing each model IEP. This process involves enumerating the resources needed and assigning a dollar value to each. In Vermont, we will use state-specific resource prices, such as local labor rates, and will account for how costs vary across districts depending on the size and scale of their special education programs. We also will examine how costs for higher-need students may differ if services are delivered through regionalized approaches (e.g., BOCES).
4. **Create cost-based tiers:** We will develop two cost-based tiers that can be used in the state's cost-factor foundation formula. One set will group IEPs according to the types and quantities of services provided, and the other will group IEPs based on the number of minutes of services. In each case, tiers will be defined by their average IEP cost and described in terms of the services and supports they represent. This dual approach will allow Vermont to assess the advantages and trade-offs of different ways of structuring service-based funding weights.
5. **Develop practical metrics:** Once the cost-based tiers are developed, we will re-engage the expert advisory panel to identify and refine the metrics that districts and schools will use to assign students to a tier of service for purposes of receiving state funding. Careful attention will be paid to minimizing the reporting burden and avoiding potential incentive effects, particularly those that could conflict with IDEA requirements for placement in the least restrictive environment.
6. **Inform the funding formula:** After estimating special education costs by student need category, we will incorporate those estimates into our weight estimation model. The model then will adjust the base amount and other cost factors to align with overall cost targets from the cost-function model, while keeping the special education cost adjustments fixed. This

approach ensures that service-based estimates for special education are preserved within a formula that remains consistent with the broader cost-function framework.[8]

b. Updating any other weights in the cost-factor foundation formula to be empirically necessary for an adequate and equitable education, taking into account cost savings generated by new, larger consolidated districts.

When districts and/or schools consolidate, there may be cost savings because of economies of scale and reducing the inefficiency of very small districts. Studies suggest that moving from very small district to a district of 2,000 students or more would result in cost savings, and that elementary schools of 300–500 students and high schools of 600–900 students may be optimally sized (Andrews, Duncombe, & Yinger, 2002).

We will use the cost-function model results to identify the relationship between district and school size and cost within the context of Vermont. We will then use these relationships to estimate how costs might change with district and/or school consolidation. For example, if two districts with 500 students each consolidate into a district of 1,000 students, we can identify how the expected cost of the consolidated 1,000-student district compares to the cost of the two separate 500-student districts by applying the estimated cost parameters to the districts' characteristics under the two scenarios.

Vermont is largely a rural state. As such, consolidation of districts and/or schools may make sense only when districts and/or schools are in relative proximity. If travel distances for students and staff become prohibitively far under a consolidation scenario, that may limit the benefits of consolidation. As such, we will work with the Vermont JFO to identify reasonable assumptions and scenarios regarding which districts and/or schools would be appropriate candidates for potential consolidation. We then will estimate the cost savings from those scenarios, modeling the consolidation of schools and/or districts by applying the cost-function model parameters to the consolidation scenario, and comparing the results to the business-as-usual scenario. These scenarios, however, would not result in changes to the base and/or weights, but would simply model how costs and funding levels would change as schools and/or districts became larger, meaning that they would receive a different cost adjustment under the scale-weighting category.

We also will approach this task from the opposite angle and work with JFO to identify a target for cost savings that the state would like to realize. We then can work to develop a model scenario where consolidation achieves the targeted calculated savings. After identifying a scenario that would achieve that level of cost savings, we then will evaluate the feasibility of implementing such a scenario and the challenges it would pose.

As an additional exercise to explore the cost implications of consolidation, we will analyze expenditure data within certain categories of spending to understand which types of expenditures may be most sensitive to economies of scale. Some types of resources represent fixed costs: those that are constant regardless of whether a district enrolls more students. For example,

[8] Performing this step of modeling the application of weights requires that data on student enrollment by the developed needs categories are available. In the short term, assuming data on need for the categories developed in Step 5 are unavailable, we will develop approximate numbers of students by need categories based on available data on students by disability category, least restrictive environment placement, and other data that might inform differences in need for students with disabilities across schools and districts.

assuming each school requires a principal, and that the principal gets paid the same amount regardless of whether the school enrolls 200 students or 500 students, the cost of principals within a school represents a fixed cost. Fixed costs decrease on a per-pupil basis as enrollment increases. The cost of a principal with $200,000 in salary and benefits is $1,000 per student in a school with 200 students and is $400 per student in a school with 500 students. By contrast, variable costs are those that increase with student enrollment. For example, a school with a 1:1 computer initiative requires an additional computer for each student enrolled. As such, this represents a variable cost with the school spending more on computers overall as enrollment increases. On a per-pupil basis, variable costs do not change with enrollment because the overall costs go up or down proportionally to enrollment. Many costs may not be fully fixed or variable but are somewhere in between. Fixed costs, and those more on the fixed side of the continuum between fixed and variable, are the costs that are potentially most responsive to consolidation.

Using spending data, we can examine the relationships between how much schools and districts spend per pupil within certain categories and district and/or school enrollments. For example, we can isolate how much is spent on salaries for staff providing instruction and determine the extent to which spending per pupil within this category is related to district or school size. Using the relationships between expenditures by category and district and school size, we can project how spending within each of these categories would be expected to change because of district and/or school consolidation, based on the same assumptions and scenarios of consolidation described above. As such, we will have two separate analyses to describe the potential cost savings of consolidation, one based on the results from the cost-function analysis, and one based on existing patterns of spending across schools and districts within various spending categories.

c. Recommending suitable geographic measures for determining sparsity within the foundation formula.

A recurring finding in Vermont's prior cost studies—as well as in research and policy in other states—is that operating small schools in sparsely populated areas presents unique cost challenges (e.g., Kolbe et al., 2021). Schools in rural contexts often face higher per-pupil costs due to the limited scale of their operations or higher resource prices tied to location. A central challenge in implementing a foundation formula that accounts for differences in costs due to a school's location is determining the most reliable geographic measure of population density. While pupil weights can be used to adjust for higher costs in rural areas, the accuracy of such adjustments depends on selecting a measure that correctly identifies schools and districts that are truly operating in sparse contexts.

To address this challenge, the study team will evaluate and compare a range of possible measures of sparsity, clearly identifying the trade-offs between different approaches. Potential measures to be examined include:

- **Population density:** Number of residents per square mile within a defined geographic area, such as a district.
- **Enrollment density:** Number of students per square mile within a defined geographic area.
- **Locale codes:** Classifications from the U.S. Department of Education's National Center for Education Statistics.

- **Driving distances or times:** Proximity from schools or district offices to the nearest city or metropolitan area.

Working in consultation with the Vermont JFO, the team also will identify any additional candidate measures that may be particularly relevant in the Vermont context.

Once a set of potential measures is established, our analysis will proceed in five steps:

1. **Policy scan:** Examine how other states account for sparsity in their funding formulas.
2. **Descriptive analysis:** Examine how each measure varies across Vermont schools and districts.
3. **Comparative analysis:** Assess correlations and relationships between measures to understand where they converge or diverge.
4. **Case identification:** Identify schools or districts where different measures yield conflicting conclusions about sparsity.
5. **Recommendation development:** Evaluate each measure based on empirical findings, ease of data collection and calculation, and conceptual appropriateness, and then recommend the most suitable measure(s) for Vermont.

Finally, we will incorporate the recommended sparsity measure(s) into the cost-function and/or weight estimation models to evaluate their impact on weights and funding projections for districts. This step will provide policymakers with clear evidence on both the conceptual and fiscal implications of different approaches to defining sparsity.

d. Determining whether it costs more to educate a secondary student than an elementary student in Vermont and, if so, recommending an appropriate weight to capture the cost differential.

A guiding principle of Vermont's cost-factor foundation formula is that it should adjust only for those factors outside of a district's or school's control that require additional resources to achieve common outcomes. For this logic to extend to secondary students, there must be evidence that educating students in high school grades to common standards costs more than educating students in elementary and middle grades, all else equal.

The 2019 *Study of Pupil Weights* found that districts did face higher costs to educate middle- and secondary-level students, which led to the inclusion of new tax capacity weights in prior funding formula. However, updated analyses conducted in Spring 2025 suggested that these cost differences no longer existed, [9] and the current cost-factor foundation formula does not include weights for grade level. The Legislature now has asked the JFO to carefully examine whether it does in fact cost more to educate students at these grade levels, and if so, to recommend an appropriate weight.

[9] The updated model did include more recent data but did not update the approach incorporating more recent advancements in modeling described previously. These advancements include the incorporation of multiple outcome measures, which may be particularly important for high schools. High schools may focus on measures other than achievement, such as graduation and college matriculation. In addition, test scores may be less reliable due to testing in fewer grades and a switch to subject-specific coursework (particularly in mathematics).

To address this question, our approach is twofold. First, we will conduct a review of recent adequacy and cost studies in other states to examine whether evidence exists regarding the additional costs of educating secondary students compared to elementary students in other contexts. Second, we will use the education cost-function model, updated with the most recent data and methods, to estimate the differential cost of serving students at the elementary (K–5), middle (6–8), and high school (9–12) levels in Vermont. While the review of other cost studies will provide valuable context, we expect the Vermont-specific cost-function estimates to yield the most relevant and rigorous evidence for determining whether additional grade-level weights are warranted in Vermont's funding formula.

e. Recommending how to account for the provision of Career and Technical Education (CTE) within Vermont's funding formula.

A central challenge for Vermont's cost-factor foundation formula is determining how to fund CTE in a way that reflects the true costs of providing high-quality programs. In prior analysis, an Augenblick, Palaich and Associates (APA; 2025) study of CTE in Vermont acknowledged that CTE program costs likely vary substantially, with pathways such as aviation maintenance technician and auto body repair requiring far more resources than lower-cost programs such as teacher education, business/accounting, or cosmetology. APA noted that developing program-specific weights would be a reasonable approach but did not pursue it because Vermont's financial accounting system could not disaggregate expenditures by program type and budgetary data provided by CTE centers were too inconsistent to facilitate analyses. Instead, APA calculated a single average cost for CTE centers based on overall CTE program spending, reasoning that all CTE centers operate a mix of higher- and lower-cost programs, and therefore costs would balance out within each center.

This approach, while pragmatic given the data constraints, is insufficient and problematic. By averaging across programs, it obscures meaningful cost variation, creating two risks: first, it disincentivizes centers from maintaining or expanding higher cost programs, and second, it fails to ensure that funding adapts if the balance of program enrollments shifts over time. In short, APA recognized the limitations of its approach but opted for a simplistic single weight largely based on convenience.

Our team recognizes that determining the cost of CTE is inherently complex: the cost structures of CTE programs differ substantially from traditional schooling and from one another, and the student outcomes valued in CTE may not align with traditional academic outcomes. Further, the state's data on student outcomes do not include CTE centers—student outcomes are attributed to their home high schools—making outcome-based analyses especially difficult. Because of these issues, CTE centers were excluded from the cost-function modeling in both the 2019 Pupil Weighting Factors Report (Kolbe et al., 2019) and its more recent update.

To address these challenges, we propose a two-pronged approach to estimate the additional cost of CTE programs.

1. **Cost-function modeling:** We will include CTE in the cost-function model to generate an overall weight for CTE participation relative to other students, assuming common educational outcomes. To do so, we will allocate spending from CTE centers back to the sending schools based on the proportion of each CTE center's enrollment by sending school.

We then will estimate the percentage of each sending school's enrollment in CTE programs, accounting for whether students are full-time or part-time in CTE programs. We then can include the percentage of enrollment in CTE programs within the cost-function and weight estimation models to estimate an overall weight for CTE programming. We successfully estimated a funding weight for CTE using the cost-function approach in our recent Delaware study (Atchison et al., 2023).

2. **Resource-cost modeling of CTE pathways:** We will work with JFO to identify the CTE pathways that both serve the largest number of students and are most closely aligned with Vermont's labor market priorities. For these programs, we will identify the resources required to operate them at scale—such as staffing ratios (preferred or required), specialized equipment, and infrastructure—using a resource-cost modeling approach. We will develop annualized cost estimates on a per full-time-equivalent (FTE) student basis, assuming ideal program sizes. To build these resource packages, we will use two complementary approaches: (a) interviews with Vermont educators and CTE program leaders to capture field-based realities, and (b) analyses of recently available national data and cost calculators (e.g., the Credential Engine's credential database[10]) to provide standardized resource-based estimates. As such, we will conduct additional analyses to estimate the relative differences in cost across programs, demonstrating how the costs of accredited CTE programs vary by type. Using this information, we will model a set of program-specific CTE weights that are adjusted based on the relative cost differences of each CTE program, with the CTE weight estimated from the education cost-function model serving as a benchmark for what the average weight across programs should be.

Modeling and Training

Estimates of cost informing education funding formulas should occur on a somewhat regular basis (e.g., every 5 years or so) to ensure that the parameters included in the funding formula are up-to-date and adjust to changes in contexts, student needs, and educational delivery models. As such, it is important that Vermont develop the capacity to continue this work independently, with support from outside organizations being provided on an as-needed basis. To that end, a key component of the project plan is providing training to JFO and AOE staff on the approach and methodology used to complete the analyses for the study.

This process will begin by ensuring that data and analyses files are well organized and clearly documented, so that the files are easily understandable, interpretable, and useful for JFO and AOE staff. Along with the analyses files, we will provide a written directory and guide describing the various analyses files, their organizational structure, and instructions on how to replicate the analyses using the files.

After delivery of the files, members of the AIR study team will conduct a virtual training session with JFO and AOE to discuss the methodology, walk through the analyses files, and answer any questions that JFO and AOE may have related to the files and methods. This training session will take place no later than January 15, 2027. In addition, members of the AIR study team will be available to answer follow-up questions and troubleshoot technical issues with JFO and AOE staff through June 2027.

[10] See: https://credentialengine.org

Project Management and Quality Assurance

[redacted]

Project Deliverables and Timeline

The project deliverables will occur as laid out in the Request for Proposal, and will include the following:

- **Work plan:** We will develop a plan for how the study team will complete all analyses and deliverables. The work plan will include a description of the methodologies and a timeline for completing the analyses and providing the deliverables.
- **Preliminary analysis, findings, and recommendations:** We will complete initial analyses and provide JFO preliminary results and recommendations from the analyses. The intent of this deliverable will be to solicit feedback from JFO with sufficient time to refine analyses and update findings and recommendations prior to the draft report.
- **Draft report:** We will develop a comprehensive draft report, documenting all analyses and methodologies, findings, and recommendations. The intent of the draft report will be to solicit feedback from JFO to guide subsequent revisions to the report.
- **Analysis, findings, modeling, and updated draft report:** We will update the draft report based on feedback from JFO. In addition, we will provide JFO with data analysis files and documentation on the analysis files. The intent of the updated draft report will be to solicit any final feedback on the report prior to delivery of the final report.
- **Final report:** We will update the draft report based on final feedback and provide a final report documenting all study analyses and methodologies, findings, and recommendations.
- **Training and support:** In addition to the analysis files provided under *analysis, findings, modeling, and updated draft report* deliverable, we will conduct a one-day virtual training session with JFO and AOE staff on the methodologies used in the study. We also will be available following the training to answer questions and provide additional support on an ad hoc basis.
- **Testimony:** Leaders of the study team will be available for legislative testimony. We have budgeted up to three trips for the principal investigator to travel to Vermont to present study findings and provide testimony. We also have one leader of the study local to Vermont. The study leaders could conduct additional meetings on a virtual basis, if necessary.

The work plan will be created at the outset of the project (assuming a start date before the end of October 2025). The next major deliverable is the preliminary results shared with JFO by July 1, 2026, with report drafts completed in the fall of 2026, and the final report delivered by December 1, 2026. Following the final report, we will engage in training and support with JFO and AOE around the modeling and methodologies and will be available for legislative testimony through June 2027.

This timeline means that the bulk of analyses will need to occur between the start of the project and the preliminary results deliverable. Following the presentation of preliminary analysis, the latter half of the project will focus on refining and finalizing the analyses and reporting. Exhibit 5 lays out the timeline for the various analyses and deliverables.

Exhibit 5. Timeline of Analyses and Deliverables

Task Type	Tasks	2025			2026												2027					
		O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J
Analysis	Data collection	■	■	■																		
	Data cleaning and preparation		■	■	■																	
	Identification of suitable geographic measures			■	■	■																
	Estimating the cost-function model					■	■	■														
	Updating special education weights		■	■	■	■	■	■	■													
	Investigating the cost of educating secondary students							■														
	Cost savings of consolidation							■	■													
	Estimate the cost of CTE pathways					■	■	■	■	■												
	Refine and complete analyses										■	■	■									
Deliverables, Reporting, and Dissemination	Develop and finalize work plan with JFO	■																				
	Develop and submit preliminary results to JFO								■	■	■											
	Develop and submit draft report to JFO										■	■	■									
	Develop and submit updated draft report to JFO												■	■	■							
	Develop and submit final report to JFO														■	■						
	Training to JFO/AOE on modeling and methodologies															■	■					
	Legislative testimony and available for training clarifications																■	■	■	■	■	■

Data Sets and Models

The main analytic approach used in this study will be the education cost-function approach, which will be supplemented with additional analyses as described in the *Project Plan: Response to Scope of Work.*

The data required for this study largely consist of school- and district-level data on (a) education spending, (b) student outcomes (e.g., assessment scores, graduation rates, attendance, absenteeism), (c) enrollments and student demographics, and (d) other geographic and contextual characteristics that affect costs. In our experience conducting similar studies in other states, these data generally are not sensitive and are, for the most part, publicly available.

For purposes of transparency, it is our preference to work with publicly available data when possible. We will thoroughly review the publicly available data to determine the suitability of the data for the study. However, not all data necessary for this study may be in the already downloadable files on the state's website.[11] As such, we will develop a *Request for Data* that will document any additional data needed for the study that we can provide to JFO.

In addition, we require data that have been relatively consistently collected and reported over several years. In the 2019 Pupil Weighting Factors report, school-level data were used for all years since 2008–09. So, we anticipate that data could be used going back to 2008–09. However, we may elect to focus our analyses on a set of more recent years, given the changing contexts, student needs, and educational demands over the past 15 years. In addition, improvements in data collection infrastructure and technology may increase the data quality from more recent years. At the outset of the study, we will provide JFO with a comprehensive inventory of data requested for the study, which we will discuss with JFO prior to any efforts taken on the part of JFO or staff in other agencies to provide the data. Below, we describe the data needed in more detail.

Education Spending and Resources

We require detailed education spending data that allow for calculation of spending by school and by district. In addition, to facilitate the analysis of expected changes in cost in consolidated districts, we will need data that allow for categorization of spending in a variety of ways, such as by function (e.g., the activity that expenditures are supporting, including instruction and administration) and by object (e.g., the type of resource that is purchased, such as staff salaries, benefits, and nonpersonnel resources). In addition, to facilitate inclusion of analyses of CTE costs, we will need to be able to identify expenditures for CTE centers (which we assume is feasible, given the 2025 APA report on CTE).

We also will require data on staff compensation for different types of staff. These data will be necessary for more nuanced resource cost modeling for the project components aimed at

[11] If required data are restricted or sensitive, AIR takes great precaution in ensuring the confidentiality of data. Our team will develop a data governance plan that will identify the staff who have access to the data and a plan for communicating expectations regarding data use to project team members who will be working with the data. In addition, AIR stores all project data on secure/encrypted servers with limited access to only designated staff and all analysis activities using the sensitive data take place within the server.

developing needs-based weights for students with disabilities and for program specific weights for CTE.

Student Outcomes

We anticipate using publicly available data on school-aggregated student outcomes from the *Vermont Education Dashboard.* Specifically, the *Vermont Education Dashboard* includes data on assessment scores, graduation, attendance, truancy, chronic absenteeism, and student discipline. We will consult with JFO regarding additional measures of student outcomes that may be of interest for use in the study but are not available on the Dashboard.

Student Enrollment and Demographics

We will use school-level data on student enrollment and demographics. These data include student enrollments by school; grade; proportions of students in various demographic categories including by income levels (FRL percentage); EL rates; and students with disabilities percentages. Given that the legislation differentiates funding for ELs by proficiency levels, we also will require data on ELs by proficiency levels. In addition, to conduct the deeper investigation of special education costs and weights, we will require detailed data on students with disabilities by school according to whatever categorizations of need may be available. Lastly, to conduct the investigation into CTE costs and funding, we will require data on CTE enrollments by sending school and CTE center.

Other Geographic and Contextual Characteristics

Our studies often use publicly available data (including data on geographic sparsity) to describe the geographic and contextual characteristics of schools. As geographic sparsity is a particular interest for this study, we will work to identify as much publicly available data to describe geographic sparsity as possible. These data include information on population size, district size, federal data collections on sparsity, and other aspects. In addition, we can use data on locations of cities of a certain size to estimate driving distances and driving times between a given school and/or district and the nearest city. We also will work with JFO to identify the existence of any state-specific data or measures that may describe geographic sparsity.

Additional Data Collection Efforts

We will also collect a limited amount of primary data through interviews and feedback from expert panelists. These data are necessary to develop a more nuanced understanding of cost for specific student populations and programs–namely for students with disabilities and CTE programs. Participation in these primary data collection activities will be voluntary. We plan to provide expert panelists for the special education weight design component with $500 stipends to encourage participation and to compensate panelists for their time. All primary data collection efforts will be reviewed by AIR's Institutional Review Board.

Business References

We provide information on three clients with whom we have worked in the last three years on projects similar in scope to the proposed study. Each reference is able to speak knowledgeably about our performance.

[redacted]

Pricing

AIR has made every effort to allocate adequate budget resources to conduct high-quality tasks and activities that are reasonable in relation to the objectives, design, and potential significance of the proposed project. For the 20-month period of performance outlined in the Request for Proposal, AIR proposes a total fixed price budget of $400,000 with a period of performance from October 30, 2025, to June 30, 2027. AIR's proposal is predicated on the information in the Request for Proposal about the project requirements and AIR's technical approach and assumptions to fulfill these requirements. Actual price may change once the scope of work is negotiated or finalized.

The proposed price includes all resources and expenses needed to complete the required tasks and deliverables. The staffing configuration proposed for this project reflects the required level of staff necessary to perform the project tasks, including time for AIR's quality review and editing processes, project management, and regular communication with JFO regarding study progress. Exhibit 6 presents the proposed project by deliverable.

Exhibit 6. Proposed Price by Deliverable

We present our detailed budget by year and deliverable that includes the proposed AIR staff's billing rates in the exhibit that follows the budget narrative (Exhibit 7).

Budget Narrative

In this section, we describe the resources included in the price for each deliverable.

Deliverable 1: Work Plan

This deliverable includes staff hours to develop the work plan.

Deliverable 2: Preliminary Analysis, Findings, and Recommendations

This deliverable includes staff hours to conduct all analyses described in the *Analysis Plan* subsection of the *Project Plan,* as well as develop a presentation to share preliminary findings and recommendations with JFO. In addition to staff hours, this deliverable includes stipends for eight individuals to participate in the panel of experts for the special education weight estimation portion of the analysis plan. We also have included in the budget annual licenses for the statistical analysis software required for completing the described analyses. Lastly, we have budgeted for our expert consultant, Bruce Baker, to contribute to related activities.

Deliverable 3: Draft Report

This deliverable includes staff hours to develop the draft report. We also include Bruce Baker, our expert consultant, to contribute to and review the report in the budget as part of this deliverable.

Deliverable 4: Updated Draft Report

This deliverable includes staff hours to update the draft report in response to feedback from JFO.

Deliverable 5: Final Report

This deliverable includes staff hours to finalize the report in response to feedback from JFO.

Deliverable 6: Training and Support

This deliverable includes staff hours to organize and document the data and analysis files, provide a written directory and guide for the files, and provide instructions on how to replicate the analysis with the files. In addition, we have included staff hours to conduct a one-day virtual training with JFO and AOE staff on the methodology used in the study. We also included time to respond to ad hoc questions and requests that may occur following the training session.

Deliverable 7: Legislative Testimony

This deliverable includes staff hours to present study findings to the Vermont legislature. We have also included travel for the principal investigator, Drew Atchison, to travel up to three times from Washington, DC, to Montpelier, VT.

Exhibit 7. Detailed Budget by Year and Deliverable

Proposed Payment Schedule

Notwithstanding any budgetary information provided herein, payment for services will be provided on a firm fixed-price basis. The total amount to be paid will be $400,000. Invoices will note the deliverable being billed, and AIR will invoice according to the timeline in Exhibit 6. AIR understands that this schedule is subject to change based on final negotiations with JFO.

Validity

This offer is good for 120 days from the date of submission. AIR reserves the right to review its submitted pricing to determine additional period(s) necessary for extension of the offered pricing or to revise its price quote after expiration of 120 days or any subsequent offered validity period(s).

References/Citations

Andrews, M., Duncombe, W., & Yinger, J. (2002). Revisiting economies of size in American education: Are we any closer to a consensus? *Economics of Education Review*, *21*(3), 245–262. https://doi.org/10.1016/S0272-7757(01)00006-1.

Augenblick, Palaich and Associates (APA), Inc. (2025). *Vermont Career and Technical Education Governance and Funding Recommendations*.

Atchison, D., Levin, J., Baker, B., & Kolbe, T. (2020). *Equity and adequacy of New Hampshire school funding: A cost modeling approach.* American Institutes for Research. https://carsey.unh.edu/sites/default/files/media/2020/09/20-12685_nh_final_report_version_v5_draft_1.pdf.

Atchison, D., Levin, J., Fatima, S., Trauth, A., Srikanth, A., Heberle, C., Gannon-Slater, N., Junk, K., Wallace, L., & Baker, B. (2023). *Assessment of Delaware public school funding*. American Institutes for Research. https://education.delaware.gov/wp-content/uploads/2023/12/Delaware_Appendices-combined-102723.pdf.

Duncombe, W. (2002). *Estimating the cost of an adequate education in New York* (Center for Policy Research Working Paper No. 44). Syracuse University. https://surface.syr.edu/cpr/114/

Duncombe, W., Lukemeyer, A., & Yinger, J. (2003). Financing an adequate education: A case study of New York. In W. Fowler (Ed.), *Developments in school finance: 2001–02* (pp. 127–154). U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics. https://oasis.library.unlv.edu/cgi/viewcontent.cgi?article=1252&context=sea_fac_articles.

Duncombe, W., & Yinger, J. (1999). Performance standards and educational cost indexes: You can't have one without the other. In H. F. Ladd, R. Chalk, & J. S. Hansen (Eds.), *Equity and adequacy in education finance: Issues and perspectives* (pp. 260–297). National Academy Press. https://nap.nationalacademies.org/read/6166/chapter/10.

Duncombe, W., & Yinger, J. (2004). *How much more does a disadvantaged student cost?* (Center for Policy Research Working Paper No. 60). Syracuse University. https://dx.doi.org/10.2139/ssrn.1810836.

Duncombe, W., & Yinger, J. (2011). Are education cost functions ready for prime time? An examination of their validity and reliability. *Peabody Journal of Education*, *86*(1), 28–57. https://doi.org/10.1142/9789811201615_0006.

Kolbe, T., Baker, B., Atchison, D., Levin, J. (2019). *Pupil weighting factors report.* Vermont Agency of Education. https://legislature.vermont.gov/assets/Legislative-Reports/edu-legislative-report-pupil-weighting-factors-2019.pdf.

Kolbe, T., Baker, B., Atchison, D., Levin, J. & Harris, P. (2021). The additional cost of operating rural schools: Evidence from Vermont. *AERA Open*, *7*(1), 1–16. https://journals.sagepub.com/doi/10.1177/2332858420988868.

Kolbe, T. & Baker, B. (2025). Updated cost estimates and recommended weights for a student-based funding formula in Vermont. https://laurasibiliavt.com/wp-content/uploads/2025/04/wtammy-kolbeweighting-update-memo4-3-2025.pdf.

Kolbe, T. & Dhuey, E. (2022). Motivational effects and public funding for special education. In Killeen & Downes (Eds.) *Recent Advancements in Education Finance and Policy.* United States: Information Age Publishing, Incorporated.

Kolbe, T. (2021). State funding for special education: Aligning policy with priorities. *Journal of Special Education Leadership, 34*(1), 19.

Appendix A. Staff Biographies

Proposed Staff Biographies

Drew Atchison, **EdD**, proposed principal investigator, is a principal researcher at AIR. His primary responsibilities include quantitative analysis on a wide range of projects examining topics such as education finance, educational equity, and accountability. In his time at AIR, he has helped conduct many studies related to school finance, including adequacy studies examining the cost of education in California, Colorado, Delaware, New Hampshire, and Vermont. As part of these studies, Dr. Atchison led quantitative analyses examining how the cost of education varies across different types of schools and districts based on the students they serve and other school or district contextual cost factors. He also led several tasks for a study examining the cost of serving students with disabilities in Ohio, and how costs differ for students with different types of disabilities. Dr. Atchison was the lead author for an article titled *The Costs and Benefits of Early College High Schools*, which was recognized as the best article in the journal *Education Finance and Policy* in 2021. For his dissertation research examining how accountability policies have impacted educational equity of inputs as well as outcomes, he was awarded the Jean Flanigan Outstanding Dissertation Award from the Association of Education Finance and Policy. Dr. Atchison has published articles in top education research journals, including the *Journal of Research on Educational Effectiveness*, *Education Finance and Policy*, *AERA Open*, and *American Educational Research Journal.* He completed his doctorate degree in Education Policy from The George Washington University in 2017.

Christopher D. Brooks, **PhD**, proposed project director, is a researcher at AIR. Dr. Brooks' research focuses on how educational resources and policies can be distributed to promote educational opportunities for all students. He uses quantitative analyses on administrative data to address the topics of education funding equity and adequacy and promoting more equal access to effective teaching. To this end, he has led and supported research on school finance distributions and systems in collaboration with state education agencies, legislators, and other stakeholders in California, New York, North Carolina, Ohio, and Oregon. Dr. Brooks is also an expert on economic evaluation of social policy and interventions, leading cost and cost-effectiveness studies on interventions related to social-emotional learning, school-community partnerships, and community college dual enrollment programs. He holds a PhD in Education Policy, Leadership, and School Improvement from the University of North Carolina at Chapel Hill.

Tammy Kolbe, **EdD,** proposed special education weight design lead and state policy expert, is a principal researcher at AIR. Dr. Kolbe's research focuses on the resources and costs associated with effectively implementing policies and programs in preK–16 educational organizations, and how educational resources can be distributed to promote goals for ensuring equal educational opportunities for all students. She frequently works with state and local education agencies on issues related to education funding and costs, particularly with respect to special education programs for students with disabilities. Currently, she is the codirector for the National Consortium for Research on Special Education Funding & Costs, a member of the editorial board for the *Journal of Education Finance*, and a member of the Cost Analysis Standards Project charged with setting national standards for conducting education program cost analysis. Dr. Kolbe has regularly worked with the Vermont Agency of Education and state legislature on projects related to education finance in the state, including the 2019 *Pupil Weighting Factors*

Report. Dr. Kolbe is the immediate past chair of the finance, economics, and policy group of the American Education Research Association (AERA). In 2018, she received the AERA Outstanding Policy Report Award for her work on special education costs and state-level special education funding reform. Previously, Dr. Kolbe was an associate professor of educational leadership and policy studies at the University of Vermont, assistant professor at Florida State University, and a research professor at the University of Connecticut, and prior to her academic career, she worked for Abt Associates Inc. She earned an EdD in Educational Leadership and Policy from the University of Vermont in 2005.

Bruce Baker, **EdD**, proposed cost function modeling senior advisor, is a professor and chair of the Department of Teaching and Learning at the University of Miami. His primary responsibilities will be to provide feedback and technical guidance related to cost function analysis. Dr. Baker is widely recognized as the nation's leading scholar on the financing of public elementary and secondary education systems. His research spans public education finance and policy, postsecondary education finance and policy, teacher and administrator labor markets, and education law. He previously has collaborated with members of the proposed AIR study team in Vermont for the *Pupil Weighting Factors Report* in 2019 and the updating cost estimates and recommended weights in 2025. Dr. Baker also has collaborated with the proposed AIR study team on investigations of finance equity and adequacy of K–12 finance systems in Colorado, Delaware, Maryland, Nevada, New Hampshire, New York, Ohio, Oregon, and Pennsylvania. Dr. Baker has authored and coauthored many peer-reviewed research articles and law review articles, as well as influential policy reports for organizations including the Economic Policy Institute, Learning Policy Institute, and Center for American Progress. He is co-principal investigator on the creation of the School Finance Indicators Database, a resource used by researchers, advocates, and policymakers across the country. Dr. Baker has consulted with numerous state legislatures on the design and reform of their school funding systems, including most recently Delaware, New Hampshire, Vermont, and Virginia. He earned his EdD in Organization and Leadership from Teachers College at Columbia University.

Kathleen L. Pfannenstiel, **PhD**, proposed co-special education weight design lead, is a senior researcher at AIR. Dr. Pfannenstiel also serves as the Data Quality Lead for the National Center on Systemic Improvement (NCSI), where she supports the training of staff, use of data, and alignment of data to outcomes. She previously co-led the Evidence-based Practices for Teaching and Learning cross-state learning collaborative. She also provides technical assistance to three states, supporting their preparation for annual Office of Special Education Programs (OSEP) Differentiated Monitoring and Support visits, strengthening of core mathematics instruction, and Multi-tiered System of Support (MTSS) implementation. In addition to NCSI, she is also a context expert on a project to increase math outcomes for students with disabilities through coaching, professional development, and IEP progress. Dr. Pfannenstiel also serves as a task lead to plan and facilitate a stakeholder convening and support a report to policymakers for the Coordination of Services in Schools and in the Community for Students with Disabilities that ensure Medicaid-covered students with disabilities can access out-of-school services. Dr. Pfannenstiel earned a doctorate in Special Education from the University of Texas at Austin, with an emphasis on learning disabilities and behavior disorders.

Jesse Levin, **PhD**, proposed quality assurance reviewer, is a principal research economist at AIR with more than 20 years of experience leading complex education finance and policy studies at

the state and national levels. He is founding director of the AIR Center for Economic Evaluation and brings deep expertise in investigating school funding equity and adequacy, resource allocation, and educational effectiveness to support innovative instructional models. Dr. Levin has served as principal investigator on numerous high-impact projects, including funding to support the needs of students who are economically disadvantaged or with disabilities in Ohio, where he led the development of cost estimates using a professional judgment approach. He also has directed similar adequacy studies in California, Colorado, Delaware, Oregon, New Hampshire, New Mexico, New York, Texas and Vermont, applying both professional judgment and cost function methodologies to inform state funding reforms. Dr. Levin also led evaluations to inform policy reform of the K–12 state school finance systems in Nevada, Hawaii, and Pennsylvania. He holds a PhD in Economics from the University of Amsterdam and Tinbergen Institute in the Netherlands.

Dr. Tessie Bailey, proposed senior advisor related to special education weight design, is a principal technical assistance consultant at AIR. Her primary responsibilities include developing high quality technical assistance resources and providing technical assistance to states, districts, and institutions of higher education. She provides support through the Collaboration for Effective Educator Development, Accountability, and Reform (CEEDAR) Center, National Center for Systemic Improvement (NCSI), and Center for Response to Intervention (CRTI). She has extensive experience in response to intervention, special education services and law, secondary and transition services, teacher education and evaluation, and scaling up evidence-based practices. Dr. Bailey also directs the PROGRESS Center, which supports educators and leaders in developing and implementing high-quality IEPs. Prior to AIR, Dr. Bailey was an assistant professor at Montana State University Billings. In this role, she taught general and special education undergraduate and graduate courses, co-chaired the Montana Higher Education Consortium, and received the 2014 Montana State University Billings Faculty Excellence Award and the 2015 ASMSUB Outstanding Faculty Award. Dr. Bailey has conducted over 100 professional development workshops and presentations in evidence-based practices and publishes in special education law and policy, response to intervention (RTI) and MTSS, and teacher preparation. She completed her Ph.D. at the University of Utah in special education curriculum and assessment and post-doctoral work in RTI/MTSS and transition at Lehigh University's Center for Promoting Research to Practice.

Appendix B. Requested Exceptions to Contract

American Institutes for Research
1400 Crystal Dr. 10th Floor
Arlington, VA 22202

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

American Institutes for Research
1400 Crystal Dr. 10th Floor
Arlington, VA 22202

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

About the American Institutes for Research®

Established in 1946, the American Institutes for Research® (AIR®) is a nonpartisan, not-for-profit organization that conducts behavioral and social science research and delivers technical assistance both domestically and internationally in the areas of education, health, and the workforce. With headquarters in Arlington, Virginia, AIR has offices across the U.S. and abroad. For more information, visit AIR.ORG.

AIR® Headquarters
1400 Crystal Drive, 10th Floor
Arlington, VA 22202-3289
+1.202.403.5000 | **AIR.ORG**