Costing Out the Resources Needed to Meet

Michigan's Standards and Requirements

Prepared for the

Michigan School Finance Collaborative

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Executive Summary

Introduction

Augenblick, Palaich and Associates (APA), in partnership with Picus, Odden, and Associates (POA), was hired by the School Finance Research Collaborative (Collaborative) to examine the resources needed for students, teachers, schools, and districts to meet Michigan's academic standards. APA and POA are nationally recognized experts in school finance issues with experience examining school finance formulas; estimating the resources needed for students, schools, and districts to meet state educational standards; and working with state policy makers to implement needed changes. The study team also includes national school finance experts Michael Griffith, Chris Stoddard, and Jennifer Imazeki. The study team has well over 100 years of combined experience studying school finance issues. This report details the approaches used by the study team to estimate the resources needed in Michigan to meet state standards.

The study team's implementation of adequacy approaches focused on engaging educators from around Michigan, ensuring the study included the complete state context in its findings. The data collection brought together over 250 educators from school districts, public school academies (charters), and intermediate school districts to examine the resources needed for students to meet state standards. These teachers, principals, special education educators, district administrators and other education professionals came from all over the state and from districts of various sizes to examine and provide input on Michigan's resource needs.

Approaches to Adequacy

The concept of adequacy as it relates to education funding grew out of the standards-based reform movement (Hamilton, Stecher, & Yuan, 2009). As states implemented specific learning standards and performance expectations for what students should know — along with consequences for districts and schools failing to meet these expectations (and, eventually, federal expectations imposed through No Child Left Behind and continued by the Every Student Succeeds Act) — the focus of school finance shifted to an examination of the resources necessary to provide districts, schools, and students with reasonable opportunities to achieve state standards. Over the past two decades, researchers have developed four approaches to creating estimates for the level of funding necessary to provide all students with the opportunity to receive an adequate education. The approaches include:

1. The **Evidence-Based (EB)** approach. The EB approach was developed by POA and uses information from research can be used to define the resource needs of a prototypical school or district to ensure that the school or district can meet state standards. The approach not only estimates resource levels but also specifies the programs and strategies through which such resources could be used efficiently. The approach is used to identify a base cost figure and

adjustments for special needs students (Special needs students include special education, poverty, and English language learner (ELL) students).

2. The **Professional Judgment (PJ)** approach. The PJ approach was first used in Wyoming in the mid-1990s and has been one of the most widely used adequacy approaches since. The 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. The approach identifies both a base cost and adjustments for special needs students.

3. The **Successful Schools/School District (SSD)** approach. The SSD approach was developed by APA. It determines an adequate per student base cost amount by using the actual expenditure levels of schools or school districts that are currently meeting or exceeding state performance objectives. This approach assumes that every school and school district, in order to be successful, needs the same level of base funding that is available to the most successful schools and districts. The approach does not identify adjustments for special needs students.

4. The fourth approach, the **cost function or statistical (CF)** approach, is an econometric method that estimates the level of funding needed to achieve a given level of student achievement as measured on assessments while controlling for student and district characteristics. Due to its complexity and reliance on econometric modeling techniques, the approach has proven difficult to explain in situations other than academic forums.

Michigan Study

This report describes the study team's implementation of both the PJ and EB approaches to examine the cost of adequacy in Michigan. Utilizing these two approaches allowed the study team to estimate both the cost of meeting the full state standards for all students at a base level, and the additional costs associated with differences in district and student characteristics. The study does not examine virtual education (online) or adult education.

APA previously implemented the SSD approach in Michigan as part of a prior study. The report, "Michigan Education Finance Study[1]," was the result of that study and was provided to the state in June of 2016. As part of that effort, APA conducted an examination of the expenditures of those Michigan districts that outperformed other districts in the state on Michigan's assessment system. The study team updates the results of this study as part of this work.

Table 1 describes the differences in the three adequacy approaches, including the benchmarks for success, data sources, and school finance parameters that can be identified by each approach.

[1] https://www.michigan.gov/documents/budget/Michigan_Education_Finance_Study_527806_7.pdf

Table 1
Summary of Three Approaches to Adequacy Used in Michigan

	Evidence-Based	Professional Judgment	Successful Schools/Districts
Benchmark of Success	Ensuring students can meet all state standards	Ensuring students can meet all state standards	Currently outperforming other Michigan schools
Data Source	Best practice research, reviewed by Michigan educators; when conflict arises in resource recommendations, the EB approach defers to the research	Expertise of Michigan educators serving on PJ panels; uses research as a starting point but defers to educators when conflict arises in resource recommendations	2013-14 expenditure data from selected successful schools updated to 2015-16 figures
Available Data Points			
Base Cost	Yes	Yes	Yes
Adjustments for Students with Special Needs (Weights)	Yes	Yes	No

In addition to implementing the two adequacy approaches and updating the SSD figures, this report addresses a number of additional components:

- District location and teacher pay. Drs. Chris Stoddard and Jennifer Imazeki examine the costs districts face due to differences in location and the competitiveness of teaching salaries in Michigan,
- District isolation. Michael Griffith examines the research on the impact of geographic isolation on the costs districts face in meeting state standards. This includes a literature review of how other states address district isolation and the results of additional PJ work focused on district isolation,
- Transportation. The study team examines transportation costs by 1) looking at how other states fund transportation and 2) examining current expenditures on transportation for Michigan districts and possible impacts on transportation costs due to the results of this adequacy study, and
- Capital review. The study team discusses resources identified through the EB and PJ studies that could have impacts on the capital needs of districts and a brief summary of these potential impacts is included.

Implementing the Adequacy Approaches

Professional Judgment

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 identified special needs (which allows for the calculation of a base cost) and then separately for special needs students, presented as weights that are additional to the base cost.

Creating Representative Schools and a Representative District

The study team designed multiple representative schools used as the basis of discussion with the PJ panels: one preschool program; two elementary schools (of 270 and 390 students); three middle schools (of 180, 420 and 735 students); and four high schools (of 220, 500, 800 and 1,200 students). The team also designed four representative districts: a very small (670 students); small (1,700 students); moderate (5,000 students); and large sized (13,590 students) district. The study team created these representative schools and districts so they would closely resemble schools and districts, on average, in Michigan. This allowed PJ panelists to comfortably estimate what resources are needed, since the representative school and district sizes generally looked familiar. At the same time, the approach developed per student figures that can be applied in each unique district and school in Michigan based on real enrollment figures and demographics.

For the purposes of this study in Michigan, the study team also examined the relationship between resources and student need concentration levels for poverty and ELL populations. For the ELL population, two concentration levels (five percent and 50 percent) were considered. For the poverty population, three concentration levels (25 percent, 50 percent, and 75 percent) were examined for both poverty and high need poverty students, where high poverty students have significantly higher needs than poverty students. The average special education percentage for the state is 13 percent, the study team disaggregated this statewide average into three categories of need: (a) mild (9 percent), (b) moderate (2.5 percent), and (c) severe (1.5 percent). The three categories are not based the disability, but on time spent in the general education classroom.

Professional Judgment Panel Design

Based on the study team's experience using the PJ approach in other states, multiple levels of PJ panels were utilized because: 1) multiple panels allow for the separation of school-level resources (which include teachers, supplies, materials, and professional development) from district-level resources (which include facility maintenance and operation, insurance, and school board activities); and 2) there is significant value in having each panel's work reviewed by another panel, and such review enhances the effectiveness of using a consensus approach.

PJ Panels were held from September 2017 to November 2017. All panels were held in Lansing, Michigan, except the Isolated District Panel, which was held online via webinar. Table 2 provides the dates of these meetings.

Table 2
PJ Panel Dates

Date	Panel
September 19-20, 2017	Elementary School Panel; Middle School Panel
September 21, 2017	Preschool Panel
September 21-22, 2017	High School Panel
October 3-4, 2017	Special Education Panel; Students in Poverty Panel
October 5, 2017	Career and Technical Education Panel
October 5-6, 2017	English Language Learners Panel
October 17-18, 2017	Very Small Sized District Panel; Small Sized District Panel
October 19-20, 2017	Moderate Sized District Panel; Large Sized District Panel
November 7, 2017	Charter Schools Panel
November 8, 2017	CFO Panel; Isolated District Panel (via webinar)
November 9, 2017	Statewide Review Panel

Each panel had between nine and twelve participants, who were a combination of classroom teachers, principals, personnel who provide services to students with special needs, superintendents, technology specialists, and school business officials. Panels included representatives from districts, charters, and ISDs. The Collaborative used a multistep process to select panel members. This included:

- Identifying potential participants by:
    - Seeking volunteers from the Network of Michigan Educators,[2] Michigan's most prestigious education network. The Network of Michigan Educators is a one-of-a-kind professional organization connecting educators recognized for excellence through programs including:
        - Michigan Teacher of the Year;
        - Milken National Educator Award;
        - Presidential Award for Excellence in Math and Science Teaching;
        - National Board Certification;
        - Michigan Secondary Principal of the Year;
        - Michigan Middle Level Principal of the Year;
        - Michigan National Distinguished Principal; and
        - Michigan Superintendent of the Year.
    - Seeking nominees from the Superintendents of the Michigan Association of School Administrators and the Michigan Association of Intermediate School Administrators.

[2] http://www.michiganeducators.org/

- The Project Steering and Technical Committee then finalized panelist selections, being careful to:
    - Follow the researchers' guidelines regarding the types of educators and the composition for each panel;
    - Include educators from all Regions of the state in proportion to the number of students served in each region; and
    - Select a group of panelists who represent the student population as a whole by race and gender.

A list of panel members is provided in Appendix A to this report.

Summarizing Michigan State Standards and Requirements

Prior to 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 Michigan standards and requirements, which included the Michigan Merit Curriculum and graduation requirements, as well as additional requirements for schools and districts around assessment, accountability, and educator evaluation. The study team prepared a brief summary document of these standards and requirements, which was reviewed by the School Finance Research Collaborative. This document was then shared with panelists (Appendix B).

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

The study team provided the PJ panels with some starting point figures from a review of best practice research and with any available staffing recommendations from educator professional associations. These figures were used to prompt discussion and panelists were in no way constrained by these recommended figures. Instead, panelists could adjust the figures as they saw fit to best suit Michigan and add in additional necessary staffing positions that were not addressed in the starting point figures.

Professional Judgment Panel Procedures

Once panelists were provided with instructions and background information to guide their efforts, as described previously, PJ panels convened and 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. Panelists were frequently reminded that they should identify the resources needed to meet state standards in the most efficient way possible, without sacrificing quality.

Each panel discussed the following school-level resource needs:

1. Personnel, including classroom teachers, other teachers, psychologists, counselors, librarians, teacher aides, administrators, nurses, etc.

2. Other personnel costs, including the use of substitute teachers and time for professional development.

3. Non-personnel costs, such as supplies, materials and equipment costs (including textbook replacement and consumables), plus the costs of offering extracurricular activities.

4. Non-traditional programs and services, including before- and after-school programs, preschool, and summer school programs.

5. Technology, including hardware, software, and licensing fees.

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

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

2. Non-personnel costs, such as maintenance and operations, insurance, safety and security, adoption of textbooks, assessment, contract services, and out-of-district placements.

PJ panels first identified the above resources for students with no special needs, then addressed the additional resources needed to serve special needs students (students in poverty, special education, ELL and Career and Technical Education (CTE)). Keeping these costs separate allowed for the creation of a base cost and additional special needs weights (discussed in greater detail later in this report).

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 20:1 in kindergarten through grade three and 25:1 in grades four and five;
- Significant time for teacher planning, collaboration, and imbedded professional development with instructional coaches. At each level this was identified essentially as teachers teaching about 75 percent of the day with the remaining time available for the listed activities; instructional coaches were seen as instrumental to helping teachers improve practice;
- A high level of student support (staffed as counselors, social workers, psychologists, and behavior interventionist) available for all students;
- Sufficient administrative support in the form of assistant principals to allow for required staff evaluations to be done well;
- Before- and after-school programs and summer learning opportunities, particularly for students in poverty;
- Technology-rich learning environments, including 1.1:1 student devices, and associated IT support;
- Sufficient staff to serve special education and ELL students;

- Sufficient nursing support to ensure students receive necessary medical care and monitoring from nurses and/or health aides to allow teachers and administrators to focus on classroom instructional needs;
- Sufficient counselor and career exploration staff to ensure students can achieve post-secondary goals; and
- Preschool for all three-year-olds and four-year-olds.

It should be noted that the resources PJ panels identified here are examples of how funds might be used to organize programs and services in representative schools. Further, there were separate panels for each school level, so approaches could vary by grade span. However, subsequent review panels agreed that the differences in approach were appropriate. 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 focus should remain on providing an estimate of the overall level of resources needed to meet adequacy requirements, not to determine the best way to organize schools and districts.

Professional Judgment Total Base Costs and Weights

Combining the school and district level costs by district size allowed the study team to calculate 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, along with 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 3. Weights represent the additional 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 poverty are $3,000, then the weight is 0.30. The district serving this student in poverty would therefore receive a total of $13,000 to provide an adequate education for that student.

Table 3
Professional Judgment Total Base Cost and Additional Weights

District Size	Very Small	Small	Moderate	Large
Base	$11,482	$10,307	$9,954	$9,590
Weights				
Poverty				
25% Concentration	0.27	0.28	0.29	0.29
50% Concentration	0.37	0.40	0.41	0.42
75% Concentration	0.39	0.42	0.43	0.44
High Need Poverty				
25% Concentration	0.45	0.50	0.51	0.51
50% Concentration	0.53	0.57	0.59	0.60
75% Concentration	0.39	0.42	0.42	0.43

District Size	Very Small	Small	Moderate	Large
ELL – 5% Concentration				
WIDA 1&2	0.62	0.52	0.51	0.46
WIDA 3&4	0.54	0.44	0.43	0.35
WIDA 5&6	0.30	0.34	0.31	0.28
ELL – 50% Concentration				
WIDA 1&2	0.56	0.48	0.43	0.40
WIDA 3&4	0.45	0.36	0.33	0.29
WIDA 5&6	0.38	0.28	0.22	0.18
Special Education				
Mild	1.03	1.08	1.09	1.06
Moderate	1.71	1.85	1.92	1.94
Severe	2.79	3.03	3.14	3.21
Average (Weighted)	1.37	1.45	1.48	1.48
CTE Weight	0.10	0.10	0.10	0.10

As table 3 shows, the per-student base cost rises from a low of $9,590 at the largest district to $11,482 at the very small district. There are small increases for the moderate and small districts.

Poverty weights are the lowest at the 25 percent concentration, ranging from 0.27 to 0.29. The 50 percent concentration weights range from 0.37 to 0.42 and the 75 percent concentration weights range from 0.39 to 0.44. All the weights are lowest in the very small district and rise in the larger districts. The 50 percent and 75 percent weights are very similar to one another.

The weights for high poverty students range from 0.45 to 0.51 for the 25 percent concentration. The 50 percent concentration weights range from 0.53 to 0.60 and the 75 percent concentration weights range from 0.39 to 0.43. Again, the weights are lowest in the very small district. Interestingly, the 75 percent concentration weights for the high poverty students are similar for the 75 percent poverty students.

For both the five percent and 50 percent ELL populations, the WIDA 1&2 students have the highest weights, the five percent population needing a weight slightly higher than the 50 percent population. In nearly all the cases, the ELL weights increase as the size of the district decreases, showing some need for a slight increase in ELL funding in smaller settings.

The special education weights are relatively similar across the district sizes, with the smallest districts actually having slightly lower weights for all three categories of need. The moderate weight is over twice as high as the mild weight for all districts, with only a slight increase in weight from moderate to severe. Combined, the average weights range from 1.37 to 1.48.

The CTE weight is applied to students who attend a CTE center. The CTE center would be staffed to have similar resources as a traditional school, for example there is a principal and a nurse in every building. The center would be staffed to fill 1,000 students and would most likely be operated by the district.

Evidence-Based Approach

Using the Evidence-Based (EB) Model, a set of recommendations can be generated that can be used to determine how Michigan could provide adequate funding to all school districts to help them offer every Michigan student an equal opportunity to achieve the state's college and career ready standards.

The Evidence-Based School Improvement Model

The intent of the Evidence-Based Model is threefold:

1. To identify the array of educational goods that would provide each student an equal opportunity to meet the state's student performance standards,
2. To identify the cost of that basket of education goods, and
3. To provide each school district with adequate funds so that it could purchase and provide that basket of goods appropriately to all its students.

Although a direct linkage between funding and student performance does not exist, the Evidence-Based model is designed to identify a level of resources that would enable all districts and schools to provide every student with robust opportunities to meet college and career ready standards.

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

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

The EB Model is used to estimate a cost-based spending level for schools has been designed to allow districts and schools to provide every child with an equal opportunity to learn to state performance standards. The EB Model is derived from research and best practices that identify programs and strategies that boost student learning. Further, the formulas and ratios for school resources developed from that research have been reviewed by dozens of educator panels in multiple states over the past decade. The EB Model relies on two major types of research:

1. Reviews of research on the student achievement effects of each of the EB Model's individual major elements, with a focus on randomized controlled trials, which are considered the "gold standard" of evidence on "what works."

2. Studies of schools and districts that have dramatically improved student performance over a four- to six-year period – what is sometimes labeled "a doubling of student performance" on state assessments.

The EB approach has been modified over time as a result of research and work in other states. Today the EB Model explicitly identifies the components of a school improvement model, and articulates how all of the model's elements are linked to strategies that, when fully implemented, produce notable improvements in student achievement (see Odden & Picus, 2014; Chapter 5).

High performing and improving schools have clear and specific student achievement goals, including goals to reduce achievement gaps linked to poverty and minority status. The goals are typically specified in terms of performance on state assessments.

Compared to traditional schools where teachers work in isolated classrooms, improving schools organize instruction differently. Regardless of the context – urban, suburban, or rural, rich or poor, large or small – improving and high performing schools organize teachers into collaborative teams: grade level teams in elementary schools and subject or course teams in secondary schools. With the guidance and support of instructional coaches, the teacher teams work with student data – usually short-cycle or formative assessment data – to:

- Plan standards-based curriculum units;
- Teach those units simultaneously;
- Debrief on how successful the units were; and
- Make changes when student performance does not meet expectations.

This collaborative teamwork makes instruction "public" over time by identifying a set of instructional strategies that work in the teachers' school. Over time all teachers are expected to use the instructional strategies that have been demonstrated to improve student learning and achievement.

High performing and improving schools also provide an array of "extra help" programs for students struggling to achieve to standards. This is critical because the number of struggling students is likely to increase as more rigorous programs are implemented to prepare all students for college and careers. Individual tutoring, small group tutoring, after-school academic help and summer school focused on reading and mathematics for younger students, and courses needed for high school graduation for older students, represent the array of "extra help" strategies these improving schools typically deploy. Their approach is to "hold standards" constant and vary instructional time.

These schools exhibit multiple forms of leadership. Teachers lead by coordinating collaborative teams and through instructional coaching. Principals lead by structuring the school to foster instructional improvement. The district leads by ensuring that schools have the resources to deploy the strategies outlined above with a focus on aggressive student performance goals, improving instructional practice and taking responsibility for student achievement results.

High performing and improving schools seek out top talent. They know that the challenge to prepare students for the competitive and knowledge-based global economy is difficult and requires smart and capable teachers and administrators to effectively get the educational job done.

The most recent summary of the research undergirding the EB model can be found in the Odden and Picus (2014) school finance textbook, and in several books that profile schools and districts that have moved the student achievement needle (Odden & Archibald, 2009; Odden, 2009; Odden, 2012). The study team recently studied dramatically improving schools in Maryland, Vermont, and Maine as part of school finance studies in those states and found the theory of improvement embodied in the EB Model is reflected in nearly all the successful schools studied (Picus, Odden, et al., 2011; Picus, Odden, et al., 2013; Odden & Picus, 2015b). In addition, other researchers and analysts have found similar features of schools that significantly improve student performance and reduce achievement gaps (e.g., Blankstein, 2010, 2011; Chenoweth, 2007, 2009, 2017).

Although the details of studies of improving and high performing schools vary, and different authors highlight somewhat different elements of the process, the overall findings are more similar than different. This suggests all schools can improve if they have adequate resources *and* deploy those adequate resources in the most effective ways.

The EB Model offers a framework for the use of resources by districts and schools to help them focus those resources on programs and strategies that would allow them to produce substantial gains in student academic performance. The study team organized the key elements of the EB school improvement model into ten areas as follows:

1. Analyze student data to become deeply knowledgeable about performance issues and to understand the nature of the achievement gap.
2. Set high goals such as aiming to educate at least 95 percent of the students in the school to proficiency or higher on state reading and math tests.
3. Review evidence on good instruction and effective curriculum.
4. Invest heavily in teacher training that includes intensive summer institutes and longer teacher work years, provide resources for trainers, and, most importantly, fund instructional coaches in all schools.
5. Provide extra help for struggling students.
6. Restructure the school day to provide more effective ways to deliver instruction.
7. Provide strong leadership and support for data-based decision making and improving the instructional program.
8. Create professional school cultures characterized by ongoing discussion of good instruction, with teachers and administrators taking responsibility for the student performance results.
9. Bring external professional knowledge into the school.
10. Recruit and retain the best talent.

Such successful schools also create a learning atmosphere inside the schools, have a school-wide approach to discipline and classroom management, and require that every student be accountable to any adult for his/her behavior and that all adults take interest in all students and hold them accountable for the behavioral practices in the school. In addition, these effective schools reach out to parents, insure that parents know the expectations of the school and welcome all parents into the school.

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

Three Tier Approach

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

The Evidence-based Model's Prototypical School Sizes

The EB model begins with a prototypical district size of 3,900, which comprises four 450-student elementary schools, two 450-student middle schools, and two 600-student high schools. It uses this approach and these prototypes to indicate the relative level of resources in schools, as well as to calculate a base per student cost. 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 Michigan and other states are larger than these prototypical school sizes, the prototypical sizes can still be used to determine a new base cost per student, as the new base cost per student would be provided for all students in a school or district, regardless of actual size. In other states with larger schools, this approach has been used with the suggestion that larger school buildings could organize their students into smaller "schools within school" units inside the larger building.

Evidence-Based Professional Judgment Panels

In addition to identifying the evidence-based resources needed to establish an adequate funding level for Michigan schools, four Evidence-Based Professional Judgment (EBPJ) panels were held to seek professional educator input to the model. The panels were held in Gaylord on October 23, Ann Arbor and Southfield on October 24, and in Grand Rapids on October 25. Approximately 20-25 panel members attended each EBPJ panel meeting. Education community stakeholders and school officials nominated panelists, who were invited to attend a panel meeting. The study team specifically sought to include a range of school staff at each EBPJ session.

Evidence-Based Professional Judgment Panel Recommendations

Six overall themes emerged from the panel conversations:

1. Panelists largely supported the overall structure and intent of the EB approach to instructional improvement, student achievement, the embedded school improvement model, and school finance adequacy. Suggested changes were at the margin but not the core of the EB approach.

2. Panelists expressed strong and universal support for the overall instructional elements of the EB model. Those elements – small class sizes, core and elective teachers, instructional coaches, intensive and ongoing professional development, extra resources to provide more instructional time for struggling students, teachers organized into collaborative work teams, etc. – were viewed as on target and reinforcing the delivery of best practices in schools.

3. Panelists universally noted that the staff and resources in the EB model exceeded existing resources in nearly all schools, and that many of the instructionally focused staff were those that were very much needed (e.g., instructional coaches) but had been cut over the past few years as budgets declined.

4. There was initial concern that the EB approach to serving students with disabilities was problematic and provided less than current resources for those students, but following detailed discussion, panelists agreed that the EB approach provided an effective approach for serving students with disabilities. The major area of concern was the state's birth to age 26 requirement for serving students with disabilities, while the EB model covered only preschool (age three and four) to grade 12 students (though at higher ages if still attending high school).

5. There was virtually no concern over the substantially fewer paraprofessionals provided for in the EB model than are typically employed in most Michigan schools. Most panelists agreed that skilled teachers provide more effective services than paraprofessionals – even trained paraprofessionals – but cautioned on the need for time to shift from paraprofessionals to skilled teachers for many extra help services.

6. Panelists noted that Michigan typically provides more school administration than the EB model but less instructional leadership staff.

There was only one major area where EBPJ panel recommendations suggested a strong reason to modify the EB model as presented to the panels: central office administration where staffing levels were reduced to more closely reflect Michigan school district practice. In two other areas, the panels suggested modest changes that were adopted: field trips for preschool students were added to the model, and additional resources were included to cover curriculum costs for programs for struggling students.

Final EB Michigan Recommendations

Table 4 provides a detailed summary of the resulting EB Michigan model resources. The resources described in Table 4 led to a base cost estimate and a set of associated weights for poverty, ELL and special education students with mild and moderate disabilities.[3]

Table 4
Summary of 2017 Michigan Adjusted Evidence-Based Model Recommendations

Model Element	2017 Evidence-Based Recommendation
Staffing for Core Programs	
1a. Preschool	Full day preschool for children aged 3 and 4. One teacher and one aide in classes of 15
1b. Full-Day Kindergarten	Full-day kindergarten program. Each K student counts as 1.0 pupil in the funding system
2. Elementary Core Teachers/Class Size	Grades K-3: 15 (Average class size of 17.3) Grades 4-5/6: 25
3. Secondary Core Teachers/Class Size	Grades 6-12: 25 Average class size of 25
4. Elective/Specialist Teachers	Elementary Schools: 20% of core elementary teachers Middle Schools: 20% of core middle school teachers High Schools: 33 1/3% of core high school teachers
5. Instructional Facilitators/Coaches	1.0 Instructional coach position for every 200 students
6. Core Tutors/Tier 2 Intervention	One tutor position in each prototypical school (Additional tutors are enabled through poverty and ELL pupil counts in Elements 22 and 26)
7. Substitute Teachers	5% of core and elective teachers, instructional coaches, tutors (and teacher positions in additional tutoring, extended day, summer school, ELL, and special education)
8. Core Pupil Support Staff, Core Guidance Counselors, and Nurses	1 guidance counselor for every 450 grade K-5 students 1 guidance counselor for every 250 grade 6-12 students 1 nurse for every 750 K-12 students, which supports a half time nurse in each prototypical elementary and middle school and a full-time nurse in each prototypical high school (Additional student support resources are provided on the basis of poverty and ELL students in Element 23)
9. Supervisory and Instructional Aides	2 for each prototypical 450-student elementary and middle school 3 for each prototypical 600-student high school
10. Library Media Specialist	1.0 library media specialist position for each prototypical school
11. Principals and Assistant Principals	1.0 principal for the 450-student prototypical elementary school 1.0 principal for the 450-student prototypical middle school 1.0 principal and 1.0 assistant principal for the 600-student prototypical high school

[3] Services for children with profound and severe disabilities are funded directly by the state in the EB Model.

Model Element	2017 Evidence-Based Recommendation
12. School Site Secretarial and Clerical Staff	2.0 secretary positions for the 450-student prototypical elementary school 2.0 secretary positions for the 450-student prototypical middle school 3.0 secretary positions for the 600-student prototypical high school
Dollar Per Student Resources	
13. Gifted and Talented Students	$40 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 $125 per student for trainers (In addition, PD resources include instructional coaches [Element 5] and time for collaborative work [Element 4])
15. Instructional Materials	$190 per student for instructional and library materials $50 per student for each extra help program of poverty, ELL, summer and extended day
16. Short Cycle/Interim Assessments	$25 per student for short cycle, interim and formative assessments
17. Technology and Equipment	$250 per student for school computer and technology equipment
18. CTE Equipment/Materials	$10,000 per CTE teacher for specialized equipment
19. Extra Duty Funds/Student Activities	$300 per student for co-curricular activities including sports and clubs for grades K-12 $50 per preschool student
Central Office Functions	
20. Operations and Maintenance	Separate computations for custodians, maintenance workers and groundskeepers and $305 per student for utilities
21. Central Office Personnel/Non-Personnel Resources	A dollar per student figure for the Central office based on the number of FTE positions generated, as depicted in Table 3.7, and the salary and benefit levels for those positions. It also includes $300 per student for miscellaneous items such as Board support, insurance, legal services, etc.
Resources for Struggling Students	
22. Tutors	1.0 tutor position for every 100 ELL students and one tutor position for every 100 non-ELL poverty students
23. Additional Pupil Support Staff	1.0 pupil support position for every 125 ELL students and one tutor position for every 125 non-ELL poverty students
24. Extended Day	1.0 teacher position for every 120 ELL and for every 120 non-ELL poverty students
25. Summer School	1.0 teacher position for every 120 ELL and for every 120 non-ELL poverty students
26. ESL staff for English Language Learner (ELL) Students	As described above: 1.0 tutor position for every 100 ELL students 1.0 pupil support position for every 125 ELL students 1.0 extended day position for every 120 ELL students 1.0 summer teacher position for every 120 ELL students; In addition, 1.0 ESL teacher position for every 100 ELL students.
27. Alternative Schools	One assistant principal position and one teacher position for every 7 ALE students in an ALE program One teacher position for every 7 Welcome Center eligible ELL students
28. Special Education	8.1 teacher positions per 1,000 students, which includes: 7.1 teacher positions per 1,000 students for services for students with mild and moderate disabilities and the related services of speech/hearing pathologies and/or OT PT. This allocation equals approximately 1 position for every 141 students.

Model Element	2017 Evidence-Based Recommendation
	Plus 1.0 psychologist per 1,000 students to oversee IEP development and ongoing review. **In addition,** Full state funding for students with severe disabilities, and state-placed students, minus the cost of the basic education program and Federal Title VIB, with a cap on the number covered at 2% of all students.
Staff Compensation Resources	
29. Staff Compensation	For salaries, average of previous year For benefits: Retirement or pension costs: 4.6% per employee Health Insurance: $12,000 per employee Social Security 6.2% (up to annual earnings of $127,200) Medicare: 1.45% Workers' Compensation: 0.6 % Unemployment Insurance: 0% as the state cost fully reimburses costs

The base cost estimate using the EB model for Michigan is $10,136 per pupil. The weights computed through the model for poverty, ELL and SPED students are detailed in Table 5 below.

Table 5
EB Total Base Cost and Additional Weights

Base	**$10,136**
Weights	
Prekindergarten	0.40
Poverty	0.32
ELL	0.41
Special Education (For mild and moderate special education students; Census approach applied to all students in a district, not only the special education count)	0.07 (see explanation below)
Alternative Schools	0.64

The special education cost estimate and derived weight require further explanation. It is important to first note that the EB model assumes the state funds 100 percent of the excess costs of programs for students with severe and profound disabilities.

To estimate costs for students with mild and moderate disabilities, the EB model uses a "census" approach and computes an additional amount based on the count of all students in a district, not on the special education student count in each district. The EB estimate for the cost of special education is $673 per student for ***all*** students.

Successful Schools 2016 Study

The study team performed a modified successful schools study in the *2016 Michigan Education Finance Study*. It was considered a modified approach due to the specific requests of the 2016 RFP, which identified a specific standard for selecting successful districts: "successful districts have proficiency levels above the state average for all of the standards under the Michigan Merit Standards." In addition to the state's definition of a successful district, APA selected three additional district performance standards for the 2016 study: (1) performing at least one standard deviation above average on all tests (High Absolute Performance); (2) showing above average growth over time (Growth); and (3) showing success serving subpopulations (student special populations such as poverty, ELL, and special education). To meet any of these three additional performance measures, districts had to first meet the RFP standard of having proficiency levels above the state average. Districts that met the state's RFP standard and one of the additional study team standards were considered "Notably Successful" districts, a fifth success designation in the study.

As dictated by the state's RFP for the study, the 2016 study only examined the performance and expenditures of school districts and did not include charter schools. All data used was for the 2013-14 school year, which was the school year for which both performance and expenditure data were available at the time of the study. Table 5 outlines the criteria for each performance standard.

Table 5
Successful Schools Standards

Standard	Criteria
Above Average	Set by state; the percentage of district students scoring proficient or above is above the statewide average in all tested subjects. Districts meeting this standard are referred to as Above Average districts.
High Absolute Performance	The percentage of district students scoring proficient or above is at least one standard deviation above the statewide average in all tested subjects. Districts meeting this standard are referred to as High Absolute Performance districts.
Growth	The change in the percentage of district students scoring proficient or above between 2009-10 and 2013-14 was above the statewide average in all tested subjects. Districts meeting this standard are referred to as Growth districts.
Special Populations	The percentage of students in each demographic subgroup present in the district is above the statewide average in all tested subjects. Districts meeting this standard are referred to as Special Populations districts.
Notably Successful	Districts that met the Above Average Performance standard and one additional performance standard (High Absolute Performance, Growth or Special Populations), are referred to as Notably Successful districts.

The list of districts that met each performance standard is included as Appendix G.

Notably Successful Districts

A total of 58 districts met at least one of the three standards and the state's baseline standard, creating the Notably Successful standard group. Of these 58 districts, 47 met only one of the three additional standards, 10 districts met two of the additional standards, and one district met all three additional standards. The 58 districts that are Notably Successful are made up of districts showing various types of higher performance including absolute performance, growth, and success with special populations. A list of the 58 Notably Successful districts can be found in Appendix G. Table 6 compares the demographics of the Notably Successful districts to the remaining districts.

Table 6

Districts Meeting and Not Meeting Notably Successful Standard				
	All Districts		Excluding Outliers	
	Meeting Standard	Remaining Districts	Meeting Standard	Remaining Districts
Number of Districts	58	483	54	474
Average Size	4,360	2,324	4,728	2,379
Average Percent Special Education	9.89%	12.67%	10.42%	12.66%
Average Percent Economically Disadvantaged	29.12%	52.95%	27.46%	52.95%
Average Percent ELL	1.76%	2.50%	1.89%	2.53%
Average Need Factor	1.224	1.351	1.223	1.351

On average, the Notably Successful districts were larger than the remaining districts. The Notably Successful districts tended to have much lower need factors than districts that did not meet the standard. The average need factor for the 58 Notably Successful districts of 1.224 is far lower than the average need factor of 1.351 the remaining districts. When examining the need factor, it is most meaningful to consider only the figures on the right side of the decimal. In this case, the factor shows that the non-Notably Successful districts *had need that was over 50 percent greater* than the Notably Successful districts.

After the high-spending outliers were excluded, there was very little change in the demographics of districts meeting the Notably Successful standard and remaining districts. Four districts were removed from the Notably Successful group and nine districts not meeting the Notably Successful standard were removed.

Next, the study team examined the expenditures of the Notably Successful districts, both all districts and excluding outliers.

Expenditures

Table 7 looks at base costs for the Notably Successful districts.

Table 7

Expenditures of Districts Meeting and Not Meeting Notably Successful Standard				
	All Districts		Excluding Outliers	
	Meeting Standard	Remaining Districts	Meeting Standard	Remaining Districts
Number of Districts	58	483	54	474
Average Size of Districts	4,360	2,324	4,728	2,379
Average Need Factor	1.224	1.351	1.223	1.351
Base Expenditures				
Instruction	$5,883	$4,944	$5,143	$4,794
Administration	$1,137	$1,133	$900	$1,061
Support	$837	$652	$875	$646
Other	$2,531	$2,153	$1,975	$2,061
Total Base Expenditures	$10,388	$8,881	$8,893	$8,562
Total Base Expenditures Less Food Service and Transportation	$9,301	$7,967	$8,188	$7,683

The study team recommended the $8,188 figure of base costs without Food Service and Transportation costs as the figure that best represents the resources needed in 2013-14 for districts to perform much better than other districts in Michigan.

Adjusting for Inflation

In order to use the $8,188 figure for this study, the figure has to be adjusted for inflation to 2015-16 dollars. To do this, the study team used the Bureau of Labor Statistics Consumer Price Index (CPI-U) for Detroit-Ann Arbor-Flint.[4] Two years of inflation were applied to the figure to adjust for changes from 2013-14 to 2015-16. The CPI in August 2013, the beginning of the 2013-14 school year, was 220.000 and it was 220.249 in August 2015, the beginning of the 2015-16 year. This small increase indicates that there was almost no inflation over this time for the area. With this data, the study team recommends not adjusting the $8,188 figure and continuing to use that figure as the 2015-16 figure for this study. This decision is clearly a very conservative decision from a cost perspective, as it is likely that district costs have increased as the cost of wages, benefits, and other operational costs have increased during this time.

[4] https://www.bls.gov/regions/midwest/data/consumerpriceindexhistorical_detroit_table.pdf

Other Studies

Transportation

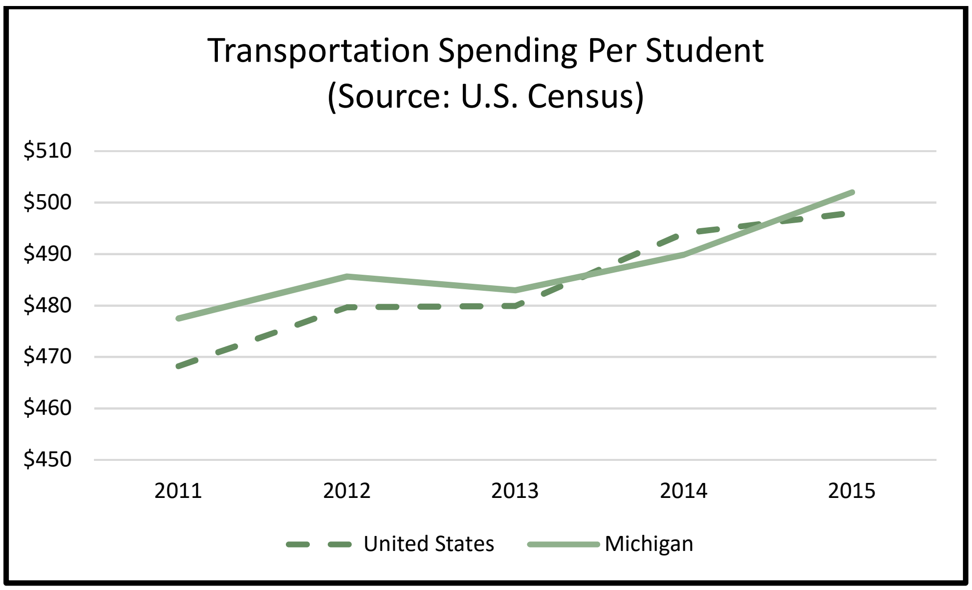
The study team examined how other states approach funding transportation and also examined current transportation expenditures in Michigan. The team also examined how the recommendations found in the PJ and EB studies could impact transportation needs in Michigan.

National Transportation Spending

During the 2014-15 school year, Michigan expended $502 per student on transportation costs, which is almost identical to the national average of $498 per student. Between the 2011 and 2015 school years, Michigan's per student transportation expenditures hewed closely to the national average (see Chart 1), never varying by more than nine dollars per student above or below the average.

Chart 1

Transportation Spending Per student



State Transportation Funding Systems in the U.S.

The study team's review found that 49 of the 50 states provide some form of transportation funding to their public schools. Indiana does not currently provide public school transportation funding but will begin doing so through the state's primary funding formula beginning in the 2018-19 school year.[5] There are five general ways that states provide transportation funding to schools:

- Reimbursement Model (22 States): states reimburse districts for a portion of their allowable transportation costs.

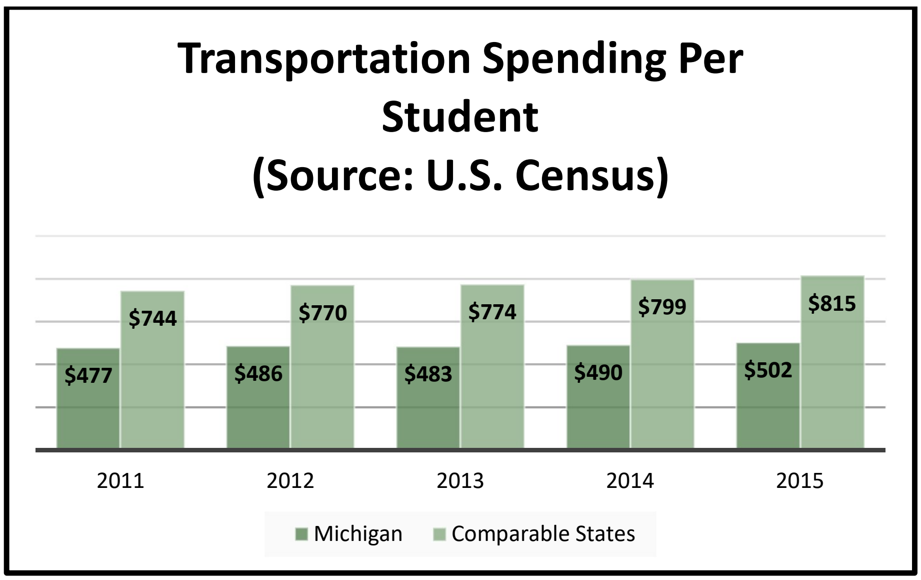
[5]Indiana House Bill 1009 of 2017.

- Included in the State's Primary Funding Formula (11 States): transportation funding is a component of the state's primary school funding formula. In some of these states additional funding is targeted to transportation. In other states, there is no specific amount of funding for transportation, but districts can use state funding for the cost of transporting students.
- Geographic Distance (10 States): funding is based on geographic considerations such as bus route miles, total square miles or the density of students in a school district.
- Per student Allocation (5 States): states provide districts with a flat per student rate regardless of their actual transportation costs.
- Full State Funding (3 States): states fully fund the cost of transportation.

State Transportation Funding in Comparative States

Between the 2011 and 2015 fiscal years, Michigan per student transportation expenditures consistently trailed that of the comparable states[6] average, as shown in Chart 2.

Chart 2
Historical Transportation Spending in Comparable States



Michigan Transportation Expenditures

The study team examined the expenditures for districts and charter schools separately. Five hundred districts had full transportation expenditures and rider information in 2016 and 41 charters had information. Transportation expenditures per student or per rider were closely correlated with the distance riders were transported. Overall, districts spent $973 per rider and charters spent $1,460 per rider.

[6] Illinois, Indiana, New York, Ohio, Pennsylvania, and Wisconsin.

Impacts on Transportation of Adequacy Results

The results of both the PJ and EB panel work identified various programs and interventions that need to be available for students to be able to meet state standards. These programs and interventions include services for all students and services directly aimed at special need students such as poverty and ELL students. Though a number of or even most of these services may exist today, the scale and scope of the programs might need to be expanded over what is currently in place. Panelists made it clear that without the proper transportation to support programs, the programs would not be available to students. The programs identified as having transportation impacts include extended day programs and preschool.

Impacts of Adequacy Results on the Possible Capital Needs of Districts/Schools

The study does not look specifically at capital needs; however, it is clear that some of the programs, interventions, and resources identified by both the PJ and EB approaches would or could lead to additional capital needs for districts and charters across Michigan. The study team identified several areas that might lead to increased capital needs:

- **Class Size Ratios**
- **Support Staff**
- **Extended Day/Year**
- **Preschool.**

These capital implications would need to be addressed for districts and Charters to be able to fully implement the adequacy recommendations allowing students, teachers, schools, and districts to meet state standards. The programs and resources described above were found to be necessary by educators from around Michigan and the capital implications need to be considered beyond the operating revenue recommendations made in this report.

Geographic Cost Differences

It is well-established that the cost of educating students is not the same across all schools and students. Costs can vary for many reasons, some of which are under the control of local school officials (such as decisions about the size of classes or about curricular offerings) but many costs cannot be controlled by local school districts. Costs outside the control of school officials include those associated with: (1) the characteristics of the student body (for example, special needs populations like poverty, English Language Learners (ELL); (2) district size or special education students); and (3) operating in certain geographical locations. When allocating funds through a state finance formula, it is appropriate for policy makers to compensate districts for differences in these uncontrollable costs. But ensuring that formula adjustments accurately reflect these cost differences can be quite challenging.

Many states include in their school funding formulas some measure of costs associated with providing a comparable education in different locations across the state. This report discusses the advantages and disadvantages of various methods to capture these geographical, cross-district cost differences, to recommend the best approach for Michigan going forward.

Approaches to Measuring Variation in Wage Costs Associated with Geographic Location

The study team examined three options for district cost adjustments:

- **Housing-Based Cost of Living Adjustment** - adjusts for the cost of living by computing the price of a basket of goods associated with each location (similar to how the Consumer Price Index is calculated across time). Typically, that local basket of goods is dominated by housing costs, although other goods' prices are also usually included (McMahon, 1996). This approach has the advantage of being straightforward to calculate and update over time, as long as data on housing costs and other items in the basket are available. The major disadvantage of a housing-based cost of living adjustment is that it does not include any information about area amenities which may also impact the wages needed to attract and retain workers.
- **Comparable Wage Index (CWI)** - is calculated by measuring the variation in non-teacher wages across localities. CWIs therefore account for the impacts of both cost of living and area amenities. The assumption is that workers who are similar to teachers in terms of their levels of education, their training, and their job responsibilities will have similar preferences as teachers. For example, if non-teacher workers in the City of Ann Arbor are paid, on average, 10 percent more than non-teacher workers in the City of Flint, then the CWI would suggest Ann Arbor City Public Schools should receive 10 percent more revenue for teacher salaries than Flint Public Schools.
- **Hedonic wage index** - is calculated by breaking down variation in current wages based on a number of different identifiable variables, such as weather, crime, or population density. Hedonic wage indices can capture variation due to both geographic location characteristics and student characteristics.

The study team examined the use of a CWI in Michigan and finds that wage costs vary significantly across regions in Michigan. A CWI is relatively straightforward to create and update on an annual basis; it also has the advantage of being clearly beyond the control of local districts, as there are no data used that are generated by schools. In contrast, the data requirements and statistical complexity of the hedonic approach make calculating and updating even a fairly simple hedonic wage index more difficult than either of the alternative approaches. A hedonic model also conflates variation due to geographic location with costs associated with student characteristics, such as poverty; this may be particularly problematic when those costs are already accounted for elsewhere in the funding system.

Labor Market Analysis

Teaching wages are an important factor in attracting and retaining workers in the teaching profession over time. A number of studies have found that teaching salaries relative to other occupations influence exit rates of existing teachers (Hanushek, Kain and Rivkin 2004, Guarino, Santibanez, and Daley 2006) and relative wages of teacher and other occupations influence the quality of individuals entering teaching (Corocoran 2004, Stoddard 2003).

The current study uses a variety of methods to compare teaching occupations to the occupations of other workers within Michigan. Because of the inherent differences in the skills, attributes, and benefits across occuaptions, this study puts salary comparisons in Michigan within the context of similar salary comparisons in other states. This study also provides information on both broad-based comparison occupation groups and more narrow groups, such as other public sector workers.

The two main methodological challenges in comparing teacher salaries with the salaries of other workers include identifying comparison occupations and adjustig for the characteristics of workers and occupations. This study uses various methods to account for these challenges and finds teachers in Michigan make, on average, less than in most other comparable occupations in the state. The largest gap (about 28 percent) is for average teacher salary relative to the salary for all professional and technical college educated workers. Gaps relative to the public sector tend to be smaller. Adjusting gaps for teacher characteristics reduces the gaps modestly. The gap between teacher salaries and salaries of related workers tend to be smaller in Michigan than the parallel gaps in the United States as a whole, but this is similar to the pattern in other states in the region.

Recommendations

The recommendations contained in this report synthesize information from each of the different components described above. Each of the recommendations focus on the development of a student based formula that allows all students to meet state standards. It also provides for adjustments related to differences in district or charter school characteristics. The study team framed each recommendation around the need to fund actual costs faced by districts or charters.

The recommendations create a system that can provide an estimate of the adequacy needs for each district or charter in the state. The base cost figures and weights identify the total resources needed to meet state standards, but do not delineate the sources of funding required to provide these resources. State, local, and federal dollars can be used to pay for the figures discussed in the recommendations. However the next step in implementing the recommendations is to determine how the resources would be paid for. While outside of the scope of this current study, the study team feels it is important to highlight during the implementation of a new system that student and taxpayer equity will also need to be considered. Ensuring that each district and charter has the ability to raise funds needed to meet all resource needs is critical to ensuring both an adequate and equitable school funding system.

Recommendation 1

Using the results of the study, create an adequacy based funding system using appropriate base cost, weights, and adjustments for district characteristics. The results of the three adequacy approaches provide the Collaborative with a wealth of information about the resources needed for students to meet Michigan's standards. This includes three base cost figures, two different sets of special needs weights, and information on the cost differences districts face due to size. Table 8 shows the study team's recommendations for a base cost and adjustments for Michigan. The parameters identified would allow students, teachers, schools, and districts to meet state standards.

Table 8
Final Recommendation Base and Weights*

Final Recommendation	
Base	$9,590
Size Adjustment	Adjusted by Formula
Poverty Weight	0.35
ELL	
WIDA 1-2	0.70
WIDA 3-4	0.50
WIDA 5-6/FELS	0.35
Special Education	
Mild	0.70
Moderate	1.15
Severe	State Reimbursement
Preschool	14,155
Isolation	0.04

*Does not include Transportation and Food Service

Recommendation 2

The base cost per student and special needs adjustments should be funded at the same levels for districts and brick and mortar charter schools. Providing the same funding for districts and charter schools produces a more equitable funding model for the state. While there are differences in the costs that the two sectors face, such as differences in retirement costs and facilities costs, the study team feels that applying the $9,590 base cost figure derived using a 4.6 percent retirement rate and does not include funding for transportation, food service, or capital to both sectors is the correct approach. Charters school are also eligible for all weights associated with students with special needs. The district size adjustment was developed specifically for districts and policy makers would need to decide how or if to apply to charter schools. The study team recognizes that applying the adjustment to charters could create a perverse incentive for the creation of additional small settings simply for higher funding.

Differences in the costs for retirement and facilities between the two sectors are discussed in further detail in recommendations below.

Recommendation 3

Retirement costs above the costs used in the costing out need to be funded for all entities facing the expense. The study team costed out the adequacy recommendations using a 4.6 percent retirement figure. This figure only represents the costs of a defined benefit program and does not fully account for the costs faced by districts and some charter schools. Table F.3 in Appendix F shows the base cost figures when applying the 25.56 percent retirement rate. This base figure needs to be used for districts or charters paying the higher retirement costs. Weights should be applied to this higher figure when determining the needed adequacy amounts.

On top of the normal costs of retirement districts and charters face, an unfunded liability also exists. The study team recommends that this liability be funded outside the base cost per student amount.

Recommendation 4

Transportation funding should be provided outside of the base per student amount and funding should be tied to actual transportation costs. In the near term, the study team suggests funding transportation at the district per rider figure of $973 until a further transportation study can be conducted that designs a more specific transportation cost formula. As additional research is conducted on transportation needs for all districts, a specific focus should include the needs of isolated districts and whether a separate funding source is needed for these districts.

The state's current approach to funding transportation creates large inequities in the funding system. Districts that face larger transportation expenditures often need to take more dollars away from instructional programs to provide the service. In other cases, some districts and charters report no transportation expenses but still receive funding.

The isolated district panel identified transportation as one of the main expenses for isolated districts. Panelists indicated that isolated districts face increased transportation costs for getting students to and from school, for before- and after- school programs, and for student activities.

Recommendation 5

The state should undertake a full capital study that examines the costs faced by districts and charter schools. Michigan's current funding model creates inequities in capital funding in a number of ways. Districts face variation in the availability of funding for capital projects. This impacts both the ability to build new buildings and districts' ability to maintain current buildings. Panelists throughout the PJ process mentioned the inequities in both areas for districts. The PJ CFO panel recommended a $400 per student figure to allow districts to address ongoing maintenance issues. The study team does not recommend including this amount in the base cost figure for districts or charters but thinks any study of capital needs should have a specific focus on the ongoing maintenance issues districts face. A determination needs to be made if an amount should be included in base funding for all districts.

Charter schools also face facilities issues. Currently, charter schools do not have the ability to raise funds through local property taxes to fund buildings and are required to acquire space using current operating dollars. The study team suggests that a future capital study take a specific review of the costs charters face for facilities and that an amount of funding for the costs of facilities be included in base funding for charters above the base amount discussed in Recommendation 1.

Recommendation 6

The study team suggests utilizing a Comparable Wage Index (CWI) to adjust for cost differences due to geographic location. The data are easily and publicly available and the statistical method of estimation is straightforward. This makes annual updates relatively easy, minimizing the large changes in allocations that can result when updates are less frequent. The comparable wage approach does not require the analyst to make decisions about which specific variables to include or exclude (in contrast to the hedonic methodology). Moreover, the comparable wage methodology is well-established (see, for example, Taylor and Fowler, 2006) and analysts are in agreement about the specification of the model. Again, this simplifies estimation, as there is no need to collect data from multiple sources or to worry that variables available in one year are not available in another. The data used for estimation is outside the control of local districts so there can be no ‘gaming’ of the resulting index.

Recommendation 7

The study team suggests utilizing a 0.10 weight for every CTE student. Both the EB and PJ approach examined the resources needed to implement CTE classes at the high school level. The EB approach recommends $10,000 per every CTE teacher to cover costs such as materials and equipment. The PJ panels identified a cost per student for CTE centers, as well as the per student cost to run CTE programming within a high school. The panelists identified a cost of $752 per CTE student within a center (based on centers having a 1,000 student enrollment). The panelists identified an additional $147 per student cost at the high school level. The recommendation of a 0.10 weight will cover the materials and costs to provide either a program within a high school or at a CTE center.

Chapter 1: Introduction

Augenblick, Palaich and Associates (APA), in partnership with Picus, Odden, and Associates (POA), was hired by the School Finance Research Collaborative (Collaborative) to examine the resources needed for students, teachers, schools, and districts to meet Michigan's academic standards. APA and POA are nationally recognized experts in school finance issues with experience examining school finance formulas; estimating the resources needed for students, schools, and districts to meet state educational standards; and working with state policy makers to implement needed changes. The study team also includes national school finance experts Michael Griffith, Chris Stoddard, and Jennifer Imazeki. The study team has well over 100 years of combined experience studying school finance issues. This report details the approaches used by the study team to estimate the resources needed in Michigan to meet state standards, and the findings from those approaches.

The study team's implementation of adequacy approaches focused on engaging educators from around Michigan, ensuring the study included the complete state context in its findings. The data collection brought together over 250 educators from school districts, public school academies (charters), and intermediate school districts to examine the resources needed for students to meet state standards. The teachers, principals, special education educators, district administrators and other education professionals came from all over the state and from various size districts. These educators participated directly in examining the resource needs of Michigan's schools and districts.

Approaches to Adequacy

The concept of adequacy as it relates to education funding grew out of the standards-based reform movement (Hamilton, Stecher, & Yuan, 2009). As states implemented specific learning standards and performance expectations for what students should know — along with consequences for districts and schools failing to meet these expectations (and, eventually, federal expectations imposed through No Child Left Behind and continued by the Every Student Succeeds Act) — the focus of school finance shifted to an examination of the resources necessary to provide districts, schools, and students with reasonable opportunities to achieve state standards. Over the past two decades, researchers have developed four approaches to creating estimates for the level of funding necessary to provide all students with the opportunity to receive an adequate education. The approaches include:

1. The **Evidence-Based (EB)** approach. The EB approach was developed by POA and uses information from research can be used to define the resource needs of a prototypical school or district to ensure that the school or district can meet state standards. The approach not only estimates resource levels but also specifies the programs and strategies through which such resources could be used efficiently. The approach is used to identify a base cost figure and adjustments for special needs students (Special needs students include special education, poverty, and English language learner (ELL) students).

2. The **Professional Judgment (PJ)** approach. The PJ approach was first used in Wyoming in the mid-1990s and has been one of the most widely used adequacy approaches since. The 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. The approach identifies both a base cost and adjustments for special needs students.

3. The **Successful Schools/School District (SSD)** approach. The SSD approach was developed by APA. It determines an adequate per student base cost amount by using the actual expenditure levels of schools or school districts that are currently meeting or exceeding state performance objectives. This approach assumes that every school and school district, in order to be successful, needs the same level of base funding that is available to the most successful schools and districts. The approach does not identify adjustments for special needs students.

4. The fourth approach, the **cost function or statistical (CF)** approach, is an econometric method that estimates the level of funding needed to achieve a given level of student achievement as measured on assessments while controlling for student and district characteristics. Due to its complexity and reliance on econometric modeling techniques, the approach has proven difficult to explain in situations other than academic forums.

Michigan Study

This report describes the study team's implementation of both the PJ and EB approaches to examine the cost of adequacy in Michigan. Utilizing these two approaches allowed the study team to estimate both the cost of meeting the full state standards for all students at a base level, and the additional costs associated with differences in district and student characteristics. The study does not examine virtual education (online) or adult education.

APA previously implemented the SSD approach in Michigan as part of a prior study. The report, "Michigan Education Finance Study[7]," was the result of that study and was provided to the state in June of 2016. As part of that effort, APA conducted an examination of the expenditures of those Michigan districts that outperformed other districts in the state on Michigan's assessment system. The study team updates the results of this study as part of this work.

Table 1.1 describes the differences in the three adequacy approaches including the benchmarks for success, data sources, and school finance parameters that can be identified by each approach.

[7] https://www.michigan.gov/documents/budget/Michigan_Education_Finance_Study_527806_7.pdf

Table 1.1
Summary of Three Approaches to Adequacy Used in Michigan

	Evidence-Based	Professional Judgment	Successful Schools/Districts
Benchmark of Success	Ensuring students can meet all state standards	Ensuring students can meet all state standards	Currently outperforming other Michigan schools
Data Source	Best practice research, reviewed by Michigan educators; when conflict arises in resource recommendations, the EB approach defers to the research	Expertise of Michigan educators serving on PJ panels; uses research as a starting point but defers to educators when conflict arises in resource recommendations	2013-14 expenditure data from selected successful schools updated to 2015-16 figures
Available Data Points			
Base	Yes	Yes	Yes
Student Adjustments (Weights)	Yes	Yes	No

In addition to implementing the two adequacy approaches and updating the SSD figures, APA has undertaken a number of study components:

- Drs. Chris Stoddard and Jennifer Imazeki examined the costs districts face due to differences in location and the competitiveness of teaching salaries in Michigan,
- Michael Griffith led the research on the impact of district isolation on the costs districts face in meeting state standards. This includes a literature review of how other states address district isolation and the results of additional PJ work focused on district isolation,
- The study team examined transportation by 1) looking at how other states fund transportation and 2) examining current expenditures on transportation for Michigan districts and possible figures for funding transportation as part of this adequacy study, and
- Finally, the study team identified resources through the EB and PJ studies that could have impacts on the capital needs of districts and a brief summary of these potential impacts is included.

Structure of This Report

The report is divided into three sections. Chapters two, three, and four focus on the three adequacy approaches. Chapters five, six, seven, and eight look at the additional studies conducted including examinations of transportation, capital, geographic cost differences, and the labor market. Finally, chapter nine synthesizes all of the components.

Adequacy Approaches

Chapter two details the PJ approach, describing the premise behind the approach then detailing how it was implemented in Michigan and the standard used to guide the PJ work. Next the chapter describes the resources identified by the panels and finally provides the base cost and adjustments related to those resources.

Chapter three details the EB approach, first describing the EB model and philosophy as well as detailing the base model identified through research. The study team then describes the input process used with Michigan educators and the state specific changes suggested by the panel. Finally, the chapter examines the base cost and adjustments identified by the approach.

Chapter four of the report details APA's SSD study. The chapter begins by describing the various ways districts were identified as successful and the final set of districts identified as best representing the base cost needed for districts to outperform other districts in the state. The study team examines how the figure needs to be adjusted from its 2013-14 school figures to bring the figures into 2015-16 dollars, the year for the figures used in other parts of the study.

Additional Studies

Chapter five details the study team's work on transportation, beginning with an examination of the various approaches used in states to fund transportation. The study team then examines the actual current expenditures on transportation for Michigan districts. Additionally, the chapter examines the possible impacts to transportation costs related to findings from the PJ and EB studies.

Chapter six details the possible facilities impacts related to the findings from the PJ and EB approaches. Though this report does not undertake a full examination of the capital needs of Michigan districts, it is important to understand that changes in programs and services for students can have impacts on district facility needs.

Chapter seven examines the costs districts face due to geographic differences, as well as the different approaches to adjusting for these differences. The chapter also recommends an approach for Michigan.

Chapter eight examines teacher compensation in Michigan both against similar professions in the state and nationally.

Results and Recommendations

Chapter nine compares the results of all three approaches, examines the differences in resources identified between the EB and PJ results, and examines how the various results could be used in a statewide funding system.

It is important to remember that the study team's focus for this report is on the resources needed for students to meet Michigan's standards. The study team understands the complexities of the Michigan education governance structure, which includes school districts, intermediate school districts (ISDs), and charters. Currently districts, and some charter schools, pay 25.56 percent of salaries for costs associated with retirement. Many charters do not participate in the state's retirement system and pay a lower amount for retirement costs. With these differences in mind, the study team has applied a 4.6 percent retirement rate when costing out the figures seen in the body of this report. This 4.6 percent represents the costs associated with a defined benefit program. Adjustments in funding will need to be made for districts or charters paying the full 25.56 percent retirement rate associated with the State's retirement system, this is discussed in the recommendations of the study. Other differences, such as facilities costs are also addressed in the recommendations section.

The results in the report focus on the resources needed to meet Michigan standards and do not identify who will be funding the needed resources. State, local, and federal dollars are available to help pay for the needed programs and services. The study team recognizes that the ability of different communities to pay for education varies widely across the state. However, this study does not attempt to recommend or determine how best to create a new funding system for Michigan which would include discussions of system equity and tax policy, but instead is intended to begin the conversation by identifying the resources needed for all students to meet Michigan's standards.

It is also clear different communities receive similar services in different ways. For example, some districts might utilize an ISD for a service while another district might provide the service itself. Similarly, a small single charter school might provide a service that another charter receives from a management organization. Therefore, the study examines the total level of resource needed but is agnostic regarding how the service should be provided.

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Chapter 2: Professional Judgment Approach

The P**rofessional 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 identified special needs (which allows for the calculation of a base cost) and then separately for special needs students, presented as weights.

The PJ approach is distinct from the successful school district (SSD) approach and similar to the evidence-based (EB) approach. Like the EB approach, the PJ approach is able to identify resources for special needs students and is also able to address future standards and performance expectations, a benchmark for academic success that is higher than the benchmark for the SSD approach.

Creating Representative Schools and Representative Districts

The PJ approach estimates the costs of adequacy by creating representative schools and representative districts. Representative schools are designed using statewide average characteristics to represent schools across the State. This includes identifying averages for school sizes and grade configurations as well as identifying average demographics for concentrations of students in poverty, ELL, and special education. For the PJ panels, the term "poverty" was used to refer to students that struggle academically and was defined using free and reduced-price lunch eligibility as a proxy. The term "high need poverty" was used to describe students who are likely to require more resources than poverty students to be successful in school, based on the presence of multiple risk factors. Panelists described these risk factors as similar to those used to determine eligibility for the Great Start Readiness Program (GSRP)[8].

In Michigan, average school and district sizes (in rounded figures) are 382 students for elementary schools, 527 for middle schools, and 512 for high schools, with an average district size of 2,466 students[9]. Statewide, the average demographics are 50 percent of students qualifying for FRPL, five percent ELL students, and 13 percent special education students. For the purposes of this study in Michigan, the study team also examined the relationship between resources and student need concentration levels for poverty and ELL populations. For the ELL population, two concentration levels (five percent and 50 percent) were considered. For the poverty population, three concentration levels (25 percent, 50 percent, and 75 percent) were examined for both poverty and high need poverty

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[8] 1. **Low Family Income:** family income equal to or less than 250% of the FPL
2. **Environmental Risk:** Parental loss due to death, divorce, incarceration, military service, or absence; sibling issues; teen parent (not age 20 when first child born); family is homeless or without stable housing, residence in a high-risk neighborhood (area of high poverty, high crime, with limited access to critical community services); or prenatal or postnatal exposure to toxic substances known to cause learning or developmental delays.
3. **Parent(s) with low educational attainment:** Parent has not graduated from high school is illiterate.
4. **Abuse/neglect to child or parent:** Domestic, sexual of physical abuse of child or parent; child neglect issues; Child Protective Services report.
5. **Severe or challenging behavior:** Child has been expelled from preschool or child care center

[9] The average school and district size does not include charter school data

students. The average special education percentage for the state is 13 percent, the study team disaggregated the statewide average into three categories of need: (1) mild (nine percent), (2) moderate (2.5 percent), and (3) severe (1.5 percent). The three categories are not based on disability, but on time spent in the general education classroom.

The study team designed multiple hypothetical schools to discuss with the PJ panels: one preschool program; two elementary schools (of 270 and 390 students); three middle schools (of 180, 420 and 735 students); and four high schools (of 220, 500, 800 and 1,200 students). The team also designed four representative districts: a very small (670 students); small (1,700 students); moderate (5,000 students); and large sized (13,590 students) district. The study team created the representative schools and four representative districts so they would closely resemble actual schools and districts, on average, in the state. This allowed PJ panelists to comfortably estimate what resources are needed, since the representative school and district sizes generally looked familiar. At the same time, the approach developed per student figures that can be applied in each unique district and school in Michigan based on real enrollment figures and demographics.

Tables 2.1a-d list the representative schools and representative districts for Michigan, including demographics.

Table 2.1a

PJ Representative Preschool (1 School Size) and Elementary Schools (2 School Sizes)

	Preschool Program	Elementary School	Elementary School
Enrollment	**64**	**270**	**390**
Special Need Populations			
Poverty, 25% Concentration	16	68	98
Poverty, 50% Concentration	32	135	195
Poverty, 75% Concentration	48	203	293
High Need Poverty, 25% Concentration	18	68	98
High Need Poverty, 50% Concentration	32	135	195
High Need Poverty, 75% Concentration	48	203	293
ELL, 5% Concentration	3	14	20
ELL, 50% Concentration	32	135	195
Special Education, Mild (9%)	6	24	35
Special Education, Moderate (2.5%)	2	7	10
Special Education, Severe (1.5%)	1	4	6

Table 2.1b

PJ Representative Middle Schools – 3 School Sizes

	Middle School	Middle School	Middle School
Enrollment	**180**	**420**	**735**
Special Need Populations			
Poverty, 25% Concentration	45	105	184
Poverty, 50% Concentration	90	210	368
Poverty, 75% Concentration	135	315	551
High Need Poverty, 25% Concentration	45	105	184
High Need Poverty, 50% Concentration	90	210	368
High Need Poverty, 75% Concentration	135	315	551
ELL, 5% Concentration	9	21	37
ELL, 50% Concentration	90	210	368
Special Education, Mild (9%)	16	38	66
Special Education, Moderate (2.5%)	5	11	18
Special Education, Severe (1.5%)	3	6	11

Table 2.1c

PJ Representative High Schools – 4 School Sizes

	High School	High School	High School	High School
Enrollment	**220**	**500**	**800**	**1,200**
Special Need Populations				
Poverty, 25% Concentration	55	125	200	300
Poverty, 50% Concentration	110	250	400	600
Poverty, 75% Concentration	165	375	600	900
High Need Poverty, 25% Concentration	55	125	200	300
High Need Poverty, 50% Concentration	110	250	400	600
High Need Poverty, 75% Concentration	165	375	600	900
ELL, 5% Concentration	11	45	40	60
ELL, 50% Concentration	110	250	400	600
Special Education, Mild (9%)	20	45	72	108
Special Education, Moderate (2.5%)	6	13	20	30
Special Education, Severe (1.5%)	3	8	12	18

Table 2.1d
PJ Representative School Districts – 4 District Sizes

	Very Small District	Small District	Moderate District	Large District
Enrollment	**670**	**1,700**	**5,020**	**13,590**
Special Need Populations				
Poverty, 25% Concentration	168	425	1,255	3,398
Poverty, 50% Concentration	335	850	2,510	6,795
Poverty, 75% Concentration	503	1,275	3,765	10,193
High Need Poverty, 25% Concentration	168	425	1,255	3,398
High Need Poverty, 50% Concentration	335	850	2,510	6,795
High Need Poverty, 75% Concentration	503	1,275	3,765	10,193
ELL, 5% Concentration	34	85	251	680
ELL, 50% Concentration	335	850	2,510	6,795
Special Education, Mild (9%)	60	153	452	1,223
Special Education, Moderate (2.5%)	17	43	126	340
Special Education, Severe (1.5%)	10	26	75	204

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 teachers, supplies, materials, and professional development) from district-level resources (which include 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 Michigan was designed to conduct panels in the following progression:

1. School-level panels: the study team first held four school-level panels based on grade-level (preschool, elementary, middle, and high school). Each of these panels focused first on the resources needed to serve students with no special needs; then identified the additional resources needed to serve students in poverty at the 50 percent concentration level.

2. Special needs panels: next, the study team held four special needs panels (one each for special education, ELL, students in poverty, and CTE) to review the work of the previous panels, then identified the additional resources needed to serve special education, ELL and CTE students, additional concentration levels of students in poverty, and resources needed for high need students in poverty.

3. District-level panels: next, four district panels reviewed the work of the previous school-level and special needs panels. 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 sized district, and large district. A fifth isolated

district panel was then held via webinar to review the work of the very small sized district panel and identify the additional resources needed as a result of geographic isolation.

4. Charter schools panel: although there was charter representation on all of the previous panels, the study team held a charter schools panel specifically with charter school representatives to review the resources identified by previous panels within the charter context and to better understand the fiscal realities of charter schools in Michigan. The panel reviewed the resources associated with school sizes similar to charter schools across the state.

5. Chief Financial Officers (CFO) panel: the study team also held a panel specifically with CFOs to review all non-personnel costs, both at the school and district level, identified by previous panels.

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

Each panel had between nine and twelve participants, who were a combination of classroom teachers, principals, personnel who provide services to students with special needs, superintendents, technology specialists, and school business officials. Panels included representatives from districts, charters, and ISDs. The Collaborative used a multistep process to select panel members. This included:

- Identifying potential participants by:
    - Seeking volunteers from the Network of Michigan Educators,[10] Michigan's most prestigious education network. The Network of Michigan Educator is a professional organization connecting educators recognized for excellence through programs including:
        - Michigan Teacher of the Year;
        - Milken National Educator Award;
        - Presidential Award for Excellence in Math and Science Teaching;
        - National Board Certification;
        - Michigan Secondary Principal of the Year;
        - Michigan Middle Level Principal of the Year;
        - Michigan National Distinguished Principal; and
        - Michigan Superintendent of the Year.
    - Seeking nominees from the Superintendents of the Michigan Association of School Administrators and the Michigan Association of Intermediate School Administrators.
- The Project Steering and Technical Committee then finalized panelist selections, being careful to:
    - Follow the researchers' guidelines regarding the types of educators and the composition for each panel;

[10] http://www.michiganeducators.org/

- Include educators from all regions of the state in proportion to the number of students served in each region; and
- Select a group of panelists who represent the student population as a whole by race and gender.

A list of panel members is provided in Appendix A to this report.

Panels were held from September 2017 to November 2017. All panels were held in Lansing, Michigan, except the Isolated District Panel, which was held online via webinar. Table 2.2 provides the dates of these meetings.

Table 2.2
PJ Panel Dates

Date	Panel
September 19-20, 2017	Elementary School Panel; Middle School Panel
September 21, 2017	Preschool Panel
September 21-22, 2017	High School Panel
October 3-4, 2017	Special Education Panel; Students in Poverty Panel
October 5, 2017	Career and Technical Education Panel
October 5-6, 2017	English Language Learners Panel
October 17-18, 2017	Very Small Sized District Panel; Small Sized District Panel
October 19-20, 2017	Moderate Sized District Panel; Large Sized District Panel
November 7, 2017	Charter Schools Panel
November 8, 2017	CFO Panel; Isolated District Panel (via webinar)
November 9, 2017	Statewide Review Panel

Panelists were not compensated for their participation, though meals were provided and some expenses, like mileage, parking, and hotel fees, were reimbursed.

Summarizing Michigan State Standards and Requirements

Prior to 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 Michigan standards and requirements, which included the Michigan Merit Curriculum and graduation requirements, as well as additional requirements for schools and districts around assessment, accountability, and educator evaluation. The study team prepared a brief summary document of these standards and requirements, which was reviewed by the School Finance Research Collaborative. This document was then shared with panelists (Appendix B). The document was not meant to be exhaustive, as all panel participants were experienced educators in Michigan; instead, it was meant to highlight key expectations and recently revised expectations, such as the implementation of the "Third Grade Reading Law" and the Executive Directive to Implement Recommendations of the Career Pathway Alliance. Panelists were instructed to use the summary document, in conjunction with their knowledge of other critical education policies and practices in Michigan, to guide their allocations of resources needed to increase the number of Michigan students meeting or exceeding standards. The instructions and background information used at the PJ panels can be found in Appendix C.

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

The study team provided the PJ panels with some starting point figures from a review of best practice research and with any available staffing recommendations from educator professional associations. These figures were used to prompt discussion and panelists were in no way constrained by these recommended figures. Instead, panelists could adjust the figures as they saw fit to best suit Michigan and add in additional necessary staffing positions that were not addressed in the starting point figures.

Tables 2.3a-c summarize the starting point figures that were shared with the panelists based upon the team's research review and recommendations from professional associations, as available. Note that where "Rec." is indicated, the research or professional associations indicated that such a resource should be in place but a specific resource level was not identified. For illustration purposes, the following tables show the starting point figures for one school at each grade span. When panelists built multiple schools at each level, the starting point figures for additional schools were higher or lower, based on the size of the school.

Table 2.3a

Research-Based and Professional Association Starting Point Personnel Figures

Elementary School of 390 Students

Personnel Position	Research-Based Recommendations	Professional Association Recommendations
Instructional Staff		
Classroom Teachers	18.2-23.8	22.5
Specials Teachers (art, music, PE, world language, etc.)	20.-2.6	
Instructional Facilitators (Coaches)	2.0	
Interventionists	1.0	
Librarians/Media Specialists	1.0	1.0
Media Aide		1.0
Pupil Support Staff		
Counselors	1.6	1.6
Nurses	1.0	0.5
Psychologists		0.6
Social Workers		1.0
Family Liaisons		
Administrative Staff		
Principal	1.0	1.0
Assistant Principals		1.0
Clerical	2.0	1.0
Bookkeeper		1.0
Other Staff		
IT Technicians		1.6

The study team's research review produced a range of class sizes shown to positively impact student success, from 15-20 in kindergarten through grade three and from 20-25 in grades four and five. The National Education Association recommended class sizes of 15:1 in kindergarten through grade three, then small class sizes in higher grades, but not a specific figure. The study team used 25:1 for grade four and five to create a comparison starting point figure. Other specials teachers were also recommended, but not at a specific resource level. Other key recommendations out of both the research and professional association recommendations were related to counselors (both the research and the American School Counselor Association recommended staffing at 250:1), librarians (both sources recommending one per school), nurses (research recommending one per school and the National Association of School Nurses recommending staffing at 750:1 for the general student population), and principals (one per school). The research review also recommended instructional coaches, teacher tutors/interventionists, clerical staff, and media aides. Additional professional association recommendations were 500:1 to 700:1 for psychologists based on school need (National Association of School Psychologists), 400:1 for social workers (School Social Work Association), the addition of an assistant principal (one per school at the elementary and middle school level, one or more at the high school level, as recommended by the National Association of Elementary School Principals and National Association of Secondary School Principals), and 250:1 staffing for IT positions (International Society for Technology in Education, NETS Standards).

Table 2.3b

Research-Based and Professional Association Starting Point Personnel Figures

Middle School of 735 Students

Personnel Position	Research-Based Recommendations	Professional Association Recommendations
Instructional Staff		
Teachers	39.2	39.2
Instructional Facilitators (Coaches)	3.7	
Interventionists	1.0	
Librarians/Media Specialists	1.0	1.0
Media Aides		1.0
Pupil Support Staff		
Counselors	2.9	2.9
Nurses	1.0	1.0
Psychologists		1.1
Social Workers		1.8
Administrative Staff		
Principal	1.0	1.0
Assistant Principals		1.0
Clerical	2.0	
Other Staff		
IT Technicians		2.9

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

Table 2.3c

Research-Based and Professional Association Starting Point Personnel Figures

High School of 800 Students

Personnel Position	Research-Based Recommendations	Professional Association Recommendations
Instructional Staff		
Teachers	42.7	42.7
Instructional Facilitators (Coaches)	8.0	
Interventionists	1.0	
Librarians/Media Specialists	1.0	1.0
Media Aides		1.0
Pupil Support Staff		
Counselors	3.2	3.2
Nurses	1.0	1.1
Psychologists		1.1
Social Workers		2.0
Administrative Staff		
Principal	1.0	1.0
Assistant Principals		1.0
Clerical	2.0	
Other Staff		
IT Technicians		3.2

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 similar ratios as the elementary recommendations.

The study team also provided starting point figures from the research review for non-personnel costs, as shown in Table 2.4.

Table 2.4

Evidence-Based Starting Figures for School-Level Non-Personnel Costs

Cost Category	Research-Based Starting Figures		
	Elementary School	Middle School	High School
Professional Development	10 days per teacher; $100 per student	10 days per teacher; $100 per student	10 days per teacher; $100 per student
Supplies and Materials	$165 per student	$165 per student	$200 per student
Student Activities	$250 per student	$250 per student	$250 per student

It is important to note that the study team's research review did not identify resources beyond the school-level items listed above (e.g. district-level resources).

Professional Judgment Panel Procedures

Once panelists were provided with instructions and background information to guide their efforts, as described previously, PJ panels convened and 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. Panelists were frequently reminded that they should identify the resources needed to meet state standards in the most efficient way possible, without sacrificing quality.

Each panel discussed the following school-level resource needs:

1. Personnel, including classroom teachers, other teachers, psychologists, counselors, librarians, teacher aides, administrators, nurses, etc.

2. Other personnel costs, including the use of substitute teachers and time for professional development.

3. Non-personnel costs, such as supplies, materials and equipment costs (including textbook replacement and consumables), plus the costs of offering extracurricular activities.

4. Non-traditional programs and services, including before- and after-school programs, preschool, and summer school programs.

5. Technology, including hardware, software, and licensing fees.

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.

2. Non-personnel costs, such as maintenance and operations, insurance, safety and security, adoption of textbooks, assessment, contract services, and out-of-district placements.

PJ panels first identified the above resources for students with no special needs, then addressed the additional resources needed to serve special needs students (students in poverty, special education, ELL and CTE). Keeping these costs separate allowed for the creation of a base cost and additional special needs weights (discussed in greater detail later in this report).

As described in the previous section, the study team provided PJ panelists with starting point figures in a limited number of personnel categories from both the study team's research review as well as recommendations from professional associations. These figures were used to prompt discussion. Panelists were in no way constrained by these recommended figures or limited to these personnel categories; instead they could identify resources as their experience and professional judgement indicated was required to meet Michigan standards.

For each panel, the figures the study team recorded represent general consensus among members. 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's costing of resources took place at a later date.) 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, much less to costs that were relatively higher or lower than others.

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 20:1 in kindergarten through grade three and 25:1 in grades four and five;
- Significant time for teacher planning, collaboration, and imbedded professional development with instructional coaches. At each level this was essentially designed so that teachers teach about 75 percent of the day with the remaining time available for the listed activities; instructional coaches were seen as instrumental to helping teachers improve practice;
- A high level of student support (staffed as counselors, social workers, psychologists and behavior interventionist) available for all students;
- Sufficient administrative support in the form of assistant principals to allow for required staff evaluations to be done thoroughly and effectively;
- Before- and after-school programs and summer level learning opportunities, particularly for students in poverty;
- Technology-rich learning environments, including 1.1:1 student devices, and associated IT support;
- Sufficient staff to serve special education and ELL students;
- Sufficient nursing support to ensure students receive necessary medical care and monitoring from nurses and/or health aides to allow teachers and administrators to focus on classroom instructional needs;
- Sufficient counselor and career exploration staff to ensure students can achieve post-secondary goals; and
- Preschool for all three-year-olds and four-year-olds.

It should be noted that the resources PJ panels identified here are examples of how funds might be used to organize programs and services in representative schools. Further, there were separate panels for each school level, so approaches may vary in how they identified resources, but subsequent review panels felt the differences were appropriate. 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 purpose of the exercise is 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, and technology specialists;
- **Pupil support staff,** including counselors, nurses, social workers, psychologists, and behavior specialists;
- **Administrative staff,** including principals, assistant principals, bookkeepers, and clerical/secretarial staff; and
- **Other staff members,** including media aides, duty aides, 504 aides, and security and school resource officers.

Tables 2.5a-e show the school level resources that panels identified for the base education of students in Michigan. 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 a FTE basis), regardless of need, at the preschool, elementary, middle, and high school settings (base education). Subsequent tables identify the additional personnel needed to serve special needs students.

As noted previously, separate panels at each level identified these resources and as a result, specific resources and approaches may vary from level to level. As these resources are not intended to be prescriptive, subsequent review panels allowed for variation as long as they felt the differences were reasonable and the resource level was sufficient to serve at each level.

Table 2.5a
Elementary School Personnel as Recommended by Michigan PJ Panels, Base Education

School Configuration and Size	K-5, 270 students	K-5, 390 Students
Recommended Average Class Size	Grades K-3: 20 Grades 4-5: 25	Grades K-3: 20 Grades 4-5: 25
Instructional Staff		
Teachers	12.6	18.2
Specials Teachers	3.0	3.0
Instructional Facilitators (Coaches)	1.4	2.0
Teacher Tutor/Interventionists	0.7	1.0
Librarians/Media Specialists	0.5	0.5
Technology Specialists	0.5	0.5
504 Aides	1.0	1.0
Media Aides	0.5	0.5
Pupil Support Staff		
Counselors	0.5	0.5
Nurses	0.2	0.2
Psychologists	0.1	0.1
Health Aides	0.8	0.8
Social Workers	0.2	0.2
Behavior Interventionists	0.2	0.2

School Configuration and Size	K-5, 270 students	K-5, 390 Students
Administrative Staff		
Principals	1.0	1.0
Clerical/Data Entry Staff	2.0	2.0
Other Staff		
IT Technicians	0.4	0.5
Substitutes	0.5	1.0
Duty Aide	1.5	2.0

For both elementary schools (of 270 and 390 students), the panelists recommended an average class size of 20:1 in kindergarten through grade three and 25:1 for grades four and five, for a total of 12.6 and 18.2 classroom teachers, respectively. Panelists also identified the need for three specials teachers to teach subjects such as art, music, physical education, and world language, and to allow for sufficient planning and collaboration time for classroom teachers. The number of specials teachers is the same between the two schools because the class size can be higher in some of these elective classes. A full time 504 aide (whose primary role is to maintain, monitor, and create 504 plans) was identified at each school to support the academic, behavioral or medical 504 plan needs. The panelists felt that the librarian/media specialist and technology specialist (whose primary role is to provide coaching to teachers on incorporating technology in the classroom) could also provide additional instruction and release time. Other key staffing included a high level of pupil support across a variety of positions (the local school site would determine the specific pupil support positions that would be the best fit for their school), IT staff for the 1.1:1 student devices were recommended, and a substitute teacher (half time at the 270-student school and full time at the 390-student school) to provide continuity of instruction when teachers are out of the classroom.

Table 2.5b
Middle School Personnel as Recommended by Michigan PJ Panels, Base Education

School Configuration and Size	Grades 6-8, 180 Students	Grades 6-8, 420 Students	Grades 6-8, 720 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	9.6	22.4	39.2
Instructional Facilitators (Coaches)	0.5	1.1	2.0
Teacher Tutor/Interventionists	0.5	1.1	2.0
Librarians/Media Specialists	0.5	0.5	1.0
Media Aides	0.0	1.0	1.0
Technology Specialists	0.5	0.5	1.0
504 Aides	1.0	1.0	2.0

School Configuration and Size	Grades 6-8, 180 Students	Grades 6-8, 420 Students	Grades 6-8, 720 students
Pupil Support Staff			
Counselors	0.7	1.7	3.0
Nurses	0.2	0.5	1.0
Heath Aides	0.5	0.5	0.0
Psychologists	0.1	0.1	0.1
Social Workers	0.2	0.3	0.5
Behavior Interventionists	0.3	0.5	0.5
Administrative Staff			
Principal	0.5	1.0	1.0
Assistant Principals	0.5	1.0	2.0
Clerical/Data Entry Staff	1.0	2.0	3.0
Other Staff			
IT Technicians	0.2	0.5	1.0
School Resource Officers	0.1	0.25	0.25
Duty Aides	1.5	1.5	2.6
Substitutes	0.5	1.0	2.0
Security Staff	0.1	0.25	0.25

For each of the middle school size configurations, panelists felt that 25:1 was an appropriate average class size. Panelists also based their staffing of middle school grades on an eight-period day, with teachers teaching an average of six classes a day to allow an average of 25 percent of the day for planning, collaboration, and embedded professional development. This resulted in a total of 22.4 teachers at the school, regardless of size. At the secondary level, there is no distinction between classroom or specials teachers, so both are included in that total teachers figure. As was the case at the elementary level, panelists also identified pupil support services for all students and administrators to address evaluations. At the middle school level, panelists identified resources for a base level of security staffing and school resource officers. Panelists also identified a need for school resource officers (SRO) on each campus for the safety of the students. The study team did not include the cost of the SRO in the base funding because the funding varied significantly by district, with some paying the full cost for an SRO, some districts splitting the cost with the municipality, and some districts receiving the services of retired police officers free of charge.

Table 2.5c
High School Personnel, as Recommended by Michigan PJ Panels, Base Education

School Configuration and Size	Grades 9-12, 220 students	Grades 9-12, 500 students	Grades 9-12, 800 students	Grades 9-12, 1,600 students
Recommended Average Class Size	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
Instructional Staff				
Teachers	11.7	26.70	42.70	85.30
Instructional Facilitators (Coaches)	1.1	2.5	4	5
Teacher Tutor/Interventionists	0.5	1.0	2.0	4.0
Librarians/Media Specialists	0.2	0.5	1.0	1.0
Media Aides	0.4	1.0	0.5	2.0
Technology Specialists	0.2	0.5	1.0	1.0
504 Aides	0.4	1.0	2.0	3.0
Pupil Support Staff				
Counselors	0.9	2.0	3.2	6.4
Nurses	0.2	0.5	0.5	1.0
Health Aides	0.2	0.5	0.5	0.0
Psychologists	0.1	0.1	0.1	0.1
Social Workers	0.2	0.5	1.0	1.0
Behavior Interventionists	0.1	0.5	0.5	1.0
Postsecondary Planning	0.2	0.5	0.5	1.0
Administrative Staff				
Principal	0.5	1.0	1.0	1.0
Assistant Principals	0.5	1.0	2.0	3.0
Athletic/Activities Director	0.5	0.5	1.0	1.0
Bookkeepers	0.2	0.5	0.5	1.0
Clerical/Data Entry Staff	1.0	2.0	2.5	4.0
Other Staff				
IT Technicians	0.8	1.0	1.0	2.0
School Resource Officers	0.2	0.5	1.0	1.0
Duty Aides	0.4	1.0	1.6	3.2
Security Staff	0.4	1.0	2.0	4.0

Table 2.5d
CTE at High School Personnel, as Recommended by Michigan PJ Panels, Base Education

	Very Small	Small	Moderate	Large
Instructional Aides	1.1	2.5	2.0	4.0
Work Based Learning Coordinator	0.0	0.5	1.0	1.0

For each of the four high school sizes, panelists kept the same average class size of 25:1 that they used for the middle schools and recommended an eight-period day (or a four-block day) to allow for a wide range of courses to be offered so that students could meet all graduation requirements. Teachers would teach six periods on average, again allowing about 25 percent of their days for meaningful collaboration and embedded professional development. The panelists also identified additional pupil support staff, administrators to manage evaluations, and other staff. As with the middle schools, panelists included staffing for security and school resource officers (SRO), which is not included in the base cost of this study as funding for this position varies greatly across districts. Panelists also included a Postsecondary Planning position at the high school level to assist students with postsecondary and career exploration opportunities. Table 2.5d shows the additional resources that were costed out by the panelists to make sure that CTE programs are offered at an adequate level.

Special Needs Personnel at the School Level

The resources described above detail the resources any student in Michigan should expect to find when entering a school. This section focuses on the resources needed for schools and districts to serve students with special needs. Special needs include students in poverty, special education students, and English language learners. Tables 2.1a-c earlier in this chapter outlined the different ways the study examined the special needs populations:

- For poverty students, the panels looked at three concentration levels for regular poverty students and high need poverty students. The panelists defined high need poverty students as students that met multiple indicators on the Great Start Readiness Program (GSRP)[11],
- The resources needed for ELL students were identified at two concentration levels, five percent concentration and 50 percent concentration, and then also by WIDA level. The three WIDA levels examined include WIDA 1&2, WIDA 3&4, and WIDA 5,6&FELS, and
- Lastly, special education resources were examined by mild, moderate, and severe levels of service need. The three levels were defined by time spent in the general education classroom.

Concentration of Poverty

Tables 2.6a-c identify the resources needed to serve poverty students at a 25 percent, 50 percent, and 75 percent concentration level. It is important to note that these tables identify certain positions as school-level personnel, even though some school districts may house these positions centrally or at the ISD. There are additional personnel not shown that were identified at the district level (Table 2.17a). Each table should be considered separately. For example, Table 2.6a identifies one teacher tutor/interventionist for the large elementary school for the 25 percent concentration and Table 2.6b shows two teacher tutor/interventionists for the 50 percent concentration. These are separate identifications and should not be added together.

[11] Great Start Readiness Program is Michigan's state funded program for four-year-old children with factors that put them at-risk of educational failure.

Table 2.6a
Additional Personnel Needed to Serve Students at 25% Concentration of Poverty Identified by Michigan PJ Panels

25% Poverty Students				
Elementary School				
District Size	Very Small	Small	Moderate	Large
# of Poverty Students	68 students	98 students	98 students	98 students
Instructional Staff				
Teacher Tutor /Interventionists	0.7	1.0	1.0	1.0
Pupil Support Staff				
Nurses	0.3	0.3	0.3	0.3
Social Workers	0.3	0.3	0.3	0.3
Health Aides	-0.3	-0.3	-0.3	-0.3
Middle School				
District Size	Very Small	Small	Moderate	Large
# of Poverty Students	45 students	105 students	184 students	184 students
Instructional Staff				
Teacher Tutor /Interventionists	0.5	1.1	2.0	2.0
Pupil Support Staff				
Social Workers	0.1	0.3	0.5	0.5
Behavior Interventionists	0.3	0.5	0.5	0.5
High School				
District Size	Very Small	Small	Moderate	Large
# of Poverty Students	55 students	125 students	200 students	400 students
Instructional Staff				
Teacher Tutor /Interventionists	0.3	0.6	1.0	2.0
Instructional Aides	0.3	0.6	1.0	2.0

Resources shown in Table 2.6a identified for poverty students are above and beyond the resources identified in the base. To fully serve these students in poverty, panelists identified the need for teacher tutor/interventionists to push-in to classrooms and work directly with students. At the high school level, the panelists recommended having an instructional aide for every additional teacher tutor/interventionist to be able to push-in to additional classrooms. The panelists added further pupil supports, including social workers to address the added student need. An additional 0.3 nurse was added at the elementary level; however, the health aide decreased by 0.3. The panelists identified the need for the health center to be staffed all day at the elementary level and the addition of more of the nurse's time at the 25 percent concentration of poverty level would lead to less need of the health aide's time. At the middle school level, an additional portion of a behavior interventionist's time was cited as a need for middle school students in the 25 percent concentration poverty level.

Table 2.6b
Additional Personnel Needed to Serve Students at 50% Concentration of Poverty Identified by Michigan PJ Panels

50% Poverty Students				
Elementary School				
District Size	Very Small	Small	Moderate	Large
# of Poverty Students	136 students	195 students	195 Students	195 students
Instructional Staff				
Teacher Tutor /Interventionists	1.4	2.0	2.0	2.0
Pupil Support Staff				
Nurses	0.6	0.8	0.8	0.8
Social Workers	0.6	0.8	0.8	0.8
Health Aides	-0.3	-0.3	-0.3	-0.3
Family Liaisons	0.3	0.5	0.5	0.5
Behavior Interventionists	0.7	1.0	1.0	1.0
Administrative Staff				
Assistant Principals	0.3	0.5	0.5	0.5
Middle School				
District Size	Very Small	Small	Moderate	Large
# of Poverty Students	90 students	210 students	368 students	368 students
Instructional Staff				
Teachers	1.8	4.2	7.4	7.4
Instructional Facilitators (Coach)	0.5	1.1	2.0	2.0
Teacher Tutor /Interventionists	0.9	2.0	3.5	3.5
Pupil Support Staff				
Social Workers	0.2	0.6	1.0	1.0
Family Liaisons	0.1	0.3	0.5	0.5
Behavior Interventionists	0.4	0.8	1.0	1.0
High School				
District Size	Very Small	Small	Moderate	Large
# of Poverty Students	110 students	250 students	400 students	800 students
Instructional Staff				
Teacher Tutor /Interventionists	0.9	2.0	3.2	6.4
Instructional Aides	0.9	2.0	3.2	6.4

High School Cont.				
Pupil Support Staff				
Social Workers	0.3	0.7	1.0	1.0
Family Liaisons	0.3	0.7	1.0	1.0
Behavior Interventionists	0.3	0.7	1.0	1.0
Post-Secondary Planners	0.1	0.3	0.4	0.8
Administrative Staff				
Clerical/Data Entry Staff	0.3	0.6	1.0	2.0

The resources increased for the 50 percent concentration of poverty, Table 2.6b, from what was needed at the 25 percent concentration, especially in terms of pupil support staff. The panelists identified a need for family liaisons at the 50 percent concentration level to assist with the needs of both the students and their families. The panelists also identified the need for additional clerical/data entry staff to assist with paperwork at the high school level. Additionally, the panelists identified the need for assistant principal support at the elementary level to assist with the increase of behavioral needs. At the middle school level, the panelists identified additional teachers at the 50 percent concentration of poverty level to assist in creating smaller class sizes for the core content classes.

Table 2.6c

Additional Personnel Needed to Serve Students at 75% Concentration of Poverty Identified by Michigan PJ Panels

75% Poverty Students				
Elementary School				
District Size	Very Small	Small	Moderate	Large
# of Poverty Students	203 students	293 students	293 students	293 students
Instructional Staff				
Teacher Tutor /Interventionists	2.1	3.0	3.0	3.0
Pupil Support Staff				
Nurses	0.6	0.8	0.8	0.8
Social Workers	1.0	1.3	1.3	1.3
Health Aides	-0.3	-0.3	-0.3	-0.3
Family Liaisons	0.7	1.0	1.0	1.0
Behavior Interventionists	0.7	1.0	1.0	1.0
Counselors	0.7	1.0	1.0	1.0
Elementary School Cont.				
Administrative Staff				
Assistant Principals	0.7	1.0	1.0	1.0
Other Staff				
Duty Aides	0.7	1.0	1.0	1.0
Substitutes	0.7	1.0	1.0	1.0

Middle School				
District Size	Very Small	Small	Moderate	Large
# of Poverty Students	135 students	315 students	551 students	551 students
Instructional Staff				
Teachers	2.3	5.3	9.3	9.3
Instructional Facilitators (Coach)	0.5	1.0	1.5	1.5
Teacher Tutor /Interventionists	0.5	1.1	2.0	2.0
Pupil Support Staff				
Social Workers	0.4	0.9	1.5	1.5
Family Liaisons	0.3	0.6	1.0	1.0
Behavior Interventionists	0.6	1.1	1.5	1.5
Administrative Staff				
Assistant Principals	0.3	0.6	1.0	1.0
High School				
District Size	Very Small	Small	Moderate	Large
# of Poverty Students	165 students	375 students	600 students	1,200 students
Instructional Staff				
Teachers	2.0	4.4	7.1	14.2
Teacher Tutor /Interventionists	0.9	2.0	3.2	6.4
Pupil Support Staff				
Social Workers	0.3	0.7	1.0	1.0
Family Liaisons	0.3	0.7	1.0	1.0
Behavior Interventionists	0.3	0.7	1.0	1.0
Post-Secondary Planners	0.1	0.3	0.5	1.0
Administrative Staff				
Assistant Principals	0.1	0.3	0.5	1.0
Clerical/Data Entry Staff	0.3	0.6	1.0	2.0

Although the panelists continued to add resources in pupil support and administrative support at the 75 percent concentration level, they did not add resources at the same rate as the 50 percent concentration level, which is considered the “tipping point” for providing added resources. The panelists added teachers to the high school and middle schools to help reduce class sizes, as well as assistant principal time to assist with the additional evaluation work affiliated with hiring more instructional staff. The panelists also identified additional counselor time at the elementary level to address mental health and behavior needs.

High-need Poverty

Tables 2.7a-c identify the resources needed to serve high poverty students at a 25 percent, 50 percent, and 75 percent concentration level. Again, resources identified for each concentration level are separate and should not be added together.

Table 2.7a
Additional Personnel Needed to Serve Students at 25% Concentration of Poverty Identified by Michigan PJ Panels

25% Poverty Students				
Elementary School				
District Size	Very Small	Small	Moderate	Large
# of Poverty Students	68 students	98 students	98 students	98 students
Instructional Staff				
Teacher Tutor /Interventionists	1.4	2.0	2.0	2.0
Pupil Support Staff				
Nurses	0.6	0.8	0.8	0.8
Social Workers	0.6	.08	0.8	0.8
Health Aides	-0.3	-0.3	-0.3	-0.3
Family Liaisons	0.3	0.5	0.5	0.5
Behavior Interventionists	0.7	1.0	1.0	1.0
Administrative Staff				
Assistant Principals	0.3	0.5	0.5	0.5
Middle School				
District Size	Very Small	Small	Moderate	Large
# of Poverty Students	45 students	105 students	184 students	184 students
Instructional Staff				
Teachers	1.8	4.2	7.4	7.4
Instructional Facilitators (Coach)	0.5	1.1	2.0	2.0
Teacher Tutor /Interventionists	0.9	2.0	3.5	3.5
Pupil Support Staff				
Social Workers	0.2	0.6	1.0	1.0
Family Liaisons	0.1	0.3	0.5	0.5
Behavior Interventionists	0.2	0.6	1.0	1.0

High School				
District Size	Very Small	Small	Moderate	Large
# of Poverty Students	55 students	125 students	200 students	600 students
Instructional Staff				
Teacher Tutor /Interventionist	0.9	2.0	3.2	6.4
Instructional Aides	0.9	2.0	3.2	6.4
Pupil Support Staff				
Social Workers	0.3	0.7	1.0	1.0
Family Liaisons	0.3	0.7	1.0	1.0
Behavior Interventionists	0.3	0.7	1.0	1.0
Post-Secondary Planners	0.1	0.3	0.4	0.8
Administrative Staff				
Clerical/Data Entry Staff	0.3	0.6	1.0	2.0

The panelists felt that a school with a concentration of 25 percent high need poverty students had the same needs as a school with a 50 percent concentration of poverty students, panelists built the resources the same for the two hypothetical schools. In both schools, there are pupil support staff to deal to with the social and emotional needs of these students and additional instructional staff to push into classrooms and assist with the academic needs of these students.

Table 2.7b

Additional Personnel Needed to Serve Students at 50% Concentration of Poverty Identified by Michigan PJ Panels

50% Poverty Students				
Elementary School				
District Size	Very Small	Small	Moderate	Large
# of Poverty Students	136 students	195 students	195 students	195 students
Instructional Staff				
Teacher Tutor /Interventionists	2.1	3.0	3.0	3.0
Pupil Support Staff				
Nurses	0.6	0.8	0.8	0.8
Social Workers	1.0	1.3	1.3	1.3
Health Aides	-0.3	-0.3	-0.3	-0.3
Family Liaisons	0.7	1.0	1.0	1.0
Behavior Interventionists	0.7	1.0	1.0	1.0
Counselors	0.7	1.0	1.0	1.0
Administrative Staff				
Assistant Principals	0.7	1.0	1.0	1.0

Elementary School Cont.				
Other Staff				
Duty Aides	0.7	1.0	1.0	1.0
Middle School				
District Size	Very Small	Small	Moderate	Large
# of Poverty Students	90 students	210 students	368 students	368 students
Instructional Staff				
Teachers	2.3	5.3	9.3	9.3
Instructional Facilitators (Coach)	0.5	1.0	1.5	1.5
Teacher Tutor /Interventionists	0.5	1.1	2.0	2.0
Pupil Support Staff				
Social Workers	0.4	0.9	1.5	1.5
Family Liaisons	0.3	1.1	1.5	1.5
Behavior Interventionists	0.3	0.6	1.0	1.0
Administrative Staff				
Assistant Principals	0.3	0.6	1.0	1.0
High School				
District Size	Very Small	Small	Moderate	Large
# of Poverty Students	110 students	240 students	400 students	800 students
Instructional Staff				
Teachers	2.0	4.4	7.1	14.2
Teacher Tutor /Interventionist	0.9	2.0	3.2	6.4
Pupil Support Staff				
Social Workers	0.3	0.6	1.0	1.0
Family Liaison	0.3	0.7	1.0	1.0
Behavior Interventionist	0.3	0.7	1.0	1.0
Post-Secondary Planner	0.1	0.3	0.5	1.0
Administrative Staff				
Assistant Principal	0.1	0.3	0.5	1.0
Clerical/Data Entry	0.3	0.6	1.0	2.0

Panelists found that the resources needed for the 50 percent concentration high-need poverty students are the same as needed to serve a school with a 75 percent concentration of students in poverty. The panel indicated there is a similarity of needs between the two concentrations and felt the resources provided at the 50 percent concentration level were adequate which includes more instructional support (teachers in the middle and high school levels to reduce class size), pupil support (family liaison and social work), and administrative support (assistant principals).

Table 2.7c

Additional Personnel Needed to Serve Students at 75% Concentration of Poverty Identified by Michigan PJ Panels

75% Poverty Students				
Elementary School				
District Size	Very Small	Small	Moderate	Large
# of Poverty Students	203 students	293 students	293 students	293 students
Instructional Staff				
Teachers	3.9	5.6	5.6	5.6
Teacher Tutor /Interventionists	2.1	3.0	3.0	3.0
Pupil Support Staff				
Nurses	0.6	0.8	0.8	0.8
Social Workers	1.0	1.3	1.3	1.3
Health Aides	-0.3	-0.3	-0.3	-0.3
Family Liaisons	0.7	1.0	1.0	1.0
Behavior Interventionists	0.7	1.0	1.0	1.0
Counselors	1.0	1.0	1.0	1.0
Administrative Staff				
Assistant Principals	0.7	1.0	1.0	1.0
Other Staff				
Duty Aides	0.7	1.0	1.0	1.0
Substitutes	0.7	1.0	1.0	1.0
Middle School				
District Size	Very Small	Small	Moderate	Large
# of Poverty Students	135 students	315 students	551 students	551 students
Instructional Staff				
Teachers	3.7	8.7	15.2	15.2
Instructional Facilitators (Coach)	0.5	1.0	1.5	1.5
Teacher Tutor /Interventionists	0.5	1.1	2.0	2.0
Pupil Support Staff				
Social Workers	0.6	1.4	2.5	2.5
Family Liaisons	0.3	0.6	1.0	1.0
Behavior Interventionists	0.6	1.1	1.5	1.5
Administrative Staff				
Assistant Principals	0.3	0.6	1.0	1.0
Security Staff	0.7	1.6	2.8	2.8

High School				
District Size	Very Small	Small	Moderate	Large
# of Poverty Students	165 students	375 students	600 students	1,200 students
Instructional Staff				
Teachers	3.0	6.8	10.9	21.8
Teacher Tutor /Interventionist	0.9	2.0	3.3	6.5
Pupil Support Staff				
Social Workers	0.6	1.3	1.6	2.0
Family Liaisons	0.6	1.3	1.6	2.0
Behavior Interventionists	0.6	1.3	1.6	2.0
Post-Secondary Planners	0.1	0.3	0.5	1.0
Administrative Staff				
Assistant Principals	0.1	0.3	1.0	2.0
Clerical/Data Entry Staff	0.3	0.6	1.0	2.0
Security Staff	0.8	1.9	3.0	6.0

The 75 percent concentration of high-need poverty students is only slightly higher resourced than the 50 percent concentration of high-need poverty students, indicating that the 50 percent level is the tipping point for adding additional resources for poverty concentrations. At the 75 percent level, panelists added additional teachers and support staff, as well as additional security guards.

ELL Resources by WIDA Level

Tables 2.8a-c identify the resources needed to serve ELL students. ELL students were identified at five percent concentration levels and 50 percent concentration levels by the WIDA group. The study team used WIDA levels, which are determined by the WIDA ELP Standards[12]. The panelists were asked to assign the number of students that fall in each of the WIDA levels per school level based on the concentration of students in the district (five percent or 50 percent). The percentage of students at the three WIDA levels examined varied by grade level.

The panelists chose to start assigning resources by WIDA level at a 50 percent concentration level. The panelists felt they could then adjust the resource level to address a five percent concentration of ELL students.

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

Table 2.8a
Additional Personnel Needed to Serve Students at 50% Concentration of WIDA 1&2 ELL Students Identified by Michigan PJ Panels

50% Concentration of WIDA 1&2 ELL Students				
Elementary School				
District Size	Very Small	Small	Moderate	Large
# of ELL Students	54 students	78 students	78 students	78 students
Instructional Staff				
Teachers	2.00	2.00	2.00	2.00
Instructional Facilitators (Coach)	0.28	0.40	0.40	0.40
Pupil Support Staff				
Language Services	0.28	0.40	0.40	0.40
Family Liaisons	0.20	0.20	0.20	0.20
Middle School				
District Size	Very Small	Small	Moderate	Large
# of ELL Students	27 students	63 students	111 students	111 students
Instructional Staff				
Teachers	1.00	2.00	3.50	3.50
Instructional Facilitators (Coach)	0.21	0.50	0.50	0.50
Pupil Support Staff				
Family Liaisons	0.20	0.20	0.40	0.40
Language Services Staff	0.21	0.50	0.50	0.50
High School				
District Size	Very Small	Small	Moderate	Large
# of ELL Students	20 students	50 students	80 students	160 students
Instructional Staff				
Teachers	0.60	1.50	2.40	4.80
Instructional Facilitators (Coach)	0.10	0.30	0.50	0.50
Pupil Support Staff				
Post-Secondary Planners	0.10	0.20	0.30	0.60
Family Liaisons	0.20	0.50	0.80	1.60
Language Services Staff	0.22	0.50	0.50	0.50

WIDA 1&2 ELL students are students that have the highest language needs and are focusing on the communication aspect of the language. The panelists determined there is a higher number of students who are WIDA 1&2 students in earlier grades, because elementary school could be the first time the student has had prolonged exposure to the English language. The panelists estimated the WIDA 1&2

students in elementary school make up 40 percent of the ELL population. In the later grades, the panelists said there would be lower percentages of WIDA 1&2 students, since many of the ELL students have typically been in the school system for an extended amount of time. The panelists estimated WIDA 1&2 students in high school at 20 percent of the ELL population.

At the WIDA 1&2 level, panelists indicated there needed to be additional teaching staff to assist students with their language needs, with two teachers at the elementary school. Additional instructional facilitators were added to instruct all teachers in the building on how to educate and work with ELL students. The panelists added a portion of family liaison time to all school levels to run cultural classes for parents and assist families with navigating the school system. Additionally, the panelists felt that language service support would help with translation needs for communication between staff and parents, as well as translating newsletters and other written communications. At the high school level, the panelists added an additional post-secondary planner to assist ELL students in their transition out of high school. The amount of instructional and support staff would also provide the district the ability to operate a welcome center for the WIDA 1&2 students and families, offering translation services, cultural support, and academic support.

Table 2.8b
Additional Personnel Needed to Serve Students at 50% Concentration of WIDA 3&4 ELL Students Identified by Michigan PJ Panels

50% Concentration of WIDA 3&4 ELL Students				
Elementary School				
District Size	Very Small	Small	Moderate	Large
# of ELL Students	54 students	78 students	78 students	78 students
Instructional Staff				
Teachers	1.25	1.80	1.80	1.80
Instructional Facilitators (Coach)	0.28	0.40	0.40	0.40
Pupil Support Staff				
Language Services	0.28	0.40	0.4	0.4
Family Liaisons	0.40	0.20	0.20	0.20
Middle School				
District Size	Very Small	Small	Moderate	Large
# of ELL Students	36 students	84 students	147 students	147 students
Instructional Staff				
Teachers	1.00	1.50	3.00	3.00
Instructional Facilitators (Coach)	0.17	0.40	0.40	0.40
Pupil Support Staff				
Family Liaisons	0.40	0.40	0.40	0.40
Language Services Staff	0.17	0.04	0.40	0.40

High School				
District Size	Very Small	Small	Moderate	Large
# of ELL Students	45 students	100 students	160 students	320 students
Instructional Staff				
Teachers	0.50	1.00	1.60	3.20
Instructional Facilitators (Coach)	0.30	0.60	1.00	1.00
Pupil Support Staff				
Post-secondary Planners	0.18	0.20	0.30	0.60
Family Liaisons	0.18	0.40	0.60	1.20
Language Services Staff	0.18	0.40	0.40	0.40

The panelists felt that the number of students categorized as WIDA 3&4 was consistent across all school levels, making up about 40 percent of the ELL population at each school level. WIDA 3&4 students are beginning and developing oral and written language in related content areas.[13] The panelists added personnel resources in instruction and pupil support, similar to resources allocated to the WIDA 1&2 students. The panelists felt that students often get stuck in this WIDA Level and if resourced higher, there would be the support needed to move the student into the WIDA 5,6&FEL level.

Table 2.8c
Additional Personnel Needed to Serve Students at 50% Concentration of WIDA 5,6&FEL ELL Students Identified by Michigan PJ Panels

50% Concentration of WIDA 5,6&FEL ELL Students				
Elementary School				
District Size	Very Small	Small	Moderate	Large
# of ELL Students	27 students	39 students	39 students	39 students
Instructional Staff				
Teachers	0.14	0.20	0.20	0.20
Instructional Facilitators (Coach)	0.14	0.20	0.20	0.20
Pupil Support Staff				
Family Liaisons	0.20	0.10	0.10	0.10

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

Middle School				
District Size	Very Small	Small	Moderate	Large
# of ELL Students	27 students	63 students	110 students	110 students
Instructional Staff				
Teachers	0.20	0.50	0.90	0.90
Instructional Facilitators (Coach)	0.04	0.10	0.10	0.10
Pupil Support Staff				
Family Liaisons	0.10	0.10	0.20	0.20
Language Services Staff	0.04	0.10	0.10	0.10
High School				
District Size	Very Small	Small	Moderate	Large
# of ELL Students	45 students	100 students	160 students	320 students
Instructional Staff				
Teachers	0.20	0.50	0.80	1.60
Instructional Facilitators (Coach)	0.03	0.05	0.05	0.20
Pupil Support Staff				
Post-secondary Planners	0.03	0.05	0.05	0.05
Family Liaisons	0.03	0.05	0.05	0.05
Language Services Staff	0.03	0.04	0.10	0.10

The WIDA Standards only go as far as level 5 and 6, where students are bridging and reaching English language proficiency on specialized and technical language.[14] The panelists felt that former English language learner (FEL) students should be included in the final category, since districts still have a responsibility to monitor these students. The panelists identified fewer instructional and student supports for this population. The main goal at this level was to provide students with some additional support so they stay on track academically. The panelists identified a higher number of WIDA 5,6&FEL students at the high school level, 40 percent, than at the elementary school, 20 percent. This is because by high school many ELL students have been in the school system for numerous years. Due to the small number of WIDA 5,6&FEL students in the elementary school, the panelists did not see the need for language services at the elementary level.

In Tables 2.9a-c, the panelists identified the resources needed for districts with five percent ELL students. The panel kept many of the resource levels at the same ratio as the 50 percent concentration; and some minimums were set in order to guarantee that students received the adequate supports needed. Panelists felt that it was difficult to serve students in lower-concentration settings, because the settings lack the economies of scale that can be experienced by serving a larger population of ELL students.

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

Table 2.9a
Additional Personnel Needed to Serve Students at 5% Concentration of WIDA 1&2 ELL Students Identified by Michigan PJ Panels

5% Concentration of WIDA 1&2 ELL Students				
Elementary School				
District Size	Very Small	Small	Moderate	Large
# of ELL Students	6 students	8 students	8 students	8 students
Instructional Staff				
Teachers	0.20	0.20	0.20	0.20
Instructional Facilitators (Coach)	0.00	0.08	0.08	0.08
Pupil Support Staff				
Family Liaisons	0.01	0.02	0.02	0.02
Language Services Staff	0.03	0.04	0.04	0.04
Middle School				
District Size	Very Small	Small	Moderate	Large
# of ELL Students	3 students	7 students	11 students	11 students
Instructional Staff				
Teachers	0.20	0.20	0.40	0.40
Instructional Facilitators (Coach)	0.00	0.05	0.10	0.10
District Size	Very Small	Small	Moderate	Large
# of ELL Students	3 students	7 students	11 students	11 students
Pupil Support Staff				
Family Liaisons	0.01	0.02	0.04	0.04
Language Services Staff	0.02	0.05	0.09	0.09
High School				
District Size	Very Small	Small	Moderate	Large
# of ELL Students	3 students	5 students	8 students	16 students
Instructional Staff				
Teachers	0.20	0.20	0.30	0.50
Instructional Facilitators (Coach)	0.00	0.06	0.10	0.10
Pupil Support Staff				
Post-secondary Planners	0.00	0.00	0.00	0.10
Family Liaisons	0.00	0.00	0.10	0.10
Language Services Staff	0.03	0.05	0.08	0.16

The panelists kept the ratio of resources very similar to the WIDA 1&2 level with 50 percent concentration. The panelists did identify minimum resource levels that WIDA 1&2 students should receive, including a minimum resource of one day of an ELL teacher a week and a day of language service a month. Additionally, panelists identified a minimum of half a day a month of family liaison staffing at the middle and elementary school level to conduct parent meetings.

Table 2.9b
Additional Personnel Needed to Serve Students at 5% Concentration of WIDA 3-4 ELL Students Identified by Michigan PJ Panels

5% Concentration of WIDA 3-4 ELL Students				
Elementary School				
District Size	Very Small	Small	Moderate	Large
# of ELL Students	6 students	8 students	8 students	8 students
Instructional Staff				
Teachers	0.20	0.20	0.20	0.20
Instructional Facilitators (Coach)	0.00	0.08	0.08	0.08
Pupil Support Staff				
Family Liaisons	0.01	0.02	0.02	0.02
Language Services Staff	0.03	0.04	0.04	0.04
Middle School				
District Size	Very Small	Small	Moderate	Large
# of ELL Students	4 Students	8 students	15 Students	15 students
Instructional Staff				
Teachers	0.20	0.20	0.40	0.40
Instructional Facilitators (Coach)	0.00	0.04	0.10	0.10
Pupil Support Staff				
Family Liaisons	0.01	0.02	0.04	0.04
Language Services Staff	0.01	0.04	0.07	0.07
High School				
District Size	Very Small	Small	Moderate	Large
# of ELL Students	4 students	10 students	16 students	32 students
Instructional Staff				
Teachers	0.10	0.20	0.40	0.40
Instructional Facilitators (Coach)	0.10	0.12	0.20	0.20
Pupil Support Staff				
Post-secondary Planners	0.02	0.02	0.03	0.06
Family Liaisons	0.01	0.04	0.10	0.13
Language Services Staff	0.02	0.04	0.05	0.06

The panelists kept the resource level of the WIDA 3&4 students very similar to the resource level of the WIDA 1&2 students. As mentioned earlier, this level of support was intended by panelists to ensure that these students do not get stuck at the WIDA 3&4 level. The high school level has a higher percentage of ELL students at the WIDA 3&4 level (40 percent) than the WIDA 1&2 level (20 percent), making the level of needed resources higher.

Table 2.9c
Additional Personnel Needed to Serve Students at 5% Concentration of WIDA 5,6&FEL ELL Students Identified by Michigan PJ Panels

5% Concentration of WIDA 5-6-FEL ELL Students				
Elementary School				
District Size	Very Small	Small	Moderate	Large
# of ELL Students	2 students	4 students	4 students	4 students
Instructional Staff				
Teachers	0.02	0.10	0.10	0.10
Instructional Facilitators (Coach)	0.00	0.04	0.04	0.04
Pupil Support Staff				
Family Liaisons	0.01	0.02	0.02	0.02
Language Services Staff	0.01	0.01	0.01	0.01
Middle School				
District Size	Very Small	Small	Moderate	Large
# of ELL Students	2 students	6 students	11 students	11 students
Instructional Staff				
Teachers	0.02	0.10	0.20	0.20
Instructional Facilitators (Coach)	0.00	0.01	0.02	0.02
Pupil Support Staff				
Family Liaisons	0.01	0.01	0.02	0.02
Language Services Staff	0.01	0.01	0.02	0.02
High School				
District Size	Very Small	Small	Moderate	Large
# of ELL Students	4 students	10 students	16 students	32 students
Instructional Staff				
Teachers	0.02	0.05	0.10	0.20
Instructional Facilitators (Coach)	0.01	0.02	0.03	0.03
Pupil Support Staff				
Post-secondary Planners	0.01	0.01	0.02	0.03
Family Liaisons	0.01	0.01	0.02	0.03
Language Services Staff	0.01	0.01	0.02	0.02

Again, the panelists kept the ratios similar to the 50 percent concentration level. The panelists set a resource minimum of an hour a day of an ELL teacher's time for the WIDA 5,6&FEL students. There are also small allocations of family liaison time to help with any family and language needs that may occur for these students.

Special Education

The panelists were asked to determine the adequate amount of resources needed to serve students with mild, moderate, and severe disabilities. Students with mild disabilities are students that spend at least 80 percent of their time in a classroom, moderate students spend 40 to 80 percent of their time in a classroom, and severe students spend under 40 percent of their time in a classroom.

Tables 2.10a-c show the resources identified at each school level for students with disabilities.

Table 2.10a
Additional Personnel Needed to Students with Mild Disabilities Identified by Michigan PJ Panels

Mild Special Education Students (9%)				
Elementary School				
District Size	Very Small	Small	Moderate	Large
# of Sped Students	24 students	35 students	35 students	35 students
Instructional Staff				
Teachers	1.60	2.30	2.30	2.30
Instructional Aides	0.80	1.15	1.15	1.15
Special Education Staff				
Speech Therapists	0.30	0.40	0.40	0.40
OT/PT Staff	0.10	0.20	0.20	0.20
IEP Coordinators	0.30	0.50	0.50	0.50
Pupil Support Staff				
Social Workers	0.20	0.40	0.40	0.40
Middle School				
District Size	Very Small	Small	Moderate	Large
# of Sped Students	16 students	38 students	66 students	66 students
Instructional Staff				
Teachers	1.07	2.53	4.40	4.40
Instructional Aides	0.53	1.27	2.20	2.20
Special Education Staff				
Speech Therapists	0.10	0.23	0.40	0.40
OT/PT Staff	0.05	0.12	0.20	0.20
IEP Coordinators	0.24	0.58	1.00	1.00
Pupil Support Staff				
Social Workers	0.11	0.25	0.44	0.44

High School				
District Size	Very Small	Small	Moderate	Large
# of Sped Students	20 students	35 students	72 students	144 students
Instructional Staff				
Teachers	1.33	2.33	4.80	9.60
Instructional Aides	0.67	1.17	2.40	4.80
Special Education Staff				
Speech Therapists	0.06	0.10	0.20	0.40
IEP Coordinators	0.57	1.00	1.20	1.40
Pupil Support Staff				
Social Workers	0.13	0.23	0.48	0.96

Students with mild disabilities make up nine percent of the student population. For these students, the panelists identified the need to have a 15:1 student teacher ratio and 50 percent of an aide's time for every teacher. Additionally, panelists identified a high need for speech therapists at the elementary level and less of a need for a speech therapist at the high school level. Similarly, panelists recognized the need for occupational and physical therapy at the elementary and middle school level but felt that, for students with mild disabilities, there was less need for resources at the high school level. Panelists identified a need for a portion of an IEP coordinator's time at all school levels to help create and track student's IEP. Panelists determined that an IEP coordinator's case load should be no larger than 80 students.

Table 2.10b
Additional Personnel Needed to Students with Moderate Disabilities Identified by Michigan PJ Panels

Moderate Special Education Students (2.5%)				
Elementary School				
District Size	Very Small	Small	Moderate	Large
# of Sped Students	7 students	10 students	10 students	10 students
Instructional Staff				
Teachers	0.70	1.00	1.00	1.00
Instructional Aides	1.00	1.50	1.50	1.50
Special Education Staff				
Speech Therapists	0.15	0.20	0.20	0.20
OT/PT Staff	0.15	0.20	0.20	0.20
Pupil Support Staff				
Social Workers	0.10	0.20	0.20	0.20

Middle School				
District Size	Very Small	Small	Moderate	Large
# of Sped Students	5 Students	11 students	18 students	18 students
Instructional Staff				
Teachers	0.50	1.10	1.80	1.80
Instructional Aides	0.75	1.65	2.70	2.70
Special Education Staff				
Speech Therapists	0.06	0.12	0.20	0.20
OT/PT Staff	0.06	0.12	0.20	0.20
Pupil Support Staff				
Social Workers	0.06	0.12	0.20	0.20
High School				
District Size	Very Small	Small	Moderate	Large
# of Sped Students	6 students	13 students	20 students	40 students
Instructional Staff				
Teachers	0.60	1.30	2.00	4.00
Instructional Aides	0.90	1.95	3.00	6.00
Special Education Staff				
Speech Therapists	0.06	0.13	0.20	0.40
OT/PT Staff	0.06	0.13	0.20	0.40
Pupil Support Staff				
Social Workers	0.06	0.13	0.20	0.40
Transition Coordinator	0.09	0.19	0.30	0.60

Students with moderate disabilities make up two and a half percent of the student population. For these students, the panelists identified the need to have a 10:1 student teacher ratio and an additional one and a half aid per teacher. Additionally, panelists identified a high need for speech therapists and occupational/physical therapists at the elementary level with a staffing ratio of one of each per every 50 students, one of each per every 80 students at the middle school level, and one of each per every 100 students at the high school level. Panelists identified the need for a portion of a transition coordinators time at the high school level at a staffing ratio of 1:66.

Table 2.10c
Additional Personnel Needed to Students with Severe Disabilities Identified by Michigan PJ Panels

Severe Special Education Students (1.5%)				
Elementary School				
District Size	Very Small	Small	Moderate	Large
# of Sped Students	4 students	6 students	6 students	6 students
Instructional Staff				
Teachers	0.50	0.75	0.75	0.75
Instructional Aides	1.00	1.50	1.50	1.50
Special Education Staff				
Speech Therapists	0.13	0.20	0.20	0.20
OT/PT Staff	0.13	0.20	0.20	0.20
Pupil Support Staff				
Social Workers	0.03	0.05	0.05	0.05
Middle School				
District Size	Very Small	Small	Moderate	Large
# of Sped Students	3 Students	6 students	11 Students	11 students
Instructional Staff				
Teachers	0.38	0.75	1.38	1.38
Instructional Aides	0.75	1.50	2.75	2.75
Special Education Staff				
Speech Therapists	0.06	0.12	0.22	0.22
OT/PT Staff	0.06	0.12	0.22	0.22
Pupil Support Staff				
Social Workers	0.03	0.05	0.09	0.09
High School				
District Size	Very Small	Small	Moderate	Large
# of Sped Students	3 Students	8 students	12 Students	24 students
Instructional Staff				
Teachers	0.38	1.00	1.50	3.00
Instructional Aides	0.75	2.00	3.00	6.00
Special Education Staff				
Speech Therapists	0.10	0.27	0.40	0.80
OT/PT Staff	0.10	0.27	0.40	0.80
Pupil Support Staff				
Social Workers	0.03	0.07	0.10	0.20
Transition Coordinators	0.03	0.07	0.10	0.20

Students with severe disabilities make up one and a half percent of the student population. The panelists identified the need to have an 8:1 student teacher ratio to serve students with severe disabilities with additional aide support. Additionally, panelists identified a high need for speech therapists and occupational/physical therapists at a staffing ratio of one of each position for every 30 severe special education students at the school level.

School-Level Non-Personnel Costs

Tables 2.5 through 2.10 show the personnel needs identified by the panels. Tables 2.11a-d, below, show additional school level non-personnel costs identified by the panels.

Table 2.11a

School-Level Non-Personnel Costs Identified by Michigan PJ Panels

Base Education			
	Elementary	Middle	High
Professional Development	$100/ student	$100/ student	$100/ student
Substitutes	$53/student	$53/student	$53/student
Supplies, Materials, and Equipment	$145/student	$165/student	$185/student
Assessment	$15/student		
Student Activities	$25/student	$250/student	$350/student
Graduation			$10 -$23/student dependent on school size

Panelists developed non-personnel cost figures for instructional supplies, materials, equipment, textbooks, student activities (field trips, sports, extracurricular activities, etc.) professional development, and substitutes. At the high school level, panelists also identified expenses related to student graduation.

These figures were reviewed by both the CFO panel and the statewide panel, who considered current expenditures and whether those expenditures were sufficient. Panelists indicated that costs for supplies, materials, and equipment and student activities increased in later grades.

Professional development costs are shown separately as a per student figure to cover professional development costs such as materials, trainer fees, or conference fees. Panelists did not identify a need for additional days for professional development beyond what is already in current teacher contracts. Instead, panelists emphasized the need for ongoing professional development coaching and peer collaboration embedded in the regular school day. As discussed above, this need was reflected in teacher staffing at each grade level allowing teachers to have about 25 percent of their day on average available outside of the classroom to allow for these activities separate from instructional time.

All figures for poverty, ELL and special education students are in addition to base figures and are only applied to the students in those categories.

Table 2.11b

School-Level Non-Personnel Costs for Special Education Students Identified by Michigan PJ Panels

Base Education			
	Elementary	Middle	High
Professional Development	$176-178 /student depending on number of students	$177 - $182/ student depending on the number of students	$176 - $190/ student depending on the number of students
Assistive technology/ adaptive equipment	$2,220/student for severe students only	$2,220/student for severe students only	$2,220/student for severe students only
Extended school year program	$1,600/student for severe students only	$1,600/student for severe students only	$1,600/student for severe students only
Transition			Mild: $35 - $250/student depending on school size Moderate: $75 - $150/student depending out school size Severe: $83 - $667/student depending on school size

The panelists added professional development days for both teachers and paraprofessionals working with special education students. Panelists also included transitional costs to assist these students with the cost of programs post-high school. Additionally, the panelists included resources for severe special education students for extended school year programs, as well as adaptive equipment and assistive technology. The cost of services for zero to three-year-old and 22 to 26-year-old students, which are mandated by the state are not included in this study.

Table 2.11c

School-Level Non-Personnel Costs for Poverty Students Identified by Michigan PJ Panels

Base Education			
	Elementary	Middle	High
Professional Development	$25/student	$25/student	$25/student
Supplies, Materials & Equipment	$25/student	$50/student	$50/student
Student Activities	$50/student	$125/student	$150/student
Internet Access	$60/student	$60/student	$60/student

The panelists added additional funds for student activities and supplies and materials, in order for students in poverty not to have to pay additional money for participation. The panelists also identified a need for internet access for these students so that they would be able to use their technology at home.

Table 2.11d
School-Level Non-Personnel Costs for ELL Students Identified by Michigan PJ Panels

Base Education			
	Elementary	Middle	High
Professional Development	$25/student	$25/student	$25/student
Supplies, Materials & Equipment	$25/student	$25/student	$25/student
Testing Person	$231 - 333/student depending on school size	$238-333/student depending on school size	$225-$318/student depending on school size
Parent Education	$12/student	$12/student	$12/student
Language services			$0-$12 depending on school size

The panelists identified additional resources to support ELL students. The panelist spoke about the need to hire staff to administer tests to ELL students. ELL teachers use significant time administering tests, which takes time away from working with students on content skills. Additionally, in the large high school setting, where administrators have significant needs in a variety of languages to effectively communicate with students and parents, the panelists identified the need for additional funds for schools to purchase 'language line' services. The ELL panel also added $12 per ELL student to pay for snacks and resources during parent education, which will helps parents become familiar with the language and the culture in their schools.

School-Level Additional Programs

Tables 2.12a-c indicate other programs, such as a before- and after-school programs, summer schools, and bridge programs, that the panels indicated were needed to ensure that schools could meet Michigan state standards and requirements. Programs are shown as elementary, middle, and high school programs; many of these programs are designed with the belief that investments that are made early in a child's education will alleviate the need for some services later on.

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 a before- and after-school program) was necessary for things like before- and after-school programs and summer school to be possible. Table 2.12a displays costs by program, depending on whether the program is focused on all students or for students in a special needs category, and then describes the resources identified for the program.

Table 2.12a
Elementary Additional Programs Identified by Michigan PJ Panels

	Before-or After-School	Before- or After-School	Summer School	Summer School	Summer School
Type of Student Served	All	Poverty	All	Poverty	High need Poverty
Percentage of Identified Populations Served	10%	100%	10%	100%	100%
Program Specifics (length of program, length of day)	8 hours per week	8 hours per week	3 hours, 4 days/week, 6 weeks	4 hours, 4 days/week, 8 weeks	4 hours, 4 days/week, 12 weeks
Personnel					
Teachers	25:1 Ratio	20:1 Ratio	25:1 Ratio	20:1 ratio	20:1 ratio
Teacher Tutor/Interventionists		100:1 Ratio		100:1 ratio	100:1 Ratio
Coordinators	0.5	0.5	0.5	1.0	1.0
Clerical Staff			0.5		
Other Costs					
Supplies, Materials and Equipment	$20/student	$30/student	$30/student	$31/student	$31/student
Professional Development	$5/student	$5/student	$5/student	$5/student	$5/student
Student Activities				$360/student	$360/student
Snacks	$20/student	$48/student	$ 24/student	$48/student	$48/student

Panelists identified the need for before- or after-school programs across all student populations. All schools would also be provided the resources to offer programming for higher achieving students and the panels estimated an enrollment of 10 percent of all students for these programs. Panelists included before-or after-school programs for all poverty and high poverty students. Panelists also provided extended year opportunities through summer school for the same populations. High poverty students would have nearly a full year program, with 12 weeks of school offered over the summer

Shown in Table 2.12b, the middle school program is the same as the elementary program except panelists also identified the need for a summer program for all students.

Table 2.12b
Middle School Additional Programs Identified by Michigan PJ Panels

	Before- or After-School	Before- or After-School	Summer School	Summer School
Type of Student Served	All	Poverty	Poverty	High need poverty
Percentage of Identified Populations Served	10%	100%	100%	100%
Program Specifics (length of program, length of day)	8 hours per week	8 hours per week	4 hours/day, 4 days/week. 8 weeks	4 hours/day, 4days/week, 12 weeks
Personnel				
Teachers	25:1 ratio	20:1 ratio	20:1 ratio	20:1 ratio
Coordinators		0.5	1.0	1.0
Principals		138:1 ratio	138:1 ratio	138:1 ratio
Other Costs				
Professional Development	$5/student	$5/student	$5/student	$5/student
Supplies, Materials and Equipment	$20/student	$30/student	$31/student	$31/student
Student Activities			$360/student	$360/student
Snacks	$20/student	$48/student	$48/student	$48/student

Table 2.12c shows that panelists identified the same resources for high school programs as for middle school, but excluded the before-or after-school programming for high school students not in a special population, believing students would have enrichment opportunities through clubs and sports. The panels also added a bridge program for grade nine poverty students to support their transition to high school.

Table 2.12c
High School Additional Programs Identified by Michigan PJ Panels

	Before- or After-School	Summer School	Summer School	Bridge
Type of Student Served	Poverty	Poverty	Poverty	Poverty
Percentage of Identified Populations Served	100%	100%	100%	25%
Program Specifics (length of program, length of day)	8 hours a week	4 hours/day, four days/week, 8 weeks	4 hours/day, four days/week, 12 weeks	3 hours/day. 5 days/week, 2 weeks
Personnel				
Teachers	20:1 ratio	20:1 ratio	20:1 ratio	25:1 ratio
Teacher tutor/Interventionists	100:1			
Coordinators	0.5	1.0	1.0	
Other Costs				
Professional Development	$5/student	$5/student	$5/student	

	Before- or After-School	Summer School	Summer School	Bridge
Supplies, Materials and Equipment	$30/student	$31/student	$31/student	$30/student
Student Activities		$360/student	$360/student	
Snacks	$48/student	$48/student	$48/student	$4/student

School-Level Technology Hardware

Tables 2.13a-c show the technology needs of each school. Panelists called for an array of technology to be available in classrooms, computer labs (fixed or mobile), media centers, and to be available for teachers and administrative staff. Of particular note, panelists recommended one-to-one mobile devices (tablets, netbooks, or similar) for all students. Even with 1.1:1 devices, panelists still included resources for computer labs, given the need for high-powered machines or dedicated spaces for certain programs and classes. Panelists identified a 1.1:1 computer to student ratio to take into account the downtime of devices. Practitioners with experience in a one-to-one environment felt that this level of costing out was actually the most cost-efficient approach.

Table 2.13a

Elementary School Technology Hardware Identified by Michigan PJ Panels

Hardware Item	# of Units Needed	
	Very Small District	Small, Moderate, and Large Districts
Administration/Main Office		
Computers	1 per office staff member	1 per office staff member
Laptops	1 per professional	1 per professional
Mobile Devices	1 per administrator	1 per administrator
Copier/Printers	1 total	5 total
Cell Phones	1 per professional	1 per professional
Faculty		
Laptops	1 per professional	1 per professional
Classroom		
Computers	1 per classroom	1 per classroom
Visual Presentation Systems	1 per classroom	1 per classroom
Computer Lab(s)-Fixed		
# of Fixed Labs	1 total	1 total
Computers	30 per fixed lab	30 per fixed lab
Printers	1 per fixed lab	1 per fixed lab
Visual Presentation Systems	1 per fixed lab	1 per fixed lab
Headphones	30 per fixed lab	30 per fixed lab

Hardware Item	# of Units Needed	
	Very Small District	Small, Moderate, and Large Districts
Computer Lab(s)-Mobile		
# of Mobile Labs	1 per classroom	
Laptops	30 per mobile lab	
Media Center		
Computers	3 total	3 total
Printers	1 total	1 total
Visual Presentation Systems	1 total	1 total
Other		
Student Devices		1.1 per student
DVD Players	1 total	1 total
Copier/Printers	1 total	1 total
3D Printers	1 total	1 total

Table 2.13b
Middle School Technology Hardware Identified by Michigan PJ Panels

Hardware Item	# of Units Needed		
	Very Small District	Small District	Moderate and Large Districts
Administration/Main Office			
Computers	1 per office staff member	1 per office staff member	1 per office staff member
Laptops	1 per professional	1 per professional	1 per professional
Mobile Devices	1 per administrator	1 per administrator	1 per administrator
Copier/Printers	1 total	2 total	3 total
Cell Phones	1 per professional	1 per professional	1 per professional
Faculty			
Laptops	1 per professional	1 per professional	1 per professional
Classroom			
Visual Presentation Systems	1 per classroom	1 per classroom	1 per classroom
Computer Lab(s)-Fixed			
# of Fixed Labs	1 total	2 total	2 total
Computers	30 per fixed lab	30 per fixed lab	30 per fixed lab
Printers	1 per fixed lab	1 per fixed lab	1 per fixed lab
Visual Presentation Systems	1 per fixed lab	1 per fixed lab	1 per fixed lab
Other			
Student Devices	1 .1 per student	1.1 per student	
Maker Spaces			1 total
3D Printers			1 total

Table 2.13c
High School Technology Hardware Identified by Michigan PJ Panels

Hardware Item	# of Units Needed			
	Very Small District	Small District	Moderate District	Large District
Administration/Main Office				
Computers	1 per office staff member	1 per office staff member	1 per office staff member	1 per office staff member
Laptops	1 per professional	1 per professional	1 per professional	1 per professional
Mobile Devices	1 per administrator	1 per administrator	1 per administrator	1 per administrator
Copier/Printers	1 total	2 total	4 total	4 total
Cell Phones	1 per professional	1 per professional	1 per professional	1 per professional
Faculty				
Laptops	1 per professional	1 per professional	1 per professional	1 per professional
Classroom				
Visual Presentation Systems	1 per classroom	1 per classroom	1 per classroom	1 per classroom
Computer Lab(s)-Fixed				
# of Fixed Labs	1 total	4 total	4 total	5 total
Computers	32 per fixed lab	32 per fixed lab	32 per fixed lab	32 per fixed lab
Visual Presentation Systems	1 per fixed lab	1 per fixed lab	1 per fixed lab	1 per fixed lab
Computer Lab(s)-Mobile				
# of Mobile Labs	1 total			
Laptops	32 per mobile lab			
Media Center				
Computers	5 total	5 total	5 total	5 total
Visual Presentation Systems	1 total	1 total	1 total	1 total
Other				
Student Devices	1 .1 per student	1.1 per student	1.1 per student	1.1 per student
3D Printers	1 total	1 total	1 total	1 total

Preschool Resources

The PJ approach held a separate preschool panel as part of the school level panels. In this separate panel, panelists identified the resources needed to serve both 3- and 4-year-old students in a school-based preschool program. Table 2.14 shows the resources identified for a 128-student preschool program with 64 students each in the three- and four-year-old program.

Table 2.14
Preschool Program Personnel as Recommended by Michigan PJ Panels, Base Education

Program Configuration and Size	64 Three-year-olds	64 Four-year-olds
Recommended Average Class Size	16:3 (one teacher and two instructional aides)	16:2 (one teacher and one instructional aide)
Instructional Staff		
Teachers	4.0	4.0
Itinerants	0.4	0.4
Instructional Facilitators (Coaches)	0.5	0.5
Instructional Aides	8	4
Pupil Support Staff		
Counselors	0.1	0.1
Nurses	0.05	0.05
Psychologists	0.1	0.1
Social Workers	0.1	0.1
Speech Therapists	0.0	0.1
Behavior Interventionists	0.5	0.5
Family Liaisons	0.5	0.5
Administrative Staff		
Principals	0.25	0.25
Clerical Staff	0.2	0.2
Other Staff		
IT Technicians	0.0	0.1
Substitutes	0.5	0.5
Duty Aides	0.0	0.25

Panelists identified the need for three adults in each classroom of 16 three-year-olds and two adults in each classroom of 16 four-year-olds. Additionally, panelists identified a need for itinerant teachers, counseling, social work, speech therapy, administration and other resources.

Table 2.15
Preschool Other Costs as Recommended
by Michigan PJ Panels, Base Education

Program Configuration and Size	64 Three-year-olds	64 Four-year-olds
Professional Development – Per Student	$100	$100
Substitutes	$63	$63
Supplies and Materials	$313	$313
Assessments	$15	$15
Student Activities	$100	$100
Enrichment	$63	$63
Family Engagement	$8	$8
Program Licensing	$6	$6

Table 2.15 shows the additional costs for preschool students that were identified by the panelists. The panelists also identified additional school programs and technology needs. The additional costs that the panelists identified do not vary between the program for three-year-olds and the program for the four-year-olds.

Table 2.16 Preschool Total Base Cost as Recommended
by Michigan PJ Panels

Program Configuration and Size	64 Three-year-olds	64 Four-year-olds
Base Cost	$15,101	$13,154

Table 2.16 shows the total cost for preschool. It is higher for the program for three-year-olds than in the program for four-year-olds because there are more personnel resources needed in the three-year-old program to be in compliance with the student to adult ratio for that age group. Panelists felt that both three- and four-year-old preschool was very important for all students in order to meet the state standards, particularly the grade three reading requirements. Panelists also discussed whether the full cost of preschool should be part of the state's funding system for all students. Funding for preschool will be discussed further in the recommendations section.

District-Level Resources

Panelists also identified the resources needed at the district level to support schools. Table 2.17a shows the personnel resources needed for all students (the base education costs), as well as the additional resources needed for students with special needs.

It is important to note that different districts often use different position titles or levels of personnel to fulfill the same functions or roles. For example, one district may have a CFO, while in another district that same function might be a supervisor level position.

Table 2.17a
District Personnel Resources, Base Education Identified by Michigan PJ Panels

Personnel	Very Small District	Small District	Moderate District	Large District
Superintendents	1.0	1.0	1.0	1.0
Assistant/Associate Superintendents	0.0	1.0	0.0	3.0
Directors	2.0	4.0	6.0	6.0
Supervisors	0.0	0.0	1.0	8.0
Coordinators	0.5	0.0	4.0	7.0
Managers	1.0	0.0	2.0	5.0
Clerical/Data Entry Staff	1.0	6.0	13.0	18.0
IT Technicians	0.0	0.0	2.0	6.0
Other Professionals	1.0	0.0	1.0	1.0
Public Relations/Communication Staff	0.0	1.0	0.0	0.0
Special Education				
Directors	0.8	1.0	1.0	1.0
Supervisors	0.0	0.0	2.0	2.0
Coordinators	0.0	0.0	1.0	2.0
Clerical/Data Entry Staff	0.4	1.0	2.0	5.0
Poverty				
Directors	0.25	0.5	1.0	1.0
Clerical/Data Entry Staff	0.15	0.3	1.5	3.0
ELL				
Directors	0.5	0.5	1.0	1.0
Clerical/Data Entry Staff		0.5	0.5	0.5

Panelists also addressed the district-level costs incurred to support schools. Such costs include building maintenance and operations (M and O), district-level technology licensing and hardware, insurance, legal fees, finance and data system fees, and dual/concurrent enrollment costs. As noted previously, transportation, food service, and capital costs were not addressed through the PJ approach.

Costs were identified first by the district-level panels as panelists were comfortable estimating resource levels. Costs were then reviewed and finalized by the CFO and statewide panels, primarily based on existing district expenditure figures. Some cost areas were already identified at the school-level, so they are not included at the district level (even if often purchased district-wide, such as assessments) to avoid double counting.

Table 2.17b identifies the additional non-personnel costs at the district level for base education, shown as per student figures for each district size. Capital Improvement/Long Term Maintenance is highlighted in table 2.17b. Panelists discussed the large inequities across districts in the current level of upkeep of buildings. Much of this differential can be tied to local communities' ability to raise funds outside of the funding formula for this maintenance. For charter schools, such fund raising is not a possibility. Since capital is excluded from the base cost figure, the study team felt it important to highlight this cost and will discuss in the recommendations how it might be utilized.

Table 2.17b
District Non-Personnel Costs, Base Education Identified by Michigan PJ Panels

Cost Area	Very Small District	Small District	Moderate District	Large District
Maintenance and Operations	$1,200 per student	$1,100 per student	$1,100 per student	$1,100 per student
Capital Improvement/Long Term Maintenance	**$400 per student**	**$400 per student**	**$400 per student**	**$400 per student**
Safety and Security	$15 per student	$15 per student	$15 per student	$15 per student
Other District Costs	$10 per student	$10 per student	$10 per student	$10 per student
Textbooks	$120 per student	$120 per student	$120 per student	$120 per student
Supplies and Materials	School-Level	School-Level	School-Level	School-Level
Assessments	$30 per student	$30 per student	$30 per student	$30 per student
Professional Development	$11 per student	$6 per student	$4 per student	$3 per student
Insurance	$50 per student	$40 per student	$30 per student	$30 per student
Legal	$40 per student	$30 per student	$25 per student	$25 per student
Governance	$50 per student	$30 per student	$20 per student	$20 per student
Marketing/Communications	$15 per student	$15 per student	$15 per student	$15 per student
Uncollected Taxes and Adjustments	$20 per student	$20 per student	$20 per student	$20 per student
Dual/Concurrent Enrollment	$60 per student	$60 per student	$60 per student	$60 per student
Science Standards	$25 per student	$25 per student	$25 per student	$25 per student
Technology	$4 per student	$2 per student	$1 per student	$1 per student

Isolation

The Isolated panel identified the additional resources needed for districts in a geographically isolated setting. The panel did not create a specific definition of an isolated district but discussed the resources needed for districts that are geographically isolated from other districts and towns. The isolated district panel reviewed the work of the Very Small school district and identified the adjustments needed for an isolated setting. Table 2.18 compares the areas where the Isolated panel made adjustments to the Very Small district resources.

Table 2.18
Isolated Panel School Resources

	Elementary School 270 Students		Middle School 180 Students		High School 220 Students	
	Isolated Panel	Very Small Panel	Isolated Panel	Very Small Panel	Isolated Panel	Very Small Panel
Personnel						
Counselors					1.0	0.9
Nurses	1.0	0.2	1.0	0.2		
Psychologists	0.2	0.1	0.2	0.1		
Behavior Specialists			0.6			
Clerical Staff					2.0	1.0
Substitutes	0.7	0.5	0.7	0.5		
Other Costs						
Professional Development	$150/tch	$100/tch	$150/tch	$100/tch	$150/tch	$100/tch
Parent Education	$12/student		$12/student			

Panel members expressed that there is a greater need for support services for students in remote areas. These support services include health care, mental health supports, and even food services. These additional services are often referred to as “wraparound services.” The panel members stated that in other areas of the state, social services are supplied by organizations other than school districts. However, isolated areas of the state do not have these support organizations, so it falls on districts to supply these needed services. The panels identified additional resources for both nursing and psychology at elementary and middle schools while adding additional counseling support at the high school level. The panelists also identified the need for additional behavioral supports in middle schools. Finally, panelists included additional resources for professional development across the grade spans and additional support for parent education/engagement at the elementary and middle school.

Table 2.19 shows the additional costs associated with the identified resources. Looking at the combined costs column, the total additional cost of isolation at the school is $475 per student. The costs are the highest in the middle school, where a higher level of wraparound services was identified.

Table 2.19
Isolated Panel Additional Costs per student

	Elementary School	Middle School	High School	Combined
Personnel				
Counselors	$0	$0	$45	$15
Nurses	$134	$201	$0	$117
Psychologists	$42	$63	$0	$37
Behavior Specialists	$0	$334	$0	$83
Clerical Staff	$0	$0	$284	$95
Substitutes	$70	$105	$0	$61
Other Costs				
Professional Development	$50	$50	$50	$54
Parent Education	$12	$12	$12	$13
Total	**$308**	**$764**	**$391**	**$475**

The Isolated panel also reviewed district resources for isolated districts. The changes made by the panel aligned with the overall resources for a very small district once the panel process was completed, with no additional costs identified. Panelists also identified transportation costs as being higher in isolated districts, these additional transportation costs are discussed later in the transportation chapter.

Developing Cost Estimates

Once the panels completed their work, the study team undertook the process of costing-out the resources identified above, which primarily involved determining salaries associated with the identified FTE positions and the prices of the necessary technology hardware. See Appendix D for more detail on salaries and benefits used, a 4.6 percent retirement rate is used here. As was discussed in the introduction chapter districts, and some charters, use a rate of 25.56 percent.

In determining technology costs, the study team assumed the majority of hardware equipment would be replaced every four years. The School Finance Collaborative surveyed district CFOs on average costs for each hardware item. See Appendix E for more detail on technology prices used.

School-Level and District-Level Costs

Tables 2.20a-c, shown below, list the base costs for each representative school by size. Base costs are disaggregated into costs for personnel, professional development, non-personnel, technology, and other programs after applying the resource prices. Appendix F shows the base cost with the full retirement rate of 25.56 percent, the base cost without retirement, as well as the base cost with the full retirement and the unfunded liability.

Table 2.20a
Elementary School Base Costs Identified by Michigan PJ Panels

Enrollment	270 Students	390 Students
School-level Costs, Base	**$8,567**	**$7,688**
Personnel Costs	$7,702	$6,857
Professional Development	$100	$100
Substitutes	$58	$54
Non-Personnel Costs	$185	$185
Technology	$381	$358
Other Programs	$140	$134

Elementary school level base costs range from $7,688 to $8,567. The larger elementary school had a lower per student cost because there are more economies of scale. For example, both schools need a principal, but in the larger school, the salary of the principal is spread across more students.

Table 2.20b
Middle School Base Costs Identified by Michigan PJ Panels

Enrollment	180 Students	420 Students	735 Students
School-level Costs, Base	**$8,859**	**$8,121**	**$7,949**
Personnel Costs	$8,859	$7,103	$6,934
Professional Development	$100	$100	$100
Substitutes	$53	$53	$53
Non-Personnel Costs	$468	$468	$468
Technology	$302	$313	$311
Other Programs	$83	$83	$83

Middle school level base cost ranges from $7,949 to $8,859. Middle school base costs are the highest across the grade spans. This is reflective of the panelists' recommendation of using a traditional middle school model to staff the school which can have higher staffing costs.

Table 2.20c
High School Base Costs Identified by Michigan PJ Panels

Enrollment	220 Students	500 Students	800 Students	1,600 Students
School-level Costs, Base	**$8,498**	**$8,197**	**$8,018**	**$7,359**
Personnel Costs	$7,440	$7,182	$7,024	$6,397
Professional Development	$100	$100	$100	$100
Substitutes	$53	$53	$53	$53
Non-Personnel Costs	$558	$545	$548	$548
Technology	$346	$317	$293	$262

High school level base cost ranges from $7,359 to $8,498. The high school base is the least expensive out of the three school levels.

Tables 2.21a-e then show the additional costs above and beyond the base for identified special needs students, including poverty, ELL, and special education students. The figures shown below would be in addition to the base amounts.

Table 2.21a

School-Level Costs for Poverty Students Identified by Michigan PJ Panels

Elementary				
District Size	**Very Small**	**Small**	**Moderate**	**Large**
25% Concentration	$3,210	$2,926	$2,926	$2,926
50% Concentration	$4,038	$4,009	$4,009	$4,009
75% Concentration	$4,697	$4,593	$4,593	$4,593
Middle				
District Size	**Very Small**	**Small**	**Moderate**	**Large**
25% Concentration	$3,513	$3,299	$3,358	$3,358
50% Concentration	$5,418	$5,312	$5,208	$5,208
75% Concentration	$4,846	$4,580	$4,450	$4,450
High School				
District Size	**Very Small**	**Small**	**Moderate**	**Large**
25% Concentration	$2,217	$2,069	$2,056	$2,036
50% Concentration	$3,322	$3,270	$3,184	$2,891
75% Concentration	$3,563	$3,507	$3,460	$3,264

Table 2.21b

School-Level Costs for High Need Poverty Students Identified by Michigan PJ Panels

Elementary				
District Size	**Very Small**	**Small**	**Moderate**	**Large**
25% Concentration	$4,782	$4,805	$4,805	$4,805
50% Concentration	$6,426	$6,276	$6,276	$6,276
75% Concentration	$4,846	$4,639	$4,639	$4,639
Middle				
District Size	**Very Small**	**Small**	**Moderate**	**Large**
25% Concentration	$7,045	$7,166	$7,152	$7,152
50% Concentration	$6,106	$5,902	$5,923	$5,923
75% Concentration	$4,487	$4,305	$4,199	$4,199
High School				
District Size	**Very Small**	**Small**	**Moderate**	**Large**
25% Concentration	$3,952	$3,906	$3,781	$3,215
50% Concentration	$5,102	$4,962	$4,930	$4,633
75% Concentration	$3,453	$3,442	$3,367	$3,140

For poverty and high-need poverty students, identified resources and subsequent per student amounts were highest in elementary school, reflecting the panelists' strong feelings that early intervention was essential to serving these students. Additionally, the per student increase from 25 percent concentration to 50 percent concentration is higher across all school-levels for poverty students than the per student increase from 50 percent concentration to 75 percent concentration. The increase in costs for high need poverty students above regular poverty students ranged from $46 to $2,267.

Table 2.21c
School-Level Costs for 50 % Concentration of ELL Students Identified by Michigan PJ Panels

Elementary				
District Size	**Very Small**	**Small**	**Moderate**	**Large**
WIDA 1&2	$ 4,324	$3,227	$3,227	$3,227
WIDA 3&4	$3,380	$3,018	$3,018	$3,018
WIDA 5,6&FEL	$1,654	$1,297	$1,297	$1,297
Middle				
District Size	**Very Small**	**Small**	**Moderate**	**Large**
WIDA 1&2	$4,873	$4,131	$3,687	$3,687
WIDA 3&4	$3,879	$2,637	$2,487	$2,487
WIDA 5,6&FEL	$1,393	$1,225	$1,192	$1,192
High School				
District Size	**Very Small**	**Small**	**Moderate**	**Large**
WIDA 1&2	$4,760	$4,632	$4,443	$4,006
WIDA 3&4	$2,627	$2,224	$2,147	$1,806
WIDA 5,6&FEL	$942	$836	$807	$799

Table 2.21d
School-Level Costs for 5% Concentration of ELL Students Identified by Michigan PJ Panels

Elementary				
District Size	**Very Small**	**Small**	**Moderate**	**Large**
WIDA 1&2	$ 3,448	$3,600	$3,600	$3,600
WIDA 3&4	$3,448	$3,600	$3,600	$3,600
WIDA 5,6&FEL	$1,716	$3,600	$3,600	$3,600
Middle				
District Size	**Very Small**	**Small**	**Moderate**	**Large**
WIDA 1&2	$6,331	$3,746	$4,677	$4,677
WIDA 3&4	$4,721	$3,138	$3,444	$3,444
WIDA 5,6&FEL	$1,716	$1,951	$2,118	$2,118

High School				
District Size	**Very Small**	**Small**	**Moderate**	**Large**
WIDA 1&2	$6,996	$5,812	$5,653	$4,587
WIDA 3&4	$5,542	$3,573	$4,084	$2,335
WIDA 5,6&FEL	$1,197	$1,071	$1,173	$1,051

Tables 2.21c and d examine the ELL costs per student. Looking at the costs for the 50 percent concentration of students, WIDA 1&2 students are slightly higher cost in the elementary school than WIDA 3&4 students and significantly higher cost than WIDA 3&4 students in middle and high school. Costs are frequently highest at the high school level and all three WIDA levels show an increase in costs as the schools get smaller. Panelists wanted to ensure that a minimum level of service was met at the smaller concentration of five percent and the costs per student tend to be higher due to this. The overall patterns are similar to the 50 percent concentration.

Table 2.21e
School-Level Costs Special Education Students Identified by Michigan PJ Panels

Elementary				
Total School Enrollment	**270 students**	**390 students**	**390 students**	**390 students**
Mild	$ 10,407	$10,409	$10,409	$10,409
Moderate	$18,990	$19,520	$19,520	$19,520
Severe	$30,580	$30,581	$30,581	$30,581
Middle				
Total School Enrollment	**180 students**	**420 students**	**735 students**	**735 students**
Mild	$9,552	$9,547	$9,547	$9,547
Moderate	$17,119	$17,114	$17,114	$17,114
Severe	$28,171	$28,166	$28,167	$28,167
High School				
Total School Enrollment	**220 students**	**500 students**	**800 students**	**1,600 students**
Mild	$11,485	$10,705	$9,486	$8,727
Moderate	$18,138	$17,359	$17,109	$16,916
Severe	$32,676	$31,896	$31,646	$31,453

Table 2.21e shows that costs for special education students increased with their need level, reflecting the higher level of supports and services required. Costs were similar across school levels.

Panelists also identified the resources needed at the district level to support schools. Table 2.22 presents the district-level cost figures for the base, as well as the additional amounts for special needs students.

Table 2.22
District-Level Costs Identified by Michigan PJ Panels

District Size	Very Small	Small	Moderate	Large
District Enrollment	670	1,700	5,020	13,590
Base	$2,868	$2,363	$2,104	$1,948
Poverty	$118	$90	$83	$43
ELL	$1,880	$1,061	$610	$225
Special Education	$1,335	$816	$889	$482

The additional district-level base cost ranged from $1,948 to $2,868. The cost of providing the additional supports and services needed at the district level for special needs students was between $43 to $118 for poverty students, $225 to $1,880 for ELL students, and $482 to $1,335 for special education students.

Professional Judgment Total Base Costs and Weights

Combining the school and district level costs by district size allowed the study team to calculate 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 (Table 2.20a-c), along with the distribution of students at each grade level. The study team then added district-level costs from Table 2.22 to develop total base costs and weights for each identified student population. These figures are shown in Table 2.23. Weights represent the additional 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 poverty are $3,000, then the weight is 0.30. The district serving this student in poverty would therefore receive a total of $13,000 to provide an adequate education for that student.

Table 2.23
Professional Judgment Total Base Cost and Additional Weights

District Size	Very Small	Small	Moderate	Large
Base	$11,482	$10,307	$9,954	$9,590
Weights				
Poverty				
25% Concentration	0.27	0.28	0.29	0.29
50% Concentration	0.37	0.40	0.41	0.42
75% Concentration	0.39	0.42	0.43	0.44
High Need Poverty				
25% Concentration	0.45	0.50	0.51	0.51
50% Concentration	0.53	0.57	0.59	0.60
75% Concentration	0.39	0.42	0.42	0.43

District Size	Very Small	Small	Moderate	Large
ELL – 5% Concentration				
WIDA 1&2	0.62	0.52	0.51	0.46
WIDA 3&4	0.54	0.44	0.43	0.35
WIDA 5&6	0.30	0.34	0.31	0.28
ELL – 50% Concentration				
WIDA 1&2	0.56	0.48	0.43	0.40
WIDA 3&4	0.45	0.36	0.33	0.29
WIDA 5&6	0.38	0.28	0.22	0.18
Special Education				
Mild	1.03	1.08	1.09	1.06
Moderate	1.71	1.85	1.92	1.94
Severe	2.79	3.03	3.14	3.21
Average (Weighted)	1.37	1.45	1.48	1.48
CTE Weight	0.10	0.10	0.10	0.10

As table 2.23 shows, the per-student base cost rises from a low of $9,590 at the largest district to $11,482 at the very small district. There are small increases for the moderate and small districts.

Poverty weights are the lowest at the 25 percent concentration, ranging from 0.27 to 0.29. The 50 percent concentration weights range from 0.37 to 0.42 and the 75 percent concentration weights range from 0.39 to 0.44. All the weights are lowest in the very small district and rise in the larger districts. The 50 percent and 75 percent weights are very similar to one another.

The weights for high poverty students range from 0.45 to 0.51 for the 25 percent concentration. The 50 percent concentration weights range from 0.53 to 0.60 and the 75 percent concentration weights range from 0.39 to 0.43. Again, the weights are lowest in the very small district. Interestingly, the 75 percent concentration weights for the high poverty students are similar to the weights for the 75 percent concentration weights for poverty students.

For both the five percent and 50 percent ELL populations, the WIDA 1&2 students have the highest weights, the five percent population needing a weight slightly higher than the 50 percent population. In nearly all the cases, the ELL weights increase as the size of the district decreases, showing some need for a slight increase in ELL funding in smaller settings.

The special education weights are relatively similar across the district sizes, with the smallest districts actually having slightly lower weights for all three categories of need. The moderate weight is over twice as high as the mild weight for all districts, with only a slight increase in weight from moderate to severe. Combined, the weights range from 1.37 to 1.48.

The CTE weight is applied to students who attend a CTE center. The CTE center was staffed by the panelists to have similar resources as a traditional school, for example providing a principal and a nurse in every building. The center would be staffed to serve 1,000 students and would most likely be operated by the district.

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Chapter 3: Evidence-Based Approach

Evidence-Based Model Overview

Using the Evidence-Based (EB) Model, this section provides a set of recommendations that can be used to determine how Michigan could provide adequate funding to all school districts to help them offer every Michigan student an equal opportunity to achieve to the state's college and career ready standards. The sections that follow this introduction describe the EB model in detail. The first describes the school improvement theory that undergirds the EB funding model. It draws from research POA and others have conducted on schools that have dramatically moved the student achievement needle. Such schools exist across the country and vary by location – urban, suburban and rural – and by school size – large, medium, and small.

The next section "unpacks" the elements of an effective school, reviews and summarizes the research supporting the individual elements, and includes specific recommendations for every element of the model. This includes class size, extra help for struggling students, professional development, student support services (including guidance counselors and nurses), and ways that instruction and teachers can be organized to bolster their effectiveness to increase student performance and reduce achievement gaps linked to student demographics.

Following preparation of the first three sections, four professional judgment panels were created to review the core recommendations in using the EB Model to Identify Adequacy for Michigan Schools section. These panels in Michigan met over a three-day period in October 2017. The Evidence-Based Professional Judgment Panels section presents the findings from the four panel meetings. The findings are organized into three categories: panel suggestions for change to the EB model that led to Michigan specific modifications of the EB model; panel suggestions for changes to the EB model that the study team believes are not needed based on the reading and interpretation of current educational research; and panel commentary on the EB elements that were generally supported by the panels.

The Final EB Michigan Recommendations section offers a summary of the final estimated EB costs using the accompanying EXCEL-based computer simulation. Please note this chapter on the EB model does not include either transportation or capital constructions costs.

The following metaphor shows how the EB funding model, and the school improvement model embedded within it, can be viewed. The EB approach to school finance adequacy provides a set of resource and program recommendations that can be called the "Education Hybrid Car." The typical hybrid car costs about what the average car costs in America, but gets double the miles per gallon (50 v. 25 miles per gallon). One can easily spend more on a car than the cost of a basic hybrid (about $25,000-$30,000) but not get the high mileage; for example, buying a speedy V-8 engine-powered car, with moon roof and leather. If one is interested in high gas mileage – or, in this case, better school performance – one can easily spend much more and get neither.

The EB School model costs about the average of what is currently spent on schools across the country (Odden, Picus & Goetz, 2010), but the school cases that the study team have studied and which deploy strategies that are funded by the EB model (e.g., Odden, 2009), generally produce twice the level of student achievement. It is the EB study team's professional position that if schools use the resources in the model as indicated in The Evidence-based School Improvement Model section, student achievement in Michigan should dramatically rise. The following sections describe the high performance EB school funding model.

The Evidence-Based School Improvement Model

The intent of the Evidence-Based Model is threefold:

1. To identify the array of educational goods that would provide each student an equal opportunity to meet the state's student performance standards,
2. To identify the costs of that basket of education goods, and
3. To provide each school district with adequate funds so that it could purchase and provide that basket of goods appropriately to all its students.

Although a direct linkage between funding and student performance does not exist, the Evidence-Based (EB) model is designed to identify a level of resources that would enable all districts and schools to provide every student with robust opportunities to meet college and career ready standards.

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

Before presenting the details of, and research supporting, each component of the Evidence-Based approach to school finance adequacy, this section provides a more general description of the school improvement model that undergirds the EB Model used to estimate school finance adequacy for Michigan.

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

The EB Model is used to estimate a cost-based spending level for schools has been designed to allow districts and schools to provide every child with an equal opportunity to learn to state performance standards. The EB Model is unique in that it is derived from research and best practices that identify programs and strategies that boost student learning. Further, the formulas and ratios for school resources developed from that research have been reviewed by dozens of educator panels in multiple states over the past decade. The EB Model relies on two major types of research:

1. Reviews of research on the student achievement effects of each of the EB Model's individual major elements, with a focus on randomized controlled trials, the "gold standard" of evidence on "what works."

2. Studies of schools and districts that have dramatically improved student performance over a four- to six-year period – what is sometimes labeled “a doubling of student performance” on state assessments.

The EB approach has been modified over time as a result of research and work in other states. Today the EB Model explicitly identifies the components of a school improvement model, and articulates how all of the model’s elements are linked to strategies that, when fully implemented, produce notable improvements in student achievement (see Odden & Picus, 2014; Chapter 5).

High performing and improving schools have clear and specific student achievement goals, including goals to reduce achievement gaps linked to poverty and minority status. The goals are typically specified in terms of performance on state assessments.

Compared to traditional schools where teachers work in isolated classrooms, improving schools organize instruction differently. Regardless of the context – urban, suburban, or rural, rich or poor, large or small – improving and high performing schools organize teachers into collaborative teams: grade level teams in elementary schools and subject or course teams in secondary schools. With the guidance and support of instructional coaches, the teacher teams work with student data – usually short-cycle or formative assessment data – to:

- Plan standards-based curriculum units;
- Teach those units simultaneously;
- Debrief on how successful the units were; and
- Make changes when student performance does not meet expectations.

This collaborative teamwork makes instruction “public” over time by identifying a set of instructional strategies that work in the teachers’ school. Over time all teachers are expected to use the instructional strategies that have been demonstrated to improve student learning and achievement.

High performing and improving schools also provide an array of “extra help” programs for students struggling to achieve to standards. This is critical because the number of struggling students is likely to increase as more rigorous programs are implemented to prepare all students for college and careers. Individual tutoring, small group tutoring, after-school academic help and summer school focused on reading and mathematics for younger students, and courses needed for high school graduation for older students, represent the array of “extra help” strategies these improving schools typically deploy. Their approach is to “hold standards” constant and vary instructional time.

These schools exhibit multiple forms of leadership. Teachers lead by coordinating collaborative teams and through instructional coaching. Principals lead by structuring the school to foster instructional improvement. The district leads by ensuring that schools have the resources to deploy the strategies outlined above with a focus on aggressive student performance goals, improving instructional practice and taking responsibility for student achievement results.

High performing and improving schools seek out top talent. They know that the challenge to prepare students for the competitive and knowledge-based global economy is difficult and requires smart and capable teachers and administrators to effectively get the educational job done.

The most recent summary of the research undergirding the EB model can be found in the Odden and Picus (2014) school finance textbook, and in several books that profile schools and districts that have moved the student achievement needle (Odden & Archibald, 2009; Odden, 2009; Odden, 2012). The study team recently studied dramatically improving schools in Maryland, Vermont, and Maine as part of school finance studies in those states and found the theory of improvement embodied in the EB Model is reflected in nearly all the successful schools studied (Picus, Odden, et al., 2011; Picus, Odden, et al., 2013; Odden & Picus, 2015b). In addition, other researchers and analysts have found similar features of schools that significantly improve student performance and reduce achievement gaps (e.g., Blankstein, 2010, 2011; Chenoweth, 2007, 2009, 2017).

After a comprehensive set of studies and analyses, Greg Duncan and Richard Murnane (2014) reached conclusions similar to those embedded in the EB Model. They note that if all students in a school are to have a chance at success in the emerging global economy, they will need high-quality preschool programs, followed by effective elementary and secondary schools. The key features needed in each school include: 1) leadership focused on improving instructional practice, 2) within-school organization of teachers into teams that over time create a set of effective instructional practices and deploy them systematically in all classrooms, 3) a culture of assistance (e.g., instructional coaches and ongoing professional development) and accountability (e.g., adults taking responsibility for the impact of their school actions on student performance), and 4) an array of extra help strategies to extend learning time for any student who needs more time to achieve to standards.

Although the details of studies of improving and high performing schools vary, and different authors highlight somewhat different elements of the process, the overall findings are more similar than different. This suggests all schools can improve if they have adequate resources AND deploy those adequate resources in the most effective ways.

The EB Model offers a framework for the use of resources by districts and schools to help them focus those resources on programs and strategies that would allow them to produce substantial gains in student academic performance. In addition to the above more global description of the EB effective schools, the study team organized the key elements of the school improvement model embedded in the EB Model into ten areas. In general, schools and districts that produce large gains in student performance follow ten similar strategies (see Chapter four and five of Odden & Picus, 2014; Odden, 2009), resources for each of which are included in the EB Model:

1. Analyze student data to become deeply knowledgeable about performance issues and to understand the nature of the achievement gap. The test score analysis usually first includes review of state test results and then, over time, analysis of formative/short cycle (e.g., Renaissance Learning Star Enterprise) as well as benchmark assessments (e.g., NWEA MAP) to help tailor instruction to precise student needs, to progress monitor students with an Individual

Education Plan to determine whether interventions are working, and to follow the performance of students, classroom, and the school over the course of the academic year. Improving schools are "performance data hungry."

2. Set high goals such as aiming to educate at least 95% of the students in the school to proficiency or higher on state reading and math tests; seeing that a significant portion of the school's students reach advanced achievement levels; having more high school students take and pass AP classes; and making significant progress in closing the achievement gap. The goals tend to be explicit and far beyond just producing "improvement" or "making AYP." Further, because the goals are ambitious, even when not fully attained they help the school produce large gains in student performance.

3. Review evidence on good instruction and effective curriculum. Successful schools throw out the old curriculum, replace it with a different and more rigorous curriculum, and over time create their specific view of what good instructional practice is to deliver that curriculum. Changing curriculum is a must for schools implementing more rigorous college and career ready standards. And such new curriculum requires changes in instructional practice. Successful schools also want *all* teachers to learn and deploy new content-based, instructional strategies in their classrooms and seek to make good instructional practice systemic to the school and not idiosyncratic to teachers' individual classrooms.

4. Invest heavily in teacher training that includes intensive summer institutes and longer teacher work years, provide resources for trainers, and, most importantly, fund instructional coaches in all schools. Time is provided during the regular school day for teacher collaboration focused on improving instruction. Nearly all improving schools have found resources to provide instructional coaches to work with school-based teacher data teams, to model effective instructional practices, to observe teachers and to give helpful but direct feedback. This focus has intensified now that schools are delivering a more rigorous curriculum focused on educating all students to college and career proficiency levels. Further, professional development is viewed as an ongoing and not a "once and done activity."

5. Provide extra help for struggling students and, with a combination of state funds and federal Title 1 funds, provide some combination of tutoring in a 1:1, 1:3, or 1:5 teacher to student format. In some cases, this also includes extended days, summer school, and English language development for all ELL students. These Tier 2 interventions in the Response to Intervention (RTI) approach to helping struggling students achieve to standards are absolutely critical. For many students, one dose of even high-quality instruction is not enough; many students need multiple extra help services in order to achieve to their potential. No school producing large gains in student learning ignored extra help strategies altogether or argued that small classes or preschool were substitutes.

6. Restructure the school day to provide more effective ways to deliver instruction. This includes multi-age classrooms in elementary schools, block schedules and double periods of mathematics

and reading in secondary schools, and "intervention" periods at all school levels. Schools also "protect" instructional time for core subjects, especially reading and mathematics. Further, most improving schools today organize teachers into collaborative teams – grade level teams in elementary schools and subject/course teams in secondary schools. These teams meet during the regular school day, often daily, and collaboratively develop curriculum units, lesson plans to teach them, and common assessments to measure student learning results. Further, teams debrief on the impact of each curriculum unit, reviewing student learning overall and across individual classrooms.

7. Provide strong leadership and support for data-based decision making and improving the instructional program, usually through the superintendent, the principal and teacher leaders. Instructional leadership is "dense" and "distributed" in successful schools; leadership derives from the teachers coordinating collaborative teacher teams, from instructional coaches, the principal and district leaders. Both teachers and administrators provide an array of complementary instructional leadership.

8. Create professional school cultures characterized by ongoing discussion of good instruction with teachers and administrators taking responsibility for the student performance results of their actions. Over time, the collaborative teams that deliver instruction produce a school culture characterized by: 1) high expectations of performance on the part of both students and teachers, 2) a systemic and school-wide approach to effective instruction, 3) a belief that instruction is public and that good instructional practices are expected to be deployed by every individual teacher, and 4) an expectation that the adults in the school are responsible for the achievement gains made or not made by students. Professionals in these schools accept responsibility for student achievement results.

9. Bring external professional knowledge into the school, e.g., hiring experts to provide training, adopting new research-based curricula, discussing research on good instruction, and working with regional education service agencies as well as the state department of education. Successful schools do not attain their goals by "pulling themselves up by their own boot straps." Faculty in successful schools aggressively seek outside knowledge, find similar schools that produce results and benchmark their practices, and operate in ways that typify professionals.

10. Finally, talent matters. Many improving schools today consciously seek to recruit and retain the best talent, from effective principal leaders to knowledgeable, committed, and effective teachers. They seek individuals who are mission-driven to boost student learning, willing to work in a collaborative environment where all teachers are expected to acquire and deliver the school's view of effective instructional practice, and who are accountability focused.

Such successful schools also create a learning atmosphere inside the schools, have a school-wide approach to discipline and classroom management, and require that every student be accountable to any adult for his/her behavior and that all adults take interest in all students and hold them accountable for the behavioral practices in the school. In addition, these effective schools reach out to parents, insure that parents know the expectations of the school and welcome all parents into the school.

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

Using the EB Model to Identify Adequacy for Michigan Schools

Introduction

This section identifies the details of every element in the EB Funding Model. The five parts of this section include the following:

1. Staffing for core programs, which include preschool, full-day kindergarten, core teachers, elective/specialist teachers, substitute teachers, instructional facilitators/coaches, core tutors, core guidance counselors, nurses, supervisory aides, librarians, library aides, school computer technicians, principals/assistant principals, and school secretarial and clerical staff.

2. Dollar per student resources for gifted and talented students, professional development, instructional materials and supplies, formative/short cycle assessments, computers and other technology, career and technical education equipment and materials and extra duty/student activities.

3. Central functions, which include maintenance and operations, central office personnel and non-personnel resources.

4. Resources for struggling students including tutors, pupil support, extended day personnel, summer school personnel, ELL personnel, alternative school personnel and special education.

5. Personnel compensation resources including salary levels, health insurance, benefits for workers' compensation, unemployment insurance, retirement, and social security.

Each section provides an overview of the current research on the element discussed, and the specifics of the EB Model recommendation for the element.

Three Tier Approach

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

Student Counts

The EB model recommends that states use an ADM student count to distribute general aid. To help district deal with the costs of declining enrollment, the model suggests states use the current year ADM count or the average of the previous three years, whichever is larger. The model also needs a measure of the number of students from poverty backgrounds to trigger specific resources. In the past, this usually has been the number of students eligible for the federal free and reduced-price lunch program. Since districts can now provide free lunches to all students if they have a large number of students from poverty, the count of free and reduced lunch students is not available in some districts, often the largest districts in the state. So, the issue is whether to use a different indicator. Illinois provides a good example of the latter and uses the non-duplicated count of children receiving services through the programs of Medicaid, the Supplemental Nutrition Assistance Program, the Children's Health Insurance Program, or Temporary Assistance for Needy Families. ELL students and students with disabilities will be as currently defined by the state.

Previously the EB model defined at-risk students as the non-duplicated count of students from poverty and ELL students, and provided additional resources that included tutoring, extended day, summer school and additional pupil support. In addition, all ELL students also received an additional allocation for ESL services. This definition confused most people who concluded that the model provided ELL students just the ESL resources. Consequently, the EB model has changed its approach. In this report, all ELL students trigger tutoring, extended day, summer school, ESL, and additional pupil support resources. Further, all non-ELL poverty students also trigger tutoring, extended day, summer school and additional pupil support resources. In addition, the model provides all ELL students additional ESOL resources. The model also describes how the EB model provides resources for students with disabilities.

Prototypical Schools

A key component of the EB model is the use of prototypical schools and districts to indicate the general level of resources in schools and districts, and to serve as a heuristic to calculate the base per student amount, and then the student weights. The EB model identifies resources for prototypical elementary, middle, and high schools, as well as a prototypical district. The model needs to use specific sizes in order for the prototypes to indicate the relative level of resources in the schools. Although EB modeling is based on these prototypes, this does not imply Michigan should adopt new policies on school or district size.

Research on School Size

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

Research on school size is quite consistent in its conclusions. Most of the research on school size addresses the question of whether large schools – those significantly over 1,000 students – are more efficient and more effective than smaller school units (schools of 300 to 500), and whether cost savings and performance improvements can be identified by consolidating small schools or districts into larger entities. The research generally shows that school units of roughly 400 to 600 elementary students and between 500 and 1,000 secondary students are the most effective and most efficient (Lee & Smith, 1997; Raywid, 1997/1998; Ready & Lee, 2004).

Moreover, the research on diseconomies of small and large scale, which should consider both costs and outcomes, generally does not provide solid evidence for a consolidation policy. In an early review of the literature, Fox (1981) concluded that little research had analyzed output in combination with input and size variables. Ten years later, after assessing the meager extant research that did address costs as well as outcomes, Monk (1990) concluded that there was little support for either school or district consolidation, a conclusion also reached by Leithwood and. Jantzi (2009).

In reviews of scale economies and diseconomies and potential cost savings from consolidation, 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 was in the 600-900 range. Both findings suggest that the very large urban districts and schools across America – and Michigan – are larger than the optimum size and perhaps need to be downsized somehow, but that the potential cost savings from consolidation of small districts and schools are realistically scant. 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.

These findings have been reinforced by several studies of small high schools in both New York City and Chicago, each of which had initiatives to create many smaller high schools, sometimes including several school units in one building. These schools generally enrolled 550 or fewer students, less than 400 students in Chicago K-8 schools. Schwartz, Stiefel and Wiswall (2013) found that achievement increased significantly in the New York City small high schools, a parallel finding of Barrow, Claessens and Schanzenbach (2010) in a similar set of experiments in Chicago high schools. Likewise, Lee and Loeb (2010) found that grade six and eight math achievement was higher in small (less than 400 students) Chicago K-8 schools than in large ones (greater than 750 students).

The Evidence-based Model’s Prototypical School Sizes

The EB model begins with a prototypical district size of 3,900, which comprises four 450-student elementary schools, two 450-student middle schools, and two 600-student high schools. It uses this approach and these prototypes to indicate the relative level of resources in schools, as well as to calculate a base per student cost. 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 Michigan and other states are larger than these prototypical school sizes, the prototypical sizes can still be used to determine a new base cost per student, as the new base cost per student would be provided for all students in a school or district, regardless of actual size. In other states with larger schools, this approach has been used with the suggestion that larger school buildings could organize their students into smaller "schools within school" units inside the larger building.

Additionally, as will be discussed in Element 21, the EB model begins with a prototypical district size of 3,900, which comprises 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 cost per student. Several states have used the micro-EB formulas and ratios to estimate a base per student cost estimate for their foundation school finance formula. States using this approach include Arkansas, New Jersey, and North Dakota. Although actual school sizes vary in each of those states, the prototypes provide good estimates of a base cost per student in the context of each of those states. POA's Wisconsin Study (Odden et al., 2007) estimated a base per student cost using prototypical schools and a prototypical district, then compared that to a district specific cost estimate created by adapting the ratios and formulas to every school and district size. In Wisconsin, the difference between the two methods was about $50 per student, a small amount in a base spending level of approximately $10,000 per student.

The EB prototypes should not be construed to imply Michigan 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 base cost per student.

Table 3.1, below, provides a summary of how each element is calculated under the 2017 EB Model recommendations.

Table 3.1
Summary of 2017 Evidence-Based Model Recommendations

	2017 Evidence-Based Recommendation
Staffing for Core Programs	
1a. Preschool	Full day preschool for children aged 3 and 4. One teacher and one aide in classes of 15
1b. Full-Day Kindergarten	Full-day kindergarten program. Each K student counts as 1.0 pupil in the funding system
2. Elementary Core Teachers/Class Size	Grades K-3: 15 (Average class size of 17.3) Grades 4-5/6: 25
3. Secondary Core Teachers/Class Size	Grades 6-12: 25. Average class size of 25
4. Elective/Specialist Teachers	Elementary Schools: 20% of core elementary teachers Middle Schools: 20% of core middle school teachers High Schools: 33 1/3% of core high school teachers
5. Instructional Facilitators/Coaches	1.0 Instructional coach position for every 200 students

	2017 Evidence-Based Recommendation
6. Core Tutors/Tier 2 Intervention	One tutor position in each prototypical school (Additional tutors are enabled through poverty and ELL pupil counts in Elements 22 and 26)
7. Substitute Teachers	5% of core and elective teachers, instructional coaches, tutors (and teacher positions in additional tutoring, extended day, summer school, ELL, and special education)
8. Core Pupil Support Staff, Core Guidance Counselors, and Nurses	1 guidance counselor for every 450 grade K-5 students 1 guidance counselor for every 250 grade 6-12 students 1 nurse for every 750 K-12 students (Additional student support resources are provided on the basis of poverty and ELL students in Element 23)
. Supervisory and Instructional Aides	2 for each prototypical 450-student elementary and middle school 3 for each prototypical 600-student high school
10. Library Media Specialist	1.0 library media specialist position for each prototypical school
11. Principals and Assistant Principals	1.0 principal for the 450-student prototypical elementary school 1.0 principal for the 450-student prototypical middle school 1.0 principal and 1.0 assistant principal for the 600-student prototypical high school
12. School Site Secretarial and Clerical Staff	2.0 secretary positions for the 450-student prototypical elementary school 2.0 secretary positions for the 450-student prototypical middle school 3.0 secretary positions for the 600-student prototypical high school
Dollar Per Student Resources	
13. Gifted and Talented Students	$40 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 $125 per student for trainers (In addition, PD resources include instructional coaches [Element 5] and time for collaborative work [Element 4])
15. Instructional Materials	$190 per student for instructional and library materials
16. Short Cycle/ Interim Assessments	$25 per student for short cycle, interim and formative assessments
17. Technology and Equipment	$250 per student for school computer and technology equipment
18. CTE Equipment/ Materials	$10,000 per CTE teacher for specialized equipment
19. Extra Duty Funds/ Student Activities	$300 per student for co-curricular activities including sports and clubs for grades K-12
Central Office Functions	
20. Operations and Maintenance	Separate computations for custodians, maintenance workers and groundskeepers, and $305 per student for utilities
21. Central Office Personnel/ Non-Personnel Resources	A dollar per student figure for the Central office based on the number of FTE positions generated and the salary and benefit levels for those positions. Also includes $300 per student for miscellaneous items such as Board support, insurance, legal services, etc.

	2017 Evidence-Based Recommendation
Resources for Struggling Students	
22. Tutors	1.0 tutor position for every 100 ELL students and one tutor position for every 100 non-ELL poverty students
23. Additional Pupil Support Staff	1.0 pupil support position for every 125 ELL students and one tutor position for every 125 non-ELL poverty students
24. Extended Day	1.0 teacher position for every 120 ELL and for every 120 non-ELL poverty students.
25. Summer School	1.0 teacher position for every 120 ELL and for every 120 non-ELL poverty students.
26. ESL staff for English Language Learner (ELL) Students	As described above: 1.0 tutor position for every 100 ELL students 1.0 pupil support position for every 125 ELL students 1.0 extended day position for every 120 ELL students 1.0 summer teacher position for every 120 ELL students, In addition: 1.0 ESL teacher position for every 100 ELL students
27. Alternative Schools	One assistant principal position and one teacher position for every 7 ALE students in an ALE program. One teacher position for every 7 Welcome Center eligible ELL students.
28. Special Education	8.1 teacher positions per 1,000 students, which includes: 7.1 teacher positions per 1,000 students for services for students with mild and moderate disabilities and the related services of speech/hearing pathologies and/or OT PT. This allocation equals approximately 1 position for every 141 students. **Plus** 1.0 psychologist per 1,000 students to oversee IEP development and ongoing review. **In addition:** Full state funding for students with severe disabilities, and state-placed students, minus the cost of the basic education program and Federal Title VIB, with a cap on the number covered at 2% of all students
Staff Compensation Resources	
29. Staff Compensation	For salaries: average of previous year For benefits: Retirement or pension costs: 25.56 % Health Insurance: $12,000 per employee Social Security and Medicare: 7.65% Workers' Compensation: 0.6 % Unemployment Insurance: 0 % as the state fully reimburses districts for these costs

Staffing for Core Programs

This section covers full-day kindergarten, core teachers, elective/specialist teachers, substitute teachers, instructional facilitators/coaches, core tutors, core guidance counselors, core nurses, substitute teachers, supervisory aides, library media specialists, principals/assistant principals, and school secretarial and clerical staff.

1a. Preschool

The EB model provides for a full-day preschool program for children ages three and four.

Model Element	2016 Evidence-Based Recommendation
1a. Preschool	Full day preschool for children aged three and four. One teacher and one aide in classes of 15.

Analysis and Evidence

Preschool education has received considerable attention in recent years, including a major push to expand preschool education by the federal government. According to the National Institute for Early Education, states enrolled 1.5 million children in public pre-school programs in 2016.[15] Underscoring that movement, there is increasing evidence that high-quality preschool programs are an effective way to help all children succeed in school (Kauerz, 2006). Research shows that preschool programs are most effective for at-risk children who are not likely to come to kindergarten fully prepared. When paired with well-resourced elementary schools, preschool programs can help at-risk children catch-up with their better-prepared schoolmates (Takanishi, 2016; Takanishi & Kauerz, 2008). In other words, there is growing recognition that integrating preschool programs with the traditional public-school system, particularly grades K-3, could strengthen the effect of both preschool programs and programs in grades K-3.

This analysis of preschool focuses on estimating the structure and costs of establishing universally available, voluntary, high-quality programs for three- and/or four-year-olds. It discusses how those preschool programs would be integrated with existing K-3 programs the EB model provides. The balance of this part is divided into five segments. The first briefly summarizes the research base supporting preschool education programs, the second summarizes research on the impact of a statewide preschool program, the third summarizes fiscal returns to preschool programs, and the fourth identifies the research base for integrating preschool programs with K-3 programs into a more unified PreK-3 program. The fifth describes the EB approach to providing for preschool programs.

The Case for Preschool. There is continued activity across the United States to establish universal preschool programs for four-year-old children and in increasing numbers of instances for three-year-olds as well. This activity stems from the increased demands on schools through standards-based education reforms, the expectations for which have now been ratcheted up to include preparing all students for college or careers, and a growing recognition that early childhood development programs can have an impact on student outcomes well beyond the preschool years. Much of the research on the effectiveness of PreK-3 programs has focused on the preschool component, with less research on the advantages of integrated programs that continue from preschool through the grade three.

[15] See http://nieer.org/state-preschool-yearbooks/yearbook2016.

Drawing from major studies that found long-term positive effects of preschool programs on student learning, Reynolds and Temple (2008) constructed five possible pathways through which early childhood development programs produced their impacts, including:

1. A cognitive advantage pathway that leads to enhanced literacy, language and numeracy skills, and better school readiness (see also Conger, 2008 for evidence on the impact of early learning on acquisition of English language skills for ELL students).

2. A family support pathway describing benefits from greater parental involvement in education and enhanced parenting skills (see also Kalil & Crosnoe, 2008).

3. A school support pathway that argues for high-quality education programs beyond preschool to strengthen the learning advantages of early childhood development programs, a pathway allowed by the Evidence-Based funding model.

4. A social adjustment pathway suggesting benefits from increased classroom and peer social skills and positive teacher-child relationships.

5. A motivational pathway arguing that early education programs provide benefits in terms of achievement motivation and commitment to school.

Whatever the pathway, most researchers find that high-quality preschool, particularly for students from lower income backgrounds, significantly affects future student academic achievement as well as other desired social and community outcomes (Barnett, 2008, 2010, 2011a, 2011b; Camilli, et al., 2010; Pianta, et al., 2012; Reynolds, et al., 2001, 2011; Reynolds and Temple, 2006, 2008; Schweinhart et al., 2005). These longitudinal studies show that students from lower income backgrounds who experience a high-quality, full-day preschool program perform better in learning basic skills in elementary school, score higher on academic goals in middle and high school, attend college at a greater rate, and as adults, earn higher incomes and engage in less socially-undesirable behavior.

In specifying more specific positive impacts, Lynch (2007) and a more recent report from the Education Commission of the States (Workman, Griffith & Atchison, 2014) identify the multiple benefits of preschool programs for children who participate in high-quality preschool programs:

- Require less special education;
- Are less likely to repeat a grade;
- Are less likely to need child welfare services;
- Enroll in K-12 education better prepared resulting in lower spending on extra help services;
- Are less likely to engage in criminal activity as juveniles and adults;
- Are less likely to need social welfare support services as adults;
- Have higher incomes, generally, when they enter the labor force;
- Pay higher taxes as a result of their higher incomes; and

- Are likely to have employer-provided health insurance.

The consistent and recurring theme in the analyses is the multiple benefits and long-term savings accrue to high-quality preschool programs. Although a high-quality program is defined to a large extent by the individuals employed to run the program and their commitment to their job, as well as a comprehensive array of services beyond the school component, it is possible to identify the components needed to support high-quality programs.

Russo (2007) identified the components of high-quality, effective PreK-3 programs as:

1. Voluntary, full-day preschool-kindergarten available to all three-and four-year-old children.

2. Full-day kindergarten that builds on preschool experiences and is available to all children, which is supported by the current Legislative Model.

3. Standards, curriculum, instruction, and assessments aligned within and across grades from preschool through grade three, which can be accomplished with new curriculum standards.

4. Curriculum focused on emotional development, social skills, and self-discipline, as well as reading and mathematics.

5. Early education lead teachers qualified to teach any grade level from preschool through grade three and compensated based on public elementary school teacher salaries.

6. Families and teachers who work together to ensure the success of all children.

In 2010 the National Institute for Early Education Research (NIEER) established 10 quality benchmarks to identify program quality, and modified them in 2017 to make them consistent with more recent research.[16] The slightly revised and enhanced standards listed below are similar to the previous standards and track closely to the elements of the EB model. The new standards include:

- Comprehensive early learning development standards that are horizontally and vertically aligned with K-3 curriculum standards and programs;
- Support for curriculum implementation;
- Teachers with a bachelor's degree;
- Teachers with specialized training in early childhood;
- Assistant teachers with a Child Development Associate credential or the equivalent;
- Teacher in-service training of at least 15 hours per year, with coaching for both teachers and assistant teachers;
- Class sizes of 20 or fewer students;

[16] See http://nieer.org/wp-content/uploads/2017/05/YB2016_StateofPreschool2.pdf .pp 14-17 for a detailed description of the NIEER quality standards.

- Staff to child ratios of 1:10 or better;
- Vision, hearing and health screening and referral and support services; and
- Continuous quality improvement systems.

For many years, nearly all of the longitudinal, randomized controlled studies of preschool programs have relied on data from three preschool programs that met the above standards: High-Scope Perry Preschool Program, Carolina Abecedarian Project, and the Chicago Child-Parent Center Program. These results reinforce the finding that the most robust impacts of preschool programs are those that emerged from studies of the effect of high-quality programs.

In sum, these studies found that a high-quality preschool program, offered for a full day and taught by fully certified and trained teachers using a rigorous, but appropriate early childhood curriculum, can provide initial positive effects and even greater effects in later primary years. By themselves, preschool programs can reduce achievement gaps linked to race and income by half. And the effect of preschool programs can be enhanced if followed by high-quality education programming in the elementary grades, particularly grades K-3.

Today, there is increasing recognition that preschool should be provided for *all students*. Recent research shows that this strategy produces significant gains for children from middle class backgrounds and even larger impacts for students from lower income backgrounds (Barnett, Brown & Shore, 2004).

<u>Impact of Statewide Preschool Programs</u>. Researchers have also analyzed the success of larger, more universal, i.e., statewide, preschool initiatives. 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 (Jacobson, 2003). There is evidence that statewide universal programs in Georgia (Henry, et. al. 2006), and Oklahoma (Gromley, Jr. et. al. 2005) have improved the performance of students who participated in those programs. In addition, 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 second grade for a two-year preschool program (Frede, Jung, Barnett et al., 2007).

More recent analyses of state preschool programs show that although preschool effects might appear to dissipate by grade three, they have longer-term positive impacts. Two recent studies of a more "universal" preschool program in Tulsa, Oklahoma, found that a high-quality Head Start program had clear short-term impacts which, tended to dissipate (though not completely and not for all children) by grade three. But the program produced significant positive impacts on participating students several years later in their middle school years (Hill, et al., 2015; Phillips et al., 2016), especially for low income and minority children. The authors argued that the grade three "fade" phenomenon, while troublesome, is muted by longer term impacts by the time children who participated in the program reached middle school. This suggests evidence that high-quality preschool programs do produce longer term, sustainable results.

Fiscal Returns to Preschool. Generally, estimates of the long-term financial benefits of preschool programs are reported as returns on investment. Reynolds and Temple (2008) reported that in addition to benefits to child well-being and student achievement, high-quality preschool programs for low-income children at-risk for underachievement produced economic returns ranging from four dollars to $10 per dollar invested. Others make similar arguments. Several studies conclude that there is a return over time of eight to 10 dollars for every one dollar invested in high-quality preschool programs (Barnett, 2007; Barnett & Masse, 2007; Barnett & Frede, 2017; Karoly et al., 1998; Reynolds et al., 2011; Zigler, Gilliam & Jones, 2006; and Gromley, 2007).

In a more detailed analysis, Lynch (2007) found that voluntary, high-quality, publicly funded preschool programs targeted to the poorest 25 percent of three-and four-year old children generate substantial benefits that would eclipse the costs of the programs in six years. By 2050, Lynch estimated that the annual benefits of these preschool programs would exceed the program costs in that year by a ratio of 12.1:1. He estimated the cost of a high-quality half-day program at $6,300 (2006 dollars) for each of the 2 million children enrolled. He further estimated that if programs were funded by individual states (rather than the Federal Government), by 2050, all 50 states would realize net benefits in tax revenues from the programs in between four and 29 years.

Lynch (2007) estimated that if a voluntary, high-quality publicly funded universal half-day preschool program for three-and four-year-olds were established, budgetary savings would surpass costs in about nine years and by 2050, benefits would exceed costs by an 8.2:1 ratio. He assumed these preschool programs would also cost approximately $6,300 (2006 dollars) per student and when fully phased in would enroll approximately seven million children.

The Case for Integrated PreK-3 Programs. The discussion above addressed preschool programs, but said little about PreK-3 programs or their benefits. While there is growing evidence that integrating preschool programs with primary grades can lead to increased educational benefits, this field has not been explored as extensively. Takinishi (2016) is an exception, and as noted above, the National Institute on Early Education Research now includes integration of preschool with the K-3 program as a core program quality standard.

Takanishi and Kauerz (2008) and more recently Takanishi (2016) argue that the PreK-3 years are the cornerstone of any educational system, and point out the importance of quality integrated PreK-3 programs in providing strong foundations for lifelong learning, educational excellence, and competitiveness in the marketplace. Bogard (2003) suggests that variability in preschool experiences is a strong predictor of children performance, and the link is even stronger for low-income children. She suggests that a PreK-3 approach to early childhood education will help to level the playing field by supporting better teacher preparation and qualifications, as well as establishing sequential learning experiences.

One of the challenges is coordinating traditional education programs with PreK-3 programs. First, the need to coordinate education programs (curriculum, professional development, teacher collaboration, school facilities) becomes more complex with the addition of more staff, students, and grade levels. An efficient way to help such coordination is to make preschool teachers part of a PreK-3 teacher collaborative team. Second, many preschool programs are offered by providers other than the public school system – frequently at sites other than the local school. Finally, coordinating preschool with the regular K-3 program is further complicated by the fact that in the foreseeable future, preschool programs will remain voluntary. This means some children will continue to come to kindergarten without the benefit of preschool programs, and other children who have had access to preschool programs will bring very different experiences to the first years of formal schooling. The success of a PreK-3 program also depends on the quality of the educational program in grades K-3, which varies across schools, school districts and even states. This issue would be mitigated with adequate funding for all Michigan schools. This study addresses that issue by using the EB Model to estimate the resources needed for a high-quality program in all PreK-3 classrooms, with the K-3 programs addressed below in the discussion of adequate EB resources for grades K-3.

Many of the components of success for high-quality preschool programs are also part of the components advocated by PreK-3 supporters. These include full-day Pre-K programs with low pupil/teacher ratios staffed by highly qualified teachers and aides, along with support for articulating curriculum, professional development, teacher collaboration and educating children with special educational needs.

In earlier research, Picus, Odden and Goetz (2009), as part of an overall effort to estimate costs for PreK-3 programs nationwide, developed case studies of several integrated preschool programs. The case studies showed that such programs were provided in regular elementary school settings; often organized schools into PreK-1, grades two through three, and grades four through five collegial teacher teams; provided preschool teachers with the same pupil-free time as the grade level elementary teachers so they could all meet during the regular school day for collaborative planning; integrated the preschool through grade one curriculum; and generally augmented a K-5 elementary school with an additional one to three preschool classrooms. Most of the preschool classrooms were staffed with one teacher and one aide for every 15-20 students.

In addition, and as recommended by the NIEER standards, preschool programs had classroom teachers that were fully certified as early childhood educators and paid on the same salary schedule as the other teachers in the school district. It should be expected that many of the components of a high-quality preschool program are part of the K-3 programs provided by the EB Model. As stated above, preschool impact is linked to quality and quality includes both a set of programs and strategies and the staff to implement them (Camilli, et al., 2010; Whitebrook, 2004). Program quality is particularly significant for males. Garcia, Heckman, Leaf & Prados (2016) write in a recent paper that males placed in relatively low-quality childcare centers experience far more negative consequences than females, which suggests that high program quality is necessary to generate quality outcomes.

Including preschool students in a district's pupil count for state aid purposes and including preschool teachers on the same salary schedule as teachers of other grades is the most straight-forward way to fund high-quality preschool programs.

The EB Method to Providing Integrated Preschool Programs. The EB method has been used to identify costs for integrated preschool programs in three recent studies. The first was a study Picus Odden & Associates conducted for The Fund for Child Development, that developed estimated costs for providing PreK-3 programs, in all 50 states and the District of Columbia (Picus, Odden & Goetz, 2009). The study estimated Pre-K-3 program costs for each state using varying assumptions of student eligibility and participation. The second was a study conducted in 2011 as part of an adequacy study for Texas (Picus, Odden, Goetz & Aportela, 2012). The third was an analysis conducted for Maine as part of a 2013 recalibration of its adequacy-oriented school funding system (Picus et al., 2013).

In these three studies, the EB Model was used to develop a per preschool pupil cost for a high-quality preschool program by identifying the elements for a high-quality preschool program. The per student cost figure was derived from a prototypical preschool program of 150 students, which included 10 classrooms of 15 students each. The preschool EB Model provides core, elective and substitute teachers. Additional personnel resources include an assistant principal position to provide a preschool program coordinator, instructional coaches, pupil support, special education teachers for students with mild and moderate disabilities, instructional aides, special education aides, nurses and secretaries. Non-personnel resources are provided for technology and equipment, instructional materials, professional development, and assessments. The EB Model also includes central office costs for central administration and operation and maintenance.

Alternatively, the State could provide a preschool program as part of the EB Model and simply add preschool student counts to those of every elementary school. By doing this and staffing the preschool grades with one teacher and one instructional aide for every 15 preschool students, an estimate of the costs of providing preschool would be included in the costs of the EB Model. The EB report provides a separate per student figure for students aged three and four in an EB Model resourced preschool program.

1b. Full-Day Kindergarten

The EB model provides for a full-day kindergarten program.

Model Element	2016 Evidence-Based Recommendation
1b. Full-day kindergarten	Full-day kindergarten program. Each K student counts as 1.0 pupil in the funding system.

Analysis and Evidence

Research shows that full-day kindergarten for students age five, particularly for such students from low-income backgrounds, has significant, positive effects on student learning in the early elementary grades (Gullo, 2000; Slavin, Karweit & Wasik, 1994). Fusaro's (1997) late 1990s meta-analysis of 23 studies comparing the achievement effect of full-day kindergarten to half-day kindergarten programs, found an average effect size of +0.77, which is substantial.[17] Children participating in full-day kindergarten programs do better in learning the basic skills of reading, writing, and mathematics in the primary grades than children who receive only a half-day program or no kindergarten at all (see also Lee, Burkam, Ready, Honigman & Meisels, 2006).

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

2. Elementary Core Teachers/Class Size

In staffing schools and classrooms, the most expensive decision superintendents and principals make is that of class size. Core teachers are defined as the grade-level classroom teachers in elementary schools. 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) or International Baccalaureate (IB) classes in these subjects are considered core classes.

Model Element	2016 Evidence-Based Recommendation
2. Core Teachers/Class Size	Grades K-3: 15 (Average class size of 17.3) Grades 4-5/6: 25

Analysis and Evidence

The gold standard of educational research is randomized controlled trials, which provide scientific evidence on the impact of a certain treatment (Mosteller, 1995). In that vein, the primary evidence on the impact of small classes today is the Tennessee STAR study, which was a large scale, randomized controlled experiment of class sizes of approximately 15 students compared to a control group of classes with approximately 24 students in kindergarten through grade three (Finn and Achilles, 1999; Word, et al., 1990). The study found students in the small classes achieved at a significantly higher level (effect size of about 0.25 standard deviations) than those in regular class sizes, and the impacts were even larger (effect size of about 0.50) for low income and minority students (Finn, 2002; Grissmer, 1999; Krueger, 2002). The same research also showed a regular class of 24 to 25 students with a teacher and

[17] Effect size is the amount of a standard deviation 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 from the 50th to the 83rd percentile. The research field generally recognizes effect sizes greater than 0.25 as significant and greater than 0.50 as substantial.

an instructional aide *did not* produce a discernible positive impact on student achievement, a finding that undercuts proposals and wide spread practices that place instructional aides in elementary classrooms (Gerber, Finn, Achilles, & Boyd-Zaharias, 2001).

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

Although some argue the impact of the small class sizes is derived primarily from kindergarten and grade one that was not the experimental treatment. Further, Konstantopoulos and Chung (2009) found the longer students were in small classes (i.e., in grades K, one, two, and three) the greater the impact on grade 4-8 achievement. They concluded the full treatment – small classes in all of the first four grades – had the greatest short and long-term impacts.

Though differences in analytic methods and conclusions characterize some of the debate over class size (see Hanushek, 2002 and Krueger, 2002), the EB model reflects those concluding class size makes a difference, but only class sizes of approximately 15 students with one teacher (and not class sizes of 30 with an aide or two teachers) and only for kindergarten through grade three.

Finally, in these times when funds for schools are scarce, it is legitimate to raise the issue of the cost of small classes versus the benefits. Whitehurst and Chingos (2011) argue that though the Tennessee STAR study supports the efficacy of small classes, there is other research today that produced more ambiguous conclusions. However, they also note the other research includes class size reductions in grades above K-3 and “natural experiments” rather than randomized controlled trials. Most importantly, they also conclude that while the costs of small classes are high, the benefits, particularly the long-term benefits, outweigh the costs and conclude small class sizes in grades K-3 “pay their way.”

The study team consistently recommend states fund all other elements of the EB Model before putting funds into smaller class sizes because research shows many other components of the EB Model are more cost effective in terms of improving student performance – particularly for improving the performance of struggling students.

A Note on the Difference Between Class Size and Staffing Ratios

As is discussed next, the EB model provides more than just core teachers; it also provides elective teachers. The model calculates the total number of instructional teachers by using class size. But some state formulas use staffing ratios, not class size, as a term that includes both core and elective teacher (these terms are defined below) while the EB model determines the number of core and elective teachers separately and determined by class size. Thus “class size” and “staffing ratios” are two terms that have different meanings. Despite the important difference between these two terms, there has been misunderstanding about class size and staffing ratios and how many total teaching resources are generated by each. The purpose of this discussion is to clarify the terms "staffing ratios" and "class size," and explain the differences between the two.

The first step is to define the phrase "class size" and the phrase "staffing ratio." Understanding the distinction between the two is critical to understanding the differences in the number of teachers in the EB staffing model versus other state's staffing models.

1. *Class Size:* In the EB Model, class size is used to determine the number of core teachers in each school. The number of core teachers is then used to determine the number of elective teachers, which is specified as a percent of core teachers. The total number of teachers who provide classroom instruction at any school is the sum of the core and elective teachers.

2. *Staffing Ratio:* Once the number of core and elective teachers is calculated, a staffing ratio can be determined by dividing the total number of (core and elective) teachers into the number of students in the school. Although the staffing ratio is not used in the EB model, it is used in some states to generate the number of teachers in each prototypical school, and is a common term used among both legislators and educators.

The second step is to show how class size and staffing ratios can be equivalently compared. Take a school of 500 students. Suppose core teachers would be staffed at class sizes of 25. This would produce 20 teachers (500 divided by 25). If the school had a six-period schedule and teachers provided instruction for five of those periods, then additional or elective teachers would be provided at the rate of 20 percent of core teachers, or an additional four teachers (20 percent times 20). This would produce a total of 24 teachers, 20 core and four elective teachers. A staffing ratio that produces the equivalent number of teachers would be determined by dividing 24 into 500, which equals 20.83. The result is a staffing ratio of 20.83 which is equivalent to providing core teachers and elective teachers for class sizes of 25.

A staffing ratio of 20.83 should not be interpreted as providing class sizes of 21 (20.83 rounded to the nearest whole number). Staffing ratios are correctly used to determine the total number of teachers provided. In a school of 500, a staffing ratio of 20.83 provides 24 total teachers (500 divided by 20.83). That total then needs to be segmented into core teachers and elective teachers, which would be 20 and four respectively, in the example above, with class sizes of 25, not 21.

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. AP and IB classes in these subjects are considered core classes.

Model Element	2016 Evidence-Based Recommendation
3. Secondary Core Teachers/Class Size	Grades 6-12: 25 (Average Class Size of 25)

Analysis and Evidence

There is less research evidence on the most effective class sizes in grades four through 12 than there is on effective class sizes in grades K-3. As a result, in developing the EB Model, the study team 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 roughly 25 students, and nearly all the late 20th century comprehensive school reform models were developed on the basis of a class size of 25 students (Odden, 1997; Stringfield, Ross & Smith, 1996) a conclusion on class size reached by the dozens of experts who created these whole-school design models. Although many professional judgment panels in several states have recommended secondary class sizes of 20, none cited research or best practices to support that proposal.

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

The EB model includes core class sizes of 25 for grades 4-12.

4. Elective/Specialist Teachers

In addition to core classroom teachers, the EB Model provides elective or specialist teachers to 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, 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. The second is that it provides time during the school day for all teachers to collaborate on instructional plans, participate in professional development activities and otherwise plan for class instruction.

Model Element	2016 Evidence-Based Recommendation	
4. Elective/Specialist Teachers	Elementary Schools:	20% of core elementary teachers
	Middle Schools:	20% of core middle school teachers
	High Schools:	33 1/3% of core high school teachers

Analysis and Evidence

In addition to the core subjects addressed above, schools need to provide a solid well-rounded curriculum including art, music, library skills, career/technical and physical education. The April 2017 issue of *Phi Delta Kappan* discusses many issues related to the importance of art and music for our public schools. Relatedly, teachers also need some time during the regular school day to work collaboratively and engage in job-embedded professional development. Providing every teacher one period a day for collaborative planning and focused professional development requires an additional 20 percent allocation for elective teachers. Using this elective staff allocation, every teacher – core and elective – would teach five of six periods during the day, and have one period for planning, preparation, and collaborative work. One of the most important elements of effective collaborative work is team-focused data-based decision making, using student data to improve instructional practices, shown to be effective by a recent *randomized controlled trial* (Carlson, Borman & Robinson, 2011).

When teachers work in collaborative teams, they review student data to design standards-based lesson plans and curriculum units, identify interventions for struggling students and monitor all student progress toward meeting performance standards. Research supports the importance of teacher collaborative work. As noted previously in the section on the high-performance school embedded in the EB model, collaborative teacher teams are key ingredients in schools producing large gains in student performance and significant reductions in achievement gaps for at-risk students. 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. Using a data base similar to the Miami-Dade data base, Sun, Loeb and Grissom (2017) found that when a more effective teacher becomes part of a teaching team, the performance of other teachers improves and the performance of the more effective teacher does not drop. This finding suggests that teacher collaboration can be enhanced when the system strategically ensures that each teacher team has a highly effective teacher as a member. Economists Jackson, and Bruegmann (2009), calling teacher collaboration “peer learning,” also found that such activities were related to student learning gains. Jensen (2014) shows how integrating “professional learning” into the lives of teachers is a core element of high performing schools in Australia. Johnson, Reinhorn & Simon (2016) found that 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. Berry (2015-16) synthesizes several studies of how teacher collaborative work is linked to student learning in many U.S. schools and Boudett and Steele (2007) provide several examples of how data-based decision making can be organized in schools.

This research supports the EB model strategy of including both core and elective teachers, making it possible for schools to offer a full liberal arts curriculum and enable all teachers to engage in collaborative work with their peers.

The 20 percent additional staff is adequate for elementary and middle schools, but the EB Model establishes a different argument for high schools. If the goal is to have more high school students take a core set of rigorous academic courses, and learn the course material at a high level of thinking and problem solving, cognitive research findings suggest that use of longer class periods, such as a block schedule, can be a better way to organize the instructional time of a high school. (Bransford, Brown and Cocking, 1999; Donovan & Bransford, 2005a, 2005b, 2005c). Typical block scheduling for high schools includes four 90-minute blocks where teachers provide instruction for three of those 90-minute blocks and have one block – or 90 minutes – for planning, preparation, and collaboration each day. This schedule requires elective teachers at a rate of 33 1/3 percent of the number of core teachers. This block schedule would operate with students taking four courses each semester attending the same classes each day, or with students taking eight courses each semester while attending different classes every other day. Such a schedule could also entail a few “skinny” blocks (45 minute periods) for some classes. Each of these specific ways of structuring a block schedule, however, would require an additional 33 1/3 percent of the number of core teachers to serve as elective teachers to provide the regular teacher with a "block" for planning, preparation, and collaboration each day.

It should be noted that staffing recommendation for high schools would be sufficient for high schools to provide all students with a rigorous set of courses throughout grades 9-12, such as Michigan's merit curriculum. It also allows schools to provide the appropriate number of credits required for high school graduation to qualify for scholarships and be college ready for virtually any post-secondary institution in the country, including Michigan's high school graduation requirements.

The elective teacher recommendation described above does not provide sufficient resources, at the same class sizes, for either middle schools or high schools to offer a seven-period day and have teachers instruct for only five of those periods. The EB Model does not resource schools at that level for two primary reasons. First, the EB Model formulates recommendations on strategies and resources to dramatically improve student performance in the core subjects of mathematics, reading/English/language arts, science, history/geography, and world languages, in part by providing nearly an hour of instruction in each of these subjects daily. Restructuring the day to add a seventh period is usually accomplished by dividing the six hours of instruction by seven rather than six, therefore reducing the minutes of instruction in core subjects; this is not a strategy that is likely to boost performance in those subjects, regardless of the arguments about the motivational aspects of elective classes. Second, increasing the provision of specialist and elective teachers to 40 percent in both middle and high schools is costlier. Therefore, a recommendation of 40 percent specialists and elective teachers in both middle and high schools would result in added costs and a potential decrease in instructional effectiveness for the core subjects, something that is not aligned with the framework for the EB approach to adequacy.

Additional Comments on Scheduling Time for Teacher Collaboration

Collaborative teacher work in Professional Learning Communities (PLCs) is critical to a school's success. During focus groups with teachers in four states over the past two years, nearly all teachers have stated that PLCs – or collaborative teacher teams – were core and critical elements of their success in producing student learning gains, aligning their practices with research.

In order for schools to create such work teams, pupil-free time must be available during the school day. Creating collaborative time and then scheduling teachers in each team for common pupil-free time is enabled by having a combination of elective and core teachers. In other states, teachers shared many different approaches to using time for planning and collaboration. The EB recommendations of providing at least 60 minutes of pupil-free time for elementary middle teachers, and 90 minutes for high school teachers has generally been viewed as adequate for carving out collaborative time. However, even when the funding model provides for such time, too often schools do not provide for that pupil-free time, or when they do, do not have teachers using most of it for collaborative team work – a key to boosting student learning. Stakeholder focus groups noted considerable differences in how strongly teachers were encouraged or required to use pupil-free time for collaborative teacher work versus individual planning and preparation.

Moreover, many middle and high schools organize the schedule for a seven-period day with teachers providing instruction for five periods. As compared to the EB Model, this requires 40 percent elective teachers over core teachers, not the 20 percent for middle schools and 33.33 percent for high schools in the EB Model. This approach either requires larger class sizes or local districts to raise funds above the adequacy level to cover the additional costs.

At the same time, school districts around the country increasingly require a seven-and-a-half-hour work day for teachers. Instruction usually comprises six hours of this time, and lunch 30 minutes, leaving 60 minutes for student arrival and departure and possible teacher collaborative time. A seven-hour teacher day together with 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 and often during the regular school day.

A reasonable goal for a funding formula, and for organizing schools to provide both instructional and collaborative time, is to create three to five pupil-free time periods a week to allow teachers to engage in collaborative teacher work. As noted above, the EB Model provides resources to allow this to happen, especially with a seven-and-a-half-hour work day.

The EB model provides elective teachers at the rate of 20 percent of the number of core elementary and middle school teachers, and 33.33 percent of core secondary teachers, for average elective class sizes of 25. This provision ensures all schools can provide a full liberal arts curriculum and schedule sufficient time for all teachers to meet several times a week in collaborative, teacher data teams.

5. Instructional Facilitators/Coaches

Instructional coaches, or instructional facilitators, coordinate the instructional program but most importantly provide the critical ongoing instructional coaching and mentoring the professional development literature shows is necessary for teachers to improve their instructional practice (Cornett & Knight, 2008; Crow, 2011; Garet, Porter, Desimone, Birman, & Yoon, 2001; Joyce & Calhoun, 1996; Joyce & Showers, 2002). This means that instructional coaches spend the bulk of their time with teachers, modeling lessons, giving feedback to teachers, helping teachers analyze student data for its instructional implications, working with teacher collaborative teams, and generally helping to improve the instructional program. The few instructional coaches who also function as school technology coordinators provide the technological expertise to fix small problems with the computer system, install software, connect computer equipment so it can be used for both instructional and management purposes, and provide professional development to embed computer technologies into a school's curriculum. This report expands on the rationale for these individuals in the section on professional development (Element 14), but includes them here as they represent teacher positions.

Model Element	2016 Evidence-Based Recommendation
5. Instructional Coaches/Facilitators	1.0 Instructional coach position for every 200 students

Analysis and Evidence

A few states (i.e., Arkansas, New Jersey, Wyoming and to a modest degree North Dakota) explicitly provide resources for school and classroom-based instructional coaches. Most comprehensive school designs (see Odden, 1997; Stringfield, Ross & Smith, 1996), and EB studies conducted in other states – Arizona, Arkansas, Kentucky, Maine, Maryland, North Dakota, Washington and Wisconsin – call for school-based instructional coaches.

Early research found strong effect sizes (1.25-2.71) for coaches as part of professional development (Joyce & Calhoun, 1996; Joyce & Showers, 2002). Several years later, Sailors and Price (2010) found that professional development combined with coaching increased the deployment of comprehensive instructional practices by between 0.64 and 0.78 SD, and Newmann and Cunningham (2009) found a similar impact on teachers' instructional impact as well as improved reading achievement by about 0.2 standard deviations. A 2010 evaluation of a Florida program that provided reading coaches for middle schools found positive impacts on student performance in reading (Lockwood, McCombs & Marsh, 2010). A related study found that coaches provided as part of a data-based decision-making initiative also improved both teachers' instructional practice and student achievement (Marsh, McCombs & Martorell, 2010). A study published two years later came to the same conclusions about coaching as part of improving reading (Coburn & Woulfin, (2012).

Positive impacts of coaching are not limited to reading instruction and achievement. Campbell and Malkus (2011) found that the combination of professional development and two years of coaching also changed teachers' instructional practice and increased students' mathematics achievement by about 0.2 standard deviations.

More importantly, a randomized controlled trial of coaching (Pianta, Allen & King, 2011) found significant, positive impacts in the form of student achievement gains across four subject areas – mathematics, science, history, and language arts. This research provides further support for this element as an effective strategy to change teachers' instructional practice and boost student learning.

Domina et al. (2015) documented the increase in the number of instructional coaches in school districts around the country. They found that the number of instructional specialists per 1000 students doubled from 1998-2013 (from about 0.7 to 1.4) and that the percent of districts with no such staff declined from 20 percent to seven percent. In addition, Cobb and Jackson (2011) argue that instructional coaches are key to improving instructional practice at scale, particularly in mathematics.

In terms of numbers of coaches, several comprehensive school designs suggest that although one instructional coach might be sufficient for the first year of implementation of a new curriculum program, additional instructional coaches are needed in subsequent years as the curriculum in more subjects is modified – something that is happening in Michigan and most other states to implement a more rigorous curriculum designed to have all students be college and career ready. Moreover, several technology-heavy school designs recommend a full-time instructional facilitator who spends at least half of their time as the site's technology expert.

Drawing from all programs, the study team concludes that one FTE instructional coaches are needed for every 200 students in a school. This resourcing strategy works for elementary as well as middle and high schools. For the prototypical schools, this recommendation equates to 2.25 instructional coach positions for each prototypical elementary and middle schools (450 students) and three instructional coach positions for the prototypical high school (600 students).

Although instructional coaching positions are identified as FTE positions, 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 half-time teachers and instructional coaches. In this example, each teacher/coach would work 50 percent time as a coach – perhaps in one curriculum area such as reading, math, science, social studies, and technology – and 50 percent time as a classroom teacher or tutor.

This level of staffing for instructional coaches, combined with the additional elements of professional development discussed below, focuses on making Tier 1 instruction (in the RTI framework) as effective as possible, providing a solid foundation of high-quality instruction for everyone, including students who struggle more to learn to proficiency, and students with disabilities.

6. Core Tutors/Tier 2 Intervention

The most powerful and effective approach for helping students struggling to meet state standards is individual one-to-one or small group (1:3 or 1:5 maximum) tutoring provided by licensed teachers (Shanahan, 1998; Wasik & Slavin, 1993). Earlier EB reports recommended allocation of tutors to schools on the basis of the number of poverty and ELL students, with no minimum tutor positions. Since then, and particularly with the onset of more rigorous college and career ready curriculum standards, the study team has concluded that all schools, even those with no or very few poverty or ELL students, will still have some struggling students that need Tier 2 resources. Thus, the EB Model has been enhanced to provide each prototypical school with at least one *core* tutor position as well as the additional tutor/Tier 2 Interventionist positions based on poverty and ELL student counts (Element 22 and 26).

Model Element	2016 Evidence-Based Recommendation
6. Core Tutors/Tier 2 Intervention	One tutor position in each prototypical school (Additional tutors are enabled through the at-risk pupil and ELL counts in Elements 22 and 26)

Analysis and Evidence

The most powerful and effective extra help strategy to enable struggling students to meet rigorous performance standards is individual one-to-one tutoring provided by licensed teachers (Shanahan, 1998; Wasik & Slavin, 1993). Students who must work harder and need more assistance to achieve to proficiency levels especially benefit from preventative tutoring (Cohen, Kulik, & Kulik, 1982). Tutoring program effect sizes vary by the components of the approach used, e.g. the nature and structure of the tutoring program, but effect sizes on student learning reported in meta-analyses range from 0.4 to 2.5 (Cohen, Kulik & Kulik, 1982; Shanahan, 1998; Shanahan & Barr, 1995; Wasik & Slavin, 1993) with an average of about 0.75 (Wasik & Slavin, 1993)., The most recent meta-analysis of the impact of intelligent, or computer-based, tutoring found that the average effect size was 0.66 across multiple subjects, which increases student performance from the 50^{th} to the 75^{th} percentile (Kulik & Fletcher, 2016), though the effect varied by type of tutoring. Finally, the most recent meta-analysis of the impact of tutoring found similarly high effects (Dietrichson, Bog, Filges, & Jorgensen, 2017).

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

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

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

1. Each tutor would tutor one student every 20 minutes, or three students per hour. This would allow one tutor position to tutor 18 students a day. (Since tutoring is such an intensive activity, individual teachers might spend only half of their time tutoring; but a one FTE tutoring position would allow 18 students per day to receive 1:1 tutoring.). Four positions would allow 72 students to receive individual tutoring daily.

2. Most students do not require tutoring all year long; tutoring programs generally assess students quarterly and change tutoring arrangements. With modest changes, close to half the student body of a 400-student school could receive individual tutoring during the year.

3. Not all students who are from a low-income background require individual tutoring, so a portion of the allocation could be used for students in the school who might not be from a lower income family, but nevertheless have a learning issue that could be remedied by tutoring. This also is part of the rationale for including one tutor in each prototypical school, regardless of the number of at-risk students.

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

One-to-one tutoring would be reserved for the students with the most severe reading difficulties, scoring 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.

It is important to note that the instruction for all student groups needing extra help needs to be more explicit and sequenced than that for other students (Honig, 1996). Young children with weakness in knowledge of letters, letter sound relationships and phonemic awareness need explicit and systematic instruction to help them first decode and then learn to read and comprehend. As Torgeson (2004:12) states:

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

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

For example, if the recommended numbers of tutors are used for such small groups, one reading position could teach 30 students a day in the one-to-three setting with 30 minutes of instruction per group, and 30+ students a day in the one-to-five setting with 45 minutes of instruction per group. Four tutoring positions could then provide this type of intensive instruction for up to 120 students daily. In short, though, one to one tutoring, and some students need one to one tutoring, other small group practices (which characterize the bulk of Tier 2 interventions) can also work, with the length of instruction for the small group increasing as the size of the group increases.

Though Torgeson (2004) states similar interventions can work with middle and high school students, the effect often is smaller as it is much more difficult to undo the lasting damage of not learning to read when students enter middle and high schools with severe reading deficiencies. However, a new randomized control study, (Cook et al., 2014) discussed next, found similarly positive impacts of a tutoring program for adolescents in high poverty schools if it was combined with counseling as well. This is made possible in the EB Model as it includes such additional non-academic pupil support resources (see Element 27 discussion). Nevertheless, Torgeson is also viewed as a key individual encouraging practitioners and policymakers to address reading interventions for secondary students, because until the 1980s most reading research and interventions were developed for grades K-3. Since then, several effective secondary reading interventions have been developed (Scammacca, Roberts, Vaughn & Stuebing, 2015) and should be considered by schools as the resources to deploy them are included in the EB funding model.

The rationale outlined above is strengthened by two recent randomized controlled trials of the effectiveness of tutoring for struggling students, which support the EB's logic of providing a minimum level of tutor support in all schools as well as additional tutors for schools with greater need. At the elementary level, May et al., (2016), using a randomized controlled trial, assessed the impact of tutors in a Reading Recovery program. Reading Recovery is a short-term intervention that provides one-on-one tutoring to first-grade students who are struggling in reading. The supplementary program aims to promote literacy skills and foster the development of reading strategies by tailoring individualized lessons to each student. As part of the scale-up, the 3,747 teachers trained in Reading Recovery with Federal I3 grant funds provided one-to-one Reading Recovery lessons to 62,000 students and taught an additional 325,000 students in other instructional settings.

The evaluation included a four-year, multi-site randomized control trial (RCT) involving nearly 7,000 first-grade students in more than 1,200 schools. Students who participated in Reading Recovery significantly outperformed students in the control group on measures of overall reading, reading comprehension, and decoding. These effects were similarly large for English language learners and students attending rural schools, which were the student subgroups of priority interest for the i3 scale-up grant program.

The RCT revealed medium to large impacts across all outcome measures. Effect sizes on the Iowa Test of Basic Skills (ITBS) Reading Total assessment and its Comprehension and Reading Words subscales at the end of 12 to 20 weeks of treatment ranged from 0.30 and 0.48 standard deviations. For the ITBS Total Reading battery, this effect size translates to a gain of +18 percentage points in the treatment group, as compared with control students. The growth rate observed in students who participated in Reading Recovery over approximately a five-month period was 131 percent of the national average rate of progress for first-grade students.

For students in high schools, Cook, et al. (2014) reported on a randomized controlled trial of a two-pronged intervention that provided disadvantaged youth with tutoring and counseling. They found intensive individualized academic extra help – tutoring – combined with non-academic supports seeking to teach grade nine and 10 youth social-cognitive skills based on the principles of cognitive behavioral therapy, led to improved math and reading performance. The study sample consisted mainly of students from low income and minority backgrounds, who generally pose the toughest challenges. The effect size for math was 0.65 and for reading was 0.48; the combined program also appeared to increase high school graduation by 14 percentage points (a 40 percent hike). The authors concluded this intervention seemed to yield larger gains in adolescent outcomes per dollar spent than many other intervention strategies.

These studies are highlighted for several reasons. First, they represent new, randomized controlled trials, supporting the efficacy of tutoring. Second, they show tutoring can work not only for elementary but also for high school students, whereas most of the tutoring research addresses elementary-aged students. Third, they show tutoring can work even in the most challenging educational environments. Lastly, they bolster the EB Model recommendation below that extra help resources in schools triggered by poverty and ELL status should also include some non-academic, counseling resources as well, as the treatment in the second study was tutoring combined with counseling.

As noted above, earlier EB analysis did not include any minimum tutors. The current EB Model provides one *core* tutor/Tier 2 intervention position in each prototypical school, and still includes the additional tutor positions of one position for every 100 poverty and ELL students. The additional support beyond the first tutor per prototypical school is discussed again in Elements 22 and 26 below.

7. Substitute Teachers

Schools need some level of support for substitute teachers to cover classrooms when teachers are sick for short periods of time, absent for other reasons, or on long-term leave. In many other states, substitute funds are budgeted at a rate of about 10 days per teacher. The EB model approach, providing funding equal to five percent of the cost of teacher salaries, approximates that ten-day figure.

Model Element	2016 Evidence-Based Recommendation
7. Substitute Teachers	5% of core and elective teachers, instructional coaches, tutors (and teacher positions in additional tutoring, extended day, summer school, ELL, and special education)

Analysis and Evidence

Five percent of a teacher work year equals approximately 10 days, so this provision provides up to ten days of substitute teacher resources for each teacher. This approach does not mean that each teacher is provided ten substitute days a year; it means the district receives a "pot" of money approximately equal to 10 substitute days per year for all teachers, in order to cover classrooms when teachers are sick for short periods, absent for other reasons, or on long term sick or pregnancy leave. This allocation is not for 10 days above what is currently provided, it simply is an amount of money for substitute teachers estimated at 10 days for each teacher on average. These substitute funds are not meant to provide for student free days for professional development. The professional development recommendations are fully developed in a separate section below (Element 16).

8. Core Guidance Counselors and Nurses

The previous EB model provided student or pupil support resources without specifying guidance counselor or nurse positions. During the past five years, that approach has been changed to provide guidance counselor and nurse positions in the core program, and to provide additional pupil support positions (e.g., social workers and family liaison persons) on the basis of poverty and ELL student counts as described in Element 23 below. Thus, core student support services now specify guidance counselor and nurse positions.

Model Element	2016 Evidence-Based Recommendation
8. Core Pupil Support Staff, Core Guidance Counselors and Nurses	1 guidance counselor for every 450 grade K-5 students 1 guidance counselor for every 250 grade 6-12 students 1 nurse for every 750 K-12 students (Additional student support resources are provided on the basis of poverty and ELL students in Element 23)

Analysis and Evidence

Schools need guidance counselors and nurses. For guidance counselors, the EB Model uses the standards from the American School Counselor Association.[18] Those standards recommend one counselor for every 250 secondary (middle and high school) students. This produces 1.8 guidance counselor positions for the 450-student prototypical middle school and 2.4 guidance counselor positions for a 600-student prototypical high school.

Today many states require guidance counselors in elementary schools as well. Moreover, even in states that do not require counselors at the elementary level, a growing number of elementary schools have begun to employ these personnel. Consequently, the EB Model includes a minimum of one guidance counselor for a 450-student prototypical elementary school.

In addition to counseling needs, the physical and medical needs of students also have changed dramatically over the past several years. Many students need medications during the school day and school staff often administer these medications. Many students have additional medical or physical needs and the study team's experience in several states suggests these needs have been growing over the past decade. Consequently, the EB Model has been enhanced to provide nurses as core positions. Drawing from the staffing standard of the National Association of School Nurses,[19] the EB Model provides core school nurses at the rate of one nurse position for every 750 students.

9. Supervisory and Instructional Aides

Supervisory aides are non-certified individuals who provide needed services and supervision needed in a school such as lunch duty, hallways, and external door monitoring, and helping elementary students get on and off buses. Supervisory aides do not provide instructional assistance to teachers inside or outside the classroom nor instruction of any kind to students. They are provided so teachers are not used for non-instructional duties and can use portions of pupil free time for teacher collaborative work as well as individual planning and preparation.

Model Element	2016 Evidence-Based Recommendation
9. Supervisory and Instructional Aides	2 for each prototypical 450-student elementary and middle school 3 for each prototypical 600-student high school

[18] https://www.schoolcounselor.org/
[19] https://www.nasn.org/

Analysis and Evidence

Elementary, middle, and high schools need staff for responsibilities that include lunch duty, hallway monitoring, before and after school playground supervision, and others. Covering these duties generally requires an allocation of supervisory aides at about the rate of two supervisory aide positions for a school of 400-500 students.

However, research does not support the use of instructional aides for improving student performance. As noted above (Element 2), the Tennessee STAR study, which produced solid evidence through field-based randomized controlled trials that small classes work in elementary schools, also produced evidence that instructional aides in a regular-sized classroom do not add instructional value, i.e., do not positively impact student achievement (Gerber, Finn, Achilles & Boyd-Zaharias, 2001).

At the same time, districts may want to consider a possible use of instructional aides that is supported by research. Two studies show how instructional aides could be used to tutor students. Farkas (1998) has shown that if aides are selected according to clear and rigorous literacy criteria, are trained in a specific reading tutoring program, provide individual tutoring to students in reading, and are supervised, then they can have a significant impact on student reading attainment. Some districts have used Farkas-type tutors for students still struggling in reading in the upper elementary grades. Another study by Miller (2003) showed instructional aides could also have an impact on reading achievement if used to provide individual tutoring to struggling students in the first grade. Neither of these studies, however, supports the typical use of instructional aides as general teacher helpers. The studies also show that such aides have only about half the impact on student achievement compared to licensed teacher tutors.

10. Library Media Specialists

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

Model Element	2016 Evidence-Based Recommendation
10. Library Media Specialist	1.0 library media specialist position for each prototypical school

Analysis and Evidence

There is scant research on the impact of school librarians on student achievement. In 2003, however, six states conducted studies of the impacts of librarians on student achievement: Florida, Minnesota, Michigan, Missouri, New Mexico, and North Carolina. In 2012, Colorado conducted a study using data from 2005-2011. The general finding was, regardless of family income, children with access to licensed librarians working full time perform better on state reading assessments (Rodney, Lance, & Hamilton-Rennell, 2003; Lance & Hofschire 2012). The Michigan study found regardless of whether the librarian was licensed, student achievement was better for low-income children, but having a licensed librarian was associated with higher achievement than having an unlicensed librarian (Rodney, Lance, & Hamilton-Rennell, 2003). Each state examined the issue differently, but library staffing and the number of operating hours were generally associated with higher academic outcomes. The EB Model recommendation for library staff is derived from best practices in other states, state statutes where they exist and the above research.

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.

Librarians can act as a partner in student achievement, assisting students to hone their 21st Century skills and preparing them to be successful in the post-secondary environment and the workplace. The library experience becomes more valuable to students and staff when libraries are staffed with licensed librarians and, for large schools, library aides that can help students effectively search, cull, and synthesize information found in the many books, magazines, and myriad sources available on the internet.

There is much anecdotal data about how librarians may enhance student learning and achievement; however, the empirical data are limited. Some studies demonstrate positive benefits; yet many of these benefits could be attributed to other sources as well. It is difficult to establish direct causality (American Association of School Librarians, 2014). Despite these challenges, the sources cited above conclude that libraries and librarians can play a role in increasing student achievement.

For libraries to be effective, they must be adequately staffed. Research is silent on the number of staff members required to provide useful service to school staff and students. Because of the lack of literature on library staffing numbers, it is appropriate to examine general practices in a large number of districts and states to understand what is working in school libraries across America.

Fortunately, through an extensive survey of school libraries conducted in 2011-12, the National Center for Educational Statistics (NCES) calculated average library staff in school libraries at both the elementary and secondary levels (NCES, 2015). To represent all staff working in the library, NCES categorized library personnel into three categories; librarians/media (aide) specialists, other professional staff, and other paid staff. The findings suggested that the EB Model of providing one librarian for every prototypical staff was appropriate, and would provide for the more non-licensed staff found in school libraries much larger than the EB Model prototypes.

School Computer Technicians

The role of the library media specialist – the individuals in the past who organized the multi-media instruments such as movie and slide projectors, and who became the computer experts in schools – has recently evolved into what the EB Model terms the "school computer technician." As the number of computers continues to increase at the school site and online testing and curriculum become more prevalent, it becomes imperative for districts to deliver quick and efficient technology support to teachers and students. Districts can provide this support through the school computer technician. The school computer technician offers all "first level" support, including, solutions to basic break-and-fix issues, connectivity difficulties, configuration errors, and printing concerns. The school computer technician can set up an LCD projector for the principal, install software for teachers, reset email and student-administration accounts, and clearly explain and demonstrate the proper use of computer hardware and devices from ergonomic mice to electronic Smartboards.

When the library was the sole source for multimedia materials, library media technicians would wheel filmstrip projectors into classrooms to create multimedia experiences for students. Because of the nexus to multimedia, as computers entered the schools, the first computer laboratories were traditionally in or close to libraries. Many library media technicians learned how to troubleshoot the machines based on their technical prowess and proximity to the lab environment.

As schools acquire more technology, using carts of laptops and banks of computers in classrooms, the "computer lab" function of the library is being distributed throughout the school. The library is no longer the only hub of multimedia resources and the sole keeper of the multi-media experience. Libraries now assist in directing students to resources.

For teachers and other staff to take full advantage of the benefits technology can provide, they need to feel support is close by and available. Having a school computer technician, instead of library media aides, on campus can generate a sense of technological security.

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 revised EB recommendation, district technicians still handle the more difficult issues, while school computer technicians have most of their time scheduled to be at specific campuses. They participate at the sites like a staff member and can be directed during their scheduled time by the principal and/or other site administrators. However, the EB Model's school computer technicians are included in the Central Office staffing, not library staffing.

11. Principals and Assistant Principals

Every school needs a principal. There is no research evidence on the performance of schools with or without a principal. All comprehensive school designs, and all prototypical school designs from all professional judgment studies around the country, include a principal for every school unit.

Model Element	2016 Evidence-Based Recommendation
11. Principals and Assistant Principals	1.0 principal for the 450-student prototypical elementary school 1.0 principal for the 450-student prototypical middle school 1.0 principal and 1.0 assistant principal for the 600-student prototypical high school

Analysis and Evidence

Much is written about the importance of school principals; few if any studies of schools that boost student learning find the absence of a principal and nearly all such schools, including those studied as part of other state adequacy projects, have strong principal leaders. Chenoweth and Theokas (2011) provide one of the most readable descriptions of the various roles principals play in creating and leading effective schools, from instructional leadership, to managing the building, creating a culture of respect and high expectations for students and teachers, and managing outside relationships. Principals who want to "get it done," meaning produce large gains in student learning while also reducing achievement gaps, would be wise to read this helpful book. Chenoweth's (2017) most recent book on cases of schools that boost student achievement provides additional detail on the management and leadership tasks of principals that turn around schools, start effective schools from scratch or lead schools to even higher levels of performance.

Few if any comprehensive school designs for 500 students include assistant principal positions. Very few school systems around the country provide assistant principals to schools with 500 or fewer students. The EB model recommends that instead of one school with a large number of students, school buildings with large numbers of students be subdivided into multiple school units within the building, with each unit having a principal. This implies that one principal would be required for each school unit. The EB model provides one assistant principal for the prototypical high school, largely for discipline and athletics.

Neumerski (2012) reviews the knowledge about the principal's role in instructional leadership, and updates that knowledge base in relation to current findings on the emerging roles of teachers and instructional coaches – individuals who also provide instructional leadership inside schools. Her review identifies ways all three roles can be integrated to ensure that a robust set of coordinated, direct and indirect instructional leadership functions exist in schools – all of which are compatible with the EB model's leadership resources.

12. School Site Secretarial Staff

Every school site needs secretarial support to provide clerical and administrative support to administrators and teachers, to answer the telephone, greet parents when they visit the school, help with paper work, and perform many other administrative support tasks.

Model Element	2016 Evidence-Based Recommendation
12. School Site Secretarial Staff	2.0 secretary positions for the 450-student prototypical elementary school 2.0 secretary positions for the 450-student prototypical middle school 3.0 secretary positions for the 600-student prototypical high school

Analysis and Evidence

The secretarial ratios included in the EB Model generally are derived from common practices across the country. There is no research on the impact secretarial and clerical staff have on student outcomes, yet it is impossible to have a school operate without adequate staff support.

Dollar per Student Resources

This section addresses areas funded by dollar per student amounts, including resources for gifted and talented, professional development, instructional materials and supplies, formative/short cycle assessments, computers and other technology, career and technical education equipment and materials and extra duty/student activities.

13. Gifted and Talented Students[20]

A complete analysis of educational adequacy should include the gifted, talented, and able and ambitious students, most of who perform above state proficiency standards. This is important for all states whose citizens desire improved performance for students at all levels of achievement.

Model Element	2016 Evidence-Based Recommendation
13. Gifted and Talented	$40 per student inflated annually

Analysis and Evidence

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

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

Discovering Hidden Talents in Low-Income and/or Culturally Diverse High Ability Learners. Research studies on the use of performance assessments, nonverbal measures, open-ended tasks, extended try-out and transitional periods, and inclusive definitions and policies produce increased and more equitable identification practices for high ability culturally diverse and/or low-income learners. Access to specialized services for talented learners in the elementary years is especially important for increased achievement among vulnerable students. For example, high-ability, culturally-diverse learners who participated in three or more years of specialized elementary and/or middle school programming had higher achievement at high school graduation, as well as other measures of school achievement, than a comparable group of high ability students who did not participate (Struck, 2003).

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

Access to Acceleration. Because academically talented students learn quickly, one effective option for serving them is acceleration of the curriculum. Many educators and members of the general public

[20] This section is based on an unpublished literature review written by Dr. Ann Robinson, Professor, University of Arkansas at Little Rock.

believe acceleration always means skipping a grade. However, there are at least 17 different types of acceleration, ranging from curriculum compacting (which reduces the amount of time students spend on material) to subject matter acceleration (going to a higher-grade level for one class) to high school course options like AP or concurrent credit (Southern, Jones & Stanley, 1993). In some cases, acceleration means *content* acceleration, which brings more complex material to the student at his or her current grade level. In other cases, acceleration means *student* acceleration, which brings the student to the material by shifting placement. Reviews of the research on different forms of acceleration have been conducted across several decades and consistently report the positive effects of acceleration on student achievement (Gallagher, 1996; Kulik & Kulik, 1984; Southern, Jones & Stanley, 1993), including AP classes (Bleske-Rechek, Lubinski & Benbow, 2004). Multiple studies also report participant satisfaction with acceleration and benign effects on social and psychological development.

<u>Access to Trained Teachers</u>. Research and teacher reports indicate general classroom teachers make very few, if any, modifications for academically talented learners (Archambault, et al, 1993), even though talented students have mastered 40 to 50 percent of the elementary curriculum before the school year begins. In contrast, teachers who receive appropriate training are more likely to provide classroom instruction that meets the needs of talented learners. Students report differences among teachers who have had such training, and independent observers in the classroom document the benefit of this training as well (Hansen & Feldhusen, 1994). Curriculum and instructional adaptation requires the support of a specially trained coach at the building level, which could be embedded in the instructional coaches recommended (Element 7) (Reis & Purcell, 1993). Overall, learning outcomes for high ability learners are increased when they have access to programs whose staff have specialized training in working with high ability learners, which could be accomplished with the professional development resources recommended (Element 16).

Overall, research on gifted programs indicates the effects on student achievement vary by the strategy of the intervention. Research in the 1990s found that enriched classes for gifted and talented students produced effect sizes of about +0.40 and accelerated classes for gifted and talented students produced somewhat larger effectives sizes of +0.90 (Gallagher, 1996; Kulik & Kulik, 1984; Kulik & Kulik, 1992). These conclusions were generally confirmed by a recent meta-analyses of 100 years of research on the effects of ability grouping and acceleration on academic achievement of K-12 students (Steenbergen-Hu, Makel & Olszewski-Kubilis, 2016). Talented students benefit substantially from "accelerated" practices, both within classrooms and across grades.

<u>Practice Implications</u>. At the elementary and middle school level, the research on best practices is to place gifted students in special classes comprised of all gifted students and accelerate their instruction because such students can learn much more in a given time period than other students. When the pull out and acceleration approach is not possible, an alternative is to have these students skip grades in order to be exposed to accelerated instruction. Research shows 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. Both of these strategies have little or no cost, except for scheduling and training of teachers, resources for which are provided by professional development (Element 16).

The primary approach to serve gifted students in high schools is to enroll them in advanced courses, such as AP and IB, to participate in dual enrollment in postsecondary institutions, or to have them take courses through distance learning mechanisms.

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

Renzulli Learning was originally run by the Connecticut National Research Center on the Gifted and Talented. In 2005, Renzulli Learning was sold to Compass Learning, an educational organization headquartered in Austin, Texas with technology-based applications used around the country. Compass Learning renamed the Renzulli Learning program GoQuest. According to the company's website,[21] a student's first experience with Renzulli Learning is with the Renzulli Profiler, a detailed online questionnaire that allows the software to generate a personal profile of each student's top interests, learning styles, and expression styles, making it easier for teachers to get to know their students and effectively differentiate instruction. Once a profile is generated, students and teachers use it to guide their exploration of the 40,000 online educational resources in the database. Students can engage in self-directed learning by exploring safe, fully-vetted resources that have been specifically matched to their individual profiles. Further, teachers can browse the database of resources to find activities that also align to specific objectives, skills, as well as State and Common Core Curriculum Standards.

In summer 2015, the study team spoke with Troy Duffield, who was the Compass Learning's lead consultant for the Rocky Mountain region. He described the attributes of Renzulli Learning and other products provided by Compass Learning and POA confirmed a new pricing structure for Renzulli Learning. The cost today is $40 per student for up to 125 students in a school, at which point the cost is $5,000 for a school and all students have full access to the program. If a figure of $40 per student were included in the EB Model, all districts would be able to afford this gifted program.

Compass Learning also offers products that can be used for both teaching the regular curriculum and providing extra help to struggling students, and these additional products have been adopted by school districts across the country. These products integrate the instructional strategies with results of testing data from three of the most popular interim, short cycle testing systems many districts use: the MAP results from the Northwest Evaluation Association (NWEA), the STAR Enterprise assessments from

[21] http://www.renzullilearning.com/

Renaissance Learning, and Scantron. The costs of these additional Compass Learning programs range from $70 to $115 per student per program, and could be funded from a district's regular instructional and professional development budgets or the resources provided by the poverty student or ELL programs.

14. Intensive Professional Development

Professional development includes a number of important components. This section describes the specific dollar resource recommendations the EB Model provides for professional development. In addition to the resources listed here, PD includes the instructional coaches described in Element 7 and the collaborative planning time provided by the provisions for elective or specialist teachers. Those staff positions are critical to an adequate PD program along with the resources identified in this section.

Model Element	2016 Evidence-Based Recommendation
14. Intensive Professional Development	10 days of student-free time for training built into the teacher contract year $125 per student for trainers (In addition, PD resources include instructional coaches [Element 5] and time for collaborative work [Element 4])

Analysis and Evidence

Effective teachers are the most influential factor in student learning (Rowan, Correnti & Miller, 2002; Wright, Horn & Sanders, 1997) and more systemic deployment of effective instruction is key to improving student learning and reducing achievement gaps (Odden, 2011a; Raudenbusch, 2009). All school faculties need ongoing professional development. Improving teacher effectiveness through high-quality professional development is arguably one of the most important strategies effective schools deploy, and thus providing resources to deploy those programs is important.

An ongoing, comprehensive, and systemic professional development strategy is the way in which all the resources recommended in this report are transformed into high-quality, Tier 1 instruction that increases student learning. Further, though the key focus of professional development is for better instruction in the core subjects of mathematics, reading/language arts, writing, history and science, the professional development resources in the EB Model are adequate to address the instructional needs for gifted and talented, special education, ELL students (including sheltered-English pedagogy), embedding technology in the curriculum and for elective teachers as well. Finally, all beginning teachers need intensive professional development, first in classroom management, organization, and student discipline, and then in instruction. The most effective way to "induct" and "mentor" new teachers is to have them working in functional collaborative teacher teams, discussed in Elements 4 and 5.

Fortunately, there is substantial research on effective professional development and its costs (e.g., Crow, 2011; Odden, 2011b). Effective professional development is defined as professional development that produces change in teachers' classroom-based instructional practice that can be linked to improvements in student learning. The practices and principles researchers and professional development organizations use to characterize "high-quality" or "effective" professional development draw upon a series of empirical research studies that linked program strategies to changes in teachers' instructional practice and subsequent increases in student achievement [see Kennedy (2016) for a review]. Combined, these studies and reports from Learning Forward, the national organization focused on professional development (see Crow, 2011), identified six structural features of effective professional development:

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

2. The *duration* of the activity, including the total number of contact hours participants are expected to spend in the activity, as well as the span of time over which the activity takes place. Research has shown the importance of continuous, ongoing, long-term professional development that totals a substantial number of hours each year, at least 100 hours and closer to 200 hours.

3. The degree to which the activity emphasizes the collective participation of teachers from the same school, department, or grade level. The 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. The research concludes teachers need to know the content they teach, need to know common student miscues or problems students typically have learning the content, and effective instructional strategies linking the two. The content focus today should emphasize content for college and career ready curriculum standards.

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. The 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 (see also Joyce & Showers, 2002).

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

Form, duration, and active learning together imply that effective professional development includes some initial learning (e.g. a two-week – 10-day – summer training institute) as well as considerable longer-term work in which teachers work to incorporate the new instructional strategies into their classroom practices, with guidance provided by instructional coaches. 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, and the more the coaching, the more time is required of teachers as well as professional development trainers and coaches.

Content focus means effective professional development focuses largely on subject matter knowledge, what is known about how students learn that subject, and the actual curriculum that is used to teach the content. Currently, this means a curriculum program to ensure students are college and career ready when they graduate from high school. Collective participation implies that professional development includes groups of and at some point, all teachers in a school, who then work together to implement the new strategies, engage in data-based decision making (Carlson, Borman & Robinson, 2011) and build a professional community.

Coherence suggests professional development is more effective when the signals from the policy environment (federal, state, district, and school) reinforce rather than contradict one another or send multiple, confusing messages. Coherence also implies professional development opportunities should be given as part of implementation of new curriculum and instructional approaches, today focusing on the college and career ready standards. There is little support in this research for the development of individually oriented professional development plans; the research implies a much more systemic approach.

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

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

- Ten days of student free time for training embedded in the salary level and a longer teacher work year; and
- Funds for training at the rate of $125 per student.

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

In a December 2016 review of the research on professional development, Kennedy (2016) generally identifies the same structural features of effective professional development as outlined above. She also notes that when effective, the impact of a professional development program is usually stronger in the year following the program and can increase even after that [for an example, see Horn (2010) and Pianta, Allen & King (2011)]. She further states that many studies find little if any impact of a professional development program, but argues that nearly all education research struggles to find consistent findings from all studies. Finally, her review included only programs lasting at least a year, whereas many less effective professional development programs are much shorter. The take away is that professional development can work. It needs all the programmatic features identified above, should last at least a year, and should be followed by intensive coaching of individual teachers in their classrooms – resources for all of which are included in the EB model.

15. Instructional Materials

The need for up-to-date instructional materials is paramount. Newer materials contain more accurate information and incorporate the most contemporary pedagogical approaches. New curriculum materials are critical today as the school systems shifts 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 (Ravitch, 2004). Up-to-date instructional materials are expensive, but affordable and vital to the learning process. Researchers estimate that up to 90 percent of classroom activities are driven by textbooks and textbook content (Ravitch, 2004). Adoption cycles with state funding attached allow districts to upgrade their texts on an ongoing basis instead of allowing these expenditures to be postponed indefinitely.

Model Element	2016 Evidence-Based Recommendation
15. Instructional Materials	$190 per student for instructional and library materials

Analysis and Evidence

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

Instructional Materials. Michigan supports rigorous curriculum standards that prepare all students to be college and career ready, particularly rigorous standards in mathematics, reading/English/language arts, science, history and world languages. Access to standards-aligned instructional resources is critical for teachers and students to successfully implement these standards. Michigan currently does not have a specified textbook adoption cycle. Adoption cycles backed by State funding for materials allow districts to upgrade their textbooks and instructional materials on an ongoing basis instead of postponing these purchases indefinitely. In 2004, 20 states had instituted adoption cycles in which they specified or recommended texts aligned to state learning standards (Ravitch, 2004). These cycles ranged from five to seven years. Michigan could consider a textbook adoption cycle as a mechanism of insuring that local districts provide students with recent, relevant, and reliable information, particularly if the funding formula included adequate resources to keep instructional materials up-to-date. Textbook adoption is a time consuming, labor-intensive process; without state encouragement, and many times state action, these important and costly decision processes can be delayed by districts for extended periods, to the detriment of the instructional programs and student learning.

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

Textbook prices range widely. At the high school level, textbooks can cost from $80 to $140. 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 might 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 percent to 30 percent premium.

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

Considering the move to Michigan's version of more rigorous curriculum standards, districts should focus on purchasing curriculum and instructional materials that will assist teachers to drive student success. These new, more demanding 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 these more rigorous curriculum standards. The EB Model recommendation providing $170 per student allows school districts to support a six-year standard adoption. The six-year adoption cycle fits nicely with the typical secondary schedule of six content courses (see below). It also comes close to matching the content areas covered at the elementary level.

Six-Year Textbook Adoption Cycle Example

Year	2016	2017	2018	2019	2020	2021
Content Area	Social Studies	Science, Health, PE	Fine Arts	English Language Arts	Foreign Language	Mathematics

In some years, at the elementary level, there are subject areas that pertain more to the secondary levels.

In these years, the funds for instructional materials provide the opportunity for purchasing not only additional supplementary texts but also consumables/pedagogical aides (see below).

Year	2016	2017	2018	2019	2020	2021
Content Area	Language Arts	Mathematics	Social Studies	Science/ Health	PE, Visual & Performing Arts	Supplements, Consumables, Manipulatives

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

<u>A comment on curriculum</u>. It goes without saying that textbooks selection substantially determines the specific curriculum a school will teach. Additionally, 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 adequate resources, it is important that districts and schools use the funds for instructional materials to select textbooks, curriculum, and instructional programs that research finds effective. In the section on tutors, the analysis emphasized that structured reading programs, which specifically, systematically, and directly address phonemic awareness and phonics, have been shown by multiple researchers to be more effective, especially for children from lower income and ELL backgrounds.

Similar evidence suggests mathematics programs and instructional practices matter. Many effective schools have used some version of the *Everyday Math* or *Math Their Way* textbooks, which integrate problem solving with concept instruction and an emphasis on arithmetic basics. Further, a recent study concludes that early elementary children with mathematics difficulties are best served by teachers who provide substantial direct mathematical instruction and routine practice and drill on math facts (Morgan, Farkas & Maczuga, 2015). The study team's conclusion is that some instructional materials are more effective with some or all students than others, and districts and schools should select specific programs only after careful analysis and review to ensure that funds for instructional materials are spent wisely.

<u>Library Materials</u>. The NCES reports the average national expenditure for library materials in the SY 2011-12 was $16 per student, excluding library salaries (NCES, 2015). Over 90 percent of the $16 was spent on book titles and the remainder on other resources such as subscription databases. In the past, electronic databases were increasing in use, however use has declined in recent years as many instructional resources such as the Khan Academy and Wikipedia are offered free to the public.

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 one to five dollars per database per year per student.

Inflating these numbers to adequately meet the needs of school libraries, the EB Model provides $20 per student to pay for library texts and electronic services. These figures modestly exceed the national average, allowing librarians to strengthen print collections. At the same time, it allows schools to provide, and experiment with, the electronic database resources on which students rely (Tenopir, 2003).

Adding this $20 per student figure to the $170 per student figure for instructional materials, brings the 2015 EB Model recommendation to $190 per student for instructional and library materials.

16. Short Cycle/Interim Assessments

The need to monitor students with IEPs and for teachers to engage in collaborative work using student data requires faculties to have access to short cycle, interim assessment data.

Model Element	2016 Evidence-Based Recommendation
16. Short Cycle/ Interim Assessments	$25 per student for short cycle, interim and formative assessments

Analysis and Evidence

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

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

In light of the high impact of data-based decision making, several articles have appeared recently to help teachers, schools, and districts to design effective structures for both facilitating and enhancing the effects of data based decision making. Hamilton et al. (2009) summarize the research on, and structures of, effective data-based decision-making mechanisms. Datanow (who has conducted several studies of these issues) and Park (2014) produced a handbook on how to structure and implement high impact data-based decision-making processes. The authors followed that book with a more succinct overview of the systems in *Educational Leadership* (Datanow & Park, 2015). And the late Richard DuFour (2015), another of the country's experts of teacher collaborative work using student data, also provided a synopsis of effective structures and processes for engaging in effective data-based decision making.

Diversity of interim assessments

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

A second type of assessment data is collected during shorter time cycles within every quarter, such as monthly, and often referred to as "short cycle" or "formative" assessments. These more "micro" student outcome data are meant to be used by teachers to plan instructional strategies before a curriculum unit is taught, to track student performance for the two to three curriculum concepts that would normally be taught during a nine week or so instructional period, and to progress monitor students with IEPs.

Examples of "short cycle" assessments, the costs of which are discussed more below, include STAR Enterprise from Renaissance Learning (www.renaissance.com), which is in an online, adaptive system that provides data in reading/literacy and mathematics for grades PreK-12. The basic package takes students about 20-30 minutes to be assessed, is aligned to the common core curriculum standards, can easily be further aligned to more specific state standards, can be augmented with professional development activities and programs, and can be given as often as the teacher wishes. Many Reading First schools, as well as many schools studied (Odden & Archibald, 2009; Odden, 2009), use the Dynamic Indicators of Basic Early Literacy Skills (DIBELS) assessments (http://dibels.uoregon.edu). Another commercial interim assessment package used frequently is Aimsweb (http://www.aimsweb.com).

Many districts have also developed their own benchmark tests, mainly in core subject areas. Others use common unit or chapter tests to gauge interim student progress toward achieving standards. While these tests cannot be normed because of their localized origin, they can provide valuable information to site and district teachers and administrators to ensure students are learning and that teachers have covered the subject standards required in district pacing guides.

Though some "interim" assessments are teacher created, it often is more efficient to start with commercially available packages, most of which today are administered online and provide immediate results. Analyses of the state tests provide a good beginning for schools to redesign their overall educational program. Benchmark assessments give feedback on each semester of instruction and are often used to determine which students need interventions or extra help. But, short cycle assessments provide the information a teacher needs to create a micro-map for how to teach specific curriculum units. Teachers need short cycle assessment and other screening data to design the details of, and daily lesson plans for, each specific curriculum unit in order to become more effective in getting all students to learn the main objectives in each curriculum unit to the level of proficiency.

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

Costs of interim assessments

The costs of these powerful assessments are modest. In the past, the EB Model provided $30 to $35 per student, which was more than sufficient for a school to purchase access to the system, as well as some specific technological equipment and related professional development. The Renaissance Learning STAR assessments can function as both interim and benchmark assessments, can be used to progress monitor students with IEPs, include both math and reading PreK-12, and cost less than this figure. Some districts have dropped Scantron, NWEA MAP, and Aims Web assessments and replaced them with just the single STAR enterprise system that provides all the information of the previous three, and at a lower overall cost.

The EB Model now includes just $25 per student for these assessments, as their costs have declined. The variety of assessment instruments available commercially to school districts, many of which are used in Michigan districts, are discussed below. They include the NWEA MAP, DIBELS, AIMSWEB, and Renaissance Learning's STAR Enterprise.

NWEA MAP

According to the Measures of Academic Progress (MAP) website, the assessments are electronically administered and scored achievement tests designed to measure growth in student learning for individual students, classrooms, schools, and districts. The assessments provide accurate and immediate scores to help teachers plan instructional programs, place new students in the appropriate courses, and screen students for special programs. MAP is a computerized adaptive testing system tailored to a student's achievement level. Each student takes a dynamically developed test. The program instantly analyzes the student's response to each question and based on how well the student has answered all previous questions, provides a question of appropriate difficulty next. The standard package includes assessments for reading, language usage, mathematics, and the upper math series (Algebra I, Geometry, Algebra II, Integrated Math I, and Integrated Math II). A science assessment has recently been added. Further, NWEA has created a Skills Navigator for math and reading that can be used to monitor students receiving interventions. The Skills Navigator is also an online assessment.

Many Michigan districts use the NWEA MAP assessments, which usually are administered in September, January and May and reflect "benchmark" assessments, i.e., assessments that show how students are progressing over the course of the year. In the fall, the results from the screener portion of the MAP can be used to place students into small reading or math groups, and to identify appropriate interventions.

The core MAP assessments can be administered three to four times a year. The cost for the reading, language usage and math assessments is $13.50 per student per year. The new science test costs an additional $2.50 per student. The Skills Navigator used for monitoring the progress of students with interventions can be administered as often as needed and costs seven dollars per student and covers both reading and math. All together these assessments would cost $23 per student. NWEA would negotiate a lower cost if the State negotiated a deal and paid for all students.[22]

DIBELS

Another popular interim assessment is the DIBELS. DIBELS includes a set of procedures and measures for assessing the acquisition of early literacy skills from kindergarten through grade 6. They are administered by teachers and designed to be short (one to six minute) fluency measures used to regularly monitor the development of early literacy and early reading skills. DIBELS is comprised of seven measures to function as indicators of phonemic awareness, alphabetic principle, accuracy, and fluency with connected text, reading comprehension, and vocabulary. DIBELS was designed for use in identifying children experiencing difficulty in acquisition of basic early literacy skills in order to provide support early and prevent the occurrence of later reading difficulties. The cost is a nominal one dollar per student.

Unfortunately, DIBELS is often administered by an instructional coach, guidance counselor or Title I teacher, or a trained paraprofessional, but not by the student's classroom teacher. Under these circumstances, the assessment data must then be provided to teachers if they are to use the results in classroom activities. This transfer of data can be cumbersome as the data are on paper and not in electronic form.

Another common interim assessment frequently used around the country is AIMSWEB. AIMSWEB, now owned by Pearson, is an assessment system that provides up to 33 alternate forms per skill, per grade. AIMSWEB covers more skill areas and grade levels than any other assessment system.

Although browser-based scoring allows teachers to automatically upload scores to the AIMSWEB database system, the assessment itself is administered to each individual student by the teacher. AIMSWEB assessments include:

[22] These cost figures were obtained from a state NWEA liaison for the MAP assessments, Carolyn Mock.

- Reading: early literacy, Spanish early literacy, reading (English and Spanish) and reading maze,
- Language arts: spelling and written expression,
- Mathematics: early numeracy, math concepts and applications, and math computations, and
- Behavior: Exclusive screening, monitoring, and intervention tools for behavior and social skills.

The complete AIMSWEB package costs six dollars per student, and the company is moving towards providing the assessments in a computer-based format.

Renaissance Learning's STAR Enterprise

A fourth type of interim assessment system is an online, computer adaptive assessment system linked to a learning progression. One such system is Renaissance Learning's STAR Enterprise, which includes early literacy, mathematics and reading. This system requires much less teacher time than the teacher administered assessments as students can take these assessments virtually on their own. Since they are online computer adaptive systems, they provide immediate feedback to teachers and include many instructional strategies to address any learning needs identified by the results. These assessments can be administered as often as needed, at no extra cost, so they work well for progress monitoring.

The STAR Enterprise assessment programs support "instructional decisions, RTI, and instructional improvement" by measuring student progress in early literacy, reading, and mathematics. The early literacy program measures student proficiency from pre-kindergarten to grade three. The reading and math programs assess student skills for grades one to 12. A science assessment is also being developed.

Subscriptions to STAR Enterprise products cost $3.80 per student for each assessment: math, reading and early literacy. The smallest subscription size available is 100 students. A more comprehensive subscription, STAR 360, costs $11.45 per student. In addition to the per student subscription fee, subscribers must pay a small annual fee ($500 in 2013) for online product hosting services. New subscribers to STAR Enterprise pay a one-time licensing fee of $1,600.

Final Comments on the Costs of Interim Assessment

Though districts need interim assessments to provide teachers with interim data for instructional decision making, grouping students, identifying appropriate interventions for struggling students, and monitoring the progress of all students, too many districts across the country have adopted multiple and often overlapping assessments. DIBELS is largely a screener assessment. AIMSWEB, MAP and STAR Enterprise also can function as screeners. Districts do not need both DIBELS and one of MAP or STAR Enterprise. Further, DIBELS and AIMSWEB, while popular, also require teachers to administer the assessments. For these reasons, the computer adaptive assessments – STAR Enterprise and MAP – have become more popular in many places, often replacing both DIBELS and AIMSWEB as well as Scantron, another paper-based testing system.

For more information about benchmark assessments, Hanover Research[23] recently completed an extensive review of the above and other interim assessment systems, including costs and ratings of them from the National Center for Response to Intervention.

[23] Hanover Research. (2013). Review *of K12 Literacy and Math Progress Monitoring Tools*. Washington, D.C.

17. Technology and Equipment

Over time, schools need to embed technology into instructional programs and school management strategies. Today, states require students not only to be technologically proficient but also to take some courses online to graduate from high school. Many state end-of-year accountability assessments are now taken in an on-line format. Further, there are many online education options, from state-run virtual schools such as those in Florida and Wisconsin, to those created by private sector companies who run many virtual charter schools, such as K12 Inc. and Connections Academy. “Blended instructional” or “the flipped classroom” models, such as Rocketship, have also emerged (Whitmire, 2014). These programs infuse technology and online teaching into regular schools, provide more one to one student assistance, and put the teacher into more of a coaching role (see Odden, 2012). Research also shows these technology systems work well for many students, and can work effectively in schools with high concentrations of lower income and minority students (Whitmire, 2014). Moreover, they can be less costly than traditional public schools (Battaglino, Haldeman & Laurans, 2012; Odden, 2012).

Model Element	2016 Evidence-Based Recommendation
17. Technology and Equipment	$250 per student for school computer and technology equipment

Analysis and Evidence

Infusing technology into the school curriculum has associated costs for computer hardware, networking equipment, software, training, and personnel associated with maintaining and repairing these machines. If these technology elements are not maintained and updated, teachers and students will become disengaged and learning opportunities will be lost.

Purchasing and embedding technology into the operation of schools has both direct and indirect costs. Direct costs include expenditures for the hardware, software, and labor costs for repairing and maintaining the infrastructure and machines. Indirect costs include the expenditures for professional development, loss of time for self-support and casual learning, and additional hours of user application development. This section focuses on direct technology costs, as the indirect costs of training and ongoing professional development are resourced by Element 14.

The EB Model assumes Michigan schools are not beginning at a baseline of zero. All Michigan schools today have some mix of computers of varying ages, the large majority of which are connected to school networks and the internet. Schools have been wired and most are now adding Wi-Fi capabilities and increasing bandwidth. This cost analysis includes funds for upgrading network switchgear and central servers that occur in the normal course of maintenance. The EB Model assumes major capital expenses such as access to fiber optics have been covered, or will be covered, with other funds from the school capital construction program.

POA refers readers to a more detailed analysis of the costs of equipping schools with ongoing technology materials (Odden, 2012) spearheaded by Scott Price, now Chief Financial Officer for the Los Angeles County Office of Education. The analysis estimated four categories of technology costs totaling

$250 a student. The amounts by category should be considered flexible, as districts and schools need to allocate dollars to their highest technology priority outlined in state and district technology plans.

The per-student costs for each of the four subcategories are:

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

This per student figure is sufficient for schools to purchase, upgrade and maintain computers, servers, operating systems and productivity software, network equipment, and student administrative system and financial systems software, as well as other equipment such as copiers. 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, originally developed in 2006 and updated in both 2010 and 2015, allows a school to have one computer for every two to three students. This ratio was sufficient to provide every teacher, the principal, and other key school-level staff with a computer, and to have an actual ratio of about one computer for every three-to-four students in each classroom.

Over the last few years, computer makers have developed alternative products, such as netbooks, 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. For school districts that value lowering the student-to-computer ratio, purchase of these devices provides an opportunity to significantly increase the number of student devices when replacing traditional units at their end-of-life. By using non-traditional form factors with lower-priced units, districts can purchase more units and lower their student-to-computers ratios. Additionally, many times it is cheaper for a district to buy additional units of these less expensive computers than to purchase multi-year service agreements.

Though Chromebooks use a different operating system than typically used in the educational environment, most instructional and interactive testing software is browser-based, making the instructional software agnostic regarding operating systems. Additional software is being continually developed for these new platforms as they become more commonly used in the educational space. Google develops applications that will work offline when a Chromebook is not connected to the internet. However, when the Chromebook is not connected to the internet, the functionality of the applications may be limited. This can be a disadvantage for low-income students in one-to-one models or loan program models who do not have internet access at home. Finally, Chromebooks and other such platforms are still not appropriate for the school or district administrative office functions.

As the ratio of these new devices to traditional devices increases there is opportunity for districts to explore one-to-one student-to-computer ratios at key grade levels. As high stakes, computerized testing is pushed further into the primary grade levels, moreover, it is essential students are able to comfortably use computers to demonstrate their knowledge. If students have not had sufficient practice with computers in a testing environment, computerized testing can become a barrier to successfully assessing student achievement. If students cannot comfortably type, text responses become more of a test of “hunt and peck” skills than a reflection of the student’s ability to respond to a prompt.

Although states and districts continue to move to online testing for accountability and short cycle, interim assessments, districts will need to increase the number of devices they have and expand their internet bandwidth to accommodate this testing. Students will also have to become accustomed to using headphones, which are required when testing groups of students together. Again, it is important students feel comfortable with the computers they will use for testing so the hardware does not become a barrier to assessing student knowledge. Many Michigan students already have some experience in online testing in those districts that use the Renaissance Learning Star or NWEA MAP online assessment systems for interim and benchmark assessment data and to show student performance gains for summer school programs.

In considering the above factors, if a district begins to adopt a mix of standard and low-cost units into district inventories, the average cost of a computer unit will drop depending on the percentage of higher and lower priced form factors. Despite this drop in average cost, the EB Model recommendation remains at $71 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 on all units. It will also allow students to experience a wider breadth of form factors that will better prepare them for the workplace.

In the past, the EB Model has recommended districts either incorporate maintenance costs into lease agreements or, if purchasing the equipment, buy 24-hour maintenance plans to eliminate the need for school or district staff to fix computers. For example, for a very modest amount, one can purchase a maintenance agreement from a number of computer manufacturers that guarantees computer repair on a next business day basis. In terms of educator concerns that it would be difficult for a manufacturer’s contractors to serve remote communities, the maintenance agreement makes meeting the service requirements the manufacturer’s or contractor’s problem and not the district’s problem. Many of the private sector companies that offer such service often take a new computer with them, leave it, and take the broken computer to fix, which often turns out to be more cost effective than to send technicians to fix broken computers. 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 into classrooms or other instructional spaces. Wireless connectivity is the only solution to creating an instructional environment in which internet access is available anywhere, anytime on campus. 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.

The 2017 EB Model recommendation for technology remains at $250. In considering inflation of technology costs over time, the cost of some computer related items has decreased although the absolute dollar amount has stayed the same. As technology has improved, price points for many technologies have remained fairly constant as the capacity and demands increase. While general computer and server costs have declined, other technology costs have risen. For example, as the need for bandwidth has increased, the older network switches with speeds of 100 megabits have been replaced with gigabit switches that cost the same as a 100 megabit seven years ago. If Michigan funds school-based technology and equipment at $250 per student, districts will 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.

A Note on Moving to a One-to-One Computer to Student Ratio. There are many in Michigan as well as around the country who argue schools should move to ensure that every student has access to a computer, and that embedding computer technologies fully into the curriculum is an idea whose time has come. One-to-one computing means each student is issued a laptop to use in all classes and at home; this approach has been successfully implemented in some grade levels in districts across the country. Districts and schools usually begin one-to-one programs by assigning computers at a specific grade level and then letting the students use the computers as they advance to the next grades. In this manner, districts can build a one-to-one computer program over a series of years. Maine, which began a program of providing every student with a computer, has one of the longest running of such programs (Silvernail & Gritter, 2007).

One-to-one programs are more expensive than a three- or two-to-one program, which are covered by the general EB figure of $250 per student. One-to-one programs raise the cost of all four areas of the previously listed formula, namely: 1) computer hardware, 2) operating systems, productivity, and other non-instructional software, 3) network equipment, bandwidth, Wi-Fi coverage, and 4) instructional software.

In the 2015 recalibration of the Wyoming EB funding formula (Odden & Picus, 2015b), POA argued that Chromebooks were not a viable option for moving to a one-to-one strategy, as they were not as durable as a Windows or Apple based laptop, and did not have the capabilities of user programs as the latter. However, the context has changed rapidly over the past two years. It is now reported that more than 50 percent of computers used in schools are Chromebook-based. Further, Chromebook technologies have substantially improved. Google continues to enhance its package of free software tools that are cloud based, meaning the "Microsoft Office-type" suite of applications (presentation, word processing, etc.). Further, students who are coming up through the system and have used the Google tools are comfortable with them (they know how to do what they want to do in the programs). In addition, Microsoft keeps improving Microsoft 360 and allowing access to these programs from the cloud, including from the Chromebook device. Finally, school systems have dramatically improved bandwidth to schools, and are shifting to wireless technologies within schools (rather than hard-wiring each classroom).

Thus, the EB estimates of one-to-one costs can be reduced, and refer readers to the 2015 Wyoming report on the details of the $571 per student estimate for a one-to-one computer program (Odden & Picus, 2015a). Though the costs of hardware drop when one shifts from PC or Apple-based computers to Chromebooks, there are still additional costs for networking equipment (expanding bandwidth and creating within-school wireless systems), printers and servers, as well as non-instructional and instructional software. Those costs can vary depending both on the current status of the school as well as the nature of licensing agreements.

With these caveats, Table 3.2 summarizes cost difference for a three-to-one and two versions of a one-to-one student to computer ratio. The three-to-one student to computer ratio is the cost per student in the EB Model recommendation at $250 per student. The one-to-one environment, with PC or Apple computers increases the cost to approximately $571 per student. A rough estimate of a one-to-one environment with more Chromebook computers reduces the $571 to about $400. Again, both of the latter two cost estimates can vary depending on the current networking capabilities of the district and its schools as well as the software licensing agreements it maintains. It is important to note these cost estimates do not include the increased costs for additional personnel needed to service the associated issues that come with three times as many computers.

Table 3.2
Cost of Implementing a 1-to-1 Student to Computer Ratio from a 3-to-1 Student to Computer Ratio*

Subcategory	3-to-1 Student-to-Computer Ratio	1-to-1 Student-to-Computer Ratio*	1-to-1 Student-to-Computer Ratio**
Computer Hardware	$71	$213	$100
Networking Equipment, Copiers, Printers	$55	$110	$100
Non-Instructional Software	$72	$144	$100
Instructional Software	$52	$104	$100
Total Cost per Student	**$250**	**$571**	**$400**

*Costs are associated with implementing a one-to-one computing program with a full-featured Windows-based laptop.
**Costs associated with more Google and Chromebook-based computers.

Benefits of One-to-One Computing.
Advocates of one-to-one computing cite various benefits, including (Oliver, 2012): improved student achievement (especially in writing skills), increased student engagement and collaboration, better implementation of project-based learning, an expansion of learning beyond the classroom, and instant access to information. Opponents claim it is difficult to isolate technology as the only contributing factor to these benefits. Other drawbacks mentioned include: the cost, the need for increased student supervision, and the necessity to provide additional professional development to teachers and other

district staff (Sauers & Mcleod, 2012; Jackson, 2009; Goodwin, 2011). Though moving to one-to-one computing is a popular education initiative across the country, there is mixed evidence on its effectiveness in dramatically boosting student achievement (see for example, Goodwin, 2011; Lowther, et al., 2007; Shapley, et al., 2009; Silvernail & Gritter, 2007). On the other hand, a 2016 meta-analysis of the impact of a one-to-one computer format concluded that such programs did improve achievement, though the effect was smaller than tutoring and class size reduction (Zheng, Warschauer, Lin, & Chang, 2016).

Another "label" for one-to-one computers is personalized learning. Personalized learning is instruction that is focused on meeting students' individual learning needs while incorporating their interests and preferences. Options for personalization have increased as personal computing devices have become increasingly affordable and available in schools and developers created software to support individual student learning. This education approach requires each student to have access to a computer and each student proceeds at his/her own pace. For example, in Mountain View California many students receive the bulk of their education through the Kahn Academy. Students log into computers, watch video lessons, take exams, book slots with teachers for specific instruction, are organized into non-age based groups, and pursue individual goals and schedules, structured to ensure they cover the California curriculum standards (see The Economist, 2017). Similar to the above findings on one-to-one computer programs, research on personalized learning also is mixed (see for example, Pane, et al., 2017).

At this point, the EB model takes a neutral position of a state's moving to a one-to-one computer to student format and/or personalized learning. If Michigan chooses that option, it would need to increase the technology allocation from $250 per student to about $400 per student, and assess the degree to which additional school computer technicians would be needed.

18. Career Technical Education Equipment/Materials

Vocational education, or its modern term, career, and technical education (CTE), has experienced a shift in focus in the past several years. Traditional vocational education focused on practical, applied skills needed for wood and metalworking, welding, automobile mechanics, typing and other office assistance careers, as well as courses in home economics. Today, many argue that voc-tech is more appropriately info-tech, nano-tech, bio-tech, and health-tech. The argument is CTE should begin to incorporate courses that provide students with applied skills for new work positions in the growing and higher wage economy including information technologies (such as computer network management), engineering (such as computer-assisted design), a wide range of jobs in the expanding health portions of the economy and bio-technical positions – all of which can be entered directly from high school. The American College Testing Company and many policymakers have concluded the knowledge, skills and competencies needed for college are quite similar to those needed for work in the higher-wage, growing jobs of the evolving economy, so all students need a solid academic high school program to be college and career ready when they graduate from high school, all of which align with Michigan education policy.

Model Element	2016 Evidence-Based Recommendation
18. CTE Equipment/ Materials	$10,000 per CTE teacher for specialized equipment

Analysis and Evidence

A recent analysis of the impact of substantive CTE programs is that of Shaun Caugherty (2016). This study of career technical programs in Arkansas found that such programs did not track low income students into low quality vocational or career-tech programs. Further, the study found that students who took 3 or more coherent CTE classes (a key element of newer approaches to CTE programming) were 21 percentage points more likely to graduate from high school in four years, and 25 percent more likely to graduate from high school if from a low-income background. Such students also were more likely to attend two- and four-year colleges, to succeed in those college settings and to earn more after high school. This represents one study that shows the potential power of the CTE approach.

A key issue is the cost of CTE programs. Many districts and states believe that new CTE programs cost more than the regular program and even more than traditional vocational classes. However, in a review conducted for a Wisconsin school finance adequacy task force, a national expert on CTE (Phelps, 2006) concluded the best of the new CTE programs did not cost more, especially if the district and state made adequate provisions for professional development (as teachers in these new programs needed training) and computer technologies (as computer technologies were heavily used). These conclusions generally were confirmed by the cost analyses the study team conducted of Project Lead the Way (PLTW), one of the most highly rated and allegedly "expensive" CTE programs in the country. Further, the team recently consulted by telephone with a state liaison for Project Lead the Way and confirmed the cost estimates remain valid.

PLTW is a nationally recognized exemplar for secondary CTE. Often implemented jointly with local postsecondary education institutions and employer advisory groups, these programs usually feature project- or problem-based learning experiences, career planning and guidance services, and technical and/or academic skills assessments. Through hands-on learning, the programs are designed to develop the science, technology, engineering, and mathematics (STEM) skills essential for achievement in the classroom and success in college or jobs not requiring a four-year college education. Today, PLTW is offered in more than 5,000 elementary, middle, and high schools in all 50 states and enroll 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 focus on engineering foundations (design, principles, and digital electronics) and specializations (e.g., architectural, and civil engineering, bio-technical engineering) that provide students with career and college readiness competencies in engineering and science. Students need to take math through Algebra 2 in order to handle the courses in the program, which also meets many states' requirements for science and other mathematics classes.

The major cost areas for the program are in class size, professional development, and computer technologies. Most programs recommend class sizes of 25, a figure provided for all secondary classrooms by the EB model. The required professional development and most of the computer technology costs are covered through the professional development and technology components of the EB Model. In most other states, these would be new costs but they are already embedded in the EB model's approach to school funding. However, a few of the PLTW concentration areas require a one-time purchase of expensive equipment, which can be covered by $10,000 per CTE teacher.

19. Extra Duty Funds/Student Activities

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

Model Element	2016 Evidence-Based Recommendation
19. Extra Duty Funds/Student Activities	$300 per student for co-curricular activities including sports and clubs for grades K-12

Analysis and Evidence

Research shows, particularly at the secondary level, students engaged in student activities tend to perform better academically than students not so engaged (Feldman & Matjasko, 2005), although too much extra-curricular activity can be a detriment to academic learning (Committee on Increasing High School Students' Engagement and Motivation to Learn, 2004; Steinberg, 1996, 1997). Feldman and Matjasko (2005) and Fredericks & Eccles (2006) 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 placed students in new social groups that tended to have higher scholastic aspirations and those aspirations "rubbed off" on everyone. But the effects differed by race and gender, and were not as strong for African Americans. Additional research concludes that students who participate in extracurricular activities from grades eight to 12, attend college, vote in national and regional elections and volunteer at a higher rate (Zaff, et al., 2003). Research also finds, largely in the context of the "No pass, no play" rules, that participation in extracurricular activities significantly reduced student decisions to drop out of high school, compared to similar students who did not participate (Crispin, 2017). The effect was similar for both at-risk and not-at-risk youth.

In an overview of additional research on the impact of non-academic activities on student performance, Bowen and Hitt find that students who participate in sports are more likely to attend college (see also Shifrer, et al., 2015), score higher on academic texts (Lipscomb, 2007) and earn higher wages when adults (Barron, Ewing & Waddell, 2000). Levine (2016) found that student participation in sports or clubs prepared youth for more engagement in adult civil life.

Because of the positive outcomes on student performance, student activities are viewed by many as an integral component of a student's education. Most states addressing school finance adequacy include an amount for student activities in the formula.

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 (e.g. world language, science), student government and other school activities. The results of the survey can be viewed in Table 3.3. Student respondents indicated 38 percent participated in athletics, followed by other school activities at 32 percent and music and performing arts at 24 percent. There were differences in participation based on student gender. Female students participated in other school clubs at a rate of 40 percent, athletics 31 percent, and music and performing arts 30 percent. Male students participated in activities in the following rates, athletics 46 percent, other social clubs 24 percent, music and performing arts 18percent, and other activities 12 percent.

Table 3.3
National High School Student Participation in Student Activities, 2009

Activity	Participation Rate (%)		
	Female	Male	Total
Newspaper Yearbook	11.30	5.80	8.70
Music Performing Arts	30.00	17.80	23.90
Athletics	31.40	46.00	38.40
Academic Clubs	16.50	11.60	14.00
Student Council	13.10	5.90	9.60
Other School Clubs	40.00	23.60	31.80

Source: Aud, et al. (2012).

Additional information on student participation is available at the state level through the National Federation of State High School Association (NFHS), an organization providing leadership for the administration of education-based interscholastic activities. NFHS surveyed state level organizations to collect athletic program participation rates based on high school competition in SY 2012-13. Table 3.4 summarizes the NFHS findings for Michigan and several other Big Ten states. NFHS found high school participation rates for Michigan students are above all state's shown, except for Minnesota. Data for other types of student activities are not available. The participation rates contained in Table 3.4 count an individual who participated in two sports twice, three sports three times, etc.

There are no national sources that provide state average expenditures per student for student activities. However, POA conducted a survey of some states for a 2015 Wyoming study. Table 3.4 shows those expenditures in 2012-13 for Wyoming and its surrounding states. The expenditures range from below $100 per student to over $400 per student; however, states do not report such expenditures in a common format, so it is hard to make strong comparisons. For example, some states include transportation expenses in student activities, which can be considerable, and others do not. Some states include some athletic staff, for example athletic directors, in school administration and others include it in student activities. As a result, the numbers are hard to interpret. Wyoming's figures were especially high because of the costs of transportation between districts separated by scores of miles. Nevertheless, the data show that most states surveyed spent between $250 and $300 per student.

Table 3.4
High School Student Activity Participation Rates in Student Athletics for Michigan and Surrounding States, SY 2012-13

State	Boys	Girls	Total	State Student Membership (1)	Athletics Participation as a % of State Student Membership
Michigan	174,429	130,009	304,438	1,555,370	19.6%
Illinois	200,270	139,674	339,944	2,072,880	16.4%
Indiana	91,094	61,483	152,577	1,041,369	14.7%
Minnesota	120,109	110,312	230,421	845,404	27.3%
Ohio	194,330	133,589	327,919	1,729,916	19.0%
Pennsylvania	169,198	146,294	315,492	1,763,677	17.9%
Wisconsin	113,020	79,380	192,400	872,436	22.1%

Source: Survey conducted by National Federation of State High School Associations based on competition at the High School Level in the 2012-13 School Year http://www.nfhs.org/ParticipationStatics/PDF/2013-14%20NFHS%20Handbook_pgs52-70.pdf.

(1) Source: National Center for Education Statistics, Selected Statistics From the Public Elementary and Secondary Education Universe: School Year 2012–13], Table 2 https://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2014098.

Table 3.5
Student Activity Expenditures Per student, SY 2012-13

State	Total Student Activities Expenditures	Student Membership	Student Activities Expenditures per ADM
Wyoming[24]	$37,730,125	91,533	$412.20
Colorado[25]	$237,610,879	863,561	$275.15
Idaho[26]	$26,124,128	284,834	$91.72
Montana[27]	$37,082,446	142,908	$259.48
Nebraska[28]	$88,217,585	303,505	$290.66
South Dakota[29]	$35,002,841	130,471	$268.28
Utah[30]	$115,501,624	613,279	$188.33

In sum, co-curricular activities should be considered an integral part of overall school activities. Just as the curriculum should include the arts, it should also include school activities. During the past several years, the EB Model has allocated between $200 and $300 per student for student activities, including intramural sports. These figures are in line with average amounts spent on such activities in many states as just noted. For 2017, the EB model includes an overall figure of $300 per student.

Central Office Functions

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

20. Operations and Maintenance

Computation of operations and maintenance costs is complicated by the lack of a strong or consistent research base. Some school finance models allocate a percentage of current expenditures to operations

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[24] WDE CRERW report, October 2014.

[25] Colorado Department of Education, Fiscal Year 2012-13 District Revenues and Expenditures, http://www.cde.state.co.us/cdefinance/fy12-13revexp.

[26] Idaho State Department of Education, Statewide Summary Combined Statement of Revenues, Expenditures and Changes in Fund Balance, https://www.sde.idaho.gov/site/statistics/docs/financial_summaries/12_13/Statewide.pdf.

[27] Montana Office of Public Instruction, Reported Expenditures by School District, http://gems.opi.mt.gov/SchoolFinance/Pages/ReportedExpenditureBySchoolDistrict.aspx.

[28] Nebraska Department of Education, Annual Financial Report - Statewide, http://www.education.ne.gov/FOS/ASPX/AFR/AFRStatewide.aspx?datayear=2012/13&id=2.

[29] South Dakota Department of Education, Statewide Annual Financial Report, http://doe.sd.gov/ofm/documents/FY13StTtl.pdf.

[30] Utah State Office of Education, Superintendent's Annual Report - Total Statewide Revenue and Expenditures by Fund, http://www.schools.utah.gov/data/Superintendents-Annual-Report/AR-2012-2013/StatewideFund.aspx.

and maintenance. The EB Model uses formulas to compute the number of personnel needed for custodial, maintenance and grounds. Additionally, funding is provided for utilities.

Model Element	2016 Evidence-Based Recommendation
20. Operations and Maintenance	Separate computations for custodians, maintenance workers and groundskeepers, and $305 per student for utilities

Analysis and Evidence

Drawing on professional standards in the field as well as research, POA has conducted analyses of the cost basis for maintenance and operations (e.g., Odden & Picus, 2015; Picus & Seder, 2010). The research evidence linking the operations and maintenance of schools directly to student performance is both limited and mixed. Even without a strong basis to support the linkage between facility quality and student outcomes, all students are entitled to attend schools in a safe, clean, and well-maintained environment. The importance of operating and maintaining this investment is clear regardless of the strength of the relationship between them.

Recently, the study team sought to find new research on the structure of maintenance and operations, but found little, if any, new evidence that would alter the basic EB formulas for this formula element. Earthman (2002) noted the importance of school facility conditions as researchers have consistently found a difference of between five and 17 percentile points in performance of students in buildings that are poorly maintained compared to students in standard buildings. Interestingly, correlations were also documented that show teacher effectiveness decreases in schools with poor facilities. The information presented cited not only the importance of clean, maintenance free buildings but also the quality of the thermal and acoustic materials in the environment where students are learning.

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

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

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

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

In some states, the study team found differences between the amount generated by the EB Model for operations and maintenance and what districts spent. To operate and maintain facilities with modern, technology enhanced, sophisticated control systems, many districts needed an additional level of expertise and training than possessed by extant staff and often subcontracted out such services. Total spending for operations and maintenance was similar to the revenues produced by the model, but the expenditures were in different categories. The study team concluded that the EB recommendation for operations and maintenance is adequate, but that districts might spend the resources in ways that are different from how they are provided.

The discussion below summarizes research on operations and maintenance, identifying the needs for custodians (school level), maintenance staff (district level) and groundskeepers (school and district level), as well as the costs of materials and supplies to support these activities.

Custodians. Custodians are responsible for the daily cleaning of classrooms and hallways as well as for routine furniture set ups and takedowns. In addition, custodians often manage routine and simple repairs like minor faucet leaks, and are expected to clean cafeterias/multipurpose rooms, lockers, and showers. Custodial workers' duties are time-sensitive, are structured and varied. Zureich (1998) estimates the time devoted to various custodial duties:

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

A formula that was developed to consider these cleaning and non-cleaning duties was updated by Nelli (2006). The formula takes into account teachers, students, classrooms, and gross square feet (GSF) in the school.

The formula is:

Base FTE school level custodian position = (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)/ four

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.

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

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

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

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

It is assumed the maintenance worker FTEs determined on the basis of a district's total allowable educational GSF for schools are sufficient to service all buildings in a district, both educational and non-educational.

Groundskeeper Positions. The typical goals of a school grounds maintenance program are generally to provide safe, attractive, and economical grounds maintenance (Mutter & Randolph, 1987). This, too, is a district level function. Although groundskeepers generally work in teams and visit schools on a less than daily schedule, the model estimates groundskeeper resources on the basis of the number of schools. Specifically, it estimates that an elementary school needs the equivalent of 0.25 FTE groundskeeper staff, a middle school 0.5 FTE groundskeeper staff, and a high school 1.5 FTE groundskeeper staff.

Supplies and Materials. Maintenance and custodial supplies are estimated at one dollar per gross square foot, which for the prototypical district is 623,000 square feet.

Utilities. It is necessary to add the per student costs of utilities and insurance to these totals. It is unlikely that a district has much control over these costs in the short run and thus each district can best estimate future costs using their current expenditures for utilities and insurance as a base. The cost of utilities is estimated at $305 per student.

21. Central Office Staffing/Non-Personnel Resources

All districts require central office staff to meet the overall management needs of the educational programs. In other states, Evidence-Based staffing models were developed using a prototypical district of approximately 3,900 students. Although most states have districts both smaller and larger than 3,900, this figure has worked to determine an adequate base spending level in those states. The per student figure for the 3,900 student districts works for larger districts, even though central office staffing is larger with more discrete positions than the EB prototypical district.

Model Element	2016 Evidence-Based Recommendation
21. Central Office Personnel/ Non-Personnel Resources	A dollar per student figure for the Central office based on the number of FTE positions generated and the salary and benefit levels for those positions. It also includes $300 per student for miscellaneous items such as Board support, insurance, legal services, etc.

Analysis and Evidence

Picus Odden and Associates has identified resources for these positions in other reports and the most recent version its textbook (see for example, Odden & Picus, 2014; Picus & Odden, 2010) drawing on a variety of research studies and professional standards for best practices. Over the past several years, the study team has developed central office staffing recommendations in several states, including Maine, Maryland, New Jersey, North Dakota, Vermont, Washington, Wisconsin, and Texas. In all states, POA began its analysis with the research of Elizabeth Swift (2007), who used professional judgment panels to determine staffing for a prototypical district. That research addressed the issue of the appropriate staffing for a district of 3,500 students. Swift's work formed the basis of each state's analysis, although in three states (Washington, Wisconsin, and North Dakota) POA also conducted professional judgment panels to review the basic recommendations that emerged from Swift's research. Through that work, POA was able to estimate the central office resources required for a district of 3,500 students. The initial studies provided for about 8 professional staff (superintendent, assistant superintendent for curriculum, business manager, and directors of human resources, pupil services, technology, and special education) and nine clerical positions.

Although the research basis for staffing school district central offices is relatively limited, analysis of the Educational Research Service (2009) Staffing Ratio report shows that nationally school districts with between 2,500 and 9,999 students employ an average of one central office professional/administrative staff member for every 440 students (Educational Research Services, 2009). This equates to about eight central office professionals (7.95) in a district of 3,500 students. The EB research-based staffing formula of eight FTE professional staff matches the ERS estimate of eight FTE central office staff for a school district of 3,500 students nationally.

Because the 3,500-student district size did not readily incorporate the EB model's prototypical schools, parameters for which are needed to estimate maintenance and operations costs, over the past few years the study team increased its prototypical district size to 3,900 students so it would include, as noted above, four 450 student elementary schools, two 450 student middle schools, and two 600 student high schools. This larger size also allowed the addition of testing and evaluation, and central office computer staff, which districts have been arguing are needed today. Further, in recent analyses, it was recommended that the EB model add individuals who work with schools to provide the first line technical help – installing computers and their software, insuring that wireless systems operate, keeping printers operating, and related technical assistance to keep all computers operating. The recommendation was one school computer technician for every 600 students working in schools, but operating from the central technology office, which adds six and a half positions to the central office. Subsequently, POA decided that this allocation was a bit too robust and have reduced it to one school computer technician for every 1,000 students, which adds just four positions to the central office.

Moreover, the EB model has been short on central resources for special education and related services. In summer 2015, POA asked a group of superintendents to design central office staff for several sizes of districts. For a 4,000 or 3,900 district office, they recommended that two speech pathologists and two psychologists be added. However, these positions are included in its recommendations for special education staffing (see Element 28), so they are not included in the central office figures. In addition to staffing, central offices need a dollar per student figure for such costs as insurance, purchased services, materials and supplies, equipment, association fees, elections, district wide technology, communications, and other costs. That figure is approximately as $300 per student.

Table 3.6 summarizes these staffing proposals organized into departments into which a central office could be organized. The table shows the staff in the previous EB central office as well as the staff in the newer, 3,900-student central office that includes the additional positions discussed above. Larger districts would be provided the resources for a larger central office by prorating up the per student cost of this 3,900-student central office, and they could have more differentiated staff with coordinators as well as a full-fledged legal counsel for large districts.

Table 3.6
EB Central Office Staffing for a District with 3,900 students

Office and Position	FTE Previous EB Model		FTE Current EB Model	
	Admin.	Classified	Admin.	Classified
Superintendent's Office				
Superintendent	1		1	
Secretary		1		2
Business Office				
Business Manager	1		1	
Director of Human Resources	1		1	
Accounting Clerk		1		2
Accounts Payable		1		2
Secretary		1		1
Curriculum and Support				
Assistant Supt. for Instruction	1		1	
Director of Pupil Services	1		1	
Dir. of Assessment and Evaluation	1		1	
Secretary		3		3
Technology				
Director of Technology	1		1	
Network Supervisor (Hardware)		1		1
Systems Supervisor (Software)		0.3		1
School Computer Technician		1		4
Secretary		1		2
Operations and Maintenance				
Director of O&M	1		1	
Secretary		1		2
Central Office Staffing (3,900)	**8**	**10**	**8**	**20**

Resources for Struggling Students

The staffing for core programs section contains positions for supporting teachers and students beyond the core classroom teachers. Those positions include: elective or specialist teachers, core tutors, instructional coaches, substitute teachers, core guidance counselors, nurses, supervisory aides, librarians, school administrators and school secretarial staff.

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

The EB Model provides substantial additional resources for struggling students: tutors, ELL teachers, pupil support, and summer school and extended day programs. These resources for students struggling 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 goal in expanding resources for struggling students is to provide adequate resources – to enable preventive services – for all struggling students, with or without a diagnosed disability, and to reduce over identification in special education by identifying need for special education after providing appropriate preventive services.

This section discusses seven categories of extra help services: tutors, pupil support, extended day programs, summer school programs, ELL teachers, alternative schools, and special education. Tutors, additional pupil support, extended day and summer school programs are provided to all ELL students, and to non-ELL poverty students. In addition, ELL students also receive an ESL allocation. The EB model today embeds "welcome centers" for ELL students new to the country and from situates where prior schooling was limited, such as refugees, etc.

22. Tutors

The first strategy to help struggling students is to provide additional support for struggling students as described in Element 8 above. In addition to the one core tutor position provided to every prototypical school discussed above for Element 8, the EB Model provides additional tutor position at the rate of one for every 100 ELL students and one tutor for every 100 non-ELL poverty students.

Model Element	2016 Evidence-Based Recommendation
22. Tutors	1.0 tutor position for every 100 ELL students and one tutor position for every 100 non-ELL poverty students.

Analysis and Evidence

Refer to Element 8 for an explanation of analysis and evidence surrounding the use of tutors.
The EB model provides one tutor for every 100 ELL students, and one tutor position for every 100 non-ELL poverty students. When the model was first changed to include one core tutor position in each prototypical school, the original ratio of additional tutors of one per 100 was raised to one position for every 125 at-risk and ELL students. Though this approach increased tutor/tier 2 interventionist resources for small schools, it actually decreased such resources for larger schools. Thus, the model now provides one tutor position for each prototypical school and uses the original formula for additional tutor resources: one tutor position for every 100 ELL students, and one tutor position for every 100 non-ELL poverty students.

23. Pupil Support

Core pupil support positions for guidance counselors and nurses are discussed in Element 10. Students in poverty, however, generally have more non-academic needs that should be addressed by additional pupil support staff, which include additional guidance counselors, as well as social workers, family liaison staff, and psychologists. Thus, in addition to the core guidance counselor and nurse positions, the EB

Model provides additional pupil support positions at the rate of one position for every 125 ELL students and one pupil support position for every 125 non-ELL poverty students.

Model Element	2016 Evidence-Based Recommendation
23. Additional Pupil Support	1.0 pupil support position for every 125 ELL students and one pupil support position for every 125 non-ELL poverty students.

Analysis and Evidence

ELL and poverty students tend to have multiple non-academic issues for schools to address. This usually requires interactions with families and parents, social and other service agencies, as well as more guidance counseling in school. The EB Model addresses this by providing more pupil support staffing resources to meet these needs. Although there are many ways schools can provide outreach to parents, or involve parents in school activities – from fundraisers 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, if the education system has clear content and performance standards, programs that help parents and students understand both what needs to be learned and what constitutes acceptable standards for academic performance have been found to improve student outcomes. Parent outreach that explicitly and directly addresses what parents can do to help their children be successful in school, and to understand the standards of performance that the school expects, are the types of school-sponsored parent activities that produce discernible impacts on students' academic learning (Steinberg, 1997).

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

At the elementary level, the focus for parent outreach and involvement programs should concentrate on what parents can do at home to help their children learn academic work for school. Too often parent programs focus on fund raising through parent-teacher organizations, involvement in decision making through school site councils, or other non-academically focused activities at the school site. Although these school-sponsored parent activities might impact other goals – such as making parents feel more comfortable being at school or involving parents more in some school policies – they have little effect on student academic achievement. Parent actions that impact learning would include: 1) reading to them at young ages, 2) discussing stories and their meanings, 3) engaging in open ended conversations, 4) setting aside a place where homework can be done, and 5) ensuring that their child completes homework assignments.

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

The Comer School Development Program was created on the premise of connecting schools more to their communities. Its Parent-School team has a somewhat different composition and is focused on training parents to raise expectations for their children's learning, to work with social service agencies and to work with the school's faculty to raise their expectations for what students can learn. Sometimes the team co-locates on school site premises to provide a host of social services

A program called Communities in Schools, which now operates in 26 states and the District of Columbia and can be resourced by the resources provided by this element, has been successful in raising school attendance rates. The program adds a caseworker, often trained in social work, to a school's pupil support team to help match social services provided by non-educational agencies to students who need them.

24. Extended-Day Programs

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

Model Element	2016 Evidence-Based Recommendation
24. Extended Day	1.0 teacher position for every 120 ELL and for every 120 non-ELL poverty students.

Analysis and Evidence

Extended-day programs provide environments for children and adolescents to spend time after the school day ends during the regular school year. In a review of research, Vandell, Pierce and Dadisman (2005) found well designed and administered after-school programs yield numerous improvements in academic and behavioral outcomes (see also Fashola, 1998; Posner & Vandell, 1994). On the other hand, the evaluation of the 21st Century Community Learning Centers Program (James-Burdumy et al., 2005), though hotly debated, indicated for elementary students, extended-day programs did not appear to produce measurable academic improvement. Critics of this study (Vandell, Pierce & Dadisman, 2005) argued the control groups had higher pre-existing achievement, which reduced the potential for finding program impact. They 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.

Overall, studies have documented positive effects of extended-day programs on the academic performance of students in select after-school programs (e.g., Takoata & Vandell, 2013: Vandell, 2014). Magana, Saab, and Svoboda (2016-17) provide a recent example of how an extended day school program was critical to turning around a low performing middle school in Denver. However, the evidence is mixed because of research methods (few randomized trials), poor program quality and imperfect implementation of the programs studied. Researchers have identified several structural and institutional supports necessary to make after-school programs effective:

- Staff qualifications and support (staff training in child or adolescent development, after-school programming, elementary or secondary education, and content areas offered in the program, staff expertise; staff stability/turnover; compensation; institutional supports);
- Program/group size and configuration (enrollment size, ages served, group size, age groupings and child staff ratio);
- Program culture of mastery, i.e., engaging in activities to become more proficient and/or to meet various standards of performance;
- 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 the community); and
- Program sustainability strategies (institutional partners, networks, linkages; community linkages that support enhanced services; long term alliances to ensure long term funding).

The resources recommended in the EB Model could be used to provide struggling students in all elementary grades and in secondary schools with additional help during the school year, but before or after the normal school day. A recent study of tutoring provided after school found positive impacts for all students in English-language arts and for the bottom half of students in mathematics (Kraft, 2015). Tutoring was provided by recent college graduates, to students individually or in groups of two to four, for one hour a day in each subject from three to five pm.

Because not all ELL or poverty students need or will attend an after-school program, the EB Model assumes 50 percent of the eligible students will attend the program – a need and participation figure identified by Kleiner, Nolin and Chapman (2004). Providing resources at a rate of one teacher position for every 30 ELL and for every 30 non-ELL poverty students results in class sizes of approximately 15 students in extended-day programs. This position is paid at the rate of 25 percent of the annual salary, enough to pay a teacher for a two-hour extended-day program, five days a week. An equivalent but simpler formula for funding this element is to resource one teacher position for every 120 ELL and for every 120 non-ELL poverty students.

The State should monitor over time the degree to which the estimated 50 percent figure accurately estimates the numbers of students needing extended-day programs. The study team also encourages all states to require districts to track the students participating in the programs, their pre- and post-program test scores, and the specific nature of the after-school program provided. States can use this information to develop a knowledge base about which after-school program structures have the most impact on student learning. These extended-day services provided will vary across Michigan's school districts, and any monitoring of the impacts of these resources should focus more on impacts on student performance than the strategy for providing the services. Most of the schools studied in other states that improved student performance had various combinations of before- and after-school extra help programs.

25. Summer School Programs

Many students need extra instructional time to achieve the state's high proficiency standards. Thus, summer school programs should be part of the set of programs available to provide struggling students the additional time and help they need to achieve to standards and earn academic promotion from grade to grade (Borman, 2001). Providing additional time to help all students master the same content is an initiative that is grounded in research (National Education Commission on Time and Learning, 1994). It should be noted summer school services are provided outside of the regular school year.

Model Element	2016 Evidence-Based Recommendation
25. Summer School	1.0 teacher position for every 120 ELL and for every 120 non-ELL poverty students.

Analysis and Evidence

Research dating back to 1906 shows students, on average, lose a little more than a month's worth of skill or knowledge over the summer break (Cooper, Nye, Charlton, Lindsay, & Greathouse, 1996). Summer breaks have a larger deleterious impact on poor children's reading and mathematics achievement. This loss can reach as much as one-third of the learning during a regular nine-month school year (Cooper et al., 1996). A longitudinal study by Alexander and Entwisle (1996) showed 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 these findings, there is emerging consensus that what happens (or does not happen) during the summer can significantly impact the achievement of students from low-income and at-risk backgrounds, and help reduce (or increase) the poor and minority achievement gaps in the United States.

However, evidence on the effectiveness of summer programs in attaining either of these goals is mixed. Although past research linking student achievement to summer programs shows some promise, several studies suffer from methodological shortcomings and the low quality of the summer school programs themselves (Borman & Boulay, 2004).

A meta-analysis of 93 summer school programs (Cooper, Charlton, Valentine, & Muhlenbruck, 2000) found the average student in summer programs outperformed about 56 percent to 60 percent of similar students not receiving the programs. However, the certainty of these conclusions is compromised because only a small number of studies (e.g., Borman, Rachuba, Hewes, Boulay & Kaplan, 2001) used random assignment, and program quality varied substantially. More recent randomized controlled trial research of summer school reached more positive conclusions about how such programs can positively impact student learning (Borman & Dowling, 2006; Borman, Goetz & Dowling, 2009). And earlier, Roberts (2000) found an effect size of 0.42 in reading achievement for a randomized sample of 325 students who participated in the Voyager summer school program.

Researchers (see also McCombs, et al., 2011) note several program components related to improved achievement effects for summer program attendees, including:

- Early intervention during elementary school;
- Full 6-8-week summer program;
- Focus on mathematics and reading achievement, or failed courses for high school students;
- Small-group or individualized instruction;
- Parent involvement and participation;
- Scrutiny for treatment fidelity, including monitoring to ensure good instruction in reading and mathematics is being delivered; and
- Student attendance monitoring.

Summer programs that include these elements hold promise for improving the achievement of poverty and ELL students and closing the achievement gap. A more recent review of the effects of summer school programs reached this same conclusion (Kim & Quinn, 2013). Their 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.

A 2016 study 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 impacts on elementary student academic achievement (Augustine, et al., 2016). Not surprisingly, the study found that students that attended such programs for longer times experienced larger gains in reading and math scores than students who attended for less than four weeks. Drawing from this study and the districts involved, Browne (2016-17) provides practical examples of how districts can design and implement such effective summer school programs, all possible with the EB model's summer school resources.

And finally, a comprehensive book on the "summer slide," written by several of the analysts cited above, expands on the points outlined above. The book describes what is known about learning loss over the summer and what can be done to prevent it (Alexander, Pitcock & Boulay, 2016). The authors' suggestions for how to structure effective summer school programs echo the recommendations above.[31]

In sum, research suggests summer school is needed and can be effective for at-risk students. Studies suggest the effects of summer school are largest for elementary students when the programs emphasize reading and mathematics, for high school students when programs focus on courses students failed during the school year, and for all students when attendance is high in a multiple-week summer program. The more modest effects frequently found in middle school programs can be partially explained by the emphasis in many middle school summer school programs on adolescent development and self-efficacy, rather than academics.

Summer school can produce powerful impacts. The EB Model provides resources for summer school for classes of 15 students, for 50 percent of all ELL and non-ELL poverty students in all grades K-12, an estimate of the number of students still struggling to meet academic requirements (Capizzano, Adelman & Stagner, 2002). The EB Model provides resources for a program of eight weeks in length and a six-hour day, which allows for four hours of instruction in core subjects. A six-hour day would also allow for two hours of non-academic activities. The formula would be one teacher position for every 30 such students or 3.33 per 100 such students. This position is paid at the rate of 25 percent of the annual salary. Simplified, the formula equates to one teacher position for every 120 ELL and every 120 non-ELL poverty students.

26. ESL Staff for English Language Learner (ELL) Students

Research, best practices, and experience show that ELL students need assistance to learn English, in addition to instruction in the regular content classes and in addition to the above tutoring, pupil support, extended day and summer school resources. This can include some combination of small classes, English as a second language classes, professional development for teachers to help them teach "sheltered English classes, and "reception" centers for districts with large numbers of ELL students who arrive as new immigrants to the country and the school throughout the year. The EB Model provides ESL teachers in addition to the tutors, pupil support, extended-day and summer school for all ELL students using the ELL count.

Model Element	2016 Evidence-Based Recommendation
26. ESL staff for English Language Learner (ELL) Students	As described above: 1.0 tutor position for every 100 ELL students 1.0 pupil support position for every 125 ELL students 1.0 extended day position for every 120 ELL students 1.0 summer teacher position for every 120 ELL students, and in addition, 1.0 ESL teacher position for every 100 ELL students.

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

Analysis and Evidence

Good ELL programs work whether the approach is structured English immersion or initial instruction in the native language, often called bilingual education (Clark, 2009). However, bilingual education is difficult to provide in most schools, including most schools in Michigan, because students come from so many different language backgrounds. Thus, most schools have adopted the "sheltered English" approach. According to Wikipedia, sheltered instruction is an approach to teaching English language learners which integrates language and content instruction. Sheltered instruction has two prime goals: 1) to provide access to mainstream, grade-level content, and 2) to promote the development of English language proficiency. Several Michigan EB Professional Judgement panelists stated that their districts had adopted the SIOP approach to sheltered English Instruction. SIOP or the Sheltered Instruction Observation Protocol (SIOP) Model is a research-based and validated instructional model that has proven effective in addressing the academic needs of English learners throughout the United States. The SIOP Model consists of eight interrelated components: lesson preparation, interaction, building background, practice and application, comprehensive input, lesson delivery, strategies and review and assessment (see Echevarria, Vogt, & Short, 2017 for more detail). Several panelists also stated that sheltered instruction represents high-quality and effective instruction, and is effective not only for ELL students but also all students, and particularly at-risk, non-ELL students.

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

Addressing that important issue 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. 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 EB Model's programs for struggling students: tutoring, extended-day, summer school and pupil support.

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

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

- Rigorous and effective curriculum and courses for all ELL students, including college and career ready, and affirmative counseling of such students to take those courses; and
- Professional development for all teachers, focusing on sheltered English teaching skills.

Hakuta (2011) supports these conclusions, and argues that English language learning takes time and more specifically that "academic language" is critical to learning the new common or college and career ready standards. These more rigorous standards require more explicit and coherent ELL instructional strategies and extra help services if schools are to be effective at ensuring ELL students learn the subject matter, English generally, and academic English specifically, i.e., learn how to read content texts in English. Most also would agree that if this instruction requires smaller regular classes, those are already provided by the EB Model.

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

Research shows ELL students from lower income and generally less educated backgrounds struggle most in school and need extra help to learn both academics and 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 provided by tutoring, pupil support, extended-day and summer school. Given these realities, it is appropriate to view the EB Model as providing all ELL students tutoring, additional pupil support, extended day, summer school and ESL resources. Put differently, for every 100 ELL students the EB model provides 1.0 tutors, 0.8 pupil support, 0.83 extended day, 0.83 summer school and 1.0 ESL teacher positions, or 4.46 teacher positions for every 100 ELL students. Put differently, every 22.4 ELL students trigger 1.0 additional licensed position to provide the extra help ELL students need to learn to standards.

27. Alternative Schools

A small number of students have difficulty learning in the traditional school environment. The Alternative Learning Environment (ALE) students this report addresses are those who also have some combination of significant behavioral, social, and emotional issues, often also including alcohol or drug abuse. Such students often do much better in small "alternative learning environments." However, this rationale for ALE does not consider alternative schools for students who simply prefer a different approach to learning academics, such as project-based learning, or more applied learning strategies that can be deployed in new career technical programs such as computer assisted engineering. The EB concept of alternative schools, which the study team believes is also the state's concept, is for "troubled" youth who need counseling and therapy embedded in the school's instructional program.

In addition, the alternative school funding formula can also be used to fund "welcome programs" for students who have recently entered this country, often from an environment of refugee status, refugee camps, and little access to formal schooling.

Model Element	2016 Evidence-Based Recommendation
27. Alternative Schools	One assistant principal position and one teacher position for every 7 ALE students; One teacher position for every 7 Welcome Center eligible ELL students

Analysis and Evidence

The Institute for Education Sciences at the United States Department of Education published statistics on alternative schools and programs for SY 2007-08 (Carver & Lewis, 2010). That study identified 558,300 students in 10,300 district-administered alternative education schools and programs across the United States. Although the report did not provide data on the size of these schools or on staffing ratios, the data suggest an average alternative school size of 54 students. Most of the programs served students in grades 9-12. The main reasons students were enrolled in alternative programs – all of which meet the study team's initial definition of severe emotional and/or behavioral problems – included:

- Possession or use of firearms or other weapons;
- Possession, distribution, or use of alcohol or drugs;
- Arrest or involvement with the criminal justice system;
- Physical attacks or fights;
- Disruptive verbal behavior;
- Chronic truancy;
- Continual academic failure;
- Pregnancy/teen parenthood; and
- Mental health needs.

One of the major issues states face in creating funding programs for alternative schools is defining them. The EB original review of literature and state practice on alternative education provided little guidance for developing a clear definition of alternative education. More recently, and as part of implementing its compulsory attendance laws, Maryland commissioned a study to review state definitions of ALE programs (see Porowski, O'Conner & Luo, 2014). Maryland needed a definition because attendance in an ALE program was an exemption in its compulsory attendance law and the state did not have a clear definition of such programs. The study found great variation across the states in both defining and structuring alternative education programs. Because individual states or school districts define and determine the features of their alternative education programs, they tend to differ in key characteristics, such as target populations, setting, services, and structure.

A formal definition of an ALE program would need to consider the target population (including both grade levels served and types of students), program setting (within a public school or outside such a structure), program offerings (academic, behavioral, counseling, social skills, career counseling, etc.) and structure (how programs are scheduled, staff responsibilities, etc.). The Porowski, O'Conner & Luo (2014) study found wide variation across states (and districts) as well as these elements.

The 2006 Urban Institute (Aron, 2006) definition of alternative education closely follows such programs:

> Alternative education refers to schools or programs that are set up by states, school districts, or other entities to serve young people who are not succeeding in a traditional public-school environment. Alternative education programs offer students who are failing academically or may have learning disabilities, behavioral problems, or poor attendance an opportunity to achieve in a different setting and use different and innovative learning methods. While there are many different kinds of alternative schools and programs, they are often characterized by their flexible schedules, smaller teacher-student ratios, and modified curricula.

In 2010, the study team also reviewed state standards – where such existed – for alternative schools. Most states use definitions similar to that of the Urban Institute, but only one state, Indiana, actually established standards for what an ALE program might look like. The Indiana Department of Education's (2010) website states:

> While each of Indiana's alternative education programs is unique, they share characteristics identified in the research as common to successful alternative schools.
>
> - Maximum teacher/student ratio of 1:15,
> - Small student base;
> - Clearly stated mission and discipline code;
> - Caring faculty with continual staff development;
> - School staff having high expectations for student achievement;
> - Learning program specific to the student's expectations and learning style;
> - Flexible school schedule with community involvement and support; and
> - Total commitment to have each student be a success.

These characteristics align with the EB Model view of ALE programs.

From work in other states, the study team has found that funding formulas for alternative schools differ substantially. In a few states, the typical staffing ratio for an alternative school is one administrative position for the school plus one teacher position for every eight students. Because alternative high schools are generally designed to serve students who are severely at-risk, the study team recommends they remain relatively small. Because of the small size of alternative schools, staff at these schools often must fill multiple roles. Many teachers in alternative schools provide many different services for students, including: instruction, pupil support, and counseling services. This suggests the staffing structure and organization for instruction in alternative schools is usually quite different from typical high schools.

Though Michigan could launch a process to more formally define alternative education programs as well as set standards for them, it might also want to simply adopt the Urban Institute's definition. It could also include a maximum size for any alternative education programs that would trigger alternative education funding. The EB model resources alternative education programs with 1.0 FTE assistant principal position and one FTE teacher position for every seven alternative students, and assumes the programs enroll fewer than 100 students.

Welcome Centers for ELL students

As noted above, some districts in Michigan – and several other districts across the country – are receiving students from several places around the world which can be characterized by strife, poverty, danger, hunger, war, refugee status or other problematic environments for children. In many cases, children escaping from these contexts and enrolling in U.S. schools have experienced insufficient formal education as well as trauma. Such students need more intensive assistance to become accustomed to the structure of U.S. schools and to effectively participate in formal schooling. These acculturation experiences are best provided in small contexts, often called "welcome centers," in which small groups of students work with an adult who not only provides appropriate beginning instruction but also supportive counseling and other related services.

Michigan would need to set standards for systematically identifying such students. The EB model would then resource such students with the same formula as that for the more typical alternative school: 1 teacher position for every seven "Welcome Center eligible ELL students." If there were several such "classrooms" in a school, the formula could include the assistant principal position too. Such resourcing would allow all districts to provide a nurturing and welcoming educational environment for such students until they could function in regular classrooms. Such programs often last nine to 18 weeks, but program length would be determined by state standards.

28. Special Education

Providing appropriate education services for students with disabilities, while containing costs and avoiding over-identification of students, particularly minority students, presents several challenges (see Levenson, 2012). Many mild and moderate disabilities, often those associated with students learning to read, are correctable through strategic early intervention – before a student is identified as an individual with a disability and an IEP is created. This intervention includes effective core instruction as well as targeted Tier 2 intervention programs, particularly one-to-one tutoring (Elements 6 and 22). For those 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 the cost of the basic education program for all non-public placements, 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).

2016 EB Recommendation: Special Education
8.1 teacher positions per 1,000 students, which includes 7.1 teacher positions per 1,000 students for services for students with mild and moderate disabilities and the related services of speech/hearing pathologies and/or OT PT. This allocation equals approximately 1 position for every 141 students.
1.0 psychologist per 1,000 students to oversee IEP development and ongoing review.
Full state funding for students with severe disabilities, and state-placed students, minus the cost of the basic education program and Federal Title VIB, with a cap on the number covered at 2% of all students.

Analysis and Evidence

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

The core principles of such a proactive approach to teaching students with disabilities are that the education system needs to adapt to the student; that the primary aim of teaching and learning is the prevention of student failure; that the aim of all educators is to build teacher capacity; that all services must be grounded in the core teaching and learning of the school and particularly skilled teachers; and, that to accomplish this, students must be educated alongside their peers in integrated environments (Frattura & Capper, 2007).

Supporting this argument, research shows that many mild and moderate disabilities, particularly those associated with students learning to read, are correctable through intensive early intervention. For example, several studies (e.g., Borman & Hewes, 2003; Landry, 1999; Slavin, 1996) have documented that through a series of intensive instructional interventions (e.g. preschool, small classes, rigorous reading curriculum, 1 to 1 tutoring), nearly 75 percent of struggling readers identified in kindergarten and grade 1 can be brought up to grade level without the need for placement in special education.

Other studies have noted decreases in disability labeling of up to 50 percent with interventions of this type (see for example, Levenson, 2011; Madden, Slavin, Karweit, Dolan & Wasik, 1993; Slavin, 1996).

That is why the EB recommendations for extended learning opportunities (Elements 22, 24 and 25) are so important. They, along with core tutoring and pupil support services, are the series of service strategies that can be deployed *before* IEP specified special education services are needed. This sounds like a common-sense approach that would be second nature to educators, but often educator practices have been rooted in a “categorical culture” that can be modified through professional development and leadership from the district office and the site principal. Further, unlike the EB funding model, many states do not provide sufficient resources for early intervention and preventive services, so students who could have been helped often end up unnecessarily in special education programs. Using a census approach to provide most of the extra resources for students with disabilities, an approach increasing in use across the country, works best for students with mild and moderate disabilities, but only if a functional, collaborative early intervention model (as outlined above) is also implemented. At the same time, it is perfectly legal for a student’s IEP to call for tutoring, extended day help or summer school services that are part of the EB model, even though the services may not be provided by a person with a special education certification.

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

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

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

Common attributes of RTI implementations are: a strong core instructional program for all students; multiple tiers of increasingly intense student interventions; implementation of a differentiated curriculum; instruction delivered by staff other than the classroom teacher; varied duration, frequency, and time of interventions; and categorical or non-categorical placement decisions (Mellard, 2004). This proactive model fits seamlessly into the EB broader approach to helping all struggling students through early interventions.

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

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

For children with more severe disabilities, clustering them in specific schools or at the SU/district level 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. Students in these categories generally include: severely emotionally disturbed (ED), children with intellectual disabilities and orthopedic disabilities and children within the autism spectrum. The ED and autism populations have been increasing dramatically across the country, and it is likely that this trend will continue in the future. To make the provision of services to these children cost-effective, it makes sense to explore clustering of services where possible and design cost parameters for clustered services in each category. In cases where students need to be served individually or in groups of two or three because of geographic isolation, it would be helpful to cost out service models for those configurations as well, but provide full state funding for those children. This strategy 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, undoubtedly including Michigan, school systems often use paraprofessionals to provide a significant portion of services to students with disabilities. As University of Vermont Professor Michael Giangreco argues, this strategy puts the least expert individuals in the role of providing instruction to the students with the most educational challenges and is not the most effective strategy. Giangreco (2015) further states that the use of paraprofessionals often occurs when schools do not have a proactive strategy for addressing the needs of students who struggle to achieve to standards and recommends, as does the EB model, the proactive approach.

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

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

Census Approach to Funding

The proactive approach to providing services to struggling students as well as students with disabilities has led to what is called the census approach to funding core special education services. The census method is accomplished by providing additional teacher resources at a fixed level. The census approach emerged across the country for several reasons:

- Continued rise in the number and percentage of "learning disabled" students and continued questioning by some of the validity of these numbers;
- Under-funding of the costs of students with severe disabilities;
- Over-labeling of poor, minority, and ELL students into special education categories, which often leads to lower curriculum expectations and inappropriate instructional services;
- Proactive approach to providing services to struggling students and the RTI system; and
- Reduction of paperwork.

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

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

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

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

Each of these is addressed below.

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

Mild and Moderate Disabilities

At an incidence rate of 12 percent, it would be reasonable to assume that one to two percentage points of that total would be for children with severe and profound disabilities. That would leave 10 percent with mild and moderate disabilities. Although the previous EB provision for resources for students with mild and moderate disabilities was one teacher and one aide for every 150 regular students, the study team is revising that via the following analysis.

The service load for special education teachers for mild and moderate disabilities ranges widely across the country, with some school districts setting the load at 15 and others at 30. And there is no national legal requirement for service loads. The following analysis assumed special education teachers service an average of 20 students with mild and moderate disabilities, which is at the lower end of the range. If the incidence of such students is 10 percent, that means about 15 students of every 150 students would have a mild or moderate disability. The EB formula then needs to be modified to provide 0.75 special education teacher positions for every 150 students (the 0.75 is determined by dividing the number of mild and moderate special education students in a group of 150, which is 15, by the service load for a teacher, which is 20). The 0.75 special education teacher position is equivalent to one teacher position for every 200 students, to align the teacher allocation to a 10 percent incidence, or five positions for every 1,000 students.

Nate Levenson (2011, 2012), a national expert on effective special education servicing, also recommends, as does the above discussion, that most of the services needed by students with mild and moderate disabilities should be provided by skilled 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.

The above analysis produces and ED recommendation of five special education teachers and 1 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

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

Severe and Profound Disabilities

The EB approach for children with severe and profound disabilities is for the state to fund 100 percent of the costs for students with severe and profound disabilities, minus federal Tile VIb and the cost of the basic education program. To control costs for this recommendation, the EB model would limit the number of students so covered to 2 percent of students in the district or SU.

Total EB recommendation for special education:

1. 8.1 positions for every 1000 students, which includes:
    - 7.1 positions per 1,000 students for services for students with mild and moderate disabilities and for the related services of speech/hearing pathologists and/or OT PT, which equals approximately one position for every 140 students, and
    - one psychologist for every 1,000 students.
2. 100 percent state funding of services for students with severe and profound disabilities, minus federal Title VIb funds and the basic education program, capped at 2 percent of all students.

Staff Compensation Resources

There are several other issues related to the Michigan Funding system that are not individual elements of the model, but integral aspects of costing the model. These issues include: salary levels, health insurance, other fringe benefits, regional cost adjustments, external cost adjustments and the school district school finance audit process.

29. Staff Compensation

To cost out the above recommendations, one needs to identify a compensation amount for each staff position. Compensation includes salary as well as benefits. Benefits include Social Security and Medicare, health insurance, retirement or pension costs, Workers' Compensation and Unemployment Insurance.

Model Element	Michigan Evidence-Based Recommendation
29. Staff Compensation	For salaries, average of previous year For benefits: Retirement or pension costs: 4.6% Health Insurance: $12,000 per employee Social Security 6.20% (up to annual earnings of $127,200) Medicare: 1.45% Workers' Compensation: 0% Unemployment Insurance: 0.6%

As is usually done in most adequacy studies, the EB approach to costing out the above recommendations is to use the average of the previous year's staff salaries to put a salary "price" on each staff element of the funding model. Staff would include the major certified categories such as teacher, principal, superintendent, assistant superintendent, as well as the major classified categories such as secretary, custodian, maintenance worker, groundskeeper, and supervisory aide.

In some cases, adequacy studies explicitly include a market analysis of salaries, for example, comparing teacher salaries to salaries of workers in other occupations with similar skills and competencies to teaching. These market analyses, however, are not part of the current study. Therefore, average salaries from the preceding year will be used as the salary price to cost out the various staff elements of the model in the process of identifying both a new base per student figure and appropriate pupil weights or dollar per student figures for ELL, non-ELL poverty students, and special education.

Benefits present a set of issues that need to be addressed in more detail. Benefits generally include:

- Social Security and Medicare;
- Health insurance;
- Retirement or pension costs;
- Worker's compensation; and
- Unemployment insurance.

These are usually calculated as a percent of salary.

For example, today Social Security and Medicare costs are 7.65 percent of salary, but Social Security applies only to incomes up to $127,200.[32] There is no income cap for Medicare taxes.

Health care insurance costs pose a more complex challenge. Costs of health care insurance often vary substantially across districts, which usually have different approaches to covering health care, including self-insurance. Rates often differ for individuals, couples, and families. Typically, the state does not explicitly state its fiscal responsibility for health insurance costs for school district employees, and typically unspecified amounts for such coverage are included in the base school funding formula. Moreover, many states' school funding formulas under-support actual health care insurance costs.

But health care costs need to be directly addressed in an adequacy study, to ensure that this part of the compensation is "adequately" reflected in any cost figure. A recent study in North Dakota found that the state average cost for health insurance for all *state* employees was about $12,000. Though the state had not explicitly adopted a policy of health care coverage for school district employees, the decision was made, with the assent of the legislative committee for which the study was conducted, to use the figure used for state employees as an "indirect" indicator of how the state would recognize health insurance costs in the school aid formula. This decision was bolstered by a previous state policy that allowed school districts to "opt into" the state health care program. Thus, in calculating a new per student figure for North Dakota, the $12,000 state figure for health insurance costs was used for all staff categories. Wyoming also uses a state health insurance cost figure in its K-12 school aid formula.

Michigan districts spend an estimated $12,000 per employee for health insurance and that figure is used in this analysis.

Retirement costs generally are set by the state. In some cases, the state pays pension costs directly to the retirement fund, and that cost is not included in local district costs. This is a straightforward way to cover pension costs, but advantages high salary over lower salary districts. Nevertheless, Michigan pays 11.04 percent "off the top" for unfunded pension liabilities. In addition, Michigan requires districts to pay 25.56 percent of salaries for ongoing pension costs. The EB approach to compensation typically adds

[32] This will increase to $128,400 for 2018.

the cost of pensions for all educators and education staff. Generally the percentage used is the figure the state requires districts to pay which is 25.56 percent for all staff. However, for the purpose of this analysis, the study team used 4.6 percent of salary for ongoing pension costs. The balance of the costs are real and need to be included in the total, but because pension costs vary for charter schools and depending on the employment date of each employee, the 4.6 percent figure was used and the balance will be included in the discussion of total costs for the PK-12 education system elsewhere in this report..

The model uses a figure of 0.6 percent for Unemployment Insurance, the current average across districts. For Workers' Compensation, the model uses zero percent because the state fully reimburses districts for these costs.

Evidence-Based Professional Judgment Panels

Introduction

As part of the Evidence-Based (EB) approach to estimating school finance adequacy, the study team conducted four Professional Judgment (PJ) panels across Michigan in October 2017. The purpose of these panels was to seek input from educational professionals on the content and elements of the EB model described previously in the "Using the EB Model to Identify Adequacy for Michigan Schools" section. At each of the panel meetings the study team shared the elements of the EB model, asked the panel members to reflect on those elements and provide us with Michigan-specific assessments as to how the element could function in Michigan. Based on this feedback, the study team identified several areas where adjustments to the EB model might be considered in estimating an Evidence-Based level of school finance adequacy, as well as several areas where the EB model would not need to be changed.

This section describes the outcomes from the four Evidence-Based PJ (EBPJ) panels. The study team used the recommendations of those panels to refine the EB model so it more accurately reflects the issues and context of Michigan. During panel meetings, the study team walked panelists through each of the elements as described previously (and summarized in Table 3.1). There were three general responses to each model element from the EBPJ panels:

1. For some elements, panel members recommended changes in the level of resources needed by Michigan schools – suggestions with which the study team agrees and have incorporated into the Michigan EB model.

2. For other elements, the panels recommended changes where the study team's reading of the evidence and best practices diverged from the panel recommendations. In these instances, a detailed description of the differences between the EB model and the panel recommendations is provided, the rationale for the EB recommendations is documented, and information is provided for state policymakers to enable them to determine their preferred approach.

3. For the remaining elements, panel members agreed that the proposed EB model resources were adequate to support Michigan schools as they seek to attain the state's desired educational outcomes.

The Excel-based simulation that accompanies this report makes it possible for stakeholders to model alternative recommendations in real time and review alternative cost projections based on those alternatives. In cases where the study team believes evidence does not support panel recommendations, Michigan policymakers may want to estimate the costs of the panel recommendations and consider modifying the EB recommendations. The simulation model allows them to make such changes and to understand the impact those changes would have on the base cost of education and the related pupil weights.

Evidence-Based Professional Judgment Panels

Four Evidence-Based Professional Judgment (EBPJ) panels were held in Michigan: one in Gaylord on October 23, one in Ann Arbor and another in Southfield on October 24, and one in Grand Rapids on October 25, to ensure representation from all regions of the state. Approximately 20-25 panel members attended each EBPJ panel meeting. Education community stakeholders and school officials nominated panelists, and all nominated individuals were invited to attend a panel meeting. The study team specifically sought to include a range of school staff at each EBPJ session.

A goal was to have half of the members of each panel be teachers from different levels of schools (elementary, middle, and high school) as well as teachers with varying work assignments including core subjects, elective classes, special education, English for speakers of other languages (ELL), and others. The study team wanted teachers with experience in helping to improve student performance in schools, that experience would make them particularly helpful in understanding the resource implications of programs to meet new Common Core and college and career ready state standards. The study team also sought lead teachers, mentor teachers, instructional coaches, and certificated personnel serving in the role of tutors.

In addition to teachers, the panels had participation from: school site administrators at all school levels; various central office administrators including superintendents, assistant/associate/deputy superintendents, curriculum directors, special education directors, and business managers; and representatives from school districts and Intermediate educational agencies.

Several days prior to the meetings, all EBPJ panel members received an e-mail outlining the purpose of the panel meetings along with an electronic copy the draft EB report. EBPJ panels met for an entire day, starting at 9:00 in the morning and ending around 4:00 in the afternoon. Each panel was supported by either Allan Odden or Lawrence Picus from Picus Odden & Associates, and an additional staff member from APA. The study team presented an overview of the EB model and then sought input – model element by model element – regarding the appropriateness of the model's resources for Michigan schools. The study team also solicited panel members' views on how the allocation of those resources could improve student learning. The findings from each of the four panels form the basis for the findings presented in this section.

The balance of this section describes six overall themes that emerged from the EBPJ panels, then describes the recommendations of the EBPJ panels regarding each element, starting with the elements where the study team concurs with recommended changes, and followed by the elements where the study team documents its recommendation to continue with the EB model resource allocation strategies and finishing with the elements with which the panels felt the EB model resource allocations were adequate as proposed.

Professional Judgment Panel Recommendations

Six overall themes emerged from the panel conversations:

1. Panelists largely supported the overall structure and intent of the EB approach to instructional improvement, student achievement, the embedded school improvement model, and school finance adequacy. Suggested changes were at the margin but not the core of the EB approach.

2. Panelists expressed strong and universal support for the overall instructional elements of the EB model. Those elements – small class sizes, core and elective teachers, instructional coaches, intensive and ongoing professional development, extra resources to provide more instructional time for struggling students, teachers organized into collaborative work teams, etc. – were viewed as on target and reinforcing the delivery of best practices in schools.

3. Panelists universally noted that the staff and resources in the EB model exceeded existing resources in nearly all schools, and that many of the instructionally focused staff were those that were very much needed (e.g., instructional coaches) but had been cut over the past few years as budgets declined.

4. There was initial concern that the EB approach to serving students with disabilities was problematic and provided less than current resources for those students, but following considerable detailed discussion, panelists agreed that the EB approach was quite robust and an effective approach for serving students with disabilities. The major area of concern was the state's birth to age 26 requirement for serving students with disabilities while the EB model covered only preschool (age three and four) to grade 12 students (though at higher ages if still attending high school).

5. There was virtually no pushback to the substantially fewer paraprofessionals in the EB model than are typically employed in most schools. Most panelists agreed that skilled teachers provide more effective services than paraprofessionals – even trained paraprofessionals – but cautioned on the need for time to shift from paraprofessionals to skilled teachers for many extra help services.

6. Panelists noted that Michigan typically provides more school administration than the EB model but less instructional leadership staff.

As indicated above, EBPJ panel recommendations fell into three categories:

1. Areas where the panelists recommended changes that the study team believes have a sound evidence basis and have been incorporated into the EB model.

2. Areas where panelists recommended that the study team consider changes or identified potential concerns with the EB model, but for now have not been changed in the EB model.

3. Areas where panelists were in general agreement with the EB model recommendations.

Each of these areas is considered below, identifying the EB model elements in each section that are impacted.

Areas Where EBPJ Recommendations Led to EB Model Changes

There was only one major area where EBPJ panel recommendations suggested a strong reason to modify the EB model as presented to the panels: central office administration. In two other areas, the panels suggested modest changes that were adopted: field trips for preschool students and higher curriculum costs for programs for struggling students.

Element 21: Central Office

The study team told all panels that the EB model's approach to central office staffing would be prorated up and down, on a dollar per student basis, for districts larger and smaller than the prototypical central office of 3,900 students. In all panel sessions, panelists suggested that while they would like the level of staff in the initially proposed central office model, they nevertheless felt the staffing was more than needed. The study team explained that the EB central office model had grown over the past several years because of increased district assessment and evaluation responsibilities, and expanded technology systems at both the district and school level. Panelists agreed, but nevertheless suggested that the model be slimmed down, and the study team agreed to do so. Table 3.7 represents the revised EB Central Office model and compares revisions with the data presented earlier, in Table 3.6. Note that the major changes are in the reduction of support staff as those had been the prime source of the increased number of positions.

Table 3.7: EB Central Office Staffing for a District with 3,900 students

Office and Position	FTE		FTE		FTE	
	Previous EB Model		Current EB Model		Revised EB Model	
	Admin.	Classified	Admin.	Classified	Admin	Classified
Superintendent's Office						
Superintendent	1		1		1	
Secretary		1		2		1
Business Office						
Business Manager	1		1	1	1	
Director of Human Resources	1		1	1	1	
Accounting Clerk		1		2		2
Accounts Payable		1		2		2
Secretary		1		1		1

Office and Position	FTE Previous EB Model		FTE Current EB Model		FTE Revised EB Model	
	Admin.	Classified	Admin.	Classified	Admin	Classified
Curriculum and Support						
Assistant Supt. for Instruction	1		1		1	
Director of Pupil Services	1		1		1	
Dir. of Assessment and Evaluation	1		1		1	
Secretary		3		3		3
Technology						
Director of Technology	1		1		1	
Network Supervisor (Hardware)		1		1		1
Systems Supervisor (Software)		0.3		1		1
School Computer Technician		1		4		2
Secretary		1		2		1
Operations and Maintenance						
Director of O&M	1		1		1	
Secretary		1		2		1
Central Office Staffing (3,900)	**8**	**10**	**8**	**20**	**8**	**15**

Element 1a: Preschool student activities

In discussing student activity resources, several panelists noted that preschool programs also take students on field trips and that there should be some modest funds for such activities. The study team agreed and added $50 per student in the student activities line for the EB preschool model.

Element 15: Instructional Materials

Several panelists noted that programs for students struggling to meet standards needed extra resources for aligned supplemental curricular programs. For example, one online reading program for ELL students, Imagine Learning, costs $100 per student per year. Other districts identified other extra help programs, such as Read 180. Thus, supplemental materials allocation for poverty students, ELL students, extended day and summer school was increased to $50 per student.

Areas Where EBPJ Panels Recommended Potential Changes That are Not Included in the Core Evidence-Based Model

PJ panelists offered suggestions regarding four elements of the EB model that have not been incorporated into the study team's recommendations. Those recommendations are described here, and remind readers that in all cases, the Excel simulation of the Michigan EB model can be used to estimate the impact of these changes on the per student revenue. The four elements are:

1. School level administration;
2. Instructional materials and computer technologies;
3. Career and technical education equipment; and
4. Special education.

Element 11: Principals and Assistant Principals

The EB model provides one principal for every prototypical elementary, middle school, and high school, and in addition provides one assistant principal for a 600-student high school.

The EBPJ panels felt strongly that all three prototypical schools (450 student elementary, 450 student middle and 600 student high school) should be resourced with an additional assistant principal, arguing that the 450-student elementary and middle schools should have both a principal and an assistant principal, and that the 600 student high school have a principal and two assistant principals. Panelists provided several arguments to support this recommendation including: the fact that traditionally more school administration has been provided in Michigan; administrative needs have grown given the rising and more difficult educational and disciplinary needs of children; and, the need for time to engage in more performance-oriented teacher evaluation systems.

Because the EB model provides substantial instructional leadership resources in the positions for instructional coaches, it provides fewer resources for school administration per se. The rationale is that while each school's leadership team needs to provide both school management and instructional leadership functions, the EB school administration staff combined with the robust instructional leadership staff (e.g., the instructional coaches) provide sufficient school leadership/management resources. And with respect to student disciplinary needs, the EB model also provides substantial pupil support staff, as well as additional pupil support staff for schools with poverty and ELL students. With this combination of school leadership/management staff and the considerable counseling and pupil support staff, the EB model posits that an effective schoolwide student management and disciplinary system can be implemented. Further, higher poverty schools, perhaps with more intense student discipline issues, could allocate a pupil support position for a "dean" position focused on student discipline. Indeed, several schools in the various panels did organize its administrative staff this way. This use of staff would be allowed by and resourced by the EB model.

Therefore, it is the study team's recommendation that the EB model does not need to provide more administrative staff.

One qualification to this recommendation is that if schools and districts adopt teacher evaluation strategies that require multiple live observations of teachers over the course of a year – which is needed if such systems are to obtain fair and accurate data on a teacher's instructional practice – then additional staff are needed to conduct these observations. Although the EB model does not address teacher evaluation explicitly, the study team would argue that there are more efficient and more effective ways to structure performance-based teacher evaluations than multiple principal observations (Grissom & Youngs, 2016; Odden, 2011a). If Michigan prefers this more expensive approach to teacher evaluation, it could provide the additional administrative staff to each prototypical school, which would produce a higher base per student figure.

Elements 15, 16 and 17: Instructional Materials, Interim, Short Cycle Assessments, and Instructional Technology

The EBPJ panelists were generally supportive of the EB model allocations of $190 per student for instructional materials, $25 per student for formative and short cycle assessments, and $250 per student for school-based technology. Most of the school business officers on the panels indicated this was more than is currently expended in these three categories.

To ensure that districts and schools are not engaging in "over testing," the EB recommendation for short cycle assessments is that no more than $25 per student be allocated as a way to encourage schools to purchase just one, integrated, online battery of such assessments, rather than multiple additional assessment systems.

Some panelists in three of the panels noted that they were spending much more for current textbook adoptions. For example, one school said it had paid $286 per student for an adoption of algebra I, algebra II and geometry textbooks. These adoptions included all the supplementary materials as well as a CD and online access that provided additional instructional support. Another school had spent close to $1,000 per student on a reading program for elementary schools, which also included several supplemental materials as well as "leveled" readers. A different elementary reading program, Read Well, cost one district $220 per student for the texts, supplies, supplemental materials, and online resources. A fourth district spent $500 per student for an Advanced Placement biology course. Ann Arbor had adopted the Lexia Learning program, a K-3 reading program for struggling students, at a cost of $184 per student. Some districts are spending substantial sums for new textbook adoptions at cost levels the study team heretofore never encountered. Also, "electronic" copies of textbooks often require hard copy adoptions as well, so produce no cost savings.

Some new curricular materials are also available at no cost from more than one source. For example, Engage New York was the result of a New York State initiative to create curricular materials linked to the Common Core Standards and all the materials are available online for free. A second example is the curriculum materials that are available – at no cost –from the organization that developed the Next Generation Science Standards. These science materials receive high marks for their quality.

The study team is therefore reluctant to increase the EB's allocation for instructional materials. Many, if not most, districts in Michigan spent less than the $190 per student in the EB model, as do nearly all districts in other states where the EB study team has conducted adequacy studies during the past five years. However, Michigan would be wise to probe the reasons why some districts spend so much on curricular materials. If those materials produce better student achievement results, the state should consider supporting those materials and increase the EB allocation in this area. But if not, districts should be encouraged to purchase lower cost but effective curricular materials.

A similar issue raised by several panelists was the district's responsibility for purchasing college texts, which are quite expensive, for students accessing the "dual enrollment" program. Some students take up to three courses, with texts for each – that must be purchased each year – costing from $100 to $200 each. As dual enrollments increase, it could be that at some point the high school textbook allocation would need to be enhanced to cover these higher costs.

Finally, Michigan is on a path to leverage technology for learning, to empower every student in the state to excel at next generation assessments, and to achieve lifetime success in a technology-based, global economy. These aspirations might at some point require more computer technologies than the EB model provides. Several panelists noted this aspiration and argued that the EB model's technology recommendations should be enhanced. As noted earlier, for the computer and technology allocation to be sufficient for Michigan to move to a one-to-one computer ratio for all students, the base $250 per student would need to be increased by $150 per student to $400 per student. If Michigan decides to take this path, then the ultimate base per student number from the core EB model would need to be increased by $150.

One large ISD provides computer-based technologies for schools on a county-wide basis and uses a figure of $250 – the EB amount – to provide the equipment that includes computer devices, operating systems, software needed for various applications and spy/security software. Another ISD used a figure closer to $300 per student.

At this point, the EB model does not support a one-to-one computer ratio and concludes that it is a bit premature to do so given the mixed evidence on its impact on student achievement. But that does not mean the state could decide to move in that direction, in which case, the base per student number would need to be increased by $150 per student.

Element 18: Career and Technical Education

In Michigan, career and technical education programs are provided both by Intermediate School Districts, usually with a special mill levy for the program, and by local districts. For the latter, it often, if not always, is the case that their ISD does not have a special CTE mill levy and provides few if any CTE programs. Michigan also has a complex approach to provide state aid for CTE programs.

In some EBPJ panels, panelists identified CTE programs with equipment costs that were quite high, sometimes approaching $50,000 for some high cost programs. In these panels, most of the CTE programs were provided by ISDs and most ISDs provided a wide range of programs including advanced manufacturing, graphic art, computer programming, robotics, accounting, welding, etc.

It is the consensus view that most state-approved career and technical education (CTE) programs often cost more to operate than non-vocational programs due to such factors as:

- Smaller classes;
- Specialized equipment;
- Supplies;
- Specialized supportive services; and
- High-quality instructors with specialized certifications.

However, during the discussions, it became clear that the bulk of these costs are included in the EB base program, including class sizes (25 in the EB model), supplies, and professional development. Thus, the major added costs would be those associated with specialized equipment. While some programs might have high equipment costs (e.g., robotics), others do not (e.g., accounting). Even though many panelists argued that the EB allocation of $10,000 per CTE program (which would include five one-hour sections a day) was too low, it is the study team's conclusion that across all CTE programs the $10,000 figure would be adequate. High equipment costs for some programs would be balanced by lower equipment costs for others; and equipment for all programs last over several years so even a program with equipment needs of $50,000 would have sufficient funding assuming the equipment would last for five years.

Thus, the study team continues to recommend that the EB CTE allocation of $10,000 per all CTE programs is adequate. Michigan should reassess its overall structure for CTE programs. While some ISDs adopt a special mill levy for CTE programs, others do not, so there certainly are inequities in the accessibility of CTE programs from the student perspective.

Element 28: Special Education

The EB model provides one teacher position for every 141 students in a school (total students, not only special education students) as well as the allocation of positions at the central office to oversee development and implementation of IEPs. In addition, the model recommends that the state fund 100 percent of the costs of students with severe and profound disabilities – the high cost students. In the MARS report, these would be the student categories of: severe cognitive impairment, severe emotional impairment, homebound and hospitalized services, severe multiple impairments, and perhaps some programs for students with severe autism.

This full state funding would be capped at two percent of total school enrollments across the state. In addition, the EB model recommends special education funding should be net of Federal Title VIb funding.

Nearly all panelists felt at the beginning of the discussion of this topic, that the EB model would not be sufficient for the Michigan special education standards and service levels, and because of the state's mandate to provide special education to all persons from birth to age 26. In terms of the latter, the EB model only covers students aged three and four, who would be in preschool, and the all students in kindergarten through grade 12, so it falls short of the state's birth to age 26 special education mandate.

At the same time, when panelists who were special educators and/or directors of special education to reviewed the service levels outlined in the special education section, it turned out that all districts represented had larger service levels than the EB proposed. After realizing these discrepancies, panelists understood how the overall EB approach to special education worked and supported it.

The panel discussions about special education were closely linked to the discussion of strategies for struggling students. The research behind the EB model includes multiple resources for educators to provide for Tier 2 interventions – tutoring, extended day, summer school and extra pupil support – *before a student is given an IEP*. The model also considers those resources in combination with the resources in the special education element to address the issues of all students who need extra help to learn to standards. Further, the substantial Tier 2 resources, if provided as preventative extra help before a student is given an IEP, have been shown over time to reduce the need for special education services. As a result, the EB model puts more resources into these Tier 2 strategies and less into special education under the theory that the combination of resources can be used to address the needs of all struggling students, those in and those not yet in a special education program.

Initially, many panelists observed that the EB special education allocation would result in fewer educators providing extra help to struggling students, including students with IEPs, then are currently employed in their schools. Some panelists struggled with considering the special education resources in combination with the multiple and additional extra help resources – tutoring, extended day, summer school, and additional pupil support.

However, when panels discussed examples that showed how to meet the needs of students who require extra help – both those with and without an IEP – several panelists noted that the EB allocations provided more resources than their schools currently had, leading to a conclusion that the combination of extra help resources and special education resources were adequate.

A few of the panelists agreed with the assertion that effective use of more preventative Tier 2 programs along with early intervention supports embedded in the EB model – preschool, small K-3 classes, multiple Tier 2 interventions including tutoring by certificated personnel – can reduce the number of students who require special education services and that the academic struggles of many students are best addressed before and without an IEP (which is made possible by the EB approach). This perspective aligns with the theory of action embedded in the EB model and drives the logic behind the way resources are allocated in the model. This leads us to reaffirm the recommendation of one teacher position for every 141 students, which covers services for students with moderate and mild disabilities, related services (OT, PT, speech and hearing help), and behaviorists to help teachers and schools implement a school-wide strategy of behavior and discipline.

It is important to note that the PJ panels supported the concept of full state funding of programs for students with severe and profound disabilities and argued that it would be important for the state to develop rules and regulations to identify these students and programs.

Areas where EBPJ Panelists Agreed with the EB Model Recommendations

For most of the elements of the EB Model, the EBPJ panelists generally agreed the resources allocations were adequate for providing the resources schools needed to give all Michigan students an equal opportunity to meet state performance standards. Each of those elements is listed below together with pertinent comments from the panels.

School Prototypes

The panelists generally supported the use of school prototypes – 450 student elementary school, 450 student middle school, and 600 student high school – as well as the prototypical district of 3,900 students including four elementary schools, three middle schools, and two high school, to both show how all elements of the EB model play out at the school level and to calculate a base dollar per student figure.

Element 1a: Preschool

The panels supported the EB model recommendation of one teacher and one instructional aide for each group of 15 students for a preschool program. Several panelists mentioned that a full-fledged preschool program could help acculturate to formal schooling many students who have been entering kindergarten with significant behavioral and social issues, in addition to laying a foundation for learning.

Michigan's Early Childhood Standards of Quality require class sizes of 16 with two adults. The EB model is a bit more specific, providing not only two adults for classes of 15 students, but more specifically a fully licensed and trained teacher as one of those two adults. Michigan's early childhood standards also support a PreK-grade 3 integrated approach to early education, a focus that is also part of the EB model.

Michigan currently has a developmental "kindergarten" program for "young" five-year-olds. If the state adopted a full-fledged preschool program as included in the EB model, it would no longer need the developmental kindergarten programs as those students would all be eligible for the PreK services.

The EB model provides not only the one teacher and one aide for every 15 students in its prototypical preschool program, but also the elective teachers (so preschool teachers in a PreK-3 setting can engage in collaborative work with other early elementary grade teachers), instructional coaches, counselors and nurses, professional development, instructional materials, assessments, and technology resources that are provided to elementary schools.

Element 1b: Kindergarten

The panels supported the EB model recommendation of one teacher for 15 students in a full day kindergarten program. As well known, Michigan already supports a full day kindergarten program.

Some panelists would urge the state to take a more proactive approach to requiring all students to attend a preschool as well as full-day kindergarten program, so that they would be better prepared to enter first grade fully prepared for academic work and appropriate school behavior.

Element 2: Core Elementary Teachers

The EB model provides core elementary teachers at the ratio of one teacher position for every 15 students in kindergarten through grade 3 and one teacher position for every 25 students in grades four and five allocation averages to approximately one teacher for every 17 elementary students in a typical K-5 elementary school. Panelists supported these class size ratios. Many panelists stated that their current elementary class sizes were larger than these numbers, and had risen during the past decades because of required budget cuts.

Element 3: Core Secondary Teachers

The EB model provides core secondary teachers at a ratio of 25 students per teacher in all middle and high schools, generally grades 6-12. The PJ panels supported this recommendation.

It should be noted that nearly all panelists noted that their current actual class sizes were much larger than the EB model of 15 and 25. One panelist stated that these smaller class sizes would “solve all their education problems.”

Element 4. Elective Teachers

The EB model provides elective teachers to prototypical schools at a rate of 20 percent of elementary and middle school core teachers and 33.33 percent of core high school teachers. The combination of core and elective teachers allows every school in Michigan – elementary, middle, and high school – to provide a full liberal arts curriculum program, to provide a curriculum for both college and career ready focused students, and to have a focus on both what the EB model labels “core” courses (mathematics, science, reading/English/language arts, social studies and world language) and other subjects such as art, music, physical education, and career-technical education.

With this mix of staffing, the EB model provides for five 60-minute daily periods of pupil free time for elementary and middle school teachers. The high school elective allocation allows high schools to organize using a block schedule with four 90-minute blocks each day and allows for teachers to teach during three blocks and have 90 minutes each day for individual and collaborative planning (this time period also could be organized as two 45 minute periods).

In viewing the issue of core and elective teachers, the challenge is to ensure that this staffing of schools allows for sufficient time for both individual planning and preparation and for collaborative teacher teamwork. Most of the panelists stated that the EB staffing allocations would be adequate to provide such collaborative time.

Many panelists, however, argued that given the onset of Common Core/College and Career Ready academic standards, middle schools are becoming more like high schools and should have a 33-1/3 percent allocation for elective teachers, just as high schools have. This obviously would increase costs.

During the discussions of how sufficient collaborative time could be structured, it became clear that the issue required understanding both the student's typical day and the teacher's typical day. The student day is usually six and a half hours, with six hours of instruction and 30 minutes for lunch. The teacher day is most commonly seven hours, or an additional 30 minutes, with five hours of instruction, 30 minutes for lunch, 45 minutes for planning or meeting, and 15 minutes for opening and closing the school day. It is difficult to find 45 minutes a day for collaborative time as well as 45 minutes for individual planning and preparation, in a seven-hour work day.

But extending the teacher work day to seven and half hours solves this dilemma. Given this longer day, Michigan principals could straightforwardly organize school days so that all teachers – elementary, middle, and high – could have at least 45 minutes of pupil free time during the regular day and at least 45 minutes of pupil free time after the instructional day, both of which could be organized in various ways to ensure adequate time for individual teacher planning and preparation and daily teacher collaborative time. The EB model's goal is to have 45 minutes of teacher collaborative time daily, because teacher collaborative work is a key to improving student performance in virtually all studies of schools that have moved the student achievement needle.

In sum, most panelists supported the EB elective allocation of 20 percent elementary, 20 percent middle school and 33 1/3 percent high school. If, however, these staff allocations together with a seven-hour teacher work day created problems in providing sufficient collaboration time, the state could lengthen the typical teacher work day by 30 minutes, from seven to seven and half hours. This would require a seven percent increase in teacher salaries. Alternatively, the state could increase the middle school elective teacher allocation to 33 1/3 percent.

Element 5: Instructional Coaches

This EB model recommendation for instructional coaches was strongly supported by panelists, who indicated that the allocation of one coach for every 200 students generally was higher than is now provided to schools. Panelists agreed that coaches are critical for supporting collaborative time and professional development to improve instructional practice. Panelists also noted that instructional coaches are a needed staff resources to effectively implement the state's third grade reading initiative.

Several panelists noted that instructional coaches needed specific professional development to execute the coach role effectively. In response, the study team noted that as all instructional coaches in the EB model are considered teachers, and thus trigger ten days of annual professional development. As noted below in the section on professional development, providing this number of pupil-free days for professional development would require extending the average teacher's work year by five days so that the typical contract would include ten pupil-free days for professional development, as compared to the estimated average of just five days today.

Several panelists also suggested that it would be wise for the state to affirmatively launch programs to develop and train instructional coaches. The study team agreed with that suggestion and stated that several groups – the state department of education, administrator, and principal associations as well as teacher unions – could take on that role. Panelists shared that the General Education Leadership Network of the Michigan Association of Intermediate School Administrator's was one group that has already implemented such an instructional coach development and training program.

Although panelists were not asked if instructional coach funds should be included in a foundation block grant or separated as a categorical program, if the EB study team were asked, it would recommend that the state make funding of coaches a categorical program. This would help to ensure that instructional coach funds were actually used to hire and deploy instructional coaches. The study team's research in other states has shown that when funding for coaches is not dedicated, up to half of coaching funds are diverted to other expenditure items and coaches are in short supply.

Element 6: Core Tutors

The EB model provides one core tutor for each prototypical school. The PJ panels supported this recommendation, agreeing that there will be students in every school who struggle to achieve to the new higher Common Core standards and this extra help strategy is important to providing all students an equal opportunity to meet the new and more rigorous standards.

Some panelists urged the EB model to use the term "Tier 2 interventionist" instead of tutor; the EB model acknowledges this perspective but as noted previously, tutors, teachers in extended day and summer school are all part of Tier 2 resources the model provides. The EB model continues to support one-to-one tutoring in the early elementary years as the most effective, initial Tier 2 intervention.

Element 7: Substitute Teachers

The recommendation that substitutes be provided at the rate of five percent of all core and elective teachers as well as for instructional coaches, tutors, special education, extended day and summer school teachers was supported. School business officers who attended the panels indicated this would be sufficient.

Elements 8 and 24: School Counselors

The standard EB model provides one school/guidance counselor for every 450 PreK-5 students and one school counselor for every 250 students in grades 6 through 12.

As noted at the panel meetings, the EB model provides not only core guidance counselors and nurses, but also additional pupil support staff based on the incidence of poverty and English language learner (ELL) students. In addition to core school counselors the EB model provides an additional counselor for every 125 ELL students as well as for every 125 non-ELL poverty students. These additional positions could be a school counselor, social worker, family liaison, disciplinary dean, etc. Indeed, combining core school counselors with this additional pupil support allocation, the EB model provides more of these support staff than are employed in several districts, including many high poverty impacted districts, represented at the EBPJ panels.

Behavioral problems were also identified as challenging issues for most schools across the state; and many panelists suggested this required more counselors, behaviorists, or disciplinary deans. Though skills in organizing and managing classroom rules and behavior are reinforced by school wide strategies and programs that are uniformly enforced, panelists felt the need for behavioral expertise. As noted, Element 28, special education, includes behaviorist positions; this position is intended largely to aid schools and teachers develop and implement a positive assertive discipline strategy in the school and in each teacher's classroom.

Some panelists argued that every prototypical school needed a full-time nurse position. This concern was somewhat alleviated when the study team pointed out that the allocation of one school nurse for every 750 students would be sufficient for districts to provide for a full-time nurse in the prototypical 600-student high school and a half time nurse position in each of the 450-student elementary and middle schools.

Finally, some panelists stated that large numbers of students currently suffer from mental health issues that require therapy and suggested that therapists, such as psychologists and/or psychiatrists, be added to the model. One big issue here is whether such services should be included in the education budget or in the broader state and local health and human/social services budget. Mental health therapists are not included in the EB model at this point, but note that Michigan as a state may need to enhance the level of mental health services it provides it citizens, including its children. One way to access such services, noted by several panelists, is to partner with local County Health Systems. Indeed, in a few districts, the county health systems provided clinics in schools.

Element 9: Supervisory Aides/School Resource Officers

The goal of the EB model's providing supervisory aides is to create a system in which non-instructional duties such as hall, lunch, recess, or bus duty are provided by supervisory aides and not teachers. The EBPJ panels broadly supported the recommendation for supervisory aides in all schools to remove these "duties" from teacher responsibilities, hire non-licensed and lower-priced staff for these functions, and have teachers use the extra time for some combination of collaborative teacher work and individual planning and preparation. The general EB allocation is two supervisory aide positions for each prototypical elementary and middle school and three for a prototypical high school.

Although the panels did not raise the issue of school resource officers (SROs), the study team takes this opportunity to make relevant comments on them. SROs are individuals who provide additional safety for schools, which can include multiple activities, including securing doors and hall duty. The EB model's perspective on SROs is that they often are (in other states), and should be, funded by the police/sheriff/public safety budgets of towns or local municipalities, not school districts. The study team assumes that is the case for some Michigan schools as well. Public safety offices generally estimate resource needs based on the total population of their jurisdiction, which includes students. Thus, public safety officers should be available to provide protection to schools during school hours when that portion of the population is in school. In addition, public safety agencies also maintain the high cost insurance required for safety and police officers, costs that would substantially increase the cost to school districts if they employed SROs.

Element 10: Library Media Specialists

The panelists supported the recommendation of one library media specialist for each prototypical school. Panelists noted that librarians today play much broader roles than in the past, including helping the school provide access to and enabling students to access a wide variety of information sources on line.

Panelists agreed with the EB approach to move what used to be library media specialists – people who monitored movie projectors, slide projectors, etc. and who became school technology experts – to the central office and name them school computer technicians.

Element 12: School Site Secretarial Staff

The allocation of two secretarial positions at prototypical elementary and middle schools and three secretarial positions at prototypical high schools was generally supported. Some panelists indicated this was more staff then they had at schools in their districts, others said it was somewhat less. The study team left these allocations as originally recommended.

Element 13: Gifted and Talented

The panels supported the recommendation of $40 per student, which provides access to the internet-based GoQuest system, formerly called Renzulli Learning. Generally, the panelists endorsed the concept of this type of approach for enriched experiences for areas of interest or talent for all students.

Element 14: Professional Development

The PJ panels supported the professional development recommendations in the EB Model. These include sufficient time during the regular school day for collaborative teacher work, instructional coaches (Element 5), additional days in the teacher work year to ensure a total of 10 days for training and $125 per student for trainers and other professional development costs (such as coffee and donuts at professional development sessions, but not for tuition credit costs).

Panelists generally agreed that today the typical Michigan teacher contract includes five pupil free days for professional development. That would mean the EB model would increase the typical teacher work year by 5 days, which is done by calculating the current average daily rate for a teacher, and adding five times that to the current average teacher salary to cost out the EB model.

During this discussion, the issues of the teacher work year, days of instruction, days supposed to be used for professional development, and days for opening and closing schools and having parents emerged. Often so-called PD days are used for something other than professional development. When asked, the EB model's suggestion to most states is to create a standard 200-day teacher work year: 180 days of instruction, 10 pupil free days devoted exclusively to professional development, two to three days at the beginning and end of each year for opening and closing school, and another two to four days for parent-teacher conferences in the fall and spring. The study team encourages Michigan to set a standard for the number of instructional days in the school year, and argue that 180 days is appropriate. At present, however, the EB model does not explicitly include a recommendation that the instructional year should be a set number of days, and accepts the instructional year a state determines. The Michigan EB model will increase the average teacher's salary by five days so that the model provides ten pupil free days for the training element of professional development.

Finally, the robust professional development resources provided by the EB model are meant to cover *all* teacher professional development needs, including for example, content-based instructional strategies now linked to common core standards, the SIOP strategies needed for sheltered English instruction, instructional skills to identify and instruct the gifted and talented, training for instructional coaches, and appropriate training for elective teachers.

Element 19: Activity Funds and Extra Duty Pay

The panelists supported the inclusion of resources for sports, clubs, and other extracurricular activities. Many argued that the funding levels were too low for high schools. Several panelists in more than one panel stated that their secondary extracurricular programs cost closer to $600 per student, excluding transportation. These panelists suggested that the activities amount be differentiated by school level, with different amounts for elementary, middle, and high schools.

Other panelists noted that these resources would be provided to school districts which themselves could make appropriate allocations among elementary, middle and high schools and suggested the amount be left as is, a point with which the study team agreed.

Element 20: Maintenance and Operations

This topic was not discussed in detail, as most of panelists lacked knowledge in this area.

Elements 23, 24, 25 and 26: Strategies for Struggling Students

Panelists were generally supportive of the recommendations of resources for these services. The EB model now provides all these resources for students who are eligible for free and reduced-price lunch as well as for all ELL students. ELL students trigger these extra help resources whether or not they are eligible for free and reduced-price lunch. The goal is to make resources for students from poverty and for ELL students more robust, and in addition to special education.

All panels stated that transportation would need to be addressed and probably expanded for both extended day and summer school programs. Transportation was not included in this study.

Element 26: English Language Learner Students

For ELL students, the EB model provides extra tutoring (one position for every 125 ELL students), extended day (one position for every 120 ELL students), summer school (one position for every 120 ELL students), additional pupil support (one position for every 125 ELL students) and additional resources for language services (one position for every 100 ELL students). Altogether, this provides 4.2 positions for every 100 ELL students; put differently, each group of about 23 ELL students triggers an additional licensed position. By any measure, this allocation is adequate and panelists generally agreed with this perspective.

Element 27: Alternative Schools

The EB model provides funding for the equivalent of one assistant principal and one full time teacher or educational professional for every seven students in an alternative school. This allocation provides a source of funding that can then be used to staff schools a variety of different ways, depending on the specific needs of the students in those alternative schools. Generally, PJ panelists felt that for typical alternative schools, with a small number of students – usually 50 or fewer – this formula would work well, particularly if alternative school students were defined as children with multiple behavioral and emotional issues, including substance abuse.

This allocation supported the staffing of the Saginaw Security School, as well as another district's Juvenile Detention Center, both of which enroll students in line with the EB approach, i.e., students with multiple, emotional behavioral and often substance abuse issues.

Panelists also supported using the alternative school formula for resourcing the Welcome Centers for ELL students new to the district and the country and from various "traumatic" places such as refugee camps, wars, etc.

Element 29: Compensation

Panelists generally understood that the model will use the prior year average salaries to "price" out all staff, and there was support for including realistic assumptions about the cost of various benefits, particularly health insurance, in the model.

For pension costs, Michigan pays "off the top" an amount for "unfunded" pension costs of 11.04 percent for education staff and requires districts to pay 25.56 percent for ongoing pension costs. The model used this approach and 25.56 percent is the estimated cost of local pensions. In the future, Michigan could decide it wanted districts also to pay the 11.04 percent amount as well; this would require a change in current policy and increase compensation costs for all staff.

Worker compensation averages 0.6 percent for all staff. The state reimburses 100 percent of unemployment insurance so that entails no cost for school districts. The EB model uses 0.6 percent for workers compensation and zero percent for unemployment insurance.

Districts on average pay about $12,000 for each employee for health insurance. The EB cost estimates use this estimated figure for health insurance costs.

Some districts also provide disability and small life insurance policies. The EB model does not include life insurance as a benefit and the costs of short-term disability are extremely low, so the model does not include a line for these items.

Summary

This section summarized the reflections and discussion of four Evidence-Based Professional Judgment panel meetings that occurred in October 2017 across the state of Michigan. Approximately 100 educators attended these meetings in four locations across the state. The panels consisted of educators, approximately half of whom were teachers and the rest school site administrators, special educators, and/or central district administrators and board members.

Overall, the panels offered several important and helpful suggestions. In three areas – central office, preschool activities, and curriculum resources for extra help programs– panel recommendations led us to recommend Michigan changes to the EB model. Although the study team did not modify the EB model in response to suggestions in four other areas, the capacity to do so through the simulation model will enable policy makers to understand the costs of these suggested changes as well, should the state choose to adopt them.

For most of the model elements, particularly the instructional-focused elements, there was general agreement among PJ panelists that the EB Model provides adequate resources for all Michigan school children to be given an equal opportunity to meet the state's proficiency standards.

Final EB Michigan Recommendations

Table 3.8 provides a detailed summary of the resultant EB Michigan model resources.

Table 3.8
Summary of 2017 Michigan Adjusted Evidence-Based Model Recommendations

Model Element	2017 Evidence-Based Recommendation
Staffing for Core Programs	
1a. Preschool	Full day preschool for children aged 3 and 4. One teacher and one aide in classes of 15
1b. Full-Day Kindergarten	Full-day kindergarten program. Each K student counts as 1.0 pupil in the funding system
2. Elementary Core Teachers/Class Size	Grades K-3: 15 (Average class size of 17.3) Grades 4-5/6: 25
3. Secondary Core Teachers/Class Size	Grades 6-12: 25 Average class size of 25
4. Elective/Specialist Teachers	Elementary Schools: 20% of core elementary teachers Middle Schools: 20% of core middle school teachers High Schools: 33 1/3% of core high school teachers
5. Instructional Facilitators/Coaches	1.0 Instructional coach position for every 200 students

Model Element	2017 Evidence-Based Recommendation
6. Core Tutors/Tier 2 Intervention	One tutor position in each prototypical school (Additional tutors are enabled through poverty and ELL pupil counts in Elements 22 and 26)
7. Substitute Teachers	5% of core and elective teachers, instructional coaches, tutors (and teacher positions in additional tutoring, extended day, summer school, ELL, and special education)
8. Core Pupil Support Staff, Core Guidance Counselors, and Nurses	1 guidance counselor for every 450 grade K-5 students 1 guidance counselor for every 250 grade 6-12 students 1 nurse for every 750 K-12 students, which supports a half time nurse in each prototypical elementary and middle school and a full-time nurse in each prototypical high school (Additional student support resources are provided on the basis of poverty and ELL students in Element 23)
9. Supervisory and Instructional Aides	2 for each prototypical 450-student elementary and middle school 3 for each prototypical 600-student high school
10. Library Media Specialist	1.0 library media specialist position for each prototypical school
11. Principals and Assistant Principals	1.0 principal for the 450-student prototypical elementary school 1.0 principal for the 450-student prototypical middle school 1.0 principal and 1.0 assistant principal for the 600-student prototypical high school
12. School Site Secretarial and Clerical Staff	2.0 secretary positions for the 450-student prototypical elementary school 2.0 secretary positions for the 450-student prototypical middle school 3.0 secretary positions for the 600-student prototypical high school
Dollar Per Student Resources	
13. Gifted and Talented Students	$40 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 $125 per student for trainers (In addition, PD resources include instructional coaches [Element 5] and time for collaborative work [Element 4])
15. Instructional Materials	$190 per student for instructional and library materials $50 per student for each extra help program of poverty, ELL, summer and extended day
16. Short Cycle/Interim Assessments	$25 per student for short cycle, interim and formative assessments
17. Technology and Equipment	$250 per student for school computer and technology equipment
18. CTE Equipment/Materials	$10,000 per CTE teacher for specialized equipment
19. Extra Duty Funds/Student Activities	$300 per student for co-curricular activities including sports and clubs for grades K-12 $50 per preschool student
Central Office Functions	
20. Operations and Maintenance	Separate computations for custodians, maintenance workers and groundskeepers and $305 per student for utilities
21. Central Office Personnel/Non-Personnel Resources	A dollar per student figure for the Central office based on the number of FTE positions generated, as depicted in Table 3.7, and the salary and benefit levels for those positions. It also includes $300 per student for miscellaneous items such as Board support, insurance, legal services, etc.

Model Element	2017 Evidence-Based Recommendation
Resources for Struggling Students	
22. Tutors	1.0 tutor position for every 100 ELL students and one tutor position for every 100 non-ELL poverty students
23. Additional Pupil Support Staff	1.0 pupil support position for every 125 ELL students and one tutor position for every 125 non-ELL poverty students
24. Extended Day	1.0 teacher position for every 120 ELL and for every 120 non-ELL poverty students
25. Summer School	1.0 teacher position for every 120 ELL and for every 120 non-ELL poverty students
26. ESL staff for English Language Learner (ELL) Students	As described above: 1.0 tutor position for every 100 ELL students 1.0 pupil support position for every 125 ELL students 1.0 extended day position for every 120 ELL students 1.0 summer teacher position for every 120 ELL students; In addition, 1.0 ESL teacher position for every 100 ELL students.
27. Alternative Schools	One assistant principal position and one teacher position for every 7 ALE students in an ALE program One teacher position for every 7 Welcome Center eligible ELL students
28. Special Education	8.1 teacher positions per 1,000 students, which includes: 7.1 teacher positions per 1,000 students for services for students with mild and moderate disabilities and the related services of speech/hearing pathologies and/or OT PT. This allocation equals approximately 1 position for every 141 students. **Plus** 1.0 psychologist per 1,000 students to oversee IEP development and ongoing review. **In addition,** Full state funding for students with severe disabilities, and state-placed students, minus the cost of the basic education program and Federal Title VIB, with a cap on the number covered at 2% of all students.
Staff Compensation Resources	
29. Staff Compensation	For salaries, average of previous year For benefits: Retirement or pension costs: 4.6% per employee Health Insurance: $12,000 per employee Social Security 6.2% (up to annual earnings of $127,200) Medicare: 1.45% Workers' Compensation: 0.6 % Unemployment Insurance: 0% as the state cost fully reimburses costs

Calculating the Base Per Student Cost and Pupil Weights

To estimate adequacy costs based on the model described in Table 3.8, the EB study team developed an Excel-based simulation that provides the Evidence-based base cost per student as well as computes weights for special education, students in poverty and English Language Learners. Critical to these estimates are the costs of personnel. Salary data used to develop the cost estimates can be found in Appendix D.

To estimate total compensation, the model used the benefit rates described earlier. With these compensation estimates, the per student EB base expenditure is estimated to be $10,136, with weights of 0.32 for poverty or at-risk students and 0.41 for ELL students.[33] The per student EB preschool cost estimate is $14,155 which computes to a weight of 0.40 relative to the base per student expenditure estimate of $10,136. The alternative school cost estimate is $16,618 per student, which computes to a weight of 0.64 relative to the base per student figure of $10,136. These weights are depicted in Table 3.9, below.

Table 3.9

EB Total Base Cost and Additional Weights

Base	**$10,136**
Weights	
Preschool	0.40
Poverty	0.32
ELL	0.41
Special Education (For mild and moderate special education students; Census approach applied to all students in a district, not only the special education count)	0.07 (see explanation below)
Alternative Schools	0.64

The special education cost estimate and derived weight require further explanation. It is important to first note that the EB model assumes the state funds 100 percent of the excess costs of programs for students with severe and profound disabilities.

To estimate costs for students with mild and moderate disabilities, the EB model uses a "census" approach and computes an additional amount based on the count of all students in a district, not on the special education student count in each district. The EB estimate for the cost of special education is $673 per student for ***all*** students.

This equates to a weight of 0.07 applied to the total number of students in a district (or state). The effect is that the total revenue generated through the EB model for special education for children with mild and moderate disabilities is equal to the base EB cost estimate (in this model $10,136) times 0.07 for all students in the district (or state). Or looked at another way, every student (except those with severe and profound disabilities) in a district (or state) generates 1.07 times the EB base cost estimate ($10,846).

Finally, it is important to remind readers that the Excel-based simulation model can be used to model alternative resource levels. When used to do so, a revised base per student cost estimate will result, along with new estimates and weights for students in poverty, English language learners, and for special education. Costs for pre-school and alternative school students will also change as the parameters of the model are adjusted by the simulation user.

[33] The ELL recommendations also include welcome centers for districts impacted by substantial numbers of new students with no English language skills. These are funded at the same level as alternative schools, and would have the effect of providing some districts with a higher weight for ELL during the time the welcome center was open.

Chapter 4: Successful Schools Districts Approach

Introduction

In its 2016 study, the *Michigan Education Finance Study,* the study team undertook a modified successful school district study (SSD) for the state of Michigan. The study examined the performance and expenditures of successful school districts in the 2013-14 school year. As part of its response to the Collaborative's RFP, the study team proposed to update the numbers from the 2016 study.

The SSD approach provides a base cost that represents the level of resources needed for districts to outperform other districts in the state on current state standards and at current performance levels. This number then can be compared to the Evidence-based (EB) and Professional Judgment (PJ) base amounts, both of which examine the resource level needed to meet the higher performance standard of all students meeting all state standards. The SSD approach does not provide a means of determining the additional funding needed for students with additional needs (e.g poverty, ELL, and special education) and districts with different circumstances (e.g isolation). In most cases the highest performing districts also tend to have lower concentrations of students with additional needs. This was true for the districts that were selected in the *2016 Michigan Education Finance Study.*

This chapter first examines the SSD approach used in the 2016 study, utilizing information pulled directly from that study and further narrative provided by the study team. The chapter ends by examining how the results of the 2016 study would need to be adjusted to be brought to 2015-16 school year figures.

Successful Schools 2016 Study

The study team performed a modified successful schools study in the *2016 Michigan Education Finance Study*. It was considered a modified approach due to the specific requests of the 2016 RFP, which identified a specific standard for selecting successful districts: "successful districts have proficiency levels above the state average for all of the standards under the Michigan Merit Standards." In addition to the State's definition of a successful district, APA selected three additional district performance standards for the 2016 study: (1) performing at least one standard deviation above average on all tests (High Absolute Performance); (2) showing above average growth over time (Growth); and (3) showing success serving subpopulations (student special populations such as poverty, ELL, and special education). To meet any of these three additional performance measures, districts had to first meet the RFP standard of having proficiency levels above the state average. Districts that met the state's RFP standard and one of the additional study team standards were considered "Notably Successful" districts, a fifth success designation in the study.

As dictated by the state's RFP for the study, the 2016 study only examined the performance and expenditures of school districts and did not include charter schools. All data used was for the 2013-14 school year, which was the school year for which both performance and expenditure data were available at the time of the study. Table 4.1 outlines the criteria for each performance standard.

Table 4.1
Successful Schools Standards

Standard	Criteria
Above Average	Set by state; the percentage of district students scoring proficient or above is above the statewide average in all tested subjects. Districts meeting this standard are referred to as Above Average districts.
High Absolute Performance	The percentage of district students scoring proficient or above is at least one standard deviation above the statewide average in all tested subjects. Districts meeting this standard are referred to as High Absolute Performance districts.
Growth	The change in the percentage of district students scoring proficient or above between 2009-10 and 2013-14 was above the statewide average in all tested subjects. Districts meeting this standard are referred to as Growth districts.
Special Populations	The percentage of students in each demographic subgroup present in the district is above the statewide average in all tested subjects. Districts meeting this standard are referred to as Special Populations districts.
Notably Successful	Districts that met the Above Average Performance standard and one additional performance standard (High Absolute Performance, Growth or Special Populations), are referred to as Notably Successful districts.

The list of districts that met each performance standard is included as Appendix G.

The following sections first present the districts that met the first four performance standards and then examine the expenditures of the Notably Successful districts.

Districts Meeting the Above Average, High Absolute Performance, Growth, and Special Populations Performance Standards

It is important to first understand the Above Average standard set by the State's RFP. Table 4.2 looks at the proficiency levels that districts had to achieve in each subject area in 2013-14 to meet the Above Average standard.

Table 4.2

Proficiency Standards for Above Average Standard by Subject Area	
	Percent Proficient or Above
Math	36%
Reading	65%
Science	20%
Social Studies	29%
Writing	47%

As Table 4.2 shows, average proficient and above levels were relatively low for most test areas, with all subjects but reading below 50 percent. For math, science, socials studies and writing districts could have less than 50 percent of their student proficient or above and be above statewide averages. Districts would have had to have over 65 percent of their students proficient or above in reading to be above average.

Table 4.3 looks at the number of districts, average size of the districts, and need factor for the districts meeting each of the first four performance standards. Again, districts had to meet the Above Average standard to be eligible to meet the other three standards. The study team used a metric called a Need Factor to examine a district's relative need, based on its concentration of students with identified needs including special education, poverty, and ELL students. The higher the need factor, the higher the level of student need in a district. Additionally, 13 school districts were found to have spending that was significantly higher than other districts. These districts were considered outliers in the study and all rsults are shown both included and excluded outliers the outlier districts, a list of the thirteen can be found in Appendix H.

Table 4.3 shows that 186 districts met the State's Above Average standard while 34 met the High Absolute Standard, 27 met the Growth standard, and 9 met the Special Populations standard. In each case at least one outlier district met the standard, with six meeting the Above Average standard, two meeting the High Absolute Performance standard, three meeting the Growth standard, and just one meeting the Special Populations standard.

Table 4.3

Comparison of Expenditures for All Standards				
	Above Average	**High Absolute Performance**	**Growth**	**Special Populations**
All Districts				
Number of Districts	186	34	27	9
Average Size of Districts	3,548	5,919	2,097	7,466
Average Need Factor	1.254	1.186	1.269	1.223
Excluding Outliers				
Number of Districts	180	32	24	8
Average Size of Districts	3,686	6,344	2,386	8,419
Average Need Factor	1.253	1.186	1.278	1.218

Notably Successful Districts

A total of 58 districts met at least one of the three standards and the State's baseline standard, creating the Notably Successful standard group. Forty-seven districts met only one of the three additional standards, 10 districts met two of the additional standards, and one district met all three additional standards. The 58 districts that are Notably Successful are made up of districts showing various types of higher performance including absolute performance, growth, and success with special populations. A list of the 58 Notably Successful districts can be found in Appendix G. Table 4.4 compares the demographics of the Notably Successful districts to the remaining districts.

Table 4.4

Districts Meeting and Not Meeting Notably Successful Standard				
	All Districts		Excluding Outliers	
	Meeting Standard	Remaining Districts	Meeting Standard	Remaining Districts
Number of Districts	58	483	54	474
Average Size	4,360	2,324	4,728	2,379
Average Percent Special Education	9.89%	12.67%	10.42%	12.66%
Average Percent Economically Disadvantaged	29.12%	52.95%	27.46%	52.95%
Average Percent ELL	1.76%	2.50%	1.89%	2.53%
Average Need Factor	1.224	1.351	1.223	1.351

On average, the Notably Successful districts were larger than the remaining districts. The Notably Successful districts tended to have much lower need factors than districts that did not meet the standard. The average need factor for the 58 Notably Successful districts of 1.224 is far lower than the average need factor of 1.351 for the remaining districts. When examining the need factor, it is most meaningful to consider only the figures on the right side of the decimal, meaning the non-Notably Successful districts *had need that was over 50 percent greater* than the Notably Successful districts.

After the high-spending outliers were excluded, there was very little change in the demographics of districts meeting the Notably Successful standard and remaining districts. Four districts were removed from the Notably Successful group and nine districts not meeting the Notably Successful standard were removed as outliers.

Next, the study team examined the expenditures of the Notably Successful districts, both all districts and excluding outliers.

Expenditures

Base Expenditures

Expenditures were examined by type of expenditure. The study team focused on examining the districts' base expenditures, which districts spend on students with no identifiable additional needs (where additional needs students include special education, poverty, and ELL students). For this study, APA examined base expenditures by expenditure type, including the following expenditure types:

- Instruction;
- Administration;
- Student Support Services;
- Instructional Support;
- Food Service;
- Transportation;
- Maintenance and Operations (M&O);
- Community Service;
- Adult Education; and
- Other Expenditures.

The tables below condense these categories into instruction, administration, support, and other. Support includes student support services and instructional supports. The study team created two total base cost figures, one with all base expenditures and one without Food Service and Transportation. Since Food Service and Transportation are often funded separately from other base functions, APA wanted to highlight the differences in expenditures when these categories are included and when they are excluded. Both expenditure categories often vary for reasons unrelated to district characteristics used in funding formulas. For example, transportation expenditures per student are often less related to the need or size of a district and more related to the geography and density of a district. APA compared districts that were Notably Successful to those districts that did not meet the standards.

Table 4.5 looks at the combined group of Notably Successful districts.

Table 4.5

Expenditures of Districts Meeting and Not Meeting Notably Successful Standard				
	All Districts		Excluding Outliers	
	Meeting Standard	Remaining Districts	Meeting Standard	Remaining Districts
Number of Districts	58	483	54	474
Average Size of Districts	4,360	2,324	4,728	2,379
Average Need Factor	1.224	1.351	1.223	1.351
Base Expenditures				
Instruction	$5,883	$4,944	$5,143	$4,794
Administration	$1,137	$1,133	$900	$1,061
Support	$837	$652	$875	$646
Other	$2,531	$2,153	$1,975	$2,061
Total Base Expenditures	$10,388	$8,881	$8,893	$8,562
Total Base Expenditures Less Food Service and Transportation	$9,301	$7,967	$8,188	$7,683

The 58 Notably Successful districts spent, on average, a little over $1,300 per student more on base expenditures than districts that did not meet the standards. The districts that met the standards also spent, on average, about $900 more per student on instruction and also spent more on support and other expenditures.

Excluding the four high-spending outlier Notably Successful districts reduced the base expenditures by nearly $1,500 per student. Districts that met the standard still had higher spending in instruction and support. Base expenditures for the districts that met the standard were on average still more than $300 more per student than in the remaining districts when including Food Service and Transportation and over $500 more per student when excluding those two expenditure areas.

The study team recommended the $8,188 figure of base costs without Food Service and Transportation costs as the figure that best represents what it took in 2013-14 for districts to perform much better than other districts in Michigan.

Adjusting for Inflation

In order to use the $8,188 figure for the current Michigan study, the figure has to be adjusted for inflation to 2015-16 dollars. To do this, the study team used the Bureau of Labor Statistics Consumer Price Index (CPI-U) for Detroit-Ann Arbor-Flint.[34] Two years of inflation need to be applied to the figure to adjust for changes from 2013-14 to 2015-16. The CPI in August 2013, the beginning of the 2013-14 school year, was 220.000 and it was 220.249 in August 2015, the beginning of the 2015-16 year. This small increase indicates that there was basically no inflation over this time for the area. With this data, the study team recommends not adjusting the $8,188 figure and continuing to use that figure as the 2015-16 figure for this study. This decision is clearly a very conservative decision, as it is likely that district costs have increased as the cost of wages, benefits, and other operational costs have increased during this time.

[34] https://www.bls.gov/regions/midwest/data/consumerpriceindexhistorical_detroit_table.pdf

Chapter 5. Transportation

This chapter reviews the study team's work examining transportation. Transportation for students includes the day-to-day travel to and from school, travel for school activities and sports, the additional travel needed to provide students with extended learning opportunities such as after school or summer school, and the specific travel needs for special education students. A number of factors can impact the costs different districts or charters face to provide these transportation services. These factors include the size of a district, the student population density of the district, the number and type of activities offered to students, and the type of special education populations served by the district or school.

In the 2017-18 school year, the state of Michigan earmarked just $3.73 million for school transportation costs.[35] Districts in the state can use this earmarked funding for specific transportation expenses, but the bulk of transportation costs to districts has to come from the operational funding through the state's funding system. Any operational funding used by districts to cover transportation costs will mean fewer dollars available for other operational costs, such as teacher salaries and benefits, textbooks, technology or school maintenance. Districts that have the same size student population may face very different student transportation costs due to their geographic size, student density, or the location of their schools. Over the years states have developed funding systems to address the fact that districts have different needs when it comes to student transportation.

The rest of this chapter is broken out into three areas. First, the study team examines how other states approach funding transportation including an analysis of comparable states. Second, the study team examines current transportation expenditures in Michigan. The examination looks at district and charter spending separately as well as special education transportation separately from other transportation. Third, the study team describes how the recommendations found in the PJ and EB studies could impact transportation needs in Michigan.

Transportation Expenditures Across the United States

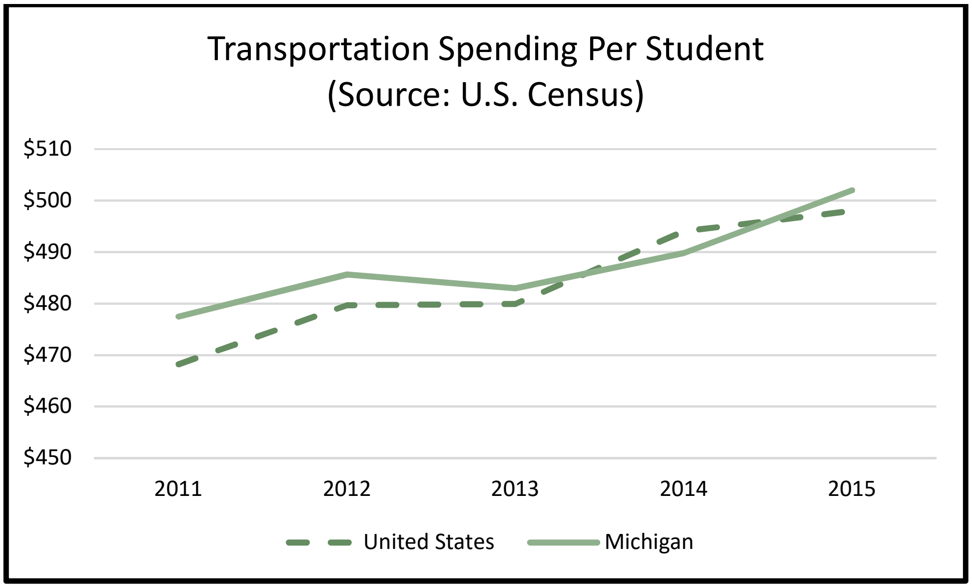
According to the U.S. Census' "Annual Survey of School System Finances" in the 2014-15 school year (the most recent year that nationally comparable data is available), Michigan's public schools spent just over $675 million to transport students.[36] During this school year, transportation expenditures in Michigan accounted for 4.6 percent of total state education expenditures, which equaled the national average for transportation spending. In other states the percentage of education funding used to transport students ranged from 7.4 percent in West Virginia to 2.3 percent in California.

During the 2014-15 school year, Michigan expended $502 per student on transportation costs, which is almost identical to the national average of $498 per student. Per student transportation expenditures ranged greatly in the states during 2014-15, with New York spending the most per student at $1,256 and Utah spending the least at $219 per student. Between the 2010-11 school year and the 2014-15 school year, Michigan's per student transportation expenditures increased by 4.9 percent. During the same time period, the national average saw a 6 percent increase. Between the 2011 and 2015 school years,

[35] Michigan annotated code: Section 388.1674
[36] https://www.census.gov/programs-surveys/school-finances/data/tables.html

Michigan's per student transportation expenditures hewed closely to the national average (see Chart 5.1), never varying by more than nine dollars per student above or below the average.

Chart 5.1
Transportation Spending Per student



State Transportation Funding Systems in the U.S.

To determine school transportation funding policies in the 50 states, the study team reviewed a 2016 study by Dr. Deborah Verstegen reviewing transportation funding in 45 states. [37] The study team then reviewed state data from the five states that were not part of the Verstegen study (Arkansas, Indiana, Louisiana, Oklahoma, and Rhode Island) to create a 50-state review of public school transportation funding policies. The review found that 49 of the 50 states provide some form of transportation funding to their public schools. Indiana does not currently provide public school transportation funding but will begin doing so through the state's primary funding formula beginning in the 2018-19 school year.[38] There are five general ways that states provide transportation funding to schools:

- Reimbursement Model (22 States): states reimburse districts for a portion of their allowable transportation costs.
- Included in the State's Primary Funding Formula (11 States): transportation funding is a component of the state's primary school funding formula. In some of these states additional funding is targeted to transportation. In other states, there is no specific amount of funding for transportation, but districts can use state funding for the cost of transporting students.

[37] Verstegen, Deborah A. (2016) "Policy Perspectives on State Elementary and Secondary Public Education Finance Systems in the United States," Educational Considerations: Vol. 43: No. 2. h ps://dx.doi.org/10.4148/0146-9282.1026

[38]Indiana House Bill 1009 of 2017.

- Geographic Distance (10 States): funding is based on geographic considerations such as bus route miles, total square miles or the density of students in a school district.
- Per student Allocation (5 States): states provide districts with a flat per student rate regardless of their actual transportation costs.
- Full State Funding (3 States): states fully fund the cost of transportation.

Table 5.1
State Transportation Formulas

Funding Method	Number of States	States
Reimbursement Model	22	Alabama, California, Connecticut, Georgia, Idaho, Illinois, Maryland, Massachusetts, Missouri, Montana, Nebraska, Nevada, New Mexico, New York, North Carolina, North Dakota, Ohio, Oregon, Pennsylvania, Rhode Island, South Carolina, and Utah
Included in State's Funding Formula	11	Arkansas, Florida, Iowa, Louisiana, Michigan, Minnesota, New Hampshire, Oregon, South Dakota, Tennessee, and West Virginia
Geographic Distance	10	Arizona, Colorado, Kansas, Kentucky, Maine Mississippi, Ohio, Oklahoma, Texas, and Virginia
Per student Allocation	5	Alaska, New Jersey, Vermont, Washington, and Wisconsin
Full State Funding	3	Delaware, Hawaii, and Wyoming

Note: The total number of states does not equal 49 because Ohio and Oregon make use of multiple methods of funding transportation. Information from Washington, D.C. was not included in this table because it functions as a single school district.

Funding Formulas and Expenditure Patterns

After reviewing national trends in transportation funding, the study team reviewed student transportation expenditure data to examine relationships between state funding policies and actual transportation expenditures. There are many factors influencing public education transportation expenditures, including geographic distances, student density, state mandates, and local district decision making. Even with those variations, there exists a pattern between state funding models and actual transportation expenditures.

As shown in Table 5.2, states that fund districts through a "Per student Allocation" expend $85 (14.6 percent) more on a per student basis to transport students than the national average. States that use some form of "Geographic Distance" to fund their student transportation systems expend $156 (45.5 percent) less to transport their students than the national average. What cannot be determined is if the different ways that states fund schools actually impact expenditures or if state school transportation needs have shaped the way that the states fund student transportation. Determining the actual causal effect would require a more in-depth study of the data.

Within each of these funding categories, there can be a large difference between state expenditures. For example, states that fund their transportation programs through the state's primary funding formula (like Michigan does) averaged spending $455 per student in FY 2014-15 to transport students, but this amount ranged from a low of $333 (Tennessee) to a high of $855 (West Virginia).

Table 5.2
Funding Formulas & Expenditures

State Transportation Formula	Transportation Expenditure Per student (FY 2014-15)[39]
Per student Allocation	$583
Full State Funding	$579
Reimbursement Model	$560
Included in State Funding Formula	$455
Geographic Distance	$342

Comparative States

Comparing Michigan's school transportation funding to all 50 states' systems provides a broad understanding of the differences in how states fund transportation and differences in spending across states. However, a more targeted examination is also useful. For example, Michigan's transportation needs are not necessarily comparable to small New England states or large western states. To help gain a greater perspective, the study team assembled school transportation information for states that are the most comparable to Michigan. Michigan's school districts are physically smaller than the national average, as shown in Table 5.3, but they are more densely populated than the average school district in the U.S., as shown in Table 5.4. APA reviewed national data to choose states with districts of approximately the same geographical size as Michigan's and with roughly the same student density. In addition, each comparable state selected had to have at least one large urban school district. Using these criteria, the study team found six comparable states: Illinois, Indiana, New York, Ohio, Pennsylvania, and Wisconsin.

[39] Calculations based on data from the United States Census using total student enrollment. Ohio and Oregon were excluded from these calculations due to the fact that they use multiple methods for funding student transportation.

Table 5.3
Average School District Size

	Average District Size (In Miles)[40]
United States	262.2
Wisconsin	128.7
Indiana	121.6
Michigan	103.7
Pennsylvania	89.6
New York	68.0
Ohio	66.3
Illinois	64.6

Table 5.4
Number of Students Per Square Mile

	Students Per Square Mile[41]
United States	13.7
Wisconsin	15.9
Michigan	24.0
Indiana	28.1
Pennsylvania	35.8
Illinois	37.1
Ohio	39.1
New York	55.5

State Transportation Funding in Comparative States

In the 2014-15 school year, per student transportation expenditures in comparable states averaged $815 and ranged from $496 (Wisconsin) to $1,256 (New York). In FY 2014-15, the per student transportation expenditures in comparable states was $313 higher, 63.4 percent, than Michigan's spending level of $502. Between the 2011 and 2015 fiscal years, Michigan per student transportation expenditures consistently trailed that of the comparable states average, as shown in Chart 5.2.

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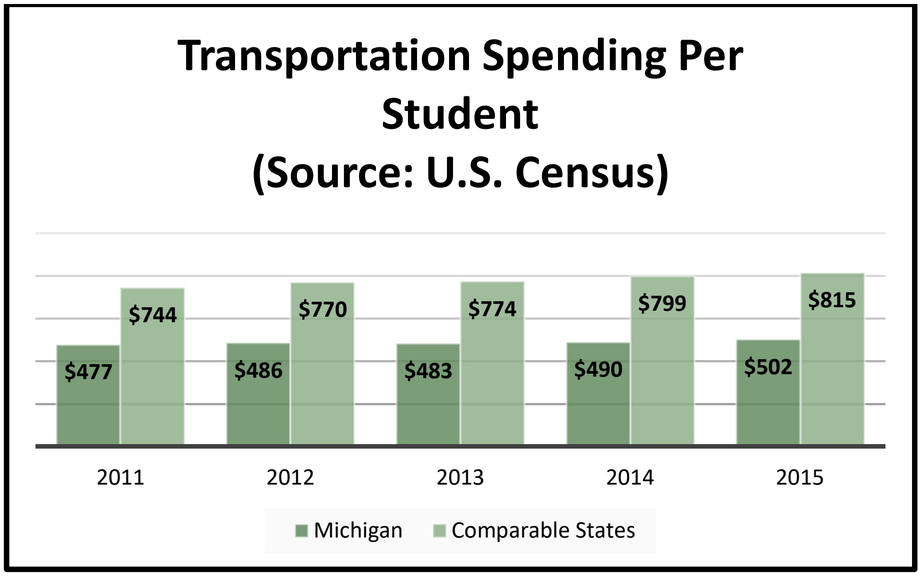
[40] Ibid

[41] Calculated by APA based on information from the United States Census, "*Annual Survey of School System Finances* 2014-15".

Chart 5.2
Historical Transportation Spending in Comparable States



Comparative State Funding for Transportation

Five of the comparable states provide some state funding for student transportation. The only comparable state that does not provide transportation funding to their schools is Indiana. The five states that do provide funding vary in their funding policies, with Illinois, New York, and Pennsylvania using the Reimbursement Model, Wisconsin providing funding on a per student basis and Ohio making use of a reimbursement model for most schools and a geographic distance model for sparsely populated districts.[42] In the 2017-18 school year state transportation funding ranged greatly from New York, which provided just over $1.7 billion, to Wisconsin, which provided $24 million, shown in Table 5.5.

[42] Ohio Legislative Service Commission, "School Funding Complete Resources". February 2017. Page 37. https://www.lsc.ohio.gov/documents/reference/current/schoolfunding/edufeb2017.pdf

Table 5.5
Comparable State Transportation Funding

	Funding Method	State Education Funding Earmarked for Transportation Fiscal Year 2017-18[43]
Illinois	Reimbursement Model	$262.9 million[44]
Indiana	No state funding	NA
Michigan	Through the state's primary funding formula	$3.73 million[45]
New York	Reimbursement Model	$1.717 billion[46]
Ohio	Reimbursement Model and Geographic Distance	$479.5 million[47]
Pennsylvania	Reimbursement Model	$549 million[48]
Wisconsin	Per student Allocation	$24 million[49]

Of the five comparative states that provide schools with additional funding for transportation costs, the per student amounts vary greatly from $27.85 (Wisconsin) all the way to $652.47 in New York, as shown in Table VIII. This variance has to do less with the type of funding formula used and more with the state's definition of the students that they will fund. Wisconsin makes use of a per student funding system that provides districts with $365 for each qualified student. However, students only qualify for state transportation aid if they live 12 miles or more from their school. In contrast, New York provides transportation funding for any student that lives more than one and a half miles from their school. This dramatic difference between a qualified student in New York and Wisconsin can help to explain the difference in state funding.

[43] These numbers represent state funding that is specifically targeted to student transportation.
[44] Illinois State Board of Education, Overview of Mandated Categorical Program Funding. October, 2017. Page 4. https://www.isbe.net/Documents/mcat-narrative.pdf
[45] Michigan annotated code: Section 388.1674
[46] New York Education Department, 2017-18 State Aid Handbook. Page 28. https://stateaid.nysed.gov/publications/handbooks/handbook_2017.pdf
[47] Ohio House Bill 49 of 2017
[48] $549.1 million for traditional pupil transportation and $80 million for transporting charter and non-public school students. Source: Pennsylvania Appropriations Act of 2017 (Act 1A).
[49] Wisconsin Act 59 of 2017.

Table 5.6
Estimated State Transportation Funding Per student[50]

	Per student Transportation Funding[51]
Indiana	$0
Michigan	$2.77
Wisconsin	$27.85
Illinois	$128.42
Ohio	$299.65

Michigan Transportation Expenditures

Since transportation costs are driven by a number of factors such as the distance traveled, the number of students transported per mile, and the types of transportation services provided rather than just the number of pupils served, it is best not to analyze transportation data on a per student basis. This section examines the expenditures detailed in Michigan's 4094 transportation report focusing on examining transportation expenditures for regular education transportation. Additionally, all analysis is done for districts and charters separately.

Regular Transportation

The 4094 report provides transportation expenditures by "Regular" and "Section 52" expenditures. For this section, the study team focuses on the costs associated with regular education. The analysis undertaken includes looking at a number of variables split into those related to district characteristics and those related to cost per unit for the 2015 -2016 school year (2016). The variables include:

1. District Characteristics:
    - Square miles (for districts only);
    - Density per FTE (students per square mile for districts only);
    - Density per rider (riders per square mile for districts only); and
    - Miles traveled per rider.
2. Costs per Unit:
    - Cost per square mile (for districts only);
    - Cost per mile transported;
    - Cost per FTE; and
    - Cost per rider.

Districts

In 2016, 516 Michigan districts had expenditures on regular transportation in the 4094 data, this included the Education Achievement Authority. Ten districts had no identified riders while an additional

[50] This number is based on total enrollment in each state.
[51] Based on FY 2014-15 total student enrollment.

four districts had no miles traveled. The study team excluded any districts without riders or miles, 14 districts, and also the Education Achievement Authority (EAA) from its analysis of district expenditures (due to a lack of square mile information for the EAA.) Additionally, one district had a cost per rider of around $95,000. This cost was nearly $90,000 more per rider than any other district. For analysis purposes this district was excluded also. Table 5.7 below shows the average, minimum, and maximum for the variables described above for the 500 districts included in the transportation analysis.

Table 5.7
Transportation Data for 500 Districts with Riders

	Square Miles	Miles per Rider	Density per FTE	Density per Rider	Cost per Square Mile	Cost per Mile Transported	Cost per FTE	Cost per Rider
Average	111	255	99.93	32.53	$24,107	$4.46	$497	$973
Median	77	221	17.99	8.62	$7,219	$3.98	$411	$876
Min	1	12	0.04	0.05	$195	$0.23	$10	$42
Max	1,281	3,325	1,481.94	615.84	$334,272	$34.49	$10,139	$7,983
StDev	127	228	197.90	56.38	$39,935	$2.60	$679	$575
CoVar	1.144	0.893	1.980	1.733	1.657	0.584	1.365	0.591

Table 5.7 shows the wide range in the variables that often impact the cost of transportation for districts. Districts range from just one square mile up to 1,281 square miles. One district traveled almost 3,400 miles per rider while the district with the lowest miles per rider was just 12 miles. The vast differences in district size also lead to very different district density. The district with the lowest density per FTE has just .04 FTE per square mile, while the district with the highest density has nearly 1,500 students per square mile. The range in density per rider is similar though lower.

The large variation in size and miles traveled leads to very large differences in the costs per unit faced by school districts. The average district spends over $24,000 per square mile for transportation but the range is over $330,000 with a minimum of $195 per square mile to $334,272 per square mile. The cost per mile transported averages $4.45 with a range of $.23 to $34.49. The average cost per FTE is just under $500 with a range of $10 to $10,139. The range for cost per rider is smaller with a minimum of $42 and a maximum of $7,983.

The last line on Table 5.7 shows the variation in figures across all districts. A figure of .0 would mean that there is no variation. In school finance, a figure above .100 is starting to show larger variation. Clearly, the variation in all categories is much higher than the .100 standard. Still, a few variables show much lower variation compared to others including cost per mile transported and cost per rider.

Table 5.8 below shows the correlations between the transportation data variables, attempting to see if the differences in costs can be explained by the relationships between the variables. A correlation describes the relationship between two variables. A correlation of 1.000 would mean that two variables are perfectly correlated in a positive direction, as one rises so does the other. A correlation of -1.000 would mean that two variables are perfectly correlated in a negative direction, as one rises the other decreases. A correlation of 0 means there is no relationship between two variables. Generally, in school finance research a correlation above +/- .300 is thought to be moderately correlated. A correlation +/- .700 is thought to be highly correlated.

Table 5.8
Correlations for 500 School Districts with Riders

	Square Miles	Miles per Rider	Density per FTE	Density per Rider	Cost per Square Mile	Cost per Mile Transported	Cost per FTE	Cost per Rider
Square Miles	1.000	0.210	-0.341	-0.347	-0.355	-0.200	0.150	0.144
Miles per student Transported	0.210	1.000	-0.222	-0.281	-0.229	-0.276	0.766	0.637
Density per FTE	-0.341	-0.222	1.000	0.711	0.780	0.523	-0.191	-0.011
Density per Rider	-0.347	-0.281	0.711	1.000	0.832	0.266	-0.169	-0.232
Cost per Square Mile	-0.355	-0.229	0.780	0.832	1.000	0.363	-0.159	-0.056
Cost per Mile Transported	-0.200	-0.276	0.523	0.266	0.363	1.000	-0.145	0.334
Cost per FTE	0.150	0.766	-0.191	-0.169	-0.159	-0.145	1.000	0.505
Cost per Rider	0.144	0.637	-0.011	-0.232	-0.056	0.334	0.505	1.000

In trying to understand the impact of different district characteristics to costs, it is best to examine the correlation between specific district characteristics and different costs per unit. The data show that the cost per square mile is highly correlated with the density of the district, both per FTE or per rider. This shows that smaller districts, which tend to have more density, have a higher cost per square mile. When density is compared to cost per FTE or cost per rider, there is either a low negative or no correlation. The strongest correlations to cost per FTE or Rider is the miles per rider transported. Miles per rider transported has a low negative correlation to the density factor.

Charter Schools

One hundred twenty-one public school academies (Charters) had transportation expenditures for the 2016 school year in the Michigan's 4094 database. Of those 121 Charters, just 52 Charters had riders in the 2016 database. Additionally, 11 charters indicated they had zero miles traveled in 2016. Without miles traveled data, the study team had no data for correlation analysis and thus the 11 charters were removed from this analysis leaving 41 charter schools in the data set. Charter schools do not have defined borders like school districts and thus square mileage is not available for each charter. Without square mileage density calculations cannot be made. Table 5.9 shows information on the variables available for charter schools which includes:

- Miles per rider;
- Cost per mile transported;
- Cost per FTE; and
- Cost per rider

Table 5.9 shows that the average miles per rider was just 625 miles nearly three times the average miles per rider for school districts. The variation for charter schools was over three times higher with a variation of over 3.000. The cost per mile for charter schools was $5.92 with a range from $0.44 to $19.69. Charters had a higher cost per mile, with a smaller range but higher variation than districts. Costs per FTE were actually similar to district costs with a slightly lower average and slightly higher median. The variation was also close. Charters had about a 50 percent higher cost per rider than districts. This was due to one charter school that had a significantly higher number of miles traveled than other districts with a smaller number of students. There was a similar range of differences in costs per rider but the variation amongst charters was about twice as high as districts.

Table 5.9
Transportation Data for 41 Charter Schools with Riders

	Miles per Rider	Cost per Mile Transported	Cost per FTE	Cost per Rider
Average	$625	$5.92	$474	$1,460
Median	$213	$3.97	$419	$1,044
Min	$32	$0.44	$25	$51
Max	$12,356	$19.69	$1,415	$7,540
StDev	$1,911	$4.78	$327	$1,435
CoVar	3.058	0.807	0.690	0.983

Table 5.10 shows the small number of correlations available for the charter school analysis. Similar to districts, there is a moderate relationship between cost per rider and miles transported per rider. Interestingly, the cost per FTE is negatively related to the miles per rider. The variation in correlations is likely due to the differences in decisions being made between charters as well as the small number of charters represented in the data.

Table 5.10
Correlations for 41 Charter Schools with Riders

	Miles per Rider	Cost per Mile	Cost per FTE	Cost per Rider
Miles per Rider	1.000	(0.251)	(0.186)	0.539
Cost per Mile	(0.251)	1.000	0.254	(0.008)
Cost per FTE	(0.186)	0.254	1.000	0.252
Cost per Rider	0.539	(0.008)	0.252	1.000

This section looked at the current actual expenditures for transportation, the next section looks at the possible areas of impact on transportation related to the adequacy recommendations.

Impacts on Transportation of Adequacy Results

The results of both the PJ and EB panel work identified various programs and interventions that need to be available for students to be able to meet state standards. These programs and interventions include services for all students and services directly aimed at special need students such as poverty and ELL students. Though a number of or even most of these services may exist today, the scale and scope of the programs might need to be greater than are in place today. Panelists made it clear that without the proper transportation to support programs, such programs would not truly be available or accessible to many students.

Extended Day: Both the EB and PJ recommendations suggest making available extended learning opportunities for students in the form of before/after school and summer school programming. Both programs would require additional transportation to be effective. An additional round of buses would need to be in place each day to provide transportation for students who remain at school. During the summer, busing would allow students to participate in the extended year opportunity. Since both of these programs are most targeted at students in poverty, the transportation becomes even more important.

Preschool: The EB and PJ panelists identified the need for preschool to allow students the best opportunity to succeed. If the preschool program is determined to be a half-day program transportation would be needed for students.

Isolation

During the PJ panel focused on isolated districts, the panelists consistently brought up transportation funding as a concern even though it was not a specific focus of this adequacy study. The panel members wanted to stress that they have a greater need for transportation funding in all facets of their educational programs. Not only do they have a higher cost of transporting students to/from school they also have higher transportation costs for extended day programs (before- and after-school and summer school) and for extracurricular activities. There was a particular focus on the high cost of transporting students to sports activities.

The information described in this section will be used to make transportation recommendations in the final chapter of the report.

Chapter 6: Impacts of Adequacy Results on the Possible Capital Needs of Districts/Schools

Capital is a major component of the funding needs for all school communities. There are a multitude of approaches to funding capital needs throughout the country and within the state of Michigan. The vast majority of capital funding for school districts is derived locally through property taxes levied by individual communities. The use of property taxes levied by individual communities for funding capital can lead to large variations in abilities of districts to fund new capital projects or even to have the resources available to adequately maintain school facilities. This leaves those with resources in a more advantageous position than those without.

Charters do not have the same access to local funding sources and generally fund their facility needs through their operating funds. This means charters must utilize the funds many districts use only for operations on both facilities and operations.

The study does not look specifically at capital needs; however, it is clear that some of the programs, interventions, and resources identified by both the PJ and EB approaches would or could lead to additional capital needs for districts and charters across Michigan. This section examines the areas the study team identified that might lead to increased capital needs. These capital implications would need to be addressed for districts and Charters to be able to fully implement the adequacy recommendations allowing students, teachers, schools, and districts to meet state standards.

Class Size Ratios: Both the EB and PJ recommend class sizes that are likely smaller than currently found in many schools in Michigan. Additionally, the PJ approach suggests lowering class size at the secondary level for poverty students. Smaller class sizes would likely create the need for additional classroom space, especially at the elementary level. Alternatively, schools might be able to utilize space differently, providing teachers with office space but not specific classrooms. Sharing classroom space would require additional office space for instructional staff for their planning and collaboration time. This alternative approach might work best at the secondary level.

Support Staff: The PJ approach has a focus on pupil support staff, providing robust support for all students and increasing the levels of support as special needs populations increase within a school. Pupil support staff members were typically identified as school based and this might require additional office space within schools for added staff.

Extended Day/Year: Both the EB and PJ approaches recommend making extended learning opportunities available for students in the form of before/after school and summer school programming. Though these programs are unlikely to require space not currently available, they are likely to put pressure on school facilities in other ways. In particular, the extended use of the building may conflict with schools' normal maintenance routines, requiring adjustments to these schedules to complete all ongoing maintenance needed.

Preschool: The EB and PJ panelists identified the need for preschool to allow students the best opportunity to succeed. Expanding the preschool opportunities for students within the public school setting would likely require additional space for these programs. Space for preschool programs is often more expensive than other educational space, as there are a number of specific resource requirements for preschool programs.

The programs and resources described above were found to be necessary by educators from across Michigan and the capital implications need to be considered beyond the operating revenue recommendations made in this report.

Chapter 7: Geographic Cost Differences

Introduction

It is well-established that the cost of educating students is not the same across all schools and students. Costs can vary for many reasons, some of which are under the control of local school officials (such as decisions about the size of classes or about curricular offerings) but many costs cannot be controlled by local school districts. Costs outside the control of school officials include those associated with (1) the characteristics of the student body (for example, special needs populations like poverty, English Language Learners (ELL), (2) district size or special education students) and (3) with operating in certain geographical locations. When allocating funds through a state finance formula, it is appropriate for policy makers to compensate districts for differences in these uncontrollable costs. But ensuring that formula adjustments accurately reflect these cost differences can be quite challenging.

Many states include in their school funding formulas some measure of costs associated with providing a comparable education in different locations across the state. This report discusses the advantages and disadvantages of various methods to capture these geographical, cross-district cost differences, to recommend the best approach for Michigan going forward.

To understand the nuances of the methods for measuring geographic variations in education costs, one must first have a general understanding of (1) what causes variations in the costs of providing a comparable education across schools and districts and (2) how such variations might be included in a state school finance formula. Section II of this report contains a general discussion of education costs, highlighting the primary sources of variation in such costs. Section III reviews the methods for estimating variations in education costs due specifically to geographic location. Section IV provides estimates of cost costs based on a Comparable Wage Index (CWI).

Variation in Educational Costs

Economists define the *cost* of producing any product as the minimum amount of money necessary to buy the *inputs* required to produce one unit of *output*. For physical goods like cars or computers, this calculation may be relatively straightforward, but when the product is education, the model is more complicated. This is true, in part, because a unit of education output has to be defined before the required inputs can be determined. Thus, most discussions of the costs of education begin with some outlining of expectations for student performance (an education output). This preliminary outlining is then followed by discussions of what inputs are needed to produce desired student performance in a given school, what prices a school faces for those inputs, and how those inputs and input prices might vary across schools and districts.

Education outputs are typically defined in terms of student performance. Student performance might be measured through scores on state accountability assessments or other standardized tests; dropout and/or graduation rates; some other measure; or some combination of measures. Regardless of the measure of student performance used, education cost calculations are associated with given levels of performance. That is, if the expectations for student performance increase, then the costs of achieving that improved performance will also necessarily increase (see Baker, 2005, and Baker, Taylor and Vedlitz, 2008, for a summary of the educational adequacy literature)[52]. This is true because higher levels of student performance require more inputs (which, in turn, require more money). In most states, the legislature or the Department of Education has established baseline expectations for, and/or agreed-upon measures for, student performance. These benchmarks are used to guide calculations of the amount of funding that is necessary, or adequate, to ensure all districts have the capacity to reach minimum student performance expectations. For example, the adequacy goal underlying Michigan's funding formula suggests that the formula should provide the amount of money necessary for all districts to provide every student an equal opportunity to meet the Michigan Merit Curriculum and other state requirements.

Variation in Educational Costs across Schools and Districts

Once an output (student performance) expectation is established, schools can consider how to reach that level of output. In general, student performance depends on the interaction between students and direct school inputs (e.g. teachers, books, and extra help services). The total cost of education is calculated by multiplying those inputs by their prices.

By far, the most important input to educational production is personnel: teachers, administrators, aides, support staff, etc. The importance of personnel is reflected in the fact that the bulk of any district's budget is spent on employee salaries and benefits (Odden and Picus, 2014). Districts also have to buy materials (e.g. books and technology) and pay for physical inputs (e.g. utilities and building maintenance). While all districts purchase these inputs, the specific amount and mix of inputs needed in any individual district depends on the characteristics of that district. For example, a district with a high number of special needs students may require more inputs, or a different combination of inputs, than a district with a lower number of special needs students. Similarly, a district's geographic location will influence its specific input prices. For example, a district in an area with a high cost of living will need to offer higher wages to attract and retain employees. Similarly, a district located in a very cold area will need to spend more on energy than a district in a more temperate area.

While expectations for student performance will presumably be the same for all schools and districts across a state, the costs of achieving those levels of performance is known to differ from school to school. There are three main factors behind these variations in costs: differences in district size, differences in student characteristics, and differences in where schools are located (in terms of geographic location). These factors, in turn, affect costs through two main channels: (1) differences in the level and/or mix of inputs needed and (2) differences in the prices of needed inputs. Although many cost analyses focus on the impact of the cost factors overall, this analysis focuses on the channels through which these factors impact costs. In this way, the analysis highlights how cost variations are best measured, as well as how and why these variations should be incorporated into funding formulas.

[52] This is not intended to imply that the relationship between costs and performance expectations is one to one, nor that the relationship is the same in every state or in every district, but simply that the two are positively correlated.

Variation in the Level and Mix of Educational Inputs

To achieve a given level of student achievement, different districts may use different levels, or combinations, of inputs. Some of this variation stems from the choices that districts make to achieve their expected levels of student performance and achievement. For example, one district might choose to prioritize a well-stocked library, while another may choose to limit class sizes so that student-to-teacher ratios are smaller. These sorts of choices are typically referred to as "discretionary factors" and, to the extent possible, should be held constant when measuring the variation in costs that will be addressed in the funding formula.

Other variation in input levels stems from "cost factors" – characteristics that influence the amount of resources used but that are outside the control of local officials. As noted, one of these cost factors is the enrollment in the district. For example, Andrews, Duncombe, and Yinger (2002) and Imazeki and Reschovsky (2003) find that very small districts typically have higher per-pupil costs than larger districts, primarily because their fixed costs (e.g. physical infrastructure, administrators) are spread over fewer students.

A second source of input variation stems from differences in the characteristics of students. A wide range of studies (see Baker, 2005, for a summary) have found that costs are higher in districts with larger proportions of low-income students, ELL students, or students with disabilities. It is generally thought that, because these students may face extra challenges at home and in the classroom, they require more resources from schools to reach the same levels of achievement as their peers. These additional resources may include smaller classes, more instructional time, special materials, etc. Depending on location, districts may also require different levels of physical inputs (Rose et al., 2008). For example, districts with more variation in temperature may require more energy for heating and cooling.

Thus, districts with these identifiable cost factors – small size, low-income students, ELL students, and challenging geographic location – typically require more inputs to reach the same levels of performance as other districts. Because these cost factors are outside a district's control, it is appropriate for the state to compensate districts for these identifiable cost factors via additional revenue.

Variation in the Prices of Educational Inputs

Even if two districts use the same level and mix of inputs, total costs may still vary if the districts face different prices for those inputs. As mentioned earlier, teachers are the most important input in education production. Correspondingly, teacher wages are the most important input price.

Some of the cross-district variations in personnel costs stem from choices districts make. For example, districts that hire more experienced and/or more educated teachers will have higher salary costs because such teachers command a wage premium. Some states provide additional revenue to districts that have more experienced and/or educated teachers;[53] however, there is little theoretical or practical

[53] For example, New Mexico computes a "training and experience index" based on five experience categories and five education categories. Districts with more teachers in higher categories have higher index values and receive

justification for this sort of aid adjustment. Not only are teacher experience and/or education levels within the control of a district, but research has also found very little connection between teacher experience and/or education (beyond the first few years of teaching experience) and student outcomes (Betts, Zau, & Rice, 2003; Monk, 1994). In fact, policies that compensate districts for having more experienced and/or educated teachers may create perverse incentives. For example, such policies might encourage districts to hire teachers who have Master's degrees but who are not necessarily providing greater contributions to student performance levels compared to teachers who do not have Master's degrees. These sorts of choices should be held constant when adjusting a funding formula for variations in teacher wage costs.

Nonetheless, there are some differences in personnel costs that *do* come from factors outside the control of districts. The most important of these is the difference between geographic locations in terms of the price required to hire a teacher – or any personnel – of a given quality. Wages vary across geographic locations, in part because the purchasing power of a dollar is not the same in all places. It costs more to achieve a given standard of living in Ann Arbor than in Grand Rapids. Because it takes different amounts of money to buy the same bundle of goods in different locations, equivalent workers will demand different wages for equivalent jobs. If a district's wages are not sufficiently high to compensate workers for higher costs of goods and services, then it will be harder for that district to attract and retain workers in high-cost areas.

At the same time, the experience of living in some places is also more pleasant than the experience of living in other places. For example, although New York City and San Francisco have much higher costs of living than other cities, each city also offers amenities (e.g. museums, heightened access to businesses, desirable weather) that may not be available in other cities or areas of their respective states. Of course, these cities may also have more prevalent crime, poverty, and urban problems than other cities. If a location is attractive enough, positive amenities can offset higher living costs, so workers may not expect or demand wages that are quite as high as would otherwise be expected. Thus, the true differences in wages needed to attract and retain equivalent workers between locations will depend on worker preferences, living costs, and local amenities.

There is a large body of literature on teacher mobility and attrition to support adjusting state aid for locational variations in wage costs (see Imazeki & Goe, 2009, for a summary). When salaries are not high enough to compensate for high costs of living or a lack of amenities, teacher turnover is higher and recruitment is more difficult. Thus, all cost studies provide some acknowledgement of these different salary needs as part of the determination of adequate levels of funding for different districts.

Adjusting for local living conditions is especially appropriate because such conditions affect *all* school worker wages, not just teacher wages. Teacher salaries may also vary from district to district because of the working conditions for teachers. Several studies have found that teachers are more likely to leave schools with certain characteristics, including schools with larger shares of students with special needs

more revenue per student. Wyoming has a similar adjustment for education and experience in its determination of costs for each school district.

(e.g. special education students, low-income students, and ELL students). As mentioned above, schools with larger shares of students with special needs generally need to hire more teachers or a different mix of teachers to help their students achieve similar levels of performance as schools with fewer special needs students. The argument here is that on top of needing more inputs, schools with larger populations of special needs students may also need to pay higher wages to attract and retain similar teachers.

However, as Rose and Sengupta (2007) pointed out, it is worth considering whether these are really uncontrollable salary costs that the state should include in funding formula adjustments. Put differently, it is important to ask *why* it is considered more difficult to teach in schools with larger numbers of special needs students. Most likely, the answer is that special needs students face additional educational challenges, placing additional demands on teachers. However, it may not be necessary to pay teachers higher wages if schools are able to improve working conditions in other ways, such as providing additional supports or reducing class sizes. The literature on teacher labor markets suggests that teachers generally care more about working conditions than salaries (Hirsch, 2008), so it may also be more cost-effective to change these sorts of inputs than to raise salaries. Thus, while it may be appropriate to provide additional revenue to districts serving more special needs students (because such districts may need to spend more money to buy more inputs), it is unclear whether it is appropriate to measure or allocate additional revenue for the impact on teacher wages as well.

In addition to variation in wages, districts may face different prices for other inputs, such as energy or supplies. These expenditures constitute a much smaller share of district budgets, and price variation is likely to be more correlated with district size, as larger districts may have access to volume discounts that are unavailable to smaller districts (Duncombe and Goldhaber, 2003).

D. Measuring and Adjusting for Variation in the Cost of Education

Overall, the uncontrollable factors that affect educational costs for a given school boil down to (1) district size, (2) the characteristics of the student body and (3) where the school is located (geographic location). As discussed, many of these cost factors can impact total educational costs through two channels: (1) input levels and (2) input prices. It is important to keep these two channels in mind when measuring and incorporating costs in a state funding formula, as these channels influence estimation methods and applications of the resulting adjustments.

When the primary channel of impact is input prices, it makes sense to measure how variables directly impact input prices. It is established economic practice to use models that have prices as the dependent variable. Thus, analyses intended to isolate the impact of geographic location, which affects costs primarily through wage effects, tend to estimate models that use salaries as the dependent variable. State funding adjustments based on these models should reflect that the models capture variation in prices only; for example, an adjustment for geographic wage costs might be applied to 80 percent of district revenue to reflect that salaries constitute 80 percent of most districts' budgets.

In contrast, when the primary channel of impact is input levels or a mix of level and prices (where the dollar impact must be measured by combining those input levels with prices), or when it is unclear how much of the impact is on input levels versus prices, analyses typically focus on the impact of variables on total costs. Thus, analyses intended to isolate the impact of district characteristics, which affect both input prices and levels, will use models with total expenditures as the dependent variable. Funding formula adjustments based on these models should then be applied to total district revenues, since they capture variation in overall costs. For example, many states use pupil weights to increase aid for districts with larger shares of students with special needs (e.g. poverty students, ELL students, and special education students). The analytic methods used to determine the magnitude of these weights all focus on the relationship between district cost factors and district total expenditures (see Baker, Taylor, & Vedlitz, 2008) and provide one number for the overall cost impact of each variable. These adjustments are then applied to total revenue to calculate the revenue allocation.[54]

Measuring Variation in Wage Costs Associated With Geographic Location

As discussed in the preceding sections, variation across districts in the costs of providing comparable educations is due to both (1) discretionary factors within the control of district officials and (2) uncontrollable cost factors outside the control of district officials. Uncontrollable cost factors include (1) district characteristics (e.g. enrollments and student demographics) that can lead to higher input needs and/or higher input prices and (2) location characteristics (e.g. cost of living and area amenities) that can lead to higher input prices. It is appropriate for the state to provide additional revenue to compensate for these cost factors. There are multiple methods available to estimate the magnitude of the differences associated with different cost factors.

As discussed in the previous section, geographic location primarily affects district costs through input prices, namely wage costs. This section will focus on how location affects wage inputs. Geographic location can also affect costs of expenditures for other inputs, such as energy or transportation inputs. Expenditures for such other inputs are likely to have greater impacts on input *levels* (e.g. districts needing to buy more buses or maintain lengthier bus routes) rather than impact *prices*. Expenditures for these other inputs demand a much smaller share of district budgets than expenditures for personnel. The report will therefore return to these other inputs as a separate issue in Section IV below.

There is a well-established body of literature on adjusting state aid formulas to account for geographic variation in teacher wages. A number of states include such adjustments. There are three possible adjustments: (1) cost of living adjustments, (2) comparable wage indices, or (3) hedonic wage indices.

Housing-Based Cost of Living Adjustment

The first option is to adjust for the cost of living by computing the price of a basket of goods associated with each location (similar to how the Consumer Price Index is calculated across time). Typically, that local basket of goods is dominated by housing costs, although other goods' prices are also usually included (McMahon, 1996). This approach has the advantage of being straightforward to calculate and

[54] Alternatively, those separate weights and adjustments could also be combined into a comprehensive index that captures variation in all costs, including the impact of both district characteristics and location factors, and differences in both input levels and prices (see Reschovsky and Imazeki, 1996). This sort of summary index is easy to incorporate into a foundation funding formula and greatly simplifies the calculation of adequate funding but further obscures the underlying sources of cost variations.

update over time, as long as data on housing costs and other items in the basket are available. The major disadvantage of a housing-based cost of living adjustment is that it does not include any information about area amenities which may also impact the wages needed to attract and retain workers. As mentioned in Section II, workers will generally accept lower wages to work in locations with pleasant amenities, such as desirable weather or vibrant cultural life. Thus, even though housing costs are higher in such locations, wages may not need to be equally high. Because high cost of living is correlated with these pleasant amenities, a cost of living 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 costs of living and underestimate it in locations with low costs of living.

Comparable Wage Index

A Comparable Wage Index (CWI) is calculated by measuring the variation in non-teacher wages across localities. CWIs therefore account for the impacts of both cost of living and area amenities. The assumption is that workers who are similar to teachers in terms of their levels of education, their training, and their job responsibilities will have similar preferences as teachers. For example, if non-teacher workers in the City of Ann Arbor are paid, on average, 10 percent more than non-teacher workers in the City of Flint, then the CWI would suggest Ann Arbor City Public Schools should receive 10 percent more revenue for teacher salaries than Flint Public Schools.

Specifically, following Taylor and Fowler (2006), a CWI is created by estimating the following equation:

$$LnAnnualSalary_i = \beta_W W_i + \beta_O O_i + \beta_I I_i + \beta_R R_i + \varepsilon_i$$

In this equation,

- the dependent variable is the natural log of annual salary,
- W_i is a vector of characteristics of worker *i*,
- O_i is an indicator variable for worker *i*'s occupation,
- I_i is an indicator variable for worker *i*'s industry,
- R_i is an indicator variable for the region that worker *i* lives in, and
- ε_i is an idiosyncratic error term.

The resulting coefficients are then used to predict a wage in each region for a worker with average characteristics (that is, average values of all worker characteristics).

Estimation of this model requires data on individual worker characteristics as well as industry, occupation, wages, and location. These variables are all available in the American Community Survey, which is administered annually.[55] The American Community Survey (ACS) is an ongoing national survey administered by the U.S. Census Bureau, sent to 3.5 million people each year, collecting information on income, housing, education and migration, as well as the employment variables already mentioned. The

[55] In 2000 and earlier, the relevant variables were collected on the long form of the decennial Census. Taylor and Fowler (2006) discuss how to use Occupational Employment Statistics data from the Bureau of Labor Statistics to update a CWI in the years between Censuses; thus, annual adjustments can still be made between Census years prior to 2005 when the relevant variables became available annually as part of the American Community Survey.

ACS replaced the long form of the decennial Census and thus, is the only national source of this type of information. Data with the individual responses necessary to compute a CWI are available in the ACS Public Use Microdata Sample for areas with at least 100,000 residents (called PUMAs or Public Use Microdata Areas). A CWI for any PUMA is therefore relatively straightforward to create and can easily be updated on an annual basis. A CWI also has the advantage of being clearly beyond the control of local districts; it does not use any school-generated data. It can also be used, or easily adjusted for use, for all labor costs (e.g. certified staff, non-certified staff, teachers, administrators, or classified staff).

On the other hand, a CWI assumes comparability of workers. The CWI captures average preferences for location among all non-teacher workers, so using a CWI to adjust for district wage costs assumes teachers have similar preferences as other workers and therefore require similar wage adjustments. This assumption could be strengthened by estimating the CWI with a sample of workers more closely aligned with teachers (e.g. workers with college degrees or workers in occupations that require education levels and/or job responsibilities similar to teaching). However, if teacher preferences are systematically different than other worker preferences, then a CWI may not be appropriate.

A CWI is also intended to capture variation across labor markets, generally measured at a broad geographical level (e.g. across a metropolitan area). The smallest area for which a CWI value can be calculated using the ACS data is a PUMA (areas with at least 100,000 residents); in densely populated regions, a PUMA may represent one part of a city or county but in sparsely populated regions, a PUMA may span multiple counties. In the results below, the analysis is done at the county level where possible, and at the PUMA level if county population is too small for a county-level estimate. To obtain the best coverage, the analysis uses the 5-year sample for 2015, which pools data across the previous 60 months in order to maximize the number of respondents in each area.

A CWI cannot measure cost variations across districts within the measured geographical area, so all districts within an area would necessarily have the same index value.

This drawback is related to another potential concern about comparable wages: A CWI does not measure variation in wages across districts due to school-specific working conditions. As discussed in the previous section, it is not clear that the state *should* make adjustments for the impact of student characteristics on wages. That said, if a state decided to make such adjustments anyway, a CWI measure would not include variation in wages because of school-specific conditions.

Hedonic Wage Index

Hedonic wage indices are calculated by breaking down variation in current wages based on a number of different identifiable variables. Thus, hedonic wage indices can capture variation due to both geographic location characteristics and student characteristics. 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,
- T_i is a vector of characteristics of teacher i (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),
- D_S is a vector of discretionary cost/working condition variables in school S (such as class size),
- C_S is a vector of uncontrollable cost/working condition variables in school S (the most commonly included are the percentages of high-need or poverty students),
- G_S is a vector of characteristics for the region that teacher i lives and works in (such as housing prices and area amenities like weather, crime or population density), and
- ε_i 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 T_i) in each school, holding constant the discretionary cost variables.

The data required to estimate this model will depend on the specific variables included. Though the most commonly included variables have been noted above, it is important to recognize that the specific choice of variables to include is ultimately up to the analyst. This can have some benefits, as the model can generate estimates of the impact of specific variables that may be of particular interest to the state. For example, the hedonic method can reveal how much of locational variation is coming from housing costs, versus how much locational variation is coming from preferences for area amenities (e.g. low crime or desirable weather). Additionally, the hedonic approach explicitly captures and controls for the impact of student characteristics on teacher wages, and thus can generate a distinct value for each district.

On the other hand, there may be some variables (e.g. measures of teacher quality or area amenities) that should theoretically be included (because theory and previous research suggest that they impact teacher wage costs), but that are excluded in practice due to lack of data. This creates a potential concern: because 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. In both cases, the resulting index will provide a potentially biased measure of true cost variations. Of particular concern is that, to the extent that unobserved or excluded variables are correlated with included cost factors, the hedonic index may overestimate or underestimate true costs. For example, if districts with more special needs students are also less efficient than districts with fewer special needs students, then the coefficients on student variables may be biased upward, rewarding districts with extra revenue for their inefficiency.

It is tempting to try to make up for missing data by including as many specific cost and control variables as possible. However, doing this creates some issues. Including additional variables can reduce the precision with which all the coefficients are estimated. This concern is also particularly salient when the additional variables are correlated with other variables already in the model. Furthermore, a larger and more complex model becomes increasing difficult to update over time. That last point is perhaps the largest drawback of the hedonic approach in general, especially for generating a measure to be used in state policy. The data requirements and statistical complexity of the hedonic approach make calculating and updating even a relatively simple hedonic wage index significantly more difficult and time-consuming than either of the alternative approaches.

Comparable Wage Index versus Hedonic Wage Index

Economic theory clearly suggests that the cost of living approach is inferior to the other two approaches; although all three methods can account for the impact of housing and other costs on wages, the cost of living approach fails to capture the impact of area amenities that affect wages. With that in mind, this analysis focuses on the relative merits of a comparable wage index and a hedonic wage index.

When attempting to capture variation in the impact of geographic location on district salaries, the comparable wage approach has multiple benefits over the hedonic approach:

1. The data are easily and publicly available, and the statistical method of estimation is straightforward. This makes annual updates relatively easy, minimizing the large changes in allocations that can result when updates are less frequent.

2. The comparable wage approach does not require the analyst to make decisions about which specific variables to include or exclude (in contrast to the hedonic methodology). Moreover, the comparable wage methodology is well-established (see, for example, Taylor and Fowler, 2006) and analysts are in agreement about the specification of the model. Again, this simplifies estimation, as there is no need to collect data from multiple sources nor worry that variables available in one year are not available in another.

3. The data used for estimation is outside the control of local districts so there can be no ‘gaming’ of the resulting index.

One aspect of the hedonic model that may seem advantageous is that it specifically includes student characteristics. Research shows that, as variables, student characteristics do have an influence on teacher salaries. However, if the state’s funding model already includes explicit adjustments for student characteristics (e.g., special needs students), it may not be appropriate to additionally incorporate variation in those variables when calculating the wage cost in isolation.

Typically, analysts estimate the costs of a student characteristic, like poverty, by looking at the characteristic’s impact on *total* expenditures, since student characteristics may lead districts to hire more teachers, or raise levels of other inputs like tutoring services, in addition to offering higher wages. These costs are then included in state aid formulas separately from adjustments for geographic location, which primarily impact wages. If a state has these separate adjustments for student characteristics, then it may be problematic to include the same student characteristics in an adjustment primarily intended to capture the impact of geographic location on wages.

The Michigan Comparable Wage Index

The rest of this report focuses on the comparable wage methodology to estimate cost differences across areas. This is based on a wage index for professional workers: full time, full year workers who have at least a Bachelor's degree and who are not self-employed.[56] The results presented below adjust wages for a variety of characteristics:

- Demographic characteristics: Age and age squared to account for a non-linear relationship between experience and salary, race, and sex;
- education: indicators for master's degree, professional degree, and Ph.D. degrees;
- usual work hours and indicators for weeks of work (27-39 weeks, 40-47 weeks, 48-49 weeks; or 50+ weeks), and
- insurance coverage through employer or union.

The resulting coefficients are then used to adjust the average wage for each area so that the average is based on the same characteristics as the average Michigan teacher:

$$Adjusted\ Ln\ Annual\ Salary = \widehat{\beta_w}\overline{W_{MI}} + \widehat{\beta_s}$$

Essentially, this methodology asks, "If the average non-teacher in each area had characteristics that were the same as the average teacher in Michigan, what would the average salary be?" This allows average salaries across areas to represent differences in area labor markets, living conditions, and amenities, rather than differences in the characteristics of workers (e.g., older or more educated in one region than another).[57]

Tables 1 and 2 shows the comparable wage indices for all full-time, full year workers with at least a BA and for a subset of those workers who are employed in the public sector (federal, state, or local employers but not employed in teaching). For comparison, unadjusted average salaries were also converted to the same format that is shown in the last two columns of Table 1.

Table 7.1 reports estimates based on metropolitan areas, which may cross county lines. Table 2 reports estimates based on counties, where that data is available, or on Public Use Microdata Areas that combine counties when the number of county level observations is too small for public reporting of the data. It is important to point out that the data used for the comparable wage analysis are taken from the U.S. Census Bureau's American Community Survey (ACS). This analysis uses the 2015 ACS 5-year

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[56] More specifically, the sample consists of full time (35+hours per week), full year (27+weeks per year) workers ages 22-65, not in school, not self employed.

[57] Additional analysis included indicators for the industry as another characteristic. The results were very similar to those excluding industry of work, and they are therefore not presented below. Further analysis also restricted the comparison occupations to a smaller set suggested by other researchers as being most comparable to teachers. (See the Economic Policy Institute's work by Allegreto, Corcoran and Mishel (2004) for one such list, and Stoddard (2013) for another.) Again, the results were very similar to those with the full set of professional and technical workers, and for brevity again they are not presented below.

estimates, which pool data across the previous 60 months. This allows for larger sample sizes to estimate differences across smaller geographic areas. Even so, there are many areas that must be aggregated to produce reliable estimates.

The tables report the difference in wage costs for each area relative to the state average. For comparison, the first column in each table reports the unadjusted relative wage, and the last two columns adjust wages to so that they are based on average characteristics.

Table 7.1
Metropolitan Area Comparable Wage Indices, 2015

Metropolitan area (2013 OMB delineations)	Wages relative to state average, All workers BA+ unadjusted	Wages relative to state average, All workers BA+ Comparable characteristics	Wages relative to state average, Public sector BA+ Comparable characteristics
Not in metro area	84.8%	86.6%	91.3%
Ann Arbor	111.7%	104.2%	107.9%
Battle Creek	98.0%	102.9%	109.5%
Detroit-Warren-Dearborn	110.4%	109.1%	108.3%
Flint	86.0%	92.6%	93.6%
Grand Rapids-Wyoming	91.6%	95.3%	96.7%
Jackson	86.2%	91.8%	92.6%
Kalamazoo-Portage	95.8%	94.4%	94.4%
Lansing-East Lansing	90.1%	93.4%	101.0%
Monroe	91.1%	96.7%	100.4%
Muskegon	84.9%	91.1%	95.6%
Niles-Benton Harbor	106.0%	101.1%	94.8%
Saginaw	88.8%	94.3%	93.7%

Areas with numbers above 100 percent have high wage costs relative to the state average and areas a number under 100 percent have lower costs. For example, Table 1 indicates that in non-metropolitan areas, wages of workers with BAs are about 87 percent of wages for the average worker in Michigan, while non-metro public sector workers are somewhat closer to the state average.

Table 7.2
Michigan County or PUMA Comparable Wage Indices, 2015

County or Combined County Area Number indicates County fips or PUMA id number in the case of combined counties	Unadjusted premium (+) or penalty (-), all workers BA+	Characteristics T adjusted premium (+) or penalty (-) all workers BA+	Characteristics adjusted premium (+) or penalty (-), public sector workers
5 Allegan County	88.1%	92.2%	89.4%
21 Berrien County	106.0%	101.1%	93.2%
25 Calhoun County	92.9%	97.7%	104.1%
65 Ingham County	90.0%	90.8%	92.8%
75 Jackson County	86.2%	91.8%	91.1%
77 Kalamazoo County	97.8%	96.2%	92.7%
81 Kent County	90.9%	94.4%	92.9%
93 Livingston County	114.1%	112.1%	108.7%
99 Macomb	93.6%	101.2%	111.2%
100 Western Upper Peninsula (Baraga, Dickinson, Gogebic, Houghton, Iron, Keweenaw, Marquette, Ontonagon)	81.2%	83.9%	87.9%
115 Monroe County	91.1%	96.7%	98.9%
121 Muskegon County	82.5%	89.4%	95.1%
125 Oakland County	123.5%	116.4%	106.9%
139 Ottowa County	93.0%	96.2%	98.6%
145 Saginaw County	88.8%	94.3%	92.1%
147 St. Clair County	91.3%	96.3%	101.4%
161 Washtenaw County	110.8%	103.8%	105.7%
163 Wayne County	98.8%	101.7%	103.0%
200 Eastern Upper Peninsula (Alger, Cheppewa, Delta, Luce, Mackinc, Menominee, Schoolcraft)	80.4%	83.5%	91.0%
300 Northeast Lower Peninsula (Alcona, Alpena, Cheboygan, Crawford, Montmorenecy, Oscoda, Otsego, Presque Isle)	75.5%	71.6%	84.3%
400 Northwest Lower Peninsula (East) (Antrim, Charlevoix, Emmet, Kalkaska, Missaukee, Wexford)	86.3%	83.4%	85.3%
500 Northwest Lower Peninsula (West) (Benzie, Grand Traverse, Leelanau, Manistee)	90.2%	85.6%	90.6%

County or Combined County Area Number indicates County fips or PUMA id number in the case of combined counties	Unadjusted premium (+) or penalty (-), all workers BA+	Characteristics T adjusted premium (+) or penalty (-) all workers BA+	Characteristics adjusted premium (+) or penalty (-), public sector workers
600 Newaygo, Mason, Oceana & Lake Counties	80.7%	80.7%	88.7%
1100 Ionia, Montcalm, Mecosta & Osceola Counties	76.5%	83.5%	86.6%
1200 Isabella, Gratiot & Clare Counties	78.8%	83.1%	85.1%
1300 Iosco, Gladwin, Roscommon, Ogemaw & Arenac Counties	79.8%	79.6%	77.5%
1400 Bay & Midland Counties	103.1%	102.4%	98.5%
1600 Tuscola, Sanilac & Huron Counties	74.9%	82.4%	84.4%
1700 Genesee, Lapeer & Shiawassee Counties	90.8%	93.8%	95.8%
1900 Eaton & Clinton Counties	90.5%	96.6%	105.7%
2200 St. Joseph & Branch Counties	80.7%	82.4%	93.8%
2300 Van Buren & Cass Counties	88.3%	90.3%	95.0%
2500 Lenawee & Hillsdale Counties	80.0%	80.0%	90.3%

Table 7.2 replicates this same analysis across county and PUMA areas. It is important to reiterate that these indices are best used for wage adjustments by school districts if public school employees and workers outside of education have similar geographic preferences. Again, the selection of the sample based on education and full time, full year work helps to ensure that workers are roughly comparable.

Across counties and county areas, CWI ranges from a low in the Northeast Lower Peninsula (Alcona, Alpena, Cheboygan, Crawford, Montmorenecy, Oscoda, Otsego, Presque Isle counties) where wage costs are 28 percent lower than the state average, to a high in Oakland County, where wage costs are 16 percent above the state average.

Public sector workers share many of the characteristics and benefits of teaching and other education related jobs. As in teaching, state and local salary schedules tend to be more similar across different parts of the state because (1) characteristics of these jobs are more similar and (2) the hiring pool is more uniform across the state. This is likely to be particularly true for educational workers. Therefore, a public sector wage index may be more representative of educational labor costs in an area.

It is worth noting that these indices are at the county, metro, or PUMA area, and as such may not capture specific localized problems. For example, particularly remote schools or districts in an area may have more difficulty recruiting or retaining teacher even if salaries are competitive with those in their local area. The specific difficulties of especially remote districts has been described both by superintendents and in the academic literature (Cowen et al, 2012; Hammer et al, 2005; Miller, 2012;

Monk, 2005; Tuck et al, 2009). For example, Miller (2012) finds that rural schools in New York have more recruitment problems for beginning teachers with strong academic preparation and Tuck et al (2009) finds that remote communities in Alaska have more turnover. Tuck et al (2009) estimate premiums in remote areas that are approximately 30 percent more than in the most urbanized district in the state. Cowen et al (2012), however, find similar rates of retention across districts in Kentucky although rural Appalachian teachers are somewhat more likely to leave the profession.

Nearly all of these studies conclude by finding that there is a subset of schools in rural areas that are particularly hard to staff. Michigan may well have some of these schools, but the labor market costs cannot be estimated at finer level without school- or district-specific salaries and school-specific teacher retention rates. An examination of teacher turnover or the number of applicants at the school level could reveal higher employment costs than is indicated by looking at local labor market costs alone.

Conclusion

This report has reviewed methods for estimating the variation in educational costs associated with geographic location. The focus has been primarily on the geographic variation in wage costs, given that the main impact of location on district costs is through wages, which in turn comprise the largest share of district budgets. The three methods that analysts use to capture this geographic variation in wage costs are cost of living, CWI, and hedonic wage models. While each has strengths and weaknesses, the CWI approach has become commonly used in state policy because of the relative simplicity of the model and the availability of data. A CWI is relatively straightforward to create and update on an annual basis; it also has the advantage of being clearly beyond the control of local districts, as there are no data used that are generated by schools. In contrast, the data requirements and statistical complexity of the hedonic approach make calculating and updating even a fairly simple hedonic wage index more difficult than either of the alternative approaches. A hedonic model also conflates variation due to geographic location with costs associated with student characteristics, such as poverty; this may be particularly problematic when those costs are already accounted for elsewhere in the funding system. The report then estimates the CWI for various regions in the state, and finds that wage costs vary significantly across regions in Michigan.

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Chapter 8: Labor Market Analysis

Teaching wages are an important determinant of the number of individuals who choose to become teachers and who choose to remain in teaching over time. Individuals considering becoming a teacher are influenced in their decisions by wages for a broad array of occupations. A number of studies have found that teaching salaries relative to other occupations influence exit rates of existing teachers (Hanushek, Kain and Rivkin 2004, Guarino, Santibanez, and Daley 2006) and relative wages of teacher and other occupations influence the quality of individuals entering teaching (Corocoran 2004, Stoddard 2003).

How do teaching salaries compare with salaries in other occupations? Salaries vary across fields for a variety of reasons. In a supply and demand framework, salaries vary in part based on how specialized of a skill set is required. This increases training and education costs for individuals who wish to pursue that career and limits the number of individuals who are able to enter that profession. As a result, highly specialized or technical occupations tend to command higher salaries. These occupations also tend to attract the most skilled and able individuals.

In the case of teaching, the set of skills required to simply "show up" are not highly specialized relative to other professional occupations. However, teachers vary substantially in ability and effectiveness, with high quality teachers making significant impacts on student outcomes (Rockoff 2004). As a result, a wide range of teaching salaries might be sufficient to supply "warm bodies," but higher salaries that are more competitive with the occupations that attract the most skilled and able workers can enable recruitment from a higher quality pool of prospecitive teachers, thus positively influencing student outcomes (Loeb and Page 2000).

Working conditions are a second factor in wage comparisons across occupations. Careers that are particularly dangerous tend to command a premium to compensate for these negative attributes. Other careers with more favorable working conditions can attract individuals even if salaries are somewhat lower. These pay differences due to positive or negative working conditions are known as "compensating differentials." Teaching jobs have a set of attributes that tend to be largely favorable with comparison with other professional occupations: weeks of work per year for a full time position are lower than weeks of week for many other full time occupations and teaching tends to have a favorable set of health and retirement benefits.

In light of these considerations, this study uses a variety of methods to compare teaching occupations to the occupations of other workers within Michigan. Because of the inherent differences in the skills, attributes, and benefits across occuaptions, this study puts salary comparisons in Michigan within the context of similar salary comparisons in other states. This study also provides information on both broad-based comaprison occupation groups as well as more narrow groups, such as other public sector workers. Finally, this study presents unadjusted salaries as well as salaries after accounting for differences in hours, weeks of work, characteristics of workers, and advanced degrees.

Sources of Information

This study relies on the **American Community Survey** (ACS), conducted annually by the US Census. The American Community Survey (ACS) is an ongoing national survey administered by the U.S. Census Bureau, sent to 3.5 million people each year, collecting information on income, housing, education and migration, as well as the employment variables already mentioned. The ACS replaced the long form of the decennial Census and thus, is the only national source of this type of information. Due to sample sizes, comparisons to specific occupations are difficult when only a few individuals who report a given occupation. However, this data is a rich source of information about personal characteristics: individuals report salary income along with demographic characteristics, hours and weeks of work, and education level. The ACS data sample analyzed in this study is restricted to individuals most similar to teachers: individuals with a bachelor's degree or higher who are not currently in school and who are not self-employed. It is also restricted to full time workers, defined to be those working more than 27 weeks per year, and working more than 35 hours per week. To avoid individuals close to retirement age or of ages when their education may not be fully complete, it is also restricted to individuals between the ages of 22 and 65. This study uses the 2015 one year sample as it is the most recent data available.

Methodological Approach

There are two main methodological challenges in comparing teacher salaries with the salaries of other workers.

Identifying Comparison Occupations

The first methodological issue is determining which occupations to use as comparison groups. This analysis uses three broad categories for comparison to teachers: all other college educated workers, college-educated professional and technical occupations, and college-educated public sector workers.

Comparison Group 1: Other College Educated Workers

This first comparison group is based on education: how do teaching salaries compare with the salaries of other college educated workers? This approach starts with the fact that a potential college student can choose from any occupation open to them with that degree, including teaching. Some of these occupations are unlikely to draw in teachers after they have already entered the profession: for example, a teacher could not change careers and become a lawyer without additional training. However, a college student may well consider the salaries in law along with salaries in teaching when making a career choice. A number of researchers and economists have used wages of college educated workers in making salary comparisons (Taylor, 2008, Loeb and Page 2002). These studies find that salaries of teachers relative to other college educated workers is a good indicator of the relative attractiveness of teaching.

Comparison Group 2: Professional and technical occupations

The three other comparison groups are subsets of college-educated workers who are selected based on the skills and attributes of the job. How do teaching salaries compare with other similarly skilled occupations? The Bureau of Labor Statistics uses a Standard Occupational Classification (SOC) to categorize occupations based on work performed, skills, education, and/or training (See 2010 SOC User's Guide for more details). Occupations are divided into 23 different major groupings; teachers are in the "Education, Training, and Library Occupations" group. These 23 groups are further aggregated into six major categories. Teachers belong to the "Professional and technical occupations" category (OCC Codes 11-000 through 29-999).[58] This category is also sometimes referred to as "Management, Business, Science and Arts Occupations." Table 1 lists the 11 BLS defined occupational groups included in this over-arching category.

Comparison Group 3: Public Sector Workers

Public sector workers typically share a number attributes. Salaries tend to be lower in the public sector than in the private sector, but benefits and retirement plans tend to be more generous. This is true for teachers and for other local and state government employees. Salary negotiations are frequently framed with the state or local revenues as a reference point and therefore are affected by the local or state economy in similar ways. Public sector workers also tend to have similar collective bargaining rights. Table 8.1 summarizes the comparison occupations groups.

Table 8.1
Occupation Groups Comparable to Teaching

Comparison Group	
Other college educated workers	All individuals with a BA are included, regardless of occupation. Sample is restricted to full time (35+hours per week), full year (27+weeks per year) workers ages 22-65, not in school, not self employed.
Professional and Technical Workers	Management Occupations; Business and Financial Operations; Computer and Mathematical Occupations; Archicture and Engineering; Life Physical and Social Science; Community and Social Service; Legal; Education, Training and Library; Arts, Design, Entertainment, Sports, and Media; Healthcare Practioncers and Technical Occupations. Includes only OCC Codes 11-0000 through 29-9999.
Public sector workers	All individuals with a BA are included, regardless of occupation. Sample is restricted to federal, state, and local employees as measured in the detailed class variable.

Adjusting for the Characteristics of Workers and Occupations

A second methodological issue is whether or not to adjust salaries for worker and job characteristics. For example, if workers in other occupations in Michigan are older or more experienced than teachers, their average salaries may be higher even though individuals with similar work experience might in reality be paid comparably.

The results presented below adjust for a variety of characteristics:

- Demographic characteristics: Age and age squared to account for a non-linear relationship between experience and salary, race, and sex,
- education: indicators for master's degree, professional degree, and Ph.D. degrees,

[58] The other five categories are Service; Sales and Office; Natural resources, Construction, and Maintenance; Production, Transportation, and Material Moving; and Miliary Specific.

- usual work hours and indicators for weeks of work (27-39 weeks, 40-47 weeks, 48-49 weeks, or 50+ weeks); and
- insurance coverage through employer or union.

The individual characteristics included in the analysis are those included in most other standard analyses of public school teaching wages. However, a few points about the limitations of comparisons are worth noting. First, due to the length of the school day and school year, teachers typically work few hours and weeks of work than other full time workers. Some researchers argue that annual salary is the appropriate basis for comparison: in this view, teachers are comparing their pay over the course of the year with what they would make in a year in an alternative career. This implies that teachers would prefer to work additional hours in the summer, but are limited by the characteristics of the job. Others argue that using salary per hour is more appropriate: in this view, teachers' summers off are a benefit of the job. In this view, propsective and current teachers compare their pay per hour with what they could make in the same time period in another job. Although annual salaries in teaching might be lower than in another occupation, if the hourly pay is the same, teaching may still be attractive due to the lower hours and weeks of work. The reality is that it is likely that different prospective teachers vary in terms of which comparison is appropriate. As a result, the analysis presents both hour-adjusted and un-adjusted wages.[59]

Another note is that retirement benefits are not included as a job characteristic in these regressions. Retirement pensions are fairly standard for teaching, but are becoming less common for other workers. However, there is much less comparable data on retirement benefits for non-teaching professions. As a result, these results include information on the prevalence of employer provided health insurance benefits for comparable occupations, but no information on retirement benefits. In this regard, public sector workers are a useful comparison group, as their retirement benefits tend to be similar to those of public school employees.

Specifically, following Taylor and Fowler (2006), the following equation is estimated:

$$LnAnnualSalary_{i,s} = \beta_w W_{i,s} + \beta_{s,} S_s + \varepsilon_i$$

In this equation,

- the dependent variable is the natural log of annual salary,
- W_i is a vector of characteristics of worker *i* who lives in state *s*,
- S_i is an indicator variable for the state that worker *i* lives in, and
- ε_i is an idiosyncratic error term.

This regression is estimated separately for teachers and for each distinct group of non-teachers (all full-time workers with BAs, only professional and technical workers, public sector workers). The regression coefficients indicate the return to each characteristic in that occupation and location.

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[59] See Ballou and Podgursky (1997) and Allegreto, Corcoran and Mishel (2004) for more details of this debate.

The resulting coefficients are then used to adjust the average wage for each state and comparison group so that the average is based on the same characteristics as the average Michigan teacher:

$$Adjusted\ Ln\ Annual\ Salary = \widehat{\beta_w}\overline{W_{MI}} + \widehat{\beta_s}$$

For example, non-teachers in Michigan are slightly older than teachers, but the premium for experience is larger in the non-teacher sector than in the teacher sector. The wages are adjusted by multiplying the regression coefficients for the relevant comparison group by the average characteristics of teachers in Michigan. This methodology is known as the Oaxaca Decomposition (Fortin, et al 2011). Essentially, this methodology asks, "If the average non-teacher had characteristics that were the same as the average teacher in Michigan, what would the average salary be?" This allows average salaries across states to represent differences in area labor markets, living conditions, and amenities, rather than differences in the characteristics of workers (e.g., older or more educated than in Michigan).[60]

Salary Comparisons: ACS Data on Individuals in Michigan and Other States

Table 8.2 reports average characteristics of the sample of full time, full year workers in Michigan and in other states. This table reports this for the two main comparison groups: all workers with at least a Bachelor's degree, and workers with a BA who are employed in the public sector but are not employed in teaching.

Table 8.2
Average Characteristics of Full Time Workers in Michigan and Other States in US, American Community Survey 2015
(Standard Deviations of Characteristics in Parentheses)

	Michigan			Other states in US		
	Teachers	All Non-teachers with BA+	Public sector NT with BA+	Teachers	All Non-teachers with BA+	Public sector NT with BA+
Annual wage/salary income	$59,626 (19,416)	$78,915 (64,297)	$67,597 (39,865)	$54,478 (21,900)	$86,746 (78,455)	$73,519 (46,424)
Usual hours	44.72	44.90	43.27	44.23	44.64	43.23
worked per week	(7.61)	(7.92)	(7.11)	(7.45)	(8.04)	(7.29)
Work less than 48	0.23	0.06	0.07	0.22	0.06	0.06
weeks per year	(0.42)	(0.23)	(0.25)	(0.42)	(0.23)	(0.24)
Insurance	0.98	0.92	0.96	0.96	0.90	0.94
	(0.16)	(0.27)	(0.19)	(0.21)	(0.30)	(0.24)

60 Additional analysis included indicators for the industry as another characteristic. The results were very similar to those excluding industry of work, and they are therefore not presented below. Further analysis also restricted the comparison occupations to a smaller set suggested by other researchers as being most comparable to teachers. (See the Economic Policy Institute's work by Allegreto, Corcoran and Mishel (2004) for one such list, and Stoddard (2013) for another.) Again, the results were very similar to those with the full set of professional and technical workers, and for brevity again they are not presented below.

	Michigan			Other states in US		
	Teachers	All Non-teachers with BA+	Public sector NT with BA+	Teachers	All Non-teachers with BA+	Public sector NT with BA+
Advanced degree	0.69	0.35	0.46	0.57	0.35	0.47
	(0.47)	(0.47)	(0.50)	(0.49)	(0.47)	(0.50)
Age	42.98	43.27	45.23	43.34	42.88	45.26
	(10.16)	(11.28)	(10.94)	(11.18)	(11.54)	(11.21)
Female	0.73	0.46	0.53	0.76	0.47	0.52
	(0.44)	(0.50)	(.50)	(0.43)	(0.50)	(0.50)
Nonwhite	0.06	0.15	0.18	0.18	0.25	0.28
	(0.24)	(0.35)	(0.38)	(0.38)	(0.43)	(0.45)
Observations	3,476	42,231	6,692	143,437	1,523,874	297,519

Source: IPUMS ACS 2015.
The data is restricted to individuals not currently in school, with a Bachelor's degree, working more than 27 weeks per year, working more than 35 hours per week, not self-employed, and between the ages of 22 and 65.

Table 8.2 indicates that teachers in Michigan make substantially less than non-teachers. The average teachers make about 24 percent less that the average college educated non-teacher and about 12 percent less than the average college educated individual in a comparable occupation. Teachers in Michigan and in the US work similar numbers of hours per week as other college educated workers, although they work about an hour longer per week than other public sector workers. However, teachers work substantially fewer weeks per year: 23 percent of teachers in Michigan work less than 48 weeks per year, while only 6 percent of other college educated workers have as short of an annual calendar. Teachers in Michigan are also somewhat more likely to have insurance offered through their employment than other college educated workers, although the proportion is similar to public sector workers. They are also slightly younger than other college-educated workers and more likely to be female. They are substantially more likely to have a Master's or other advanced degree.

Table 8.3 performs the salary comparisons by reporting unadjusted wages (the same as those in Table 8.2) and adjusted wages, as described in the previous section. Wages are adjusted by performing a regression analysis for each category of worker (e.g., comparable workers in Michigan, all workers with a BA in Michigan, etc.). The regression coefficients indicate the return to each characteristic in that occupation and location.

Table 8.3 shows that characteristics matter in explaining the gap. After adjusting for characteristics, the gap is smaller. Teachers in Michigan make 24.4 percent less than non-teachers without any adjustments, but about 20 percent less with the characteristic adjustment. The gap is somewhat larger (about 28 percent unadjusted, 22 percent adjusted) when compared to professional and technical workers. Salaries are closest for teachers and other public sector workers after adjusting for characteristics, but there is still a 4.4 percent wage penalty for teaching relative to public sector workers. The bottom panel of Table 8.3 replicates this analysis for the US as a whole. It shows that in the US, the gaps are larger.

The smallest differential is about 16 percent when comparing adjusted teaching pay in the US with adjusted public sector worker pay.

Table 8.3
Teaching and Non-teaching Salaries Adjusted for Individual Characteristics, American Community Survey 2015

	(1) Unadjusted Salary	(2) Salary Adjusted to Match Hours, Weeks of Work and Personal Characteristics of MI Teachers	(3) Unadjusted Teacher gap (Teacher salary relative to comparison)	(4) Adjusted Teacher gap (Adj. Teacher salary relative to Adj. comparison)
Michigan				
Teachers	$59,626			
All Full time workers with BA	$78,915	$74,482	-24.4%	-19.9%
Full time Professional and technical occupation workers with BA	$82,596	$76,088	-27.8%	-21.6%
Full time Public Sector workers with BA	$67,597	$62,349	-11.8%	-4.4%
US				
Teachers	$54,478	$56,060		
All Full time workers with BA	$86,746	$84,011	-37.2%	-33.3%
Full time Professional and technical occupation workers with BA	$89,652	$85,316	-39.2%	-34.3%
Full time Public Sector workers with BA	$73,519	$66,788	-25.9%	-16.1%

Source: IPUMS ACS 2015. Sample is restricted to individuals not currently in school, with a Bachelor's degree, working more than 27 weeks per year, working more than 35 hours per week, not self-employed, and between the ages of 22 and 65. Adjustments use the rate of return to the characteristic in the comparison group applied to the average characteristics of Michigan teachers.

Comparative Wage Index

An alternative way to present these same results is to look at the wage premium or penalty experienced in each state relative to the US average. In other words, how are Michigan teachers paid in comparison to teachers in other states? Again, some adjustment is needed when comparing salaries across state lines, as costs of living, local labor markets, and area amenities differ.

This approach is often described as a Comparative Wage Index. The essential idea is that non-teacher salaries in each state in part reflect these labor market cost factors of each state. If non-teachers in one state are paid more than non-teachers in another state, then the labor market likely requires higher wages to attract high quality teachers to that state as well. However, it is worth noting that if local labor market conditions affect non-teachers and teachers differently in some states than in others, or if working conditions in teaching vary significantly across states, these wage comparisons will be not be valid across all states.

Table 8.4 presents these comparisons, first without any characteristics adjustments and then adjusting to make workers' characteristics the same across occupations. The first row shows on average across the US, teachers make 63 percent of what non-teachers make without making any adjustments (Column 3). However, this gap varies across states; in Michigan teachers make 76 percent of a non-teaching wage.

The next columns show how wages in each state compare to the US average. For example, the second row shows that in Alabama, non-teachers make 86 percent (or 14 percent less) of the average US non-teacher (Column 4). Teachers in Alabama also make 86 percent of the average US teachers. Columns 6 through 9 show this for the full set of comparison groups after adjusting for characteristics. The results indicate that while non-teachers in Michigan have wages that are slightly below the US average non-teacher wage, teachers in Michigan fare slightly better (wages are about 7% higher).

Table 8.4
Comparison of Teaching Wages and Non-Teaching Wages Across States

State	Average Wage, unadjusted for characteristics			Wages relative to US average, unadjusted for characteristics		Wages relative to US average, Adjusted for characteristics			
	Teachers	Non-teachers w BA+	Teaching wage relative to non-teaching wage	Non-teachers w BA+	Teachers	Non-teachers w BA+	Prof & Tech	Public sector	Teachers
US	$54,600	$86,535	63%	100%	100%	100%	100%	100%	
AL	$46,876	$74,424	63%	86%	86%	87%	88%	94%	87%
AK	$62,408	$79,581	78%	92%	114%	100%	98%	107%	116%
AZ	$44,174	$80,939	55%	94%	81%	96%	95%	93%	82%
AR	$45,050	$70,266	64%	81%	83%	82%	81%	79%	86%
CA	$66,016	$98,418	67%	114%	121%	116%	116%	115%	119%
CO	$48,525	$83,968	58%	97%	89%	98%	87%	94%	87%
CT	$69,073	$113,522	61%	131%	127%	115%	114%	111%	119%
DE	$58,245	$81,050	72%	94%	107%	98%	98%	98%	107%
DC	$64,155	$100,013	64%	116%	118%	121%	118%	134%	119%
FL	$47,387	$79,628	60%	92%	87%	92%	93%	92%	90%
GA	$49,737	$84,278	59%	97%	91%	97%	96%	88%	91%
HI	$50,511	$72,178	70%	83%	93%	93%	93%	104%	96%
ID	$44,852	$67,878	66%	78%	82%	79%	80%	80%	81%
IL	$58,658	$88,200	67%	102%	107%	102%	101%	101%	107%
IN	$49,421	$71,636	69%	83%	91%	83%	84%	83%	92%
IA	$49,984	$67,128	74%	78%	92%	81%	82%	90%	95%
KS	$44,994	$72,785	62%	84%	82%	84%	84%	79%	84%
KY	$48,959	$73,635	66%	85%	90%	83%	83%	81%	88%
LA	$45,651	$72,751	63%	84%	84%	89%	87%	88%	90%

State	Average Wage, unadjusted for characteristics			Wages relative to US average, unadjusted for characteristics		Wages relative to US average, Adjusted for characteristics			
	Teachers	Non-teachers w BA+	Teaching wage relative to non-teaching wage	Non-teachers w BA+	Teachers	Non-teachers w BA+	Prof & Tech	Public sector	Teachers
ME	$45,587	$69,347	66%	80%	83%	80%	79%	81%	82%
MD	$63,292	$96,527	66%	112%	116%	113%	112%	126%	115%
MA	$63,541	$98,130	65%	113%	116%	110%	109%	105%	113%
MI	$59,626	$78,915	76%	91%	109%	91%	91%	94%	107%
MN	$53,398	$80,151	67%	93%	98%	94%	94%	92%	99%
MS	$41,115	$64,886	63%	75%	75%	76%	75%	78%	77%
MO	$44,320	$73,300	60%	85%	81%	85%	84%	79%	80%
MT	$44,301	$62,660	71%	72%	81%	73%	73%	79%	80%
NE	$47,141	$67,975	69%	79%	86%	81%	82%	86%	88%
NV	$53,974	$77,880	69%	90%	99%	93%	97%	101%	98%
NH	$52,568	$85,882	61%	99%	96%	97%	97%	91%	96%
NJ	$67,367	$105,467	64%	122%	123%	118%	118%	117%	124%
NM	$45,256	$75,218	60%	87%	83%	89%	88%	93%	84%
NY	$72,198	$94,051	77%	109%	132%	107%	107%	108%	122%
NC	$42,167	$80,485	52%	93%	77%	92%	92%	86%	80%
ND	$44,617	$64,624	69%	75%	82%	80%	81%	84%	88%
OH	$55,814	$77,989	72%	90%	102%	90%	90%	93%	102%
OK	$40,170	$69,840	58%	81%	74%	82%	83%	81%	76%
OR	$52,472	$79,480	66%	92%	96%	93%	94%	95%	93%
PA	$60,437	$80,596	75%	93%	111%	93%	93%	96%	110%
RI	$66,441	$83,510	80%	97%	122%	98%	98%	108%	119%
SC	$45,975	$72,568	63%	84%	84%	85%	86%	83%	85%
SD	$38,935	$57,964	67%	67%	71%	70%	71%	75%	74%
TN	$44,293	$76,571	58%	88%	81%	87%	87%	84%	82%
TX	$48,430	$89,088	54%	103%	89%	103%	101%	94%	96%
UT	$48,342	$80,295	60%	93%	89%	91%	90%	90%	90%
VT	$51,301	$68,300	75%	79%	94%	79%	79%	84%	92%
VA	$51,374	$95,578	54%	110%	94%	111%	111%	120%	96%
WA	$57,043	$90,636	63%	105%	104%	106%	106%	102%	100%
WV	$45,254	$69,121	65%	80%	83%	79%	78%	84%	82%
WI	$52,018	$75,269	69%	87%	95%	87%	88%	89%	96%
WY	$56,362	$66,960	84%	77%	103%	80%	78%	88%	103%

As noted, the information in Table 8.4 captures differences in labor markets across states, implying that labor market differences across states affect teachers and non-teachers in similar ways. For example, in Alabama, the wage penalty for teachers and non-teachers is exactly the same: both types of workers make about 14 percent less than the national average.

However, to the degree that working conditions in teaching vary in significant ways across states, or to the degree that local labor markets affect non-teachers and teachers differently, these comparisons may not accurately reflect the true differences in teaching costs across states.

To examine the relevance of this concern for Michigan, Table 8.5 reproduces the information in Table 8.4 for other states in the East North Central and the adjacent Middle Atlantic census regions. These states are comparable both because their teacher labor pools may overlap geographically and because the general economies of these states share common economic features. In **all** of these states, the teaching wages in the state relative to the US look better than non-teaching wages in the state relative to the US. Either the state wage penalty in teaching is smaller than the state penalty in non-teaching (IN, WI), or the state wage premium in teaching is larger than the state premium in non-teaching (IL, NJ, NY), or there is a wage penalty in non-teaching but a wage premium in teaching (OH, MI, PA).

What could explain this common regional pattern? One possibility is that there may be particularly difficult labor market conditions in non-teaching (e.g., the wage penalties in rust belt states like Michigan, Indiana, Ohio, Wisconsin, and Pennsylvania). If the local economy depresses wages in non-teaching but do not affect teaching labor markets in as acute a way, the wage penalty in the state will be smaller in teaching. On the other side, if teaching conditions in this region are particularly difficult, teaching wages may be high in comparison with the national average for reasons other than the local labor market conditions.

Table 8.5
Area Premium/Penalty in Michigan Comparison States

	Difference between Non-teachers w/BA in state and in US	Difference between Teachers in State and US	Teaching difference – Non-teaching difference
Michigan	91%	107%	16%
Illinois	102%	107%	5%
Indiana	83	92	9
New Jersey	118	124	7
New York	107	122	15
Ohio	90	102	12
Pennsylvania	93	110	17
Wisconsin	87	96	9

Conclusion

How does teacher pay compare in Michigan? Based on ACS data, teachers in Michigan make, on average, less than in most other comparable occupations. The largest gap (about 28 percent) is for average teacher salary relative to the salary for all professional and technical college educated workers. Gaps relative to the public sector tend to be smaller. Adjusting gaps for teacher characteristics reduces the gaps modestly. The gap between teacher salaries and salaries of related workers tend to be smaller in Michigan than the parallel gaps in the United States as a whole, but this is similar to the pattern in other states in the region.

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Chapter 9: Results and Recommendations

Chapters II through VIII provide detail on the various areas of analysis conducted by the study team for the Collaborative. This chapter combines findings from these multiple analyses to offer a set of recommendations. These recommendations synthesize the information from each of the different components of the study. Each of the recommendations focus on the development of a student based formula that allows all students to meet state standards. It also provides for adjustments related to district or charter school characteristic differences. The study team framed each recommendation around the need to fund actual costs faced by districts or charters.

The base cost figures and weights identify the total resources needed to meet state standards, but do not delineate the sources of funding required to provide these resources. State, local, and federal dollars can be used to pay for the figures discussed in the recommendations. However the next step in implementing the recommendations is to locate and provide the needed resources. While outside of the scope of this current study, the study team feels it is important to highlight during the implementation of a new system that student and taxpayer equity will also need to be considered. Ensuring that each district and charter has the ability to raise funds needed to meet all resource needs is important to ensuring both an adequate and equitable school funding system.

Recommendation 1

Using the results of the study, create an adequacy based funding system using appropriate base cost, weights, and adjustments for district characteristics. The results of the three adequacy approaches provide the Collaborative with a wealth of information about the resources needed for students to meet Michigan's standards. This includes three base cost figures, two different sets of special needs weights, and information on the cost differences districts face due to size. When deciding which figures to use in creating an adequacy based funding system, it is important to understand the differences in the results from the three studies.

The study team believes both the EB and PJ approaches can stand on their own and the results for either could be utilized as the parameters for implementing a new funding system in Michigan. The recommendations below utilized the results of the three approaches, the national adequacy literature, and the study teams' experience to provide a single set of parameters based on adequacy estimates and the other elements of the study.

As was shown in Table 1.1 in the introductory chapter, the three approaches to adequacy offer the study team different types of information it can use to improve the adequacy of Michigan's funding system. All three approaches generate a base cost figure. The SSD approach focuses on what it takes currently for districts to outperform other districts, but not necessarily meet all state standards for all students. The PJ and EB approaches provide a base cost figure that is more forward looking, examining the resources needed for all students to meet all state standards. Special need student weights are only developed through the PJ and EB approaches, and include weights for added resources needed to adequately serve students in poverty, ELL students, and special education students. It should be noted that the PJ approach examined special needs weights based on various concentrations and/or levels, while the EB approach did not examine the various concentrations or levels.

Base Costs

Table 9.1 compares the base cost figures generated by the three approaches. All three base cost figures exclude costs for transportation, food service, and capital. Transportation will be discussed separately. For the PJ base cost, the large district base cost is the lowest cost and is set as the base cost for the approach. The table shows the base cost figures for all three approaches. It is important to note, the SSD approach includes all retirement costs districts pay and is not perfectly comparable to the other two base cost numbers. This is because the SSD base figure represents what districts actually spent to outperform other districts, not what is needed to meet all current state standards as noted above. The PJ and EB base cost figures are similar to each other and represent the same higher performance benchmark, with the PJ base figure estimated to be $546 dollars per student lower than the EB figure.

Table 9.1
Base Cost Figures from Three Adequacy Approaches*

	Professional Judgment	Evidence-based	Successful School District
Base Cost	$9,590	$10,136	$8,188

*The PJ, EB, and SSD base costs do not include transportation and food service.
PJ and EB are costed out at 4.6% retirement while SSD includes full retirement.

The SSD approach does not allow the study team to identify the specific allocation of resources that generates the successful school district base cost. However, the study team can compare the resource allocation differences in the PJ and EB base costs. The two models differ in resource allocation in a number of areas, but the area that accounts for the majority of cost difference between the two models is the K-3 class size ratio. The PJ panelists indicated that a 20 to 1 class size ratio in this grade range was adequate for a base school, while the EB approach identified a 15 to 1 class size ratio through its review of available research. This difference in class size ratio accounted for almost all of the cost difference in the between the PJ and EB base cost. Increasing the class size for grades K-3 for the EB approach produces a base cost of $9,582 per student, which is a $554 per student decrease from the recommended EB base cost figure and only $8 different than the recommended PJ figure.

The base cost figure is the most important factor in any new school finance system. The EB and PJ base cost figures provide the Collaborative with cost-based estimates of what is needed at the base level for students to meet Michigan state standards. The two figures are very similar, with one recommended class size ratio (for grades K-3) accounting for the vast majority of difference in costs. The SSD figure provides the Collaborative with information on the base cost for districts to currently outperform other districts in the state today. Any new finance system would likely require a phase-in period and the use of some combination of the SSD and recommended PJ and EB base cost figures could provide a solid foundation for implementation.

The study team recommends utilizing the $9,590 base cost figure which ensures that almost all of the resources identified by both the EB and PJ approaches can be addressed through the base cost. Since the key difference between the EB and PJ is driven by the EB-recommended K-3 student-teacher ratio of 15:1, Michigan state officials should monitor student performance in grades K-3 and consider moving closer to 15:1 if further performance gains are viewed as necessary after implementing the PJ-recommended base cost.

Poverty

The EB approach focused on one poverty concentration for one district size, while the PJ panel examined three different concentrations of weights and two levels of poverty across multiple school sizes. Table 9.2 shows the weights identified by the PJ and EB panels for regular poverty students, showing the EB model district weight and then the weights by the three concentration levels for each of the PJ districts. It is important to remember that the base cost figures described above provide resources for all students at a level that is likely higher than most Michigan districts currently spend. These higher figures include academic and social emotional supports for all students which reduce the number of students identified as having additional needs and reduce the cost of additional services for identified students. The weights below reflect the cost of additional services recommended for students.

Table 9.2
Poverty Weights by Approach

	Evidence-based	Professional Judgment 25% Concentration	Professional Judgment 50% Concentration	Professional Judgment 75% Concentration
EB Model District	0.32			
PJ Very Small		0.27	0.37	0.39
PJ Small		0.28	0.40	0.42
PJ Moderate		0.29	0.41	0.43
PJ Large		0.29	0.42	0.44

As illustrated, the EB weight is higher than the all of the 25 percent concentration PJ weights, but lower than the 50 and 75 percent concentration weights. The PJ weights are generally consistent across the district sizes, with the smaller districts having slightly lower weights. This is in part because the weights are derived from higher base cost figures, meaning the amount of resources across the district sizes is similar. The figures shown in Table 9.2 fall in the range of weights, generally between .30 and .60, found in many adequacy studies across the country over the past decade and a half (A Comprehensive Review of State Adequacy Studies Since 2013).[61]

Table 9.3 shows the high need poverty weights by district size from the PJ work. The study team believes that this was the first-time high need poverty was examined in an adequacy study. The PJ approach was the most effective approach to examine the costs especially since there is no national research to which the results can be compared or incorporated in an EB analysis. The high need poverty weights are highest at the 50 percent concentration, slightly lower at the 25 percent concentration, and lowest at the 75 percent concentration.

Table 9.3
High Need Poverty Weights by PJ District Size

	High Need Poverty 25% Concentration	High Need Poverty 50% Concentration	High Need Poverty 75% Concentration
PJ Very Small	0.45	0.53	0.39
PJ Small	0.50	0.57	0.42
PJ Moderate	0.51	0.59	0.42
PJ Large	0.51	0.60	0.43

The PJ panelists were most comfortable talking about the additional resources needed school-wide when considering high need poverty, but it is likely most schools would have some high need poverty students but not have the high concentrations examined here. With that in mind, understanding the differences in resource needs between the poverty weights and high need poverty weights is important for the Collaborative. Focusing on the 50 percent concentration level, which the study team feels is the most appropriate level for most districts, the range of added cost weight between poverty and high need poverty students is 0.16 to 0.18. This means that high need poverty students need around 40 percent more resources than poverty students.

The study team recommends Michigan utilize a poverty weight of .35 for all students. A concentration factor is not recommended at this time. The current research base does not suggest the need for a concentration factor and the results of the two approaches also provide conflicting information. The study team believes further study of the cost of serving high need poverty students is important. This additional study should include an examination of the additional costs identified by the panels and further study on the appropriate and specific definition for what constitutes a high need poverty

[61] http://marylandpublicschools.org/Documents/adequacystudy/AdequacyReviewReport_rev_091214.pdf

student. The study team believes that any definition should set a high bar for a student to qualify for this category and to receive the additional funding needed. Based on the study team's current research in Michigan, these students are likely to require approximately an added .15 weight to be adequately served.

English Language Learners

The PJ and EB approaches each take a different view of ELL services. The EB approach assumes all ELL students, regardless of poverty status, would receive the 0.41 weight identified by the approach. PJ panelists identified the resources needed for the language needs of ELL students but felt that students that were both ELL and poverty would need both the ELL and poverty weight. Table 9.4 shows the additional resources identified by both approaches. The table looks at the 50 percent concentration for the PJ work and shows the results by WIDA level and district size. The EB examined just one concentration and looked at all ELL students together.

Table 9.4
ELL Weights by Approach (50% Concentration for PJ Results)

	Evidence-based	Professional Judgment WIDA 1-2	Professional Judgment WIDA 3-4	Professional Judgment WIDA 5-6/FELS
EB Model District	0.41			
PJ Very Small		0.56	0.45	0.38
PJ Small		0.48	0.36	0.28
PJ Moderate		0.43	0.33	0.22
PJ Large		0.40	0.29	0.18

The EB approach identifies tutoring, extended day, summer school, additional pupil support services, and one ELL teacher per 100 ELL students along with additional material costs for each ELL student. The PJ approach resourced teachers at lower ratios for both WIDA 1&2 and WIDA 3&4 with ratios as low at 30 students per teacher and included other services such as additional teacher coaching, language services, and parent engagement. Panelists in the PJ also resourced ELL looking at different WIDA groupings. Table 9.4 shows that the highest weights are for the WIDA 1&2 level, with the lowest weights for WIDA 5,6&FELS. The table also shows that PJ panelists felt it was costlier to serve ELL students in smaller districts than in larger districts. The weights in the table are in line with adequacy figures from other adequacy studies as well. (A Comprehensive Review of State Adequacy Studies Since 2013). The PJ weights are on the higher side if added to the poverty weights.

The PJ results for the 5 percent concentration, shown in Table 9.5, show even higher weights needed due to the inefficiencies faced at the lower concentration levels. The weights continue the pattern shown in the 50 percent concentration of higher weights in smaller districts.

Table 9.5
Weights for 5% ELL Concentration

	Professional Judgment WIDA 1-2	Professional Judgment WIDA 3-4	Professional Judgment WIDA 5-6/FELS
PJ Very Small	0.62	0.54	0.30
PJ Small	0.51	0.44	0.34
PJ Moderate	0.51	0.43	0.31
PJ Large	0.46	0.35	0.28

The study team recommends the use of weights for the three WIDA levels. The weights are for all ELL students and follow the EB approach of including all services for the students and assuming students would not be eligible for an additional regular poverty weight. The weights by WIDA level are .70 for WIDA 1-2, .50 for WIDA 3-4, and .35 for WIDA 5-6/FELS. The study team believes these weights reflect the results of the study approaches, including the input of Michigan educators, and the national research on ELL adequacy weights.

Special Education

The study team again has worked to combine the findings from both the PJ and EB approaches with regard to funding for special education students. There are several key differences between the two approaches. The PJ approach examined special education at the mild, moderate, and severe levels based on the amount of time students are in the regular education classroom, with severe need students spending the least amount of time in the regular classroom. The EB approach includes funding for special education mild and moderate students as a weight for all students, which could be included in the base, assuming a set percentage of mild and moderate students would be in a district (often referred to as a census approach) while assuming high cost students would be fully reimbursed by the state. Table 9.6 compares the additional resources identified by both approaches for special education students. In order to make as close to an "apples to apples" comparison as possible, the EB figures are converted into a weight to be applied only to the mild and moderate students (instead of all students) and the PJ weights are shown for all three levels, as well as with the mild and moderate weight combined.

Table 9.6
Special Education Weights for Mild/Moderate Special Education Students

	Evidence-based	Professional Judgment Mild	Professional Judgment Moderate	Professional Judgment Mild/Moderate
EB Model District	0.61			
PJ Very Small		1.06	1.75	1.23
PJ Small		1.11	1.90	1.30
PJ Moderate		1.12	1.97	1.32
PJ Large		1.10	2.00	1.32

The EB mild/moderate weight is less than half of the PJ mild/moderate weight. This is true regardless of the district size. The PJ weights are generally lower for the smaller districts. The special education weights from the PJ range from 1.39 to 1.52 when combining mild, moderate, and severe weight results for the four PJ districts. These weights would be on the high side of results from other adequacy studies (A Comprehensive Review of State Adequacy Studies Since 2013).

The study team recommends that funding for severe students be fully funded by the state. Weights for mild and moderate would average about 0.80 for the state, which generates a mild special education weight of 0.70 and a moderate special education weight of 1.15. These weights are within the range of adequacy research from around the country and within the bounds of the results of the EB and PJ approaches in Michigan.

District Size

Michigan school district sizes vary widely. Table 9.7 shows the number of districts in four size ranges. Smaller districts often face higher costs per student due to economies of scale issues.

Table 9.7
Michigan District Sizes

	Very Small	Small	Moderate	Large
District Size	<1,000	1,000 – 2,999	3,000-7,499	7,500 +
Number of Districts	196	210	102	33

While the EB approach is based upon one prototypical district size, the PJ approach examined the differences in costs that districts face due to district size and the size of schools within each district.

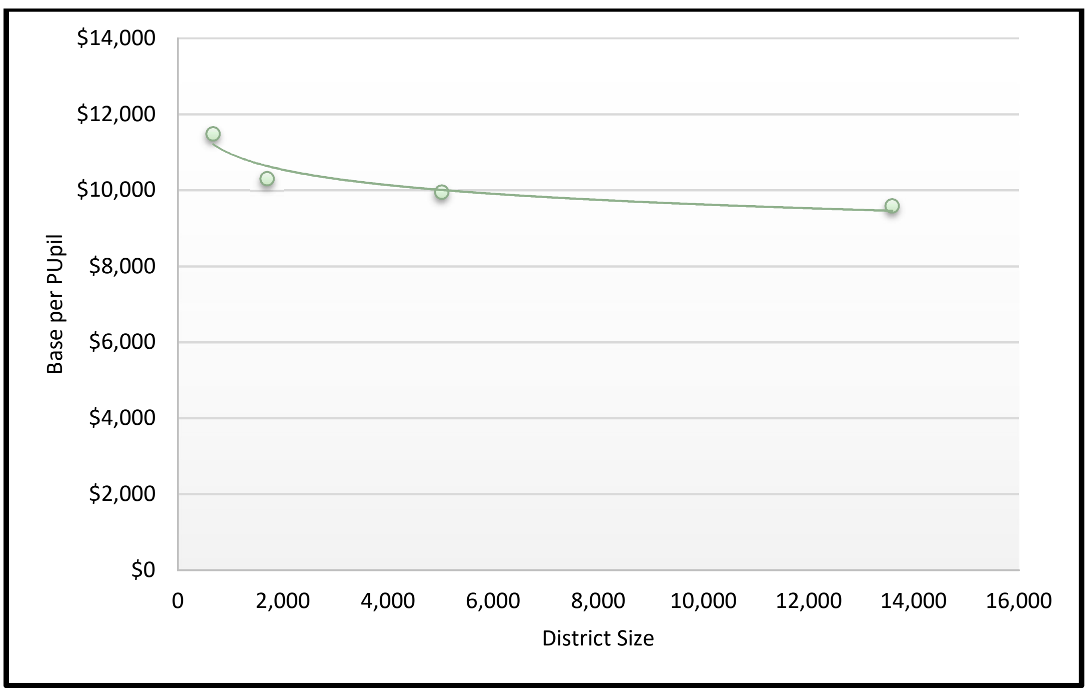
Table 9.8 shows the four base cost figures for the different district sizes. The largest district has the lowest base cost figure, which increases by about $400 per student moving from the large district to the moderate sized district and from the moderate district to the small district. There is more than a $1,100 increase moving from the small district base cost to the very small district base cost.

Table 9.8
Base Costs by PJ District Size

	Very Small	Small	Moderate	Large
Students	670	1,700	5,020	13,590
Base Cost	$11,482	$10,307	$9,954	$9,590

A size adjustment can be created using these four data points, displayed in Figure 9.1 below. The graph plots the four base cost figures and applies a trend line to show the relationship between the data points. The resulting line is similar to what is seen in many school finance formulas, with costs increasing more steeply as districts become smaller.

CHART 9.1: BASE COSTS BY DISTRICT SIZE



The study team recommends applying the size curve described above with a minimum base figure of $9,590.

Preschool

Both the EB and PJ approaches identified the resources needed for preschool services for both three- and four-year-old students. Table 9.9 shows the costs per student for both approaches. The EB approach has the same cost for three- and four-year-olds, while the PJ figures are different for three- and four-year-olds. Additionally, the EB approach allows either a separate standalone setting (i.e. Head Start or other Pre-K program) or inclusion of the program within a K-5 building while the PJ assumes services within a K-5 building. Despite these differences, the figures are similar across the two approaches. The main differences in costs include an additional adult per classroom for three-year-olds in the PJ approach and the added costs of a standalone setting in the EB model.

Table 9.9
Preschool Costs per student

	Evidence-based 3 and 4 Year Old	Professional Judgment 3 Year Old	Professional Judgment 4 Year Old
Cost per student	$14,155	15,071	$13,154

A major decision when considering preschool funding is how many students will participate in preschool programming in each age level and how funding will be allocated for the program. PJ panelists encouraged preschool programming for all students, often referring to "universal" preschool. It is clear, even if offered free of charge, a number of families would not choose to send their students to preschool programming. Additionally, many families currently provide these services to their students on their own. This means there are already many dollars being utilized for preschool services outside the school funding system.

The report *A Comprehensive Analysis of Prekindergarten in Maryland*[62] examines these issues in detail. A number of the main considerations any state should consider when designing a prekindergarten program include these research findings:

1. Significant returns on investment for prekindergarten programing only flow to students who experience high quality programs, rather than to any student who participates in prekindergarten programming.

2. Research suggests that states should invest in programs for 4-year-olds before investing in 3-year-olds.

3. Prekindergarten programming could be offered in either schools or private settings. Often high-quality slots are concentrated in the public-school system. Many centers and homes would need to raise the quality of their programs to be included.

[62] http://marylandpublicschools.org/Documents/adequacystudy/MDPreKComprehensiveAnalysis011316.pdf

4. ECE policy specialists recommend “universal preschool” as a goal. This is often defined as between 60 and 80 percent of 4-year-olds attending a quality preschool.

5. All funding sources should be considered, including parent contributions.

Reviewing these findings and other considerations will be important as decisions on prekindergarten funding are made in Michigan.

The study team recommends the EB figure of $14,155 as the cost of preschool in Michigan. Additional study needs to be undertaken on how best to fully implement preschool in the state.

Isolation

The costing out of non-transportation operating costs for isolated districts showed a $405 per student increase in costs. This equates to a weight of 0.04 above the PJ base cost of $9,590. The inclusion of a size adjustment for districts lessens the fiscal impact of addressing the diseconomies of scale associated with isolated districts. The additional resources identified by the PJ panel were built off of the Very Small district, the highest resourced base cost in the PJ study. If this size adjustment did not exist, the isolation weight would be much higher.

Michigan’s current formula for isolated districts is limited to just five school districts. Panelists felt that the definition for isolated districts should be expanded, but did not identify a specific definition. The study team reviewed the definitions used by other states:

- Maine provides additional funding subsidies to geographically isolated schools and island schools. Maine’s formula takes into account enrollment per grade and per school, availability of other school options, and distance to nearest school, with different thresholds for different grade configurations of schools,[63]
- Minnesota’s general education formula awards sparsity revenue to districts located in isolated areas that have less than 400 pupils in grades 7-12, or under 140 pupils in grades K-6. The amount of revenue Minnesota awards to secondary pupils varies depending on the number of pupils, the distance to the nearest high school, and the attendance area. The amount of revenue Minnesota awards to elementary pupils varies depending on the number of pupils enrolled in schools located 19 or more miles from the nearest elementary school,[64]
- Oregon gives a higher weight to students in a qualified small school based on grade level, average grade size, and distance to the nearest school. The weight is based on the size of each school, not the size of the district,[65] and

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[63] Maine Department of Education. Draft: Essential Programs & Services Cost Component Calculations (ED279).

[64] Verstegen, D. A Quick Glance at School Finance: Density and Sparsity of Small Schools. 2015

[65] Verstegen, D. A Quick Glance at School Finance: Density and Sparsity of Small Schools. 2015

- North Dakota applies a weighting factor of 0.1 for school districts greater than 275 square miles in size with under 100 ADM. In addition, school districts greater than 600 square miles with fewer than 50 ADM are guaranteed funding at 50 ADM.

The study team recommends that the current Michigan isolation definition be kept with the removal of the requirement that districts be in the Upper Peninsula. Districts would receive an additional weight of .04 for each student along with any size adjusted base funding allocated as part of the size adjustment discussed earlier. This additional funding would address the needs of these unique school districts but would not address transportation costs that will be discussed below.

Table 9.10 shows the study team's final set of cost recommendations.

Table 9.10

Final Recommended Per-Student Base Cost and Weights*

Final Recommendation	
Base Cost	$9,590
Size Adjustment	Adjusted by Formula
Poverty Weight	0.35
ELL	
WIDA 1-2	0.70
WIDA 3-4	0.50
WIDA 5-6/FELS	0.35
Special Education	
Mild	0.70
Moderate	1.15
Severe	State Reimbursement
Preschool	14,155
Isolation	0.04

*The PJ and EB base costs do not include transportation and food service.

Recommendation 2

The base cost per student and special needs adjustments should be funded at the same levels for districts and brick and mortar charter schools. Providing the same funding for districts and charter schools produces a more equitable funding model for the state. While there are differences in the costs that the two sectors face, such as differences in retirement costs and facilities costs, the study team feels that applying the $9,590 base cost figure derived using a 4.6 percent retirement rate and does not include funding for transportation, food service, or capital to both sectors is the correct approach. Charters school are also eligible for all weights associated with students with special needs. The district size adjustment was developed specifically for districts and policy makers would need to decide how or if to apply to charter schools. The study team recognizes that applying the adjustment to charters could create a perverse incentive for the creation of additional small settings simply for higher funding.

Differences in the costs for retirement and facilities between the two sectors are discussed in further detail in recommendations below.

Recommendation 3

Retirement costs above the costs used in the costing out need to be funded for all entities facing the expense. The study team costed out the adequacy recommendations using a 4.6 percent retirement figure. This figure only represents the costs of a defined benefit program and does not fully account for the costs faced by districts and some charter schools. Table F.3 in Appendix F shows the base cost figures when applying the 25.56 percent retirement rate. This base figure needs to be used for districts or charters paying the higher retirement costs. Weights should be applied to this higher figure when determining the needed adequacy amounts.

On top of the normal costs of retirement districts and charters face, an unfunded liability also exists. The study team recommends that this liability be funded outside the base cost per student amount.

Recommendation 4

Transportation funding should be provided outside of the base per student amount and funding should be tied to actual transportation costs. In the near term, the study team suggests funding transportation at the district per rider figure of $973 until a further transportation study can be conducted that designs a more specific transportation cost formula. As additional research is conducted on transportation needs for all districts, a specific focus should include the needs of isolated districts and whether a separate funding source is needed for these districts.

The state's current approach to funding transportation creates large inequities in the funding system. Districts that face larger transportation expenditures often need to take more dollars away from instructional programs to provide the service. In other cases, some districts and charters report no transportation expenses but still receive funding.

The isolated district panel identified transportation as one of the main expenses for isolated districts. Panelists indicated that isolated districts face increased transportation costs for getting students to and from school, for before- and after- school programs, and for student activities.

Recommendation 5

The state should undertake a full capital study that examines the costs faced by districts and charter schools. Michigan's current funding model creates inequities in capital funding in a number of ways. Districts face variation in the availability of funding for capital projects. This impact both the ability to build new buildings and districts' ability to maintain current buildings. Panelists throughout the PJ process mentioned the inequities in both areas for districts. The PJ CFO panel recommended a $400 per student figure to allow districts to address ongoing maintenance issues. The study team does not recommend including this amount in the base cost figure for districts or charters but thinks any study of capital needs should have a specific focus on the ongoing maintenance issues districts face. A determination needs to be made if an amount should be included in base funding for all districts.

Charter schools also face facilities issues. Currently, charter schools do not have the ability to raise funds through local property taxes to fund buildings and are required to acquire space using current operating dollars. The study team suggests that a future capital study take a specific review of the costs charters face for facilities and that an amount of funding for the costs of facilities be included in base funding for charters above the base amount discussed in Recommendation 1.

Recommendation 6

The study team suggests utilizing a Comparable Wage Index (CWI) to adjust for cost differences due to geographic location. The data are easily and publicly available and the statistical method of estimation is straightforward. This makes annual updates relatively easy, minimizing the large changes in allocations that can result when updates are less frequent. The comparable wage approach does not require the analyst to make decisions about which specific variables to include or exclude (in contrast to the hedonic methodology). Moreover, the comparable wage methodology is well-established (see, for example, Taylor and Fowler, 2006) and analysts are in agreement about the specification of the model. Again, this simplifies estimation, as there is no need to collect data from multiple sources or to worry that variables available in one year are not available in another. The data used for estimation is outside the control of local districts so there can be no 'gaming' of the resulting index.

Recommendation 7

The study team suggests utilizing a 0.10 weight for every CTE student. Both the EB and PJ approach examined the resources needed to implement CTE classes at the high school level. The EB approach recommends $10,000 per every CTE teacher to cover costs such as materials and equipment. The PJ panels identified a cost per student for CTE centers, as well as the per student cost to run CTE programming within a high school. The panelists identified a cost of $752 per CTE student within a center (based on centers having a 1,000-student enrollment). The panelists identified an additional $147 per student cost at the high school level. The recommendation of a 0.10 weight will cover the materials and costs to provide either a program within a high school or at a CTE center.

Appendix A: Professional Judgment and Evidence-Based Professional Judgment Panelists

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SCHOOL FINANCE
RESEARCH COLLABORATIVE

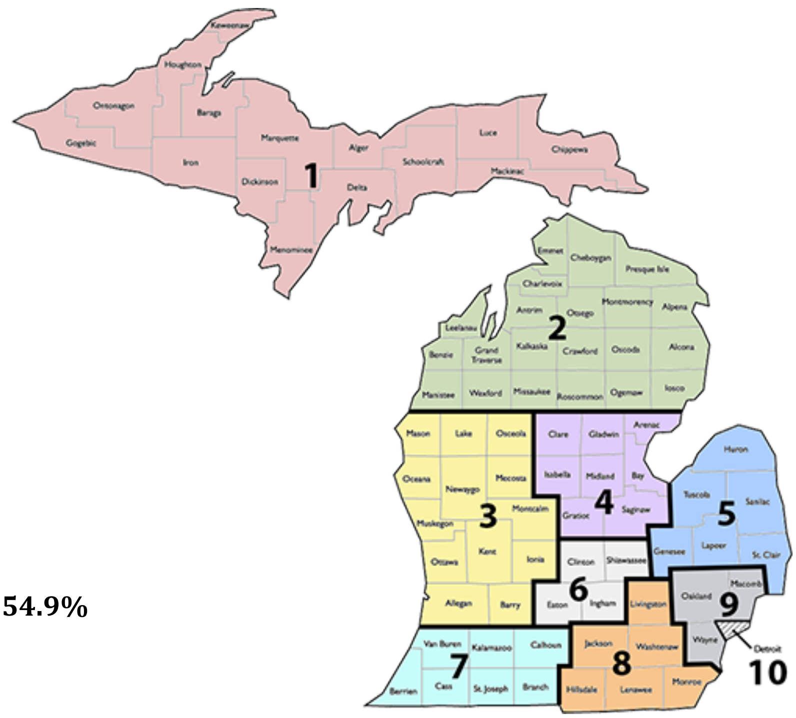
ADEQUACY STUDY PANEL COMPOSITION SUMMARY

October 20, 2017

- All 20 of the Adequacy Study panels have now been finalized and panelists have confirmed.
- A total of 266 Michigan Educators are involved.
- 146 separate educational entities located within 42 ISD's (out of a total of 56 ISDs) are represented in the final panel composition

Adequacy Study Panel Representation (Professional Judgment and Evidence Based Methodologies)

- 266 panelists
- 20 panels
- 25 PSA representatives
- 46 ISD representatives
- 195 LEA representatives



Regional Representation

- MASA Region 1 – 14 panelists
- MASA Region 2 – 8 panelists
- MASA Region 3 – 41 panelists
- MASA Region 4 – 9 panelists
- MASA Region 5 – 24 panelists
- MASA Region 6 – 26 panelists
- MASA Region 7 – 11 panelists
- MASA Region 8 – 13 panelists
- MASA Region 9 – 110 panelists
- MASA Region 10 – 10 panelists
- **Total Regions 1 to 8: 146 panelists or 54.9%**

Region 9/10 Analysis

- Macomb: 32 panelists
- Oakland: 48 panelists
- Wayne: 30 panelists Note: DPS has 10, so a total of 40 for *Wayne County* combining Regions 9 & 10
- **Total Region 9 and 10: 120 panelist or 45.1%**

Gender & Race Demographics Representation

- 188 Caucasian - 70.7%
- 78 Minority - 29.3%
- 148 Female - 55.6%
- 118 Male - 44.4%

Position Composition Summary

- 36 Business Office Administrators
- 9 CTE or Curriculum Directors
- 20 Special Ed or Student Services Directors
- 29 Unclassified Instructional Leader
- 52 Principals
- 46 Superintendents
- 60 Teachers
- 7 Instructional Coaches and Tutors
- 7 Technology Administrators

Professional Judgment Panelists

Panelist Name	School District
Preschool Panel	
Kelly Adamek	Macomb ISD
Jane Dezinski	Newaygo County RESA
JoAnne Elkin	Macomb ISD
Jessica Gillard	Lansing Public School District
Sergio Keck	Lansing Public School District
Lena Montgomery	Wayne RESA
Jodi Ramos	Genesee ISD
Elizabeth Spaner	Kalamazoo Public Schools
Ericka Taylor	Saginaw ISD
Rick West	Troy School District
Kellye Wood	Oakland Schools
Elementary School Panel	
Anupam Chugh	Wayne RESA
Sharon Coil	Utica Community Schools
Emanuel Haley	Oak Park School District
Tracy Horodyski	Kenowa Hills Public Schools
LaDonna Mask	Lansing Public School District
Angela Rodriguez	El-Hajj Malik El-Shabazz Academy
Dan Romzek	Genesee ISD
Linda Schneider-Rediske	Utica Community Schools
Julie Williams	Pontiac School District
Alena Zachery-Ross	Okemos
Middle School Panel	
Allen Archer	Farmington Public Schools
Fred Borowski	Huron Academy
Danene Charles	Dearborn Public Schools
Brian Doepker	Laingsburg Community Schools
Mark Greathead	Riverview Community School District

Panelist Name	School District
Jan Harding	Macomb ISD
Dannon Holley	Oak Park School District
Jolene Kruse	Grand Blanc Community Schools
Steve Lenar	Holly Area School District
Jared McEvoy	Utica Community Schools
Jane Porath	Traverse City Public Schools
High School Panel	
Bill Barnes	Charlotte Public Schools
Cordelia Black	Lansing Public School District
Daniel Boggan III	Lansing Public School District
Sarah Giddings	Washtenaw Educational Options Consortium
Rodney Lewis	Grand Rapids Public Schools
Thomas Lietz	Utica Community Schools
Jeff Mozdzierz	Oakland Schools
Lisa Phillips	Detroit Public Schools
Steve Poole	Midland Public Schools
Jessica Shultz	Gilbraltar School District
Yvette Williams	Pontiac School District
Poverty Panel	
Daveda Colbert	Oak Park School District
Tracey French	Muskegon Heights Public School Academy
Michelle Krause	Hazel Park Schools
Paula Lightsey	Southfield Public Schools
Ryan McLeod	East Detroit Public Schools
Soledad Ramirez-Heiler	Lansing Public School District
Amy Taranko	Hart Public Schools
Marlo Thigpen	Ecorse Public Schools
Karlin Tichenor	Lansing Public School District
Lori Tubbergen Clark	Newaygo County RESA
Nikolai Vitti	Detroit Public Schools
Kevin Weber	Wayne Westland
English Language Learner Panel	

Panelist Name	School District
Hadeel Azzo	Lamphere Public Schools
Ramona Fletcher	Kalamazoo Public Schools
Rima Hassan	Dearborn Public Schools
Karyn Lange	Melvindale North Allen Park School District
Robert Livernois	Warren Consolidated School District
Su McKeithen Polish	Macomb ISD
Rodney Thomas	Lamphere Public Schools
Suzanne Toohey	Oakland Schools
Cyndi Willoughby	Pontiac School District
Special Education Panels	
Lori Abbott-Smith	Lansing Public School District
Beth Alberti	Macomb ISD
Barbara Bailey	Grand Blanc Community Schools
Paul Bodiya	Macomb ISD
Marcelle Carruthers *	Lansing Public School District
Heather Gauck	Grand Rapids Public Schools
Karen Howey	Wayne RESA
Scott Koenigsknecht	Ingham ISD
Karen Olex	Oakland Schools
Rikki Saunders	Kalamazoo Public Schools
Camila Stewart	Kalamazoo Public Schools
Career and Technical Education	
Linda Blankenship	Allegan ESA
Claire Brisson	Chippewa Valley Public Schools
Dave Campbell	Kalamazoo RESA
Jason Clinkenscale	Birmingham Public Schools
George Dennis	Kent ISD
Paul Galbenski	Oakland Schools
Jarrad Grandy	Oakland Schools
Ryan Irwin	Airport Community Schools
Steven Kay	Wayne Westland
Tirria Kendred	Wayne RESA
Chris Lamer	Ottawa ISD
Jacquie Rehkopf	Ottawa ISD
Very Small District Panel	
Bryan DeAugustine	N.I.C.E. Community Schools
Rachel Fuerer	Eastern Upper Peninsula ISD

Panelist Name	School District
Dena Mayer	Rudyard Area Schools
Angie McArthur	Engadine Consolidated Schools
Brian Reattoir	Brimley Area Schools
Jason Stowe	Leland Public Schools
Stephanie Vittitow	Ojibwe Charter School
Wendy Warmuth	Dickinson-Iron ISD
Al Waters	Honey Creek Community School
Small District Panel	
Michelle Barsh	Clarenceville School District
Heidie Ciesielski	Fenton Area Public Schools
Jodi Ferris	Fremont Public Schools
Jennifer Johnson	Clarkston Community Schools
Janine Kopera	Melvindale North Allen Park School District
Tom Livezey	Oakridge Public Schools
Justin Michalak	Warren Woods Public Schools
David Moore	Corunna Public Schools
Michael Musary	Armada Public Schools
Nancy Stebbins	Charter School Partners
Dirk Weeldreyer	School Equity Caucus
Moderate District Panel	
Brian Davis	Holland Public Schools
John Deiter	DeWitt Public Schools
Kela Geisert	Flint Community School District
Rhoda Johnson	Beecher Schools
Charity Jones	Oak Park School District
Dennis McDavid	Berkley School District
Anthony Morey	East Grand Rapids School District
Kelly Newell	Fraser Public Schools
Michael Zopf	Northville Public Schools
Amy Swantek	Dryden Community Schools and Imlay City Community Schools
Large District Panel	
Mike Batten	Waterford School District
Kathy Duquette	Dearborn Public Schools
Cindy Green	Kalamazoo Public Schools
Christine Johns	Utica Community Schools
Laura LaMore	Grand Rapids Public Schools
Teri Les	Walled Lake Consolidated School District
Donya Odom	Detroit Public Schools
Robert Shaner	Rochester Community Schools

Panelist Name	School District
Paul Sibley	Chippewa Valley Public Schools
Isolated District Panel	
Donna Boughner	Crawford AuSable School District
Andy Claes	Delta Schoolcraft ISD
Heidi Homeister	Burt Township Public Schools
Mike Klosowski	Laker School District
Michele Lemire	Menominee County ISD
Tom McKee	Whitefish Township Schools
Becky Newell	DeTour Area Schools
David Patterson	Charlton Heston Academy
Joe Powers	Crawford AuSable School District
Angela Reed	DeTour Area Schools
George Rierson	Cass City Public Schools
Vaughn White	Hesperia Community Schools
Charter School Panel	
Steve Beyer	Charyl Stockwell Academy
Laura Carpenter	Arts and Technology Academy of Pontiac
Adam Holcomb	West MI Academy of Environmental Science
Ken Kander	Holly Academy
Shawn Leonard	Detroit Merit Charter Academy
Mary Kay Shields	CS Partners
Sarah Vander Baan	Benton Harbor Charter School Academy
Mark Weinberg	International Academy Flint
Waseem Younis	The Dearborn Academy
CFO Panel	
Lisa Abbey	Grosse Pointe Public Schools
Michael Cuneo	Rockford
Jodi DeKuiper	Newaygo County RESA
Stephanie Eagen	Utica Community Schools
John Fitzgerald	Lake Orion Community School District
Brian Marcel	Washtenaw ISD
Scott Sederlund	Chippewa Valley Public Schools
Gary Start	Kalamazoo Public Schools
Jeremy Vidito	Detroit Public Schools
Donna Welch	Huron Valley
Statewide Panel	
Yvonne Caamal Canul	Lansing Public School District
Steven Carlson	Sandusky Community Schools
Mike DeVault	Macomb ISD
Steven Ezikian	Wayne RESA

Panelist Name	School District
Ron Koehler	Kent ISD
Deborah Koepke	Utica Community Schools
Dedrick Martin	St. John Public Schools
Monica Merritt	Plymouth Canton Schools
Deborah Piesz	Birmingham Public Schools
Emily Pohlonski	Novi Community School District
Greg Socha	Kalamazoo Public Schools
Barb VanSweden	Fitzgerald Public Schools

Evidence-Based Professional Judgment Panelists

Panelist Name	School District
Chris Frank	Saginaw ISD
Tammy Evans	Oakland Schools
Denise Belt	Genesee ISD
George Peña	Lansing Public School District
Lynette Lentz	Newaygo County RESA
Erin Senkowski	Saginaw ISD
Nick Orlowski	CS Partners
Karen Leslie	Crawford AuSable School District
Cyndi Nickel	Walled Lake School District
Chuck Fabbro	Vassar Public Schools
Chris Hodges	Gaylord Community Schools
Tom House	Harrison Community Schools
Doug Leisenring	Delta Schoolcraft ISD
Tim Tenneriello	Mid-Michigan Leadership Academy
May Denha	West Bloomfield School District
Shannon Scott	Leland Public Schools
April Medema	Gladwin Community Schools
Deborah Hasselschwert	EPBP Laker Schools
Tina Bennion	Lanse Cruse Public Schools
Liz Zajac	Newaygo County RESA
Theresa Swalec	Fitzgerald Public Schools
Elizabeth Longshore	Lansing Public School District
Denise Short	Hesperia Community Schools
Marios Demetriou	Ann Arbor Public Schools
Teresa Zigman	Livingston ESA
Phil Carolan	Lenaway / Monroe ISD

Panelist Name	School District
Paul Salah	Wayne RESA
Jennifer Taiariol	Livonia Public Schools
Cherie Vannatter	Washtenaw ISD
Chris Matheson	CS Partners
Nicholas Brown	Detroit Public Schools
Ben Edmonson	Ypsilanti Community Schools
Josha Talison	Ecorse
Sue Carnell	Westwood Community Schools
Khalil El-Saghir	Wayne RESA
Janice Ford	Wayne RESA
Russ Keberly	Livonia
Angela Ristau	Farmington Public Schools
Lois Vaughan-Hussain	Wayne RESA
Melissa Hyatt	Genesee ISD
Neil Cassabon	Warren Woods Public Schools
Mark Cummins	Macomb ISD
Shawn K. Wightman, Ed.D.	Marysville Public Schools
Judy Pritchett	Macomb ISD
Heidi Kattula	Oakland Schools
Jennifer Taylor	Lapeer Community Schools
Lisa Wujczyk	Romeo Community Schools
Sherrell Hobbs	Detroit Public Schools
Edward Hill	Southfield
Bilaal Tawwab	Flint Community Schools
George Heitsch	Farmington Public Schools
Gary Neihaus	Grosse Pointe Schools
Rojas Ricardo	Northville Public Schools
Kathy Slate	Southfield
Lauren Seals	Saginaw township Schools
Grayling Mercer	Oak Park
Amy Sheaffer	Port Huron Area Schools
Cecilia Valdivieso	Warren Woods
Victoria Wilson-Widman	Waterford School District
Kellie Chaney	Southfield Public Schools
John Maes	Ferndale Public Schools
Mike Hagerty	Kent ISD
Tom Johnson	Kalamazoo RESA
Nicole Airgood	Sturgis Public Schools
Greg Bodrie	Fruitport Schools
Shan Shaw	Lansing Public School District

Panelist Name	School District
Nicole Beard	Lansing Public School District
Maria Boyd-Springer	Flint School District
Ariel Rodriguez-Pena	Lansing Public School District
Mark Pogliano	Jackson Public Schools
Stiles Simmons	Baldwin Community Schools
Kimberly Carter	Battle Creek Public Schools
Patricia Dobias	Holland Public Schools
Cheryl Radecki	East Grand Rapids Schools
Sheree Bos	Kentwood Public Schools
Randy Cook	Tri-County Area Schools
Susie Hernandez	Lansing Public School District
Becky Martin	East Grand Rapids Schools
Erika Vann	Kentwood Public Schools
Catrina Wiskur	Genesee ISD
Lisa Little	Fruitport Schools
Melisa Mulder	Kentwood Public Schools

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Appendix B: Michigan Standard Summary Document

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Review of Michigan Standards and Requirements

Minimum Days and Hours of Instruction[1]

Beginning in 2016-2017, the required minimum number of days of pupil instruction is 180. If a collective bargaining agreement that provides a complete school calendar was in effect for employees of a district as of the effective date of the amendatory act that added this subdivision, and if that school calendar is not in compliance with this subdivision, then this does not apply to that district until after the expiration of that collective bargaining agreement.

The *State School Aid Act* establishes a minimum of 1,098 hours of pupil instruction in a school year. The state superintendent may waive the minimum instructional hour requirement for a department-approved alternative education program. School districts have the option of counting up to 38 hours of professional development time toward the 1,098 hours of pupil instruction requirement.

Flexible Learning Options[2]

Flexible learning options available to public school students in Michigan include:

1) Seat Time Waivers: Section 101(9) of the State School Aid Act (MCL 388.1701) allows the State Superintendent to waive the required days and hours of student instruction for alternative education programs or another innovative program. This would include a four-day school week. The alternate program must be approved by the Michigan Department of Education (MDE).
2) Options for Hours and Days Waivers: Under 388.1701 (9), waivers can be granted to districts for the minimum number of hours and days (to 146) of student instruction. This waiver can be granted for a MDE-approved alternative education program or another approved innovative program. The waiver can include a 4-day school week.
3) Work-Based Learning Experiences: This program involves a work-based learning experience coordinated by the school district through a contract with the employer providing the educational experience. The experience must be related to school instruction and a training plan of supervised work is required. The work experience is to be monitored by a certified instructor employed by the district. Students may receive high school credit for the learning experience if the requirements of the program are met. The experience must not generate more than one-half of the student's full-time equivalency (FTE) and the employment of the student must not exceed the maximum hours set by the district.
4) College Course Enrollment and Early/Middle Colleges: Public school and approved nonpublic school students are potentially eligible to take up to 10 college courses while in grades 9-12. A

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1 http://www.legislature.mi.gov/(S(5vzbprk5mvdlaqwwfr2pattt))/mileg.aspx?page=getObject&objectName=mcl-388-1701; https://www.michigan.gov/documents/mde/compulsory_attendance_257944_7.pdf

2 http://www.michigan.gov/documents/mde/Flexible_Learning_Document_3_458395_7.pdf

district or ISD may apply to implement an Early/Middle College school or program where a student may earn a high school diploma, an associate's degree, 60 transferable credits, or a certificate of merit over the course of 5 years.

5) Career and Technical Education (CTE) Options: The Michigan Merit Curriculum (MMC) specifies that credit is based on proficiency with the expectations outlined in the state's academic standards. This opens the door for alternative delivery methods of the academic content, including academic content naturally embedded in CTE instructional programs. Click here for more information on using CTE to deliver academic content.
6) Testing Out: Students can earn credit for content required under the MMC by simply testing out. According the MMC Law, Section 380.1278(1)(4)(c), a public school can grant credit to students for earning a score, determined by the MDE or by the school district, on the assessments developed or selected for the subject area. The school is responsible for ensuring that a student's understanding of the subject area content applies to the credit.
7) Personal Curriculum: The Personal Curriculum (PC) is a process to modify specific credit requirements and/or content expectations based on the individual learning needs of a student. PC is designed to serve students who want to accelerate, or go beyond, the MMC requirements and for students who need to individualize learning requirements to meet MMC expectations.

Early Literacy Initiative[3]

Michigan as a state is focusing on increasing the early literacy skills of its students through MDE's Early Literacy Initiative. The MDE believes that to ensure the early literacy skills of all Michigan's students, it needs to develop and deliver an educational system that provides high-quality instruction to all students, provides regular information on student progress and strategically intervenes with research-based strategies when students fall behind. The MDE also believes that prior to children becoming students (at kindergarten entry), engaging and supporting parents and other family members in supporting language and age-appropriate early literacy development will provide the foundation for later success for students, as well as increased engagement of families in their children's schooling.

The Early Literacy Initiative is a core component of supporting the implementation of College- and Career-Ready standards in Michigan, particularly in the earliest grades. MDE is making a concerted effort to consistently focus on the foundations described above and build capacity to support districts on literacy.

"Third Grade Reading Law"[4]

Enacted in October 2016, House Bill 4822 establishes requirements to provide assistance to students to "help ensure that more pupils will achieve a score of at least proficient in English language arts on the grade 3 state assessment." It requires that school districts and school academies utilize valid and reliable screening, formative, and diagnostic reading assessment systems, and requires that K-3 students who

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[3] http://www.michigan.gov/mde/0,4615,7-140-28753_74161---,00.html

[4] https://www.michigan.gov/documents/mde/3rd_Grade_Reading_Law_FAQ-June_2017_573055_7.pdf

exhibit a reading deficiency are provided reading intervention programs. Students who score more than grade level behind on the end of third grade assessment will be retained. The 3rd grade state summative assessment will be used to ‘trigger’ retention beginning with the 2019-2020 school year (this year’s first-graders). The “Third Grade Reading Law” also provides opportunities for students determined to be retained by the state assessment to demonstrate a grade 3 reading level through an alternative standardized reading assessment approved by the superintendent of public instruction or through a pupil portfolio demonstrating competency in grade 3 English language arts standards.

Michigan Merit Curriculum (MMC)[5]

Districts must ensure that any student who entered 8th grade during or after the 2005-2006 school year and wishes to receive a high school diploma from a public school must meet the requirements of the MMC. This includes alternative and adult education students. Modifications can be made to the MMC based on student needs.

The MMC is crafted around the philosophical belief that all students will need postsecondary learning opportunities beyond high school. It is not a curriculum in the traditional sense in that it doesn’t describe instructional materials and approaches. Instead it specifies that all students who earn a diploma, at a minimum, have demonstrated proficiency with the content outlined by the state academic standards or guidelines. Since districts are responsible for awarding diplomas, so too are they responsible for providing all students the opportunity to learn the content outlined by the standards. As the learning skills for college and the workplace have merged, the MMC, if properly implemented, will prepare students with the skills and knowledge needed to be successful in our global economy and workplace. It supports the need for personalization, acceleration, and innovation in an atmosphere of high expectations and high support for students.

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[5] http://www.michigan.gov/documents/mde/Complete_MMC_FAQ_August_2014_467323_7.pdf

Michigan Merit Curriculum High School Graduation Requirements (18 credits)
ENGLISH LANGUAGE ARTS (ELA) - 4 Credits
Proficiency in State Content Standards for ELA (4 credits)
MATHEMATICS - 4 Credits
Proficiency in State Content Standards for Mathematics (3 credits) Proficiency in district approved 4th mathematics credit options (1 credit) (Student must have a math experience in their final year of high school.)
ONLINE LEARNING EXPERIENCE
Course, Learning or Integrated Learning Experience
PHYSICAL EDUCATION & HEALTH - 1 Credit
Proficiency in State Content Standards for Physical Education and Health (1 credit); ***Or*** Proficiency with State Content Standards for Health (1/2 credit) and district approved extra-curricular activities involving physical activities (1/2 credit)
SCIENCE - 3 Credits
Proficiency in State Content Standards for Science (3 credits); ***Or beginning with the class of 2015:*** Proficiency in some State Content Standards for Science (2 credits) **and** completion of a department approved formal career and technical education program (1 credit)
SOCIAL STUDIES - 3 Credits
Proficiency in State Content Standards for Social Studies (3 credits)
VISUAL, PERFORMING AND APPLIED ARTS - 1 Credit
Proficiency in State Content Standards for Visual, Performing and Applied Arts (1 credit)
WORLD LANGUAGE - 2 Credits ***(Effective beginning with students graduating in 2016)***
Formal coursework OR an equivalent learning experience in grades K-12 (2 credits); ***Or*** Formal coursework or an equivalent learning experience in grades (1 credit) **and** completion of a department approved formal career and technical education program **or** an additional visual, performing and applied arts credit (1 credit)

Awarding of Credits

The MMC requires that credit be awarded not by the commonly used Carnegie unit, which is based on seat time, but based on a student's demonstration that he or she has successfully met the content expectations for the credit area. The content area standards and guidelines outline the content required for earning the total credit in each content area as specified in the legislation. Credit assigned to courses and other learning opportunities are at the discretion of the district, and may or may not be the same as the credit earned by the student.

Students may earn credit if they successfully demonstrate mastery of subject area content expectations or guidelines for the credit. The assignment of credit must be based, at least in part, on student performance on assessments designed to measure the extent to which they meet the credit expectations and guidelines. Districts determine the assessments and criteria of success for determining student proficiency.

As noted under Flexible Learning Options, beyond earning credit through a traditional course setting, a student may earn a credit in a variety of ways, including, but not limited to:

- Work-based learning programs
- Integrated sequences
- Project-based learning
- Independent teacher-guided study
- Testing out
- Career and Technical Education
- College Coursework
- Early College
- Advanced Placement Courses
- International Baccalaureate
- On-line classes

Educational Development Plan (EDP)

The MMC legislation 380.1278b (11) states: The board of a school district or board of directors of a public school academy shall provide the opportunity for each pupil to develop an educational development plan during grade 7, and shall ensure that each pupil reviews his or her educational development plan during grade 8 and revises it as appropriate before he or she begins high school. An educational development plan shall be developed, reviewed, and revised by the pupil under the supervision of the pupil's school counselor or another designee qualified to act in a counseling role under section 1233 or 1233a selected by the school principal and shall be based on high school readiness scores and a career pathways program or similar career exploration program. An educational development plan shall be designed to assist pupils to identify career development goals as they relate to academic requirements. During the process of developing and reviewing a pupil's educational development plan, the pupil shall be advised that many of the curricular requirements of this section and section 1278a may be fulfilled through career and technical education.

College and Career Ready Skills[6]

Career & college-ready students possess the skills necessary to earn a self-sustaining wage and participate in postsecondary opportunities without remediation.

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[6] http://www.michigan.gov/mde/0,4615,7-140-28753---,00.html

This means that they:

- Use technology and tools strategically in learning and communicating
- Use argument and reasoning to do research, construct arguments, and critique the reasoning of others
- Communicate and collaborate effectively with a variety of audiences
- Solve problems, construct explanations and design solutions

These characteristics of career & college-ready students are evident within all of the academic standards, including the arts and the CTE Career Ready Practices. Students that are career & college-ready are provided with opportunities throughout their K-12 education to use technology and tools; engage in argument, reasoning, and problem solving; and to communicate and collaborate.

Executive Directive to Implement Recommendations of the Career Pathway Alliance[7]

The June 26, 2017 Executive Directive issued by State Superintendent Brian J. Whiston directed the MDE staff to administratively implement nine recommendations of the Career Pathway Alliance, including:

- Required productive use of education development plans (EDPs) and talent transcripts – Put meaningful and regular use of education development plans in School Improvement Plans. (Recommendation 3A)
- Require career exploration and job readiness education – As part of School Improvement Plans, schools must submit a plan with a series of milestones for career exposure in elementary, middle, and high school. (Recommendation 3B)
- Externships for continuing education and professional development – Allow teachers and counselors to use externships with employers and meaningful job shadow opportunities to qualify as professional development and continuing education credit. (Recommendation 4D)
- Maximize Michigan Merit Curriculum Flexibility – Provide technical assistance to local school districts on how to integrate Michigan Merit Curriculum requirements with career programs (ex. carpentry and geometry) and extracurricular activities, such as FIRST Robotics and Square One. (Recommendation 5A)
- Require state-funded CTE programs must lead to an industry-recognized credential - Require an industry-recognized credential as determined by the state (TED & MDE) through discussions with regional employers. (Recommendation 6)
- Establish a "Rising Tide" (technical assistance teams) for professional trades programs – Bring education, parents and employers together to identify needs, gaps, and solutions. (Recommendation 9)

Michigan Assessments [8]

[7] http://www.michigan.gov/documents/mde/Career_Pathways_ED_576698_7.PDF

[8] http://www.michigan.gov/mde/0,4615,7-140-22709---,00.html

The following assessments are required to be administered:

- Early Literacy and Mathematics Benchmark (K-2) assessments (also referred to as the K-2s)
- M-STEP (Michigan Student Test of Educational Progress)
    - English language arts and mathematics will be assessed in grades 3–8, science in grades 4 and 7, and social studies in grades 5 and 8.
- PSAT 8/9 and PSAT 10
    - The PSAT 8/9 is given to students in grade 9 only and the PSAT 10 given to grade 10 students
- The Michigan Merit Examination (MME)
    - Administered to students in grade 11 and eligible students in grade 12 based on Michigan high school standards.
    - Consists of three components that include the College Board SAT, ACT WorkKeys job skills assessment in reading, mathematics, and locating information and the M-STEP science and social studies.
- MI-Access
    - Michigan's alternate assessment system designed for students who have, or function as if they have, cognitive impairments whose IEP (Individualized Educational Program) Team has determined that General Assessments, even with accommodations, are not appropriate. The three MI-Access assessments are Functional Independence, Supported Independence, and Participation.
- W-APT (WIDA-ACCESS Placement Test)
    - An English language proficiency "screener" test given to incoming students who may be designated as English language learners.
- WIDA ACCESS for ELLs
    - An English language proficiency assessment given to Kindergarten through 12th graders who have been identified as English language learners (ELLs).

Michigan District and School Accountability[9]

MDE releases school accountability reports including the Michigan School Scorecards for districts and schools, as well as Top-to-Bottom School Rankings. MDE also recognizes schools that outperform others on these diagnostics as Reward Schools.

Michigan Top-to-Bottom School Rankings

The Top-to-Bottom School Rankings are a part of Michigan's current school accountability system which ranks schools on student performance in mathematics, English language arts, science, and social studies. Graduation rate data is also used for high schools. Each school receives an Overall Ranking based on the performance components of student achievement and student improvement. Additionally, each school

[9] http://www.michigan.gov/mde/0,4615,7-140-22709_59490---,00.html

receives an Achievement Gap Ranking based solely on the achievement gaps between the highest and lowest scoring 30 percent of students within the school.

These rankings are used to recognize the top 5% of schools in the Overall Ranking and the top 5% of schools with the highest improvement values as Reward Schools. Schools that outperform their expected ranking or outperform other similarly-situated schools by "Beating the Odds" are also considered Reward Schools.

All schools are included in the rankings if they have two years of assessment data for 30 or more complete academic year students in two or more tested subjects. These measurements were developed in conjunction with a diverse set of education stakeholders as part of Michigan's approved federal No Child Left Behind (NCLB) flexibility waiver.

Educator Evaluations[10]

Requirements for Teacher Evaluations

- The performance evaluation system shall include at least an annual year-end evaluation for all teachers.
- For the 2015-2016, 2016-2017, and 2017-2018 school years, 25% of the annual year-end evaluation shall be based on student growth and assessment data.
- Beginning with the 2018-2019 school year, 40% of the annual year-end evaluation shall be based on student growth and assessment data.
- Beginning with the 2018-2019 school year, for core content areas in grades and subjects in which state assessments are administered, 50% of student growth must be measured using the state assessments. Districts may choose to use state assessment data prior to 2018-19, but are not required to do so. The MDE will provide student growth percentiles (SGPs) as the state measure of student growth starting with the 2015-16 state assessments.
- Student assessment and growth data not based on the state measure must be measured using multiple research-based growth measures or alternative assessments that are rigorous and comparable across schools within the school district, ISD, or PSA. They may include student learning objectives (SLOs) or nationally normed or locally adopted assessments that are aligned to state standards or based on achievement of individualized education program goals.
- The portion of a teacher’s annual year-end evaluation that is not based on student growth and assessment data shall be based primarily on a teacher’s performance as measured by the observation tool developed or adopted by the school district, ISD, or PSA.
- The system must assign to each teacher an effectiveness rating of highly effective, effective, minimally effective, or ineffective.
- Midyear progress reports are required for teachers who are (a) in the first year of the probationary period or (b) received a rating of minimally effective or ineffective on the most recent annual evaluation.

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[10] https://www.michigan.gov/documents/mde/Educator_Evaluations_At-A-Glance_522133_7.pdf

- Teachers who are rated as highly effective on three consecutive annual evaluations may be evaluated biennially instead of annually.
- Unless a teacher has received a rating of effective or highly effective on his/her two most recent annual year-end evaluations, there must be at least two classroom observations of the teacher each school year. Beginning with the 2016-2017 school year, at least one observation must be unscheduled. The school administrator responsible for the teacher's performance evaluation shall conduct at least one of the observations. Within 30 days after each observation, the teacher must be provided with feedback from the observation.
- Teachers who are rated ineffective on three consecutive annual year-end evaluations must be dismissed from employment by the district.

Requirements for Administrator Evaluations

- The performance evaluation system shall include at least an annual year-end evaluation for all administrators regularly involved in instructional matters.
- For the 2015-2016, 2016-2017, and 2017-2018 school years, 25% of the annual year-end evaluation shall be based on student growth and assessment data.
- Beginning with the 2018-2019 school year, 40% of the annual year-end evaluation shall be based on student growth and assessment data.
- The student growth component of the evaluation must be an aggregate of all of the student growth and assessment data used in teacher evaluations in the school or district.
- The portion of the evaluation that is not based on student growth data and the district's adopted evaluation tool must be based on the administrator's proficiency in using the observation tool for teachers; the progress made by the school or district in meeting the goals set forth in the school or district improvement plan as applicable; student attendance in the school or school district; and student, parent, and teacher feedback.
- The system must assign to each school administrator an effectiveness rating of highly effective, effective, minimally effective, or ineffective.
- An improvement plan is required for a school administrator who is rated as minimally effective or ineffective.
- Administrators who are rated as highly effective on three consecutive annual year-end evaluations may be evaluated biennially instead of annually.
- Administrators who are rated as ineffective on three consecutive annual year-end evaluations must be dismissed from employment by the district.

Additional Requirements for Special Needs Students

ELL Students

<u>Title III - Language Instruction for Limited English Proficient and Immigrant Students</u>[11]

The Title III program is designed to assure speedy acquisition of English language proficiency, assist students to achieve in the core academic subjects, and to assist students to meet State standards. It also

[11] http://www.michigan.gov/mde/0,4615,7-140-6530_30334_40078---,00.html

provides immigrant students with high quality instruction to meet challenging State standards, and assists the transition of immigrant children and youth into American society.

Michigan English Language Proficiency Standards[12]

The Michigan English Language Proficiency Standards are correlated with the national Teachers of English to Speakers of Other Languages (TESOL) English as a Second Language (ESL) Standards for Pre-K-12 Students and the Michigan Curriculum Framework: English Language Arts Standards. The Michigan English Language Proficiency Standards are "applied standards" relevant to the language acquisition process for English language learners and are presented in the language acquisition domains of listening, speaking, reading, and writing. Although the skill domains (listening, speaking, reading, and writing) are addressed separately, they are integrated in classroom instruction. Within each domain, standards apply to each level of proficiency. The benchmarks clarifying each standard are designed to outline the progression of achievement within the standard. Proficiency in listening, speaking, reading, and writing as outlined in these standards will allow English language learners to make a successful transition to full participation in the English language arts curriculum and achievement of the English Language Arts Standards.

Local school districts are encouraged to use the standards as a framework for developing programs designed to meet the needs of English language learners.

Common Statewide Entrance and Exit Protocol (EEP)[13]

The Entrance and Exit Protocol constitutes the official MDE road map for identifying and placing English learners in local English Language Acquisition, language assistance program/Title III supplemental services as well as for exiting them from such programs. As of the beginning of the 2012/2013 school year, the Michigan Department of Education expects all teachers and administrators to adhere to the protocol and procedures delineated in the EEP document.

The purpose of the common Entrance and Exit Protocol is to:

- Adhere to and apply federal requirements
- Provide a uniform and consistent method for determining eligibility for English learner services to students who are identified as potentially Limited English Proficient based on the Home Language Survey across Michigan schools
- Ensure that English learners are able to demonstrate proficiency in English and on local assessments before they are exited from bilingual/ESL services and programs

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[12] https://www.michigan.gov/documents/English_Lang_153694_7._Proficiency_Standards.pdf

[13]

http://www.michigan.gov/documents/mde/Entrance_and_Exit_Protocol_updated_May_2016_550634_7.pdf

The Michigan's English learner Entrance and Exit Protocol was last updated in 2017 to align with the new WIDA standard setting cut scores.

Special Education Students

Michigan Administrative Rules for Special Education (MARSE) With Related Individuals with Disabilities Education Act (IDEA) Federal Regulations[14]

Federal law requires states to provide a free appropriate public education (FAPE) to all students with disabilities through age 21 who are found to be in need of special education services. In Michigan, schools and districts must meet all Michigan Administrative Rules for Special Education (MARSE) and related Individuals with Disabilities Education Act (IDEA) Federal Regulations. According to MARSE and IDEA, education programs for disabled students must be designed to meet their individual needs and could include specially designed instruction in classrooms, at home, or in private or public settings. Examples of these services include speech, occupational, and physical therapy, psychological counseling, and medical diagnostic services that are necessary to a child's education. Teachers of students with disabilities are required to be trained in the instruction of disabled students. Services begin as soon as eligibility is determined.

Standards for Extended School Year Services in Michigan[15]

The need for extended school year (ESY) services must be considered for every student with a disability at each Individualized Education Program (IEP) Team meeting. ESY services must be provided if the IEP Team determines that such services are necessary for the provision of a FAPE to the student. The need for ESY must be determined individually and may not be provided or denied based upon category of disability or program assignment. Related services (including therapy services and transportation) and supplemental aids and services must be considered, as well as instructional programming when developing a plan for ESY services.

[14] http://www.michigan.gov/documents/mde/MARSE_Supplemented_with_IDEA_Regs_379598_7.pdf

[15] http://www.michigan.gov/documents/mde/StandardsForESY_245917_7.pdf

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Appendix C: Instructions for Professional Judgment Panel (Statewide)

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INSTRUCTIONS TO MICHIGAN PROFESSIONAL JUDGMENT PANEL MEMBERS

Augenblick, Palaich and Associates
Denver, Colorado

November 9th, 2017

The work you are doing today is part of an adequacy study being conducted in Michigan on behalf of the School Finance Research Collaborative. It relies on your professional experience to identify the resources needed so that all students, schools, and districts can fulfill all state standards. Below you will find a number of instructions to help you in this process. 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 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, four school-level professional judgment panels were convened to address: (1) elementary schools; (2) preschool programs; (3) middle schools; and (4) high schools. 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). Five additional panels were then held to review the work of the school-level panels and address the resources needed for (1) special education students, (2) English Language Learners (ELL), (3) different concentrations of students in poverty, (4) career and technical education, and (5) charter schools. District-level panels were also held to review the work of all prior panels, and identify the district-level resources needed to support schools. Finally, a CFO panel was held earlier this week to specifically review non-personnel costs at the school and district level.

3. Today, you are serving on a statewide review panel to review the work of all prior panels and address any inconsistencies across schools/districts and discuss any outstanding issues.

4. The characteristics of each representative school(s) are identified, including: (1) grade span; (2) enrollment; and (3) the proportion of students in each special needs category.

5. The "input" requirements and "outcome" objectives that need to be accomplished by the representative school(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.

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). 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.

APPENDIX D: SALARIES AND BENEFITS

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Salaries and Benefits

Both the evidence-based (EB) and professional judgment (PJ) approaches to adequacy identify the resources needed to meet Michigan standards. Once these resources are identified, the study team needed to apply cost figures to estimate the costs associated with meeting standards. The key components of costs for both studies are the salaries and benefits of the personnel identified by the approaches. Each approach uses a high level of specificity for personnel categories to provide the best possible estimate of costs. This means that the study team needs specific salary information for various school and district level staff, including categories such as teachers, media specialists, counselors, principals, superintendents, and secretaries.

Salaries

In most states in which the study team has worked, this type of personnel position data is readily available from the state at a statewide average level. The study team worked over the length of the study to acquire this level of detail from the state, including multiple requests to the Center for Educational Performance and Information (CEPI). These requests came from both the study team and Collaborative partners. CEPI was unable to provide this data in a timely manner for the study and at the time of this report had not provided the study team with the information.

In the absence of CEPI data, the study team turned to many other options across the state to try and find statewide average salary information for the necessary personnel categories. This included reviewing work done by The School Superintendents Association[16] and Ramberg and Associates. The study team also consulted with a number of private businesses that work with school districts across the state. None of these avenues produced the full set of data needed.

In a few states, the study team has been faced with a similar lack of available salary data and has turned to salary data from other states to produce the costs needed for a study. In Michigan, the study team was able to identify the statewide average teacher salary for 2015-16 through the state's Bulletin 1014 information. This data point was then combined with actual salary data from Colorado, Maryland, and Wyoming, three states with recent adequacy studies. The study team explored the relationship between personnel positions and statewide teacher average salary for the three states. The team then, where available, averaged the ratios across the three states and applied those ratios to Michigan's teacher salary to produce salaries for the Michigan study. The table on the page below shows the ratios for the three states, the average ratio, and the salaries used for this study.

Benefits

Benefit information was provided to the study team by CFOs from around the state. Benefits include the costs of retirement, social security and Medicare, and healthcare benefits. The amounts used include 4.6% for retirement. Districts across Michigan pay different retirement rates. The traditional districts retirement system includes 25.56% retirement rate and charters school retirement rates vary by charter.

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[16] 2016 AASA Superintendent Salary & Benefits Study by Leslie A. Finnan and Robert S. McCord

The study team used a 4.6% rate encompass the minimum amount that most districts spend. FICA has a 7.65%, 0.60% for unemployment, and $12,000 per eligible employee for healthcare and other benefits.

	Ratio from Teacher Salary				
	Wyoming	Maryland	Colorado	Three State Average	Salaries Used for Michigan Study
Teaching	1.00	1.00	1.00	1.00	$61,875
Administrative Assistant	0.55	0.67	0.61	0.61	$37,826
Assistant Principal	1.49	1.54	1.40	1.48	$91,430
Assistant Superintendent	2.20	2.39	2.17	2.25	$139,396
Behavior Specialist	1.03	1.16	1.02	1.07	$66,122
Bookkeeping	0.55	0.67	0.61	0.61	$37,826
Coordinator	1.32	1.61	1.23	1.38	$85,661
Counseling	1.03	1.11	1.05	1.06	$65,660
Custodians	N/A	0.65	N/A	0.65	$40,219
Director	1.32	1.92	1.68	1.64	$101,539
Educational Media Specialist	1.08	1.11	1.16	1.12	$69,125
ELL Coordinator	1.00	1.00	1.00	1.00	$61,875
Family Liaison	0.39	0.67	0.61	0.56	$34,359
Groundskeepers	N/A	0.86	N/A	0.86	$53,213
Health Aide	0.39	0.42	0.32	0.38	$23,280
IEP Coordinator	1.00	1.00	1.00	1.00	$61,875
Information Management	0.93	0.82	0.82	0.86	$52,961
Instructional Aide	0.39	0.45	0.31	0.38	$23,659
Instructional Coaches	1.14	1.00	1.19	1.11	$68,703
Instructional Consulting	1.00	1.00	1.00	1.00	$61,875
Manager	N/A	1.61	1.00	1.30	$80,596
Media Aide	N/A	0.50	0.31	0.41	$25,101
Nursing	0.89	0.87	1.01	0.92	$57,168
Occupational Therapy	1.04	1.21	1.14	1.13	$69,969
Other Professional Educational	1.00	1.16	N/A	1.08	$66,749
Physical Therapy	1.04	1.21	1.14	1.13	$69,969
Principal	1.66	1.82	1.60	1.69	$104,692
Psychological	1.29	1.32	1.10	1.24	$76,495
Salaries for Specials Teachers	1.00	1.00	1.00	1.00	$61,875
Secretary-Clerical-Bookkeeper	0.55	0.67	0.61	0.61	$37,826
Social Work	1.03	1.23	1.09	1.12	$69,138
Speech and Language Therapist	1.06	1.14	1.14	1.11	$68,895
Substitutes	1.00	1.00	1.00	1.00	$61,875
Superintendent	2.40	3.05	2.07	2.51	$155,096
Supervision/Direction- Staff	1.32	1.61	N/A	1.46	$90,367
Supervisor	1.32	1.61	1.68	1.54	$94,990
Teacher/tutor interventionist	1.00	1.00	1.00	1.00	$61,875
504 Aide	0.39	0.45	0.31	0.38	$23,659

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APPENDIX E: TECHNOLOGY PRICES

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Technology Hardware Costs				
		Cost per Unit	**Replacement Cycle**	**Annual Price**
Administration/Main Office				
Computers	Admin	$900	4	$225
Laptops	Admin	$1,000	4	$250
Mobile Devices	Admin	$600	1	$600
Phone Stipend	Admin	$700		$700
Printers	Admin	$200	4	$50
Copier/Printer	Admin	$10,600	8	$1,325
Faculty				
Computers	Faculty	$900	4	$225
Laptops	Faculty	$850	4	$213
Mobile Devices	Faculty	$425	3	$142
Classroom				
Computers	Classroom	$900	4	$225
Printers	Classroom	$200	4	$50
Visual Presentation System	Classroom	$9,500	10	$950
Document Camera	Classroom	$400	4	$100
Computer Lab(s)- Fixed				
# of fixed labs	Fixed			
Computers	Fixed	$900	4	$225
Printers	Fixed	$200	4	$50
Visual Presentation System	Fixed	$9,500	10	$950
Document Camera	Fixed	$200	4	$50
Headphones	Fixed	$5		$5
Computer Lab(s)- Mobile	Fixed Lab	$1,000	4	$250
# of mobile labs	Fixed Lab	$900	4	$225
Computer Lab(s)- Mobile				
# of mobile labs	Mobile			
Laptops	Mobile	$850	4	$213
Other Hardware Item	Mobile			
Other Hardware Item	Mobile			
Media Center				
Computers	Media	$900	4	$225
Printers	Media	$200	4	$50
Visual Presentation System	Media	$9,500	10	$950

Other				
Student Devices	Other	$500	3	$167
3D Printer	Other	$2,500	5	$500
Video Cameras	Other	$400	4	$100
Infrastructure Hardware	Other	$25	1	$25
Maker Space	other	$15,000	10	$1,500
Copier/Printer	Other	10600	8	$1,325

APPENDIX F: RETIREMENT

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Adequacy Estimates Without Retirement

The retirement system requires that districts to pay 25.56 percent on certified and classified staff's salary for retirement. Some charters also pay into the retirement system while others hire staff through a third party which does not require the 25.56 retirement contribution. Additionally, the retirement system has an unfunded liability of 11 percent. The Collaborative asked the study team to look at the base figure in three ways:

- What districts currently pay, which is what the study team used throughout the study and the chapters above;
- What base costs would be without retirement, seen below in table F.1; and
- What base costs would be if the unfunded liability was included, seen below in table F.2.

Table F.1 and F.2 look at the base cost for the EB and PJ costs without retirement, as well as with the unfunded liability. The new base numbers below would also change the weights for students with special needs.

Table F.1
Adequacy Estimates Without Retirement

		Very Small	Small	Moderate	Large
EB Base Cost	$9,844				
PJ Base Cost		$11,179	$10,039	$9,697	$9,351

The PJ base without retirement is $9,351 per student, which is a $1,352 decrease from the base for the study. The EB base decreases by $1,624 to $9,844 per student when excluding retirement. These new bases allow the Collaborative to see the impact of retirement on the per student base.

Table F.2
Adequacy Estimates Including Unfunded Liability

		Very Small	Small	Moderate	Large
EB Base Cost	$12,168				
PJ Base Cost		$13,585	$12,168	$11,734	$11,291

In table F.2 the study team included retirement and the 11 percent unfunded liability in the base costs. This increased the PJ base by $588 per student and the EB base by $700 per student. These new bases show the impact of cost per student for the district to fund the unfunded liability.

Table F.3
Adequacy Estimates with 25.56% Retirement rate

		Very Small	Small	Moderate	Large
EB Base Cost	$11,469				
PJ Base Cost		$12,861	$11,527	$11,121	$10,703

In table F.3 the study team included the adequacy estimates with a 25.56 percent retirement rate that is used by traditional districts and some charters. The cost would be $11,121 in a moderate district and using the PJ approach and it would be $11,469 using the EB approach.

APPPENDIX G: LIST OF SUCCESSFUL SCHOOL DISTIRCTS

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District ID	District Name	Above Average Standard	High Absolute Performance Standard	Growth	Special Populations	Notably Successful
2080	Superior Central School District	1	0	0	0	0
3010	Plainwell Community Schools	1	0	0	0	0
3020	Otsego Public Schools	1	0	1	0	1
3040	Wayland Union Schools	1	0	0	0	0
3070	Hopkins Public Schools	1	0	0	0	0
3080	Saugatuck Public Schools	1	0	0	0	0
3100	Hamilton Community Schools	1	0	0	0	0
5060	Elk Rapids Schools	1	0	0	0	0
7010	Arvon Township School District	1	0	1	0	1
7040	L'Anse Area Schools	1	0	0	0	0
8030	Hastings Area School District	1	0	0	0	0
8050	Thornapple Kellogg School District	1	0	0	0	0
9090	Pinconning Area Schools	1	0	1	0	1
10015	Benzie County Central Schools	1	0	0	0	0
10025	Frankfort-Elberta Area Schools	1	0	0	0	0
11020	St. Joseph Public Schools	1	1	0	0	1
11030	Lakeshore School District (Berrien)	1	0	0	0	0
11200	New Buffalo Area Schools	1	0	0	0	0
11340	Bridgman Public Schools	1	0	1	0	1
13110	Marshall Public Schools	1	0	0	0	0
14030	Edwardsburg Public Schools	1	0	0	0	0
15020	Boyne City Public Schools	1	0	0	0	0
16015	Cheboygan Area Schools	1	0	1	0	1
16070	Mackinaw City Public Schools	1	0	0	0	0
17010	Sault Ste. Marie Area Schools	1	0	0	0	0
17050	DeTour Area Schools	1	0	1	0	1
17140	Brimley Area Schools	1	0	0	0	0

District ID	District Name	Above Average Standard	High Absolute Performance Standard	Growth	Special Populations	Notably Successful
18010	Clare Public Schools	1	0	1	0	1
19010	DeWitt Public Schools	1	0	0	0	0
19070	Fowler Public Schools	1	1	0	0	1
19100	Bath Community Schools	1	0	0	0	0
19120	Ovid-Elsie Area Schools	1	0	1	0	1
19125	Pewamo-Westphalia Community Schools	1	0	0	0	0
19140	St. Johns Public Schools	1	0	0	0	0
20015	Crawford AuSable Schools	1	0	0	0	0
22030	Breitung Township School District	1	0	0	0	0
23060	Grand Ledge Public Schools	1	0	0	0	0
23080	Olivet Community Schools	1	0	0	0	0
23490	Oneida Township S/D #3	1	0	1	0	1
24020	Harbor Springs School District	1	0	0	0	0
24070	Public Schools of Petoskey	1	0	0	0	0
25030	Grand Blanc Community Schools	1	0	0	1	1
25050	Goodrich Area Schools	1	0	0	0	0
25100	Fenton Area Public Schools	1	0	0	0	0
25120	Flushing Community Schools	1	0	0	0	0
25140	Davison Community Schools	1	0	0	0	0
25150	Clio Area School District	1	0	0	0	0
25200	Lake Fenton Community Schools	1	0	0	0	0
25250	Linden Community Schools	1	0	0	0	0
26040	Gladwin Community Schools	1	0	0	0	0
27010	Bessemer Area School District	1	0	0	0	0
28010	Traverse City Area Public Schools	1	0	0	0	0
28090	Kingsley Area Schools	1	0	0	0	0

District ID	District Name	Above Average Standard	High Absolute Performance Standard	Growth	Special Populations	Notably Successful
31010	Hancock Public Schools	1	0	0	0	0
31030	Public Schools of Calumet, Laurium & Keweenaw	1	0	0	0	0
31050	Chassell Township School District	1	0	0	0	0
31100	Dollar Bay-Tamarack City Area Schools	1	0	0	0	0
31110	Houghton-Portage Township School District	1	0	0	0	0
32060	Harbor Beach Community Schools	1	0	1	0	1
32170	Ubly Community Schools	1	0	0	0	0
33010	East Lansing School District	1	0	0	0	0
33060	Haslett Public Schools	1	1	0	0	1
33070	Holt Public Schools	1	0	0	0	0
33130	Mason Public Schools (Ingham)	1	0	0	0	0
33170	Okemos Public Schools	1	1	0	0	1
33200	Stockbridge Community Schools	1	0	0	0	0
33230	Williamston Community Schools	1	1	0	1	1
34090	Lakewood Public Schools	1	0	0	0	0
34110	Portland Public Schools	1	0	0	0	0
35030	Tawas Area Schools	1	0	1	0	1
36015	Forest Park School District	1	0	1	1	1
37040	Beal City Public Schools	1	0	0	0	0
38010	Western School District	1	0	0	0	0
38040	Columbia School District	1	0	0	0	0
38100	Hanover-Horton School District	1	0	0	0	0
39065	Gull Lake Community Schools	1	0	0	0	0
39140	Portage Public Schools	1	0	0	0	0
39160	Schoolcraft Community Schools	1	0	0	0	0

District ID	District Name	Above Average Standard	High Absolute Performance Standard	Growth	Special Populations	Notably Successful
39170	Vicksburg Community Schools	1	0	0	0	0
41025	Northview Public Schools	1	0	0	0	0
41040	Byron Center Public Schools	1	1	0	0	1
41050	Caledonia Community Schools	1	1	0	0	1
41070	Cedar Springs Public Schools	1	0	0	0	0
41090	East Grand Rapids Public Schools	1	1	0	0	1
41110	Forest Hills Public Schools	1	1	0	0	1
41130	Grandville Public Schools	1	0	0	0	0
41170	Lowell Area Schools	1	0	0	0	0
41210	Rockford Public Schools	1	0	0	0	0
41240	Sparta Area Schools	1	0	0	0	0
42030	Grant Township S/D #2	1	1	0	0	1
44020	Almont Community Schools	1	0	0	0	0
44090	North Branch Area Schools	1	0	0	0	0
45010	Glen Lake Community Schools	1	1	0	0	1
45020	Leland Public School District	1	0	0	0	0
46040	Blissfield Community Schools	1	0	1	0	1
46060	Clinton Community Schools	1	0	0	0	0
46140	Tecumseh Public Schools	1	0	0	0	0
47010	Brighton Area Schools	1	1	0	0	1
47060	Hartland Consolidated Schools	1	0	0	0	0
47070	Howell Public Schools	1	0	0	0	0
47080	Pinckney Community Schools	1	0	0	0	0
49040	Les Cheneaux Community Schools	1	0	0	0	0
49110	Mackinac Island Public Schools	1	0	0	0	0
50040	Anchor Bay School District	1	0	0	0	0
50050	Armada Area Schools	1	0	0	0	0

District ID	District Name	Above Average Standard	High Absolute Performance Standard	Growth	Special Populations	Notably Successful
50080	Chippewa Valley Schools	1	0	0	0	0
50130	Lakeview Public Schools (Macomb)	1	0	1	0	1
50140	L'Anse Creuse Public Schools	1	0	0	0	0
50190	Romeo Community Schools	1	0	0	0	0
50210	Utica Community Schools	1	0	0	0	0
52015	NICE Community School District	1	0	0	0	0
52090	Negaunee Public Schools	1	0	0	0	0
52100	Powell Township Schools	1	0	0	0	0
52160	Wells Township School District	1	1	1	1	1
52170	Marquette Area Public Schools	1	0	0	0	0
55120	Stephenson Area Public Schools	1	0	0	0	0
56010	Midland Public Schools	1	1	0	0	1
56020	Bullock Creek School District	1	0	0	0	0
57030	McBain Rural Agricultural Schools	1	0	0	0	0
58030	Bedford Public Schools	1	0	0	0	0
58070	Ida Public School District	1	0	0	0	0
61060	Mona Shores Public School District	1	0	0	0	0
61180	Montague Area Public Schools	1	0	0	0	0
61230	North Muskegon Public Schools	1	1	0	0	1
61240	Whitehall District Schools	1	0	0	0	0
62040	Fremont Public School District	1	0	1	0	1
62050	Grant Public School District	1	0	0	0	0
63010	Birmingham Public Schools	1	1	0	0	1
63040	Royal Oak Schools	1	0	1	0	1
63050	Berkley School District	1	0	1	0	1
63070	Avondale School District	1	0	0	0	0
63080	Bloomfield Hills Schools	1	1	0	1	1

District ID	District Name	Above Average Standard	High Absolute Performance Standard	Growth	Special Populations	Notably Successful
63100	Novi Community School District	1	1	0	0	1
63110	Oxford Community Schools	1	0	0	0	0
63150	Troy School District	1	1	0	1	1
63160	West Bloomfield School District	1	0	0	0	0
63190	Clarkston Community School District	1	1	0	0	1
63200	Farmington Public School District	1	0	0	0	0
63210	Holly Area School District	1	0	0	0	0
63220	Huron Valley Schools	1	0	0	0	0
63230	Lake Orion Community Schools	1	1	0	0	1
63240	South Lyon Community Schools	1	1	0	0	1
63260	Rochester Community School District	1	1	0	1	1
63270	Clawson Public Schools	1	0	1	0	1
63290	Walled Lake Consolidated Schools	1	0	0	0	0
65045	West Branch-Rose City Area Schools	1	0	1	0	1
69020	Gaylord Community Schools	1	0	0	0	0
69030	Johannesburg-Lewiston Area Schools	1	0	0	0	0
70010	Grand Haven Area Public Schools	1	1	0	0	1
70040	Allendale Public Schools	1	0	0	0	0
70070	West Ottawa Public School District	1	0	0	0	0
70120	Coopersville Area Public School District	1	0	0	0	0
70175	Jenison Public Schools	1	1	1	0	1
70190	Hudsonville Public School District	1	1	1	0	1
70300	Spring Lake Public Schools	1	1	0	0	1
70350	Zeeland Public Schools	1	0	1	0	1
72010	Roscommon Area Public Schools	1	0	1	0	1
73110	Chesaning Union Schools	1	0	0	0	0

District ID	District Name	Above Average Standard	High Absolute Performance Standard	Growth	Special Populations	Notably Successful
73190	Frankenmuth School District	1	0	0	0	0
73200	Freeland Community School District	1	0	0	0	0
73255	Swan Valley School District	1	0	0	0	0
74050	East China School District	1	0	0	0	0
74100	Marysville Public Schools	1	0	0	0	0
74120	Memphis Community Schools	1	0	0	0	0
74130	Yale Public Schools	1	0	0	0	0
76060	Brown City Community Schools	1	0	0	0	0
76080	Croswell-Lexington Community Schools	1	0	0	0	0
76090	Deckerville Community School District	1	0	0	0	0
78070	New Lothrop Area Public Schools	1	0	1	0	1
80110	Gobles Public School District	1	0	0	0	0
80140	Lawton Community School District	1	0	0	0	0
80150	Mattawan Consolidated School	1	0	0	0	0
80160	Paw Paw Public School District	1	0	1	0	1
81010	Ann Arbor Public Schools	1	1	0	0	1
81040	Chelsea School District	1	1	1	0	1
81050	Dexter Community School District	1	1	0	0	1
81080	Manchester Community Schools	1	0	0	0	0
81120	Saline Area Schools	1	1	0	1	1
81140	Whitmore Lake Public School District	1	0	0	0	0
82055	Grosse Pointe Public Schools	1	1	0	0	1
82095	Livonia Public Schools School District	1	0	0	0	0
82100	Plymouth-Canton Community Schools	1	1	0	1	1
82155	Trenton Public Schools	1	0	0	0	0
82300	Grosse Ile Township Schools	1	0	0	0	0

District ID	District Name	Above Average Standard	High Absolute Performance Standard	Growth	Special Populations	Notably Successful
82390	Northville Public Schools	1	1	0	0	1
83010	Cadillac Area Public Schools	1	0	0	0	0

APPENDIX H: OUTLIERS

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District Code	District Name
2010	AuTrain-Onota Public Schools
2020	Burt Township School District
7010	Arvon Township School District
11200	New Buffalo Area Schools
15010	Beaver Island Community School
17050	DeTour Area Schools
17160	Whitefish Township Schools
31070	Elm River Township School District
42030	Grant Township S/D #2
45040	Northport Public School District
49020	Bois Blanc Pines School District
52100	Powell Township Schools
52160	Wells Township School District

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Appendix I: References

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Appendix J: Glossary of Key Terms

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Glossary of Key Terms Used in This Report

Term	Definition
Adequacy Study/Costing Out Study	An adequacy or costing out study is undertaken to understand what level of resources are necessary to ensure students, teachers, schools, and districts can meet the standards set by the state. Researchers have developed four approaches to creating estimates for the level of funding necessary to provide all students with the opportunity to receive an adequate education: the evidence-based approach, professional judgment approach, successful schools/school district approach, and cost function or statistical approach.
Average Daily Membership (ADM)	Average Daily Membership (ADM) refers to the average number of students enrolled within a school or district each day over a specific time period.
Base per Student Cost	In a school funding formula, the "base" amount refers to the amount of funding per student for every student, regardless of student need or district characteristics (also referred to as a foundation amount in some states).
Coefficient of Variation	The coefficient of variation is a statistic that measures the amount of variation around the average for a set of values. A coefficient of variation of 0.0 shows that there is no variation and a variation above 1.0 shows high variation.
Evidence-Based Approach	The evidence-based (EB) approach assumes that information from research can be used to define the resource needs of a prototypical school or district to ensure that the school or district can meet state standards. The approach not only estimates resource levels but also specifies the programs and strategies through which such resources could be used efficiently. The approach is used to identify a base cost figure and adjustments for special needs students.
Geographic Cost Difference	Geographic cost difference refers to a measure of differences in costs associated with providing a comparable education in different locations across a state.
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. The approach identifies both a base cost and adjustments for special needs students.
Standard Deviation	Standard deviation is a measure that is used to quantify the amount of variation or dispersion of a set of data values.
Students in Poverty	Often referred to as "at-risk" students in other states, this refers to the number of students expected to struggle academically, using the number of students eligible for the free and reduced price lunch program as a proxy.
Students in Poverty, High Need	Refers to students from a poverty background with needs significantly higher than the average poverty student. At this time, the study team does not have a recommendation on the definition for these students.

Successful School District Approach	The successful schools/school district (SSD) approach determines an adequate per student base cost amount by using the actual expenditure levels of schools or school districts that are currently meeting or exceeding state performance objectives. This approach assumes that every school and school district, in order to be successful, needs the same level of base funding that is available to the most successful schools and districts. The approach does not identify adjustments for special needs students.
Weight	In a school funding formula, weights represent the additional resources needed above the base per student cost for student and district characteristics. For example, if the base cost for a student is $10,000 and the additional needs related to poverty are $3,000, then the weight is 0.30. The district serving this student in poverty would therefore receive a total of $13,000 to provide an adequate education for that student.