# Moving From Good to Great in Wisconsin: Funding Schools Adequately And Doubling Student Performance



**Prepared for**

**Wisconsin State and Local Policymakers, Educators and Citizens**

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**The Wisconsin School Finance Adequacy Initiative**
**CPRE/WCER/UW-Madison**

**Fourth Draft**
**October 20, 2006**

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# AN EVIDENCED-BASED APPROACH TO SCHOOL FINANCE ADEQUACY IN WISCONSIN

The greatest danger for most of us is not that we aim too high and we miss, but we aim too low and reach it. -Michelangelo

Wisconsin's education and school finance systems are at a crossroads. Historically, the state has focused on school finance equity and its links to property tax relief. But given the curriculum standards the state has decided all students should be taught, the knowledge needs of the emerging global economy and the performance levels to which all students need to achieve to participate effectively in that economy, however, it is time to focus on school finance adequacy – to identify what it would take programmatically to teach students to those performance levels and to fully fund those programs. These twin goals are the prime objectives of this school finance adequacy study. The resulting cost figure will set a target for what the state should fund for K-12 education – with a combination of state and local funds

During most of the twentieth century, school finance policy – in Wisconsin and across the country – primarily focused on equity, or the "fair" distribution of education resources across districts and students. Throughout these decades, resources available to school districts relied heavily on local property wealth, and property wealth per pupil varied greatly, as it continues to do so today. As Wisconsin and other states took a greater role in financing public education through the 1970s and 1980s school finance reforms, they generally used increased resources to counteract disparate property wealth, strengthening the equalizing aspect of state school finance systems by allocating new state dollars inversely to measures of local property wealth per pupil.

Wisconsin not only reflected this general course, but in the early 1990s increased the state role in financing education to two-thirds of all funding. Though the state has been unable to afford the two-thirds commitment for the past couple of years, it still supports K-12 education at a high level. When state revenues for various property tax relief programs tied to education are excluded, the state role is about 62% of the local-state shared costs, still one of the highest state roles in the country. Further, the increased state role helped on the equity side. In its 2000 decision in *Vincent v. Voight,* a suit that challenged the constitutionality of the school finance system on the basis of equity, the Wisconsin Supreme Court upheld the Wisconsin school finance system claiming that it was as equal as "practicable."

As the opening paragraph states, however, it is time for Wisconsin to move beyond the equity issue and fully embrace an ambitious versions of school finance adequacy. The future of Wisconsin and especially its children depend on the degree to which the state and its workers can compete effectively in the emerging, global, knowledge-based economy. Those states and countries that succeed the most effectively will be those who can produce a workforce with a much higher level of cognitive skills. The key that will enable the students of today to have a good economic and civic future of tomorrow is their level of knowledge and skills. Thus Wisconsin's education system must begin to focus more aggressively on educating students to higher standards. The goal should be to insure that all students, or at least 95 percent of students,

achieve to at least the proficiency level and that a much higher percentage of students achieve at the advanced levels. We term these goals "doubling student performance." And the evidence-based approach to school finance adequacy in Wisconsin has this goal as its driving force. The report outlines an approach to school finance adequacy that would provide all districts and schools with the resources to "double" student performance in the next 5-10 years, and in the process to dramatically reduce the achievement gap between majority students and students of color and from lower income backgrounds. Accomplishing these goals would move Wisconsin's K-12 education system from a "good" system to a "great" system, and in the process would provide the education base the state needs to grow its economy at rates much faster than the past.

Section one of this report sets the stage for these adequacy recommendations. Section one first describes the current Wisconsin school finance system and then shows that it meets most standard equity benchmarks. Section one then shows, however, that although student test scores look good on state tests and the state's definition of proficiency, the results are not so sanguine when a national definition of proficiency is used; indeed, the data show that although the state's test show about 85 percent of students score at or above proficiency, the national tests show that only about 35 percent meet a more rigorous proficiency benchmark. These results lend support to the goal that Wisconsin needs to "double" student performance if it is to play its role in strengthening the state's future, both for all citizens and for students currently in the public school system. The last part of Section one identifies several districts and schools in Wisconsin that have doubled student performance in the past five years, ending with a synthesis of how they have accomplished these impressive feats that suggests other districts and schools can produce similar achievement gains. The remainder of the report then moves to the details of defining school finance adequacy. Section two describes the evidence-based approach to school finance adequacy that is used in the adequacy analysis, and applies the analysis to prototypical elementary, middle and high schools. Section three provides an adequacy analysis for central office functions. Section four presents recommendations for adequately resourcing Wisconsin schools and districts. Section five identifies several related issues, including teacher salaries, and section six gives a summary.

## 1. THE WISCONSIN SCHOOL FINANCE AND EDUCATION SYSTEM

In 2004–05, Wisconsin public schools educated 880,000 students in 425 districts. Wisconsin schools were funded with $7.9 billion from local and state sources (Wisconsin Department of Public Instruction [WDPI], 2005).

The state used a three-tiered guaranteed tax base (GTB) system of school finance. For the **first tier** of the system, the primary aid level, the state guaranteed a tax base of $1.93 million to all districts, allowing them to tax themselves as if their tax base were $1.93 million for revenues up to $1,000 per pupil. Just about every public school received some aid because the $1.93 million level was above almost every district's property valuation per pupil. This tier required a local property tax rate of 0.52 mills.

The **second tier,** the secondary aid level, provided a GTB of $1,006,510, called the secondary guarantee, for spending from $1,000 to $7,782, the latter called the secondary cost ceiling. Fully accessing the $7,782 per pupil required an additional local property tax rate of 6.74 mills, for a Tier 1 plus Tier 2 tax rate of 7.26 mills.

For the **third tier** or tertiary level, the state guaranteed the statewide average property value per pupil, or $407,300. Districts with a tax base at or lower than this guarantee could use the guarantee to spend at any higher level they chose and still receive positive state aid. Districts with a tax base above this level could also spend at a higher level, but their state aid would be a negative number, and that number would be subtracted from their Tier 2 aid until that tier was reduced to zero. This tier was designed to discourage spending above the secondary cost ceiling for high-wealth districts (WDPI, 2005).

In 1993, the Wisconsin Legislature enacted a revenue cap on spending to thwart the continuous increases in education spending that had occurred during the previous decade. Allowed to increase generally at a rate of inflation, the revenue limit recently has been set at a fixed level; in 2004–05, the limit was $241 per pupil (Reschovsky, 2002; WDPI, 2005). Districts can exceed the revenue caps through a local referendum. There is no cap on the top amount a district can choose to spend.

Simultaneously, the state also eliminated binding arbitration, made teacher strikes illegal, and adopted the Qualified Economic Offer (QEO). The QEO was adopted to ensure that bargained agreements could be financed within the allowable cost increases. Districts can bargain with unions over salaries and benefits, but if the two sides cannot agree, the district can impose a settlement if it offers a QEO, which is defined as an offer that increases salaries and benefits by at least 3.8%. Over the past several years, we conclude that the QEO has been responsible at least in part for reducing the rate of teacher salary increases.

Additionally, in fiscal year 1997, the state made a commitment to pay two thirds of school funding—a figure that does not include federal revenue but does include $469 million in property tax relief each year (Norman, 2002). In 2003–04, state funds, excluding the property tax relief, accounted for about 61.6 percent of district revenues, and during the 2003 legislative session, the two-thirds guarantee was reduced to 65 percent.

Though there are restrictions – the revenue caps, referenda to exceed the revenue caps, and the QEO – the Wisconsin school finance system is largely a "locally controlled" system – each local district can decide how much it wants to spend for education. And, on average, the state picks up 65 percent, or 61.6 percent, of what local districts decide to spend. In part because education is a valued commodity, this system has been a stimulus to local spending, and in recent years, the state has had difficulty fully funding it.

Several issues can be raised about this school finance system. Is it equitable? That is the focus of the next section. Is it adequate? That is the focus of the remainder of the report. Over time, how long can the state afford to pick up 65-67 percent of the expenditures that local governments – school districts – decide to spend? And, is there another way to structure the school finance system, so that the state picks up its fair share – perhaps two-thirds – of an "adequate" spending level, again the focus of this initiative?

**Equity Analysis Results**

Technically, this part of the report provides results for an ex post equity analysis of the local and state revenues for the Wisconsin public school funding system. We use district level, 2001-04 financial data available in the "Factor Files" from the Wisconsin Department of Public Instruction (DPI) website (http://www.dpi.state.wi.us/dfm/sfms/genaid.html), as well as 1996-97, 1998-99, 1999-00 and 2004-05, unaudited data generously made available to us by the Department of Public Instruction (DPI). Using commonly accepted equity statistics, this analysis reviews how the allocation of resources, specifically state equalizing aids and local revenues (i.e., operating revenues excluding state and federal categorical aid), meet standard equity benchmarks (Odden & Picus, 2000). This analysis weights statistics by the student population – average daily membership (ADM) – in the district, giving, for example, Milwaukee, with a 2004-05 membership of 97,359, a proportionally larger influence on the equity statistics than Washington, a district that served just 104 students.

Figure 1 shows the results of this system for the 2004-05 school year, the last year for which data are available. The data are presented by deciles, each of which includes about 10 percent of the student enrollment. The data are ranked by shared cost per pupil, with the lowest shared cost districts being in Decile 1 and the highest shared cost districts in Decile 10.

Figure 1 reveals several aspects of Wisconsin school finance. First, there are variations in property wealth per pupil, tax rates, and spending per pupil. Second, the data reflect what we call the "new" school finance problem. Higher wealth districts have not only higher state and local revenues per pupil but also higher tax rates, whereas lower wealth districts have both lower revenues per pupil and lower tax rates. The fact is that local tax rate effort for schools is the prime determinant of spending differences in Wisconsin, not property wealth per pupil. Indeed, the ratio of the average local tax rate in the highest spending decile to that in the lowest spending decile is greater than the ratio of the revenues per pupil in those two deciles.

**Figure 1**
**Wisconsin School Finance in 2004-05**

| Decile | Average number of pupils per district (deciles) | Average property value per pupil ($) | Average property tax rate (mills) | Average Local Revenue Per Pupil ($) | Average state revenue per pupil ($) | Average total revenue per pupil ($) | Number of districts (deciles) |
|---|---|---|---|---|---|---|---|
| **1** | 1,996 | 409,766 | 7.07 | 2,851 | 4,868 | 7,720 | 41 |
| **2** | 98,338 | 219,109 | 7.49 | 1,641 | 6,229 | 7,870 | 1 |
| **3** | 4,219 | 370,551 | 7.41 | 2,720 | 5,213 | 7,932 | 19 |
| **4** | 2,427 | 389,036 | 8.00 | 3,051 | 5,086 | 8,137 | 36 |
| **5** | 1,717 | 366,628 | 8.58 | 3,054 | 5,250 | 8,304 | 46 |
| **6** | 2,573 | 400,000 | 8.85 | 3,523 | 4,928 | 8,451 | 37 |
| **7** | 1,584 | 441,977 | 9.11 | 3,640 | 5,021 | 8,661 | 54 |
| **8** | 1,523 | 458,640 | 9.90 | 4,383 | 4,556 | 8,939 | 58 |
| **9** | 1,558 | 491,944 | 10.27 | 4,849 | 4,392 | 9,241 | 56 |
| **10** | 1,144 | 798,840 | 10.62 | 6,843 | 3,130 | 9,973 | 77 |
| **Weighted average** | | 433,276 | 8.74 | 3,651 | 4,876 | 8,527 | |
| **Weighted std. dev.** | | 324,034 | 1.65 | 1,880 | 1,427 | 706 | |
| **Median district** | | 356,900 | 8.67 | 3,108 | 5,190 | 8,408 | |

| | Totals | |
|---|---|---|
| | **Amount** | **Percent** |
| **Local revenue** | 3,180,487,047 | 42.8% |
| **State revenue** | 4,247,967,027 | 57.2% |
| **Total revenue** | 7,428,454,074 | |

In assessing equity, two aspects of equity can be analyzed. The first is the degree to which revenues per pupil are distributed equally across school districts. Even though the Wisconsin school finance system allows for local control over how much to spend for education, many in Wisconsin still want to know how much inequity in spending per pupil is created by this local control. The second equity issue, called fiscal neutrality, is the degree to which spending differences are linked statistically to local property wealth per pupil, a factor that should not be linked to local spending differences.

Expenditure equality. As it has for the past decade, Wisconsin meets all of the standard benchmarks for the expenditure equality version of equity. Figure 2 shows the statistical indicators for equal revenues per pupil for the 2001-02 to 2004-05 school years as well those for the 1996-97 and 1998-99 school years, which were used by the Supreme Court in the *Vincent v. Voight* decision. The two indicators that are most often used to make conclusions about

expenditure equality are the *coefficient of variation (CV*) and the *McLoone index*. The coefficient of variation indicates the percent variation about the average – a CV of 10 percent would indicate that two-thirds of all districts spend within one standard deviation of the average. Indeed, the standard equity benchmark for the CV is less than or equal to 10 percent. Figure 2 shows that for the 2004-05 school year, the CV was 0.083 or 8.3 percent, under the 10 percent benchmark, and lower than the 10.3 percent and 10.4 percent during the time the *Vincent* v. *Voight* case was litigated.

**Figure 2**
**Wisconsin School Finance Equity Statistics**[1]

| Indicator | 1996-97 (*Vincent)* | 1998-99 (*Vincent)* | 2001-02 | 2002-03 | 2003-04 | 2004-05 |
|---|---|---|---|---|---|---|
| | | | | | | |
| **Equal Revenues Per pupil** | | | | | | |
| Range | $6430 | $7016 | $6735 | $7533 | $8471 | $8563 |
| Restricted Range (5th and 95th percentiles) | $2007 | $2043 | $1977 | $2090 | $1986 | $1947 |
| Federal Range Ratio | 0.370 | 0.339 | 0.288 | 0.288 | 0.263 | 0.251 |
| Coefficient of Variation | 0.103 | 0.104 | 0.089 | 0.087 | 0.085 | 0.083 |
| McLoone Index | 0.954 | 0.945 | 0.961 | 0.953 | 0.960 | 0.952 |
| Verstegen Index | 1.109 | 1.107 | 1.095 | 1.084 | 1.087 | 1.017 |
| | | | | | | |
| **Median** | $5918 | $6597 | $7413 | $7900 | $8176 | $8409 |
| | | | | | | |
| **Fiscal Neutrality** | | | | | | |
| Correlation Coefficient | 0.565 | 0.574 | 0.552 | 0.563 | 0.565 | 0.532 |
| Elasticity | 0.081 | 0.083 | 0.091 | 0.047 | 0.048 | 0.051 |
| | | | | | | |

The *McLoone Index* is an equity statistic that focuses on the bottom-half of all districts. It compares the revenues per pupil in the districts that spend below the median to the revenues if those districts were spending at the median. The standard benchmark for the McLoone index is greater than or equal to 95 percent, which would indicate that the revenues in the bottom half of the districts were at least 95 percent of those at the median. Figure 2 shows that for the 2004-05 school year, the McLoone was 0.952 or 95.2 percent, just above the benchmark, and similar to the levels in the late 1990s as well.[2]

Indeed, the numbers in Figure 2 show that for the past four years, Wisconsin has met the CV and McLoone Index equity benchmarks every year. Moreover, this has been the case virtually for the past decade as well (Odden & Picus, 2000). Though there is variation in

[1] All statistics are weighted by district membership. Norris District has been excluded, as it is an extreme outlier in per pupil expenditures, enrollment, and property wealth. Statistics and values represent local and state resources, excluding state and federal categorical revenues. 2004-05 data are unaudited. See Appendix A for definitions of each of the fiscal neutrality and equity indicators.

[2] It is important to note that a determination of an equitable system of funding does not mean that the funds available to a district are distributed to schools and students in an equitable manner, especially considering the diversity of student and school needs. Also, it does not mean that districts and schools are using resources in a way that educates students effectively (Odden & Picus, 2004).

revenues per pupil across districts, as Figure 1 shows, the system nevertheless meets standard equity benchmarks, one major reason why the state's top court claimed that the system was as equal as "practical." Indeed, Figure 2 illustrates that the system has become *more* equitable in terms of the coefficient of variation, and even the elasticity that is discussed below, than it was in 1996-97 and 1998-99, the school years most often cited in *Vincent v. Voight* decision.

Fiscal neutrality. Wisconsin also meets equity benchmarks for fiscal neutrality, or the statistical relationship between revenues per pupil and property wealth per pupil. The key fiscal neutrality statistic is the *wealth elasticity*. This statistic indicates the percent increase in revenues per pupil that is associated with a percent increase in property wealth per pupil. The equity benchmark is less than or equal to 10 percent, which means that as property wealth per pupil increases, revenues per pupil increase by at most 10 percent of the rate of increase of property wealth per pupil, so if property wealth per pupil increases 100 percent, revenues per pupil would increase by less than or equal to 10 percent. Figure 2 shows that the wealth elasticity for Wisconsin was just 0.051 or 5.1 percent, about half the benchmark. What this indicates is that while revenues per pupil do increase with property wealth per pupil, the increase is not strongly linked to the size of the property wealth per pupil differences. This further supports our conclusion from Figure 1 that the major factor producing differences in revenues per pupil in Wisconsin school districts is differences in local school tax rates; by and large, higher spending districts have higher school tax rates.

Other issues. Astute readers will note that the above analyses made no accounting for differences in pupil need. We have conducted these analyses and when we add proxies for student need by weighting all students eligible for free and reduced price lunch by an additional 0.25, all English language learning students by an additional 0.20, and all disabled students by an additional 0.90, standard weights used in school finance analyses (Odden & Picus, 2002), the equity statistics worsen.

In addition, when we adjust for variations in the purchasing power of the education dollar, using the Geographic Cost of Education Index (GCEI) developed for each district in the country by the National Center for Education Statistics (2003), the equity statistics also worsen.

Moreover, when we use both pupil-need weights to indicate extra student need and the GCEI, the CV increases to 0.115 or 11.5% percent – above the 10% benchmark.

These findings suggests that equity issues should always be included in school finance analyses, and that variation in both student needs and the purchasing power of the education dollar should be recognized in the school finance system, or conclusions about equity – and undoubtedly adequacy, too – could be incorrect. Further, these issues need to be centrally involved in an adequacy analysis, and as we will show, these issues will be included in our analyses of what it will take to provide an adequate education program in Wisconsin, so as to produce a proposal that recognizes variation in student, school and district characteristics.

**The School Finance Problem and the Shift to Adequacy**

Though Wisconsin is doing relatively well on distributional equity, the vexing issue for the state in the short term has been difficulty keeping the increasingly expensive two-thirds funding commitment, and in the long term determining what level of school funding it should support.

We *conclude that the major problem with the two-thirds funding commitment is that it is not affordable in the long run* – unless state taxes are raised, which is not likely politically feasible. The inability of the state to retain the two-thirds funding commitment during the past two years is simply a harbinger of the future. Given the structure of the current Wisconsin school finance system, the two-thirds funding commitment is a commitment to fund whatever level of education local districts and communities want to provide. In an ideal world, that would be nice. But education is a highly desired public good, and Wisconsin communities desire more and more education every year. This has meant the state cost – which is set at two-thirds of what locals decide to spend – continues to rise with essentially no top in sight.

Given the curriculum standards the state has decided all students should be taught, and the performance standards to which all students need to achieve to have good economic, family and civic lives in the future, it is time that the state identifies what it would take programmatically to attain those standards – and to fully fund those programs. Such results are the prime objectives of this adequacy study. The adequate cost figure will set a target for what the state should fund for K-12 education – with a combination of state and local funds – to allow all districts and schools to double student performance and dramatically reduce the achievement gaps. We hope the results of the multiple studies that will comprise the overall adequacy report will provide a new starting point for education and school finance policy debates in Wisconsin. This study will address not only what the state should fund but also how it can design an adequacy oriented school finance structure that provides that funding. We seek to shift the conversation from funding what the system had last year, to funding a system that can double student performance in the next 5-10 years.

**Wisconsin Student Performance and the Issue of Adequacy**

Addressing the funding side of the education reform agenda is critical because the performance goals are so ambitious. The goal over time is to get 95 percent or more of students at or above proficiency levels[3] and a significant percentage – perhaps 50 percent – at the advanced level, at least in mathematics and science. Measures of current levels of performance provide a mixed picture of the nature of the performance improvement challenge.

As Charts 1-10 below show, when using the state's testing system, the large bulk of Wisconsin students score above proficiency. But when using a national benchmark, the National Assessment of Educational Progress (NAEP), a much smaller portion of Wisconsin's students score at or above the proficiency standard. Though the two tests are not identical, and though the

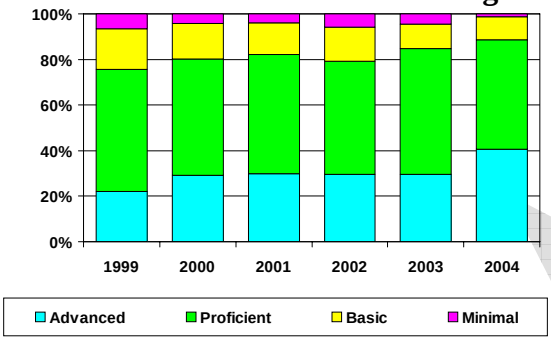
[3] For one example of a rural district in another state similar to Wisconsin accomplishing this goal, see Lynn Fielding, Nancy Kerr and Paul Rosier. (2004). *Delivering on the Promise … of the 95% Reading and Math Goals.* Kennewick, WA: The New Foundation Press.

NAEP test may not be perfectly aligned to the Wisconsin standards, the discrepancy between the two tests reflects a different level of rigor in setting the proficiency performance level – the NAEP sets a tougher standard. Moreover, the NAEP standard is a common national standard and over time will likely be the standard by which each state's students will be measured.

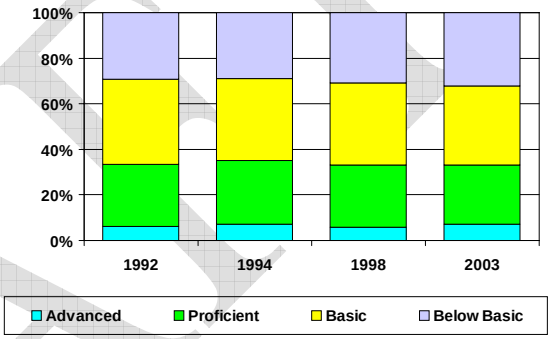
In this light, Charts 1-10 show that only 30-35 percent of Wisconsin students score at or above proficiency as measured by NAEP, a much lower percentage than indicated by the state tests. Doubling this performance, a stiff challenge over the next decade, would produce just 60-70 percent of students at or above a national proficiency standard, a significant gain. And as noted above, the goal should include educating more students to the advanced performance level.

**Charts 1 and 2**

**Wisconsin 3rd Grade Reading**

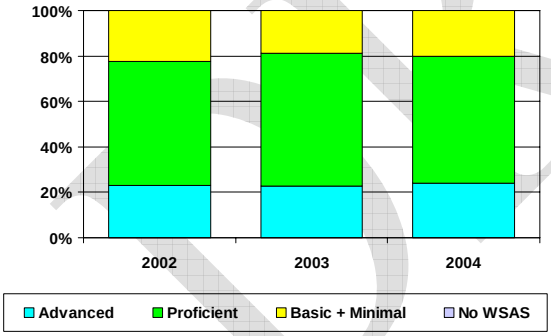



**NAEP 4th Grade Reading**

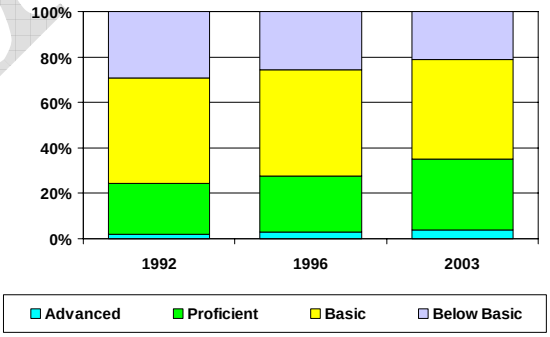



**Charts 3 and 4**

**Wisconsin 4th Grade Math**

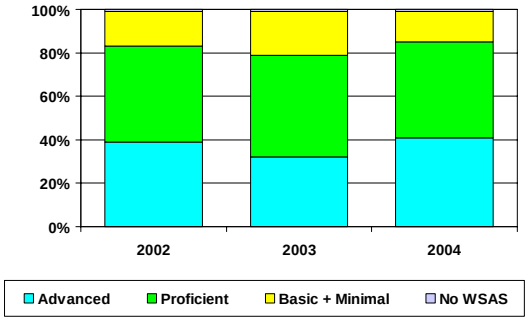



**NAEP 4th Grade Math**

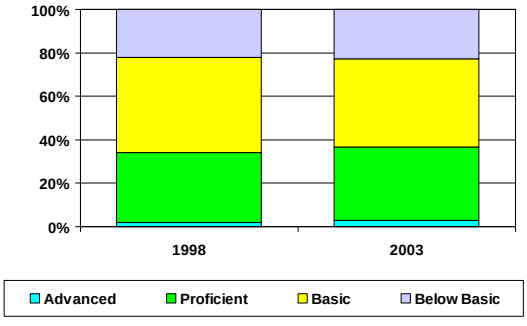



**Charts 5 and 6**

**Wisconsin 8th Grade Reading**

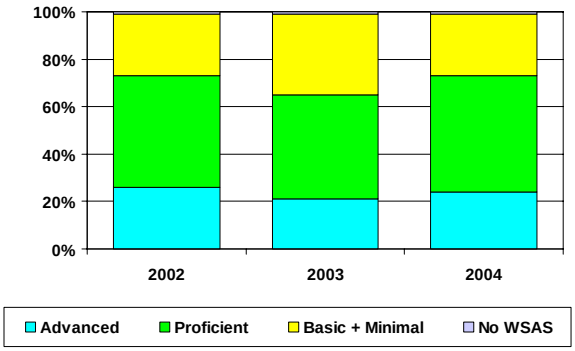



**NAEP 8th Grade Reading**

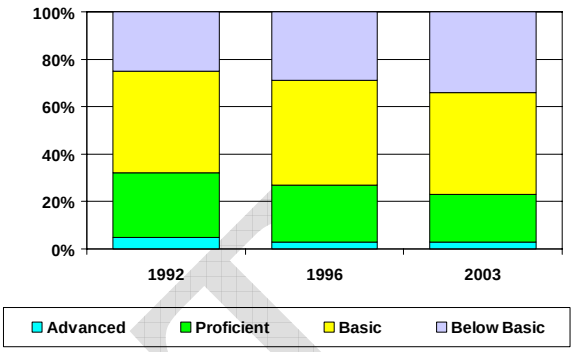


**Charts 7 and 8**

**Wisconsin 8th Grade Math**

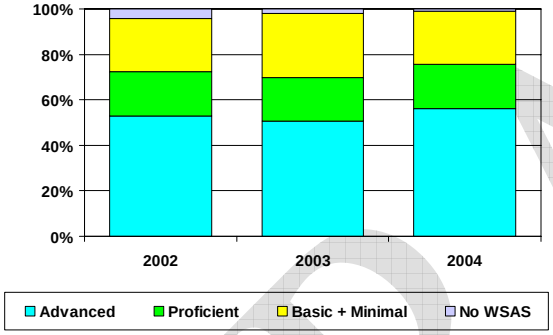



**NAEP 8th Grade Math**

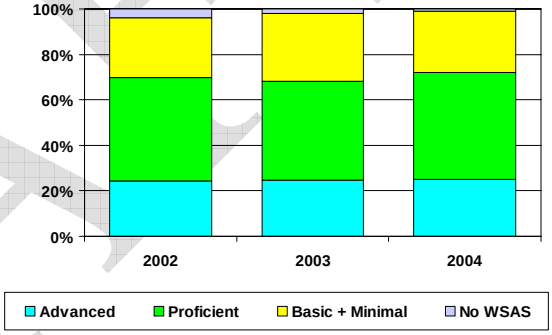



**Charts 9 and 10**

**Wisconsin 10th Grade Reading**




**Wisconsin 10th Grade Math**




Moreover, the above NAEP results show that the percentage of students achieving above a national proficiency standard in any subject and at the 4th, 8th and 10th grades has changed little since 1998. This further stiffens the performance improvement challenge. It indicates that new strategies and new efforts are needed to produce the progress needed, particularly if this study shows that more fiscal resources are needed to fund the education system adequately. The achievement track record from 1998 indicates that the old educational strategies are not powerful enough to produce the student performance improvements the state needs. To boost performance in quantum amounts, schools and districts will need to reengineer and restructure themselves; hopefully, the proposals in this report will provide ideas about the nature of much of that work.

In sum, Wisconsin cannot be satisfied with improving performance only marginally; such modest gains will not allow the economic vitality needed for the state to continue to prosper, to provide the workers needed for the state's growing knowledge-based economy, or for all individuals to enjoy a good life. Wisconsin's education system – like those in virtually all states – needs to double and triple current performance so that in the short term, 60 percent of students achieve at or above proficiency, and in the longer term 90 percent of students achieve at that

level. This task is daunting and will require a dramatically different approach to teaching and learning within schools as well as to Wisconsin's public school funding.

This adequacy study provides a blueprint for how to do both. Schools must redesign the way they operate in order to take advantage of the evidence on educational effectiveness presented in this report. All current and any new dollars will need to be reallocated toward these evidence-based approaches if these ambitious education goals are to be accomplished.

Costs included in the study. We note at the beginning that the educational costs included in this study address mainly instructional issues. We will redesign strategies, programs and services covering expenditures for the instructional, instructional support, pupil support and site administration functions. We also will prepare a proposal for a redesigned central office, but we will "carry forward" expenditures for transportation, food services, and operation and maintenance (the latter because Wisconsin does not have the statewide data base for redesigning that function). We may suggest a different state approach for helping with transportation costs. And we will have a new proposal for helping districts with debt service and capital needs. We will not address the approximately $500 million in property tax relief that has been included in the two-thirds state funding calculations.

This report is focused on answering the following key questions:

1. What are the high impact educational programs and strategies that will allow every school to provide each Wisconsin student with the opportunity to learn to or above proficiency on state standards as measured by the state's Wisconsin Knowledge and Concept Exams, with proficiency standards calibrated over time to those of the NAEP?
2. How much do those strategies cost, and what is the size of the gap, if any, between current resource levels and adequate levels needed to implement all evidence-based strategies?
3. What is the program and fiscal implementation strategy? First, how can current dollars be used more effectively both through finding inefficiencies and reallocating current resources? Second, how can any new dollars be targeted only to evidence-based practices that produce more results in student achievement?

We should emphasize that we assume all dollars and programs currently in the system would be sunsetted, and that extant dollars and any new dollars would be used for the strategies identified in the report. In that sense, we are assuming complete reallocation of current resources to the most effective and evidence-based educational strategies at the classroom, school and district level – strategies discussed in this report. Although the state might not want to mandate these actions, our funding recommendations will make these assumptions so that we will not simply propose adding new dollars on top of current dollars, but propose a complete new use of all dollars – first those currently in the system and then any additional dollars if that is the finding of the adequacy analysis.

**New Vision of a School**

In order to ensure that the following recommendations on school resources are used effectively, they need to be weaved together into a holistic school vision that is much more productive – produces a much larger amount of student academic achievement – than Wisconsin schools today. The vision under girding these recommendations includes large changes from how most schools currently operate, because the performance improvement goals require quantum improvements.

The education performance improvement challenge facing Wisconsin and all other states in the country is to double and then triple student academic achievement over the next several years. This task cannot be accomplished by working harder in schools as we know them; educators will need to work smarter in redesigned schools. Schools will need to be restructured. All current dollars – and any new dollars required to provide the previously recommended resources – will need to be reallocated to this new, more powerful vision of a school.

The vast bulk of educational resources need to be used for more direct services to students, for instructional purposes and for the consistent and ongoing improvement of classroom instruction. The assumption, backed by a wide variety of research, is that better classroom instruction in each core content area is the prime route to improved student performance. Funds need to focus on student needs and surround classrooms with supports that help all teachers dramatically improve their classroom instructional practices. To ensure that young students have minimum academic and social skills so they are ready to learn when they enter school, the new school vision includes preschool and full-day kindergarten, if not for all students, then at least for children entering school from low income backgrounds.

Our new school vision has small classrooms in the early elementary years, when learning to read and the basics of numeracy– the foundations for learning everything else – are critically important. The new school vision has class sizes of 25 for grades 4-12. The new school vision then has a comprehensive, integrated and rigorous professional development structure and strategy to help all teachers enhance their instructional practice in quantum leaps. The new school vision also includes intensive extra help strategies so that no student falls behind and any student struggling to learn to standards is provided immediate, intensive help to do so – tutoring in small groups.

The new school vision assumes all students will take a common core of rigorous classes, with the goal of taking algebra by the eighth (or at the latest the ninth) grade and the college preparatory curriculum in high school – the path we believe will prepare Wisconsin's students for college, work in the global market and citizenship.[4] Knowledge and skills for the global, knowledge-based economy require the same skills to enter the work force or go to college after high school graduation. The new school vision includes substantial family outreach and involvement resources. The vision includes funds so that the school can stay up-to-date with computer technology resources and tap the Worldwide Web for instructional materials and even instructional courses – when and if they become available. Career-tech education in the future is

[4] Having all students take the college prep curriculum in high school is increasingly recognized as the prime way to make students ready for college or the world of work in the 21st century global marketplace (Olson, 2006).

info-tech, nano-tech, bio-tech and health-tech if it is to function to bolster Wisconsin's economy to a faster growth curve and schools need to focus on developing the cognitive expertise all children will need to work in those high tech and high skill growing job areas.

It should be clear that this new vision, each element backed by evidence on its effectiveness, is very different from typical schools in Wisconsin today. Our proposals take all current school level and instructional resources and reallocate them, plus any new resources, to a proposed set of evidence-based, proven-effective strategies. Full-day kindergarten is supported by the current school aid program, and that is a strategy with evidence that it boosts student learning. Except for SAGE classrooms, the typical K-3 classroom in Wisconsin has 25 or more students; we propose 15, based on results from randomized experiments. Classes in grades 4-12 often have 30-35 students; we propose 25 based on best practices.

Many teachers question the state's QEO and current low salary levels; we will propose raising salaries where they are behind regional labor markets, but only if those pay raises are liked to improved instructional expertise that research shows is produces value-added student learning gains, and providing intensive instructional support.

Typical professional development is usually a mile wide and an inch deep, with little if any follow through coaching; the report proposes intensive and ongoing professional development, with two-week summer institutes and coaching in all classrooms to instigate instructional change. The proposed professional development resources can also be deployed for a strong new teacher induction and mentoring program, so learning how to teach will be structured rather than random.

The typical intervention for students not learning to proficiency is a pull out remedial program, with untrained aides often providing the help; we propose the most effective strategy – one-to-one and small group tutoring by certified teachers, as well as academically focused extended day and summer school programs so that instructional time can vary for struggling students but performance standards held constant.

In most schools, guidance counselors, social workers and other pupil support personnel work in isolation with little impact; we propose integrated family/community outreach-pupil support teams stressing those actions parents can take to help their children learn.

For the maximum impact, our resources need to be used to deploy a more effective curriculum program, from too much whole language reading today to a balanced, research-based approach with more phonics and phonemic awareness in the early elementary years, from just basic skills in mathematics today to mathematic concepts with applications to real-world problems, from little science today to science concepts again with applications to real-world issues, and to a stronger approach to U.S history. Our model includes an emphasis on writing and communication, with ample resources for art, music, physical education and advanced work for the gifted, talented and able and ambitious student.

We should note that our new school vision does not propose additional funding for longer school years or longer days for students, except for those who need extended day academic help.

It does not include small classes of 20 for students in grades 4-12, as many professional judgment adequacy studies do. The new school vision proposes no assistant principals for the schools of prototypical sizes, no deans, and no traditional instructional aides used as teacher helpers. Because the model excludes many high cost proposals and practices seen elsewhere, and our new vision is to have smaller school units, these "support" and non-instructionally oriented resources are not needed.

Over time, we seek to have a larger number of smaller, more personalized, school units – no larger than 600 students – at all levels in the education system. This recommendation is justified by a wide range of research showing that smaller schools work better for all children, especially at the secondary level, and especially for lower income, minority and English language learning students.

Using a car metaphor, we are designing a "hybrid" car which is much more effective, efficient and environmentally friendly than typical cars today. It looks like the typical school (car) but has twice the performance. We would like a "hover mobile" running on hydrogen, but that is not possible in the near term.

So our new school vision is quite different from many schools in Wisconsin today, though it may not be as technologically radical as some would want. But we do not yet have evidence for a school vision laden with technology that would be better. We believe our vision could "morph" into such an even stronger vision once that is possible, and we have provided the technology resources to position schools to do so.

**Evidence Underlying This Vision and These Ambitious Student Performance Expectations**

To those who wonder whether there is a knowledge base for improving student achievement so dramatically, we would direct their inquiry to research – largely from cognitive psychology – during the past two decades. This research has shown us that virtually all students, except those with significant disabilities, can learn complex materials, and be educated to think, understand, problem solve and communicate in written and oral form effectively. This research was nicely summarized in a recent book from the National Academy of Sciences (Bransford, Brown & Cocking, 1999), which includes chapters not only on student learning, but also on how that knowledge can be translated into curriculum standards for students and professional development for teachers.

These general findings have been articulated into detailed summaries of the instructional practices most effective in teaching students mathematics (Donovan & Bransford, 2005b), science (Donovan & Bransford, 2005c) and history (Donovan & Bransford, 2005a) and join the other many syntheses of effective reading practices (e.g., Cunningham & Allington, 1994). One finding from that research is that students cannot learn to understanding and problem solving levels, unless the curriculum, instructional and testing processes are redesigned to make those demands of all students.

Thus, research shows not only that the vast bulk of students from lower income, minority or English language learning backgrounds can learn complex materials, but also that these

students often are the prime beneficiaries of new instructional programs that expect them to learn to those levels, and provide the extra assistance some might need to perform to those levels. Put a different way, although there is a low achievement/high poverty link and a minority/non-minority achievement gap today, it does not have to be that way, or at least the linkages and gaps can be much less than they are. In sum, we believe that the country, Wisconsin and the professional education communities have the professional knowledge base to produce the quantum improvements in student learning, including improvements for lower income and English language learning students, that would be allowed by the adequate funding models we are proposing.

Finally, to those who would quote the education production function studies as concluding that money does not make a difference, we quote from the recently published 3rd edition of the school finance text written by Odden and Picus, both of whom are former Presidents of the American Education Finance Association:

> The most often cited research in this field [economic production functions] is the synthesis work of Eric Hanushek (1981, 1986, 1989, 1997). Hanushek has consistently argued that there does not appear to be a systematic relationship between the level of funding and student outcomes (see also Hanushek, 2002, on the class size debate).
>
> Hanushek has now analyzed 90 different studies, with 377 separate production function equations over a 20-year time period. In his 1997 publication, he continued to argue that "These results have a simple interpretation: There is no strong or consistent relationship between school resources and student performance. In other words, there is little reason to be confident that simply adding more resources to schools as currently constituted will yield performance gains among students" (Hanushek, 1997: 148).
>
> Hanushek essentially divided the 377 different findings into two major categories: those indicating a positive and those indicating a negative relationship. He compared the numbers in each category and found more negative than positive findings. He then concluded that the variation in findings was such that a systematic relationship between money and outcomes had not yet been identified…
>
> Others have analyzed the same studies as Hanushek and reached opposite conclusions. Hedges, Laine and Greenwald (1994a, 1994b; see also Laine, Greenwald & Hedges, 1996; and Greenwald, Hedges & Laine, 1996a, 1996b) concluded that in fact, money can make a difference. They calculated the effect size of the different studies and, rather than counting the number of positive and negative findings, calculated an average effect size; their results produce a significantly positive effect size. The larger effects of the "positive" studies are greater than the smaller effects of the "negative" studies. Relying on this and other evidence, Hedges Laine, and Greenwald, (1994a) concluded that school spending and achievement are positively related. In his rejoinder, Hanushek (1994) argued that while there is evidence that the relationship exists, there is not evidence of a strong or systematic relationship. We side more with Hedges, Laine and Greenwald than with Hanushek, viewing the "effect size" as the way to summarize across studies.

We would, however, note that beyond this more arcane debate about the conclusions of economic production function studies, all analysts conclude that *it is the way money is spent that will make the largest and critical differences*. That is why the most recent National Research Council's book on school finance is entitled *Making Money Matter* (Ladd & Hansen, 1999). And, that is why our report's recommendations, if funded and implemented, would redirect school resources to those strategies for which there is evidence that they do work. As will be clear, each and every one of the proposals is backed by evidence on its effectiveness. If current and new funds in schools were used to implement the these recommendations, greater student performance should result – Wisconsin test scores should rise – once again showing that it is the way money is used in schools that makes the impact on student performance real and measurable.

Moreover, this vision of more effective schools is not just an academic artifact. We next provide several examples of how this vision has been brought together in outcome oriented Wisconsin initiatives that have propelled student performance to impressive higher levels. Readers are referred to a study several of this report's authors prepared for a state of Washington adequacy study that included examples of schools and districts doubling performance in that state.[5]

**The Madison, Wisconsin Story[6]**

Madison, Wisconsin is a medium-sized urban district in south Central Wisconsin. In many ways, it is like several districts in Washington. For years, it was a relatively homogeneous community with good schools and high levels of student achievement. In the late 1980s and early 1990s, its demographics began to change. By the mid-1990s it was moving past a 25 percent low income and minority enrollment towards the 50 percent level. And as its diversity grew, so did the achievement gap between its middle class white students and the rising numbers of low income and minority, particularly, African-American students. A mid-1990s analysis of reading achievement showed that only about 30 percent of low income and African-American students met the state's third-grade reading benchmarks, and even worse, almost all such students who scored below the basic level in reading at grade 3 were below basic in grade 8 as well. In other words, if students did not read at or above the basic level by grade 3, they almost never caught up.

Something had to be done. So the district conducted an equity, diversity and adequacy "audit" of the district. As a result it set three overarching goals for the district:

- Produce all students reading at or above proficiency by the end of third grade.
- Have all students take and pass algebra by the end of grade 9 and geometry by the end of grade 10.

[5] Mark Fermanich, Michelle Turner Mangan, Allan Odden, Lawrence O. Picus, Betheny Gross and Zena Rudo. (2006). *Washington Learns: Successful District Study*. Report prepared for the K-12 Advisory Committee of Washington Learns.

[6] This case was researched and written up by Rebecca Lowenhaupt and Allan Odden.

These goals have guided the district for nearly the past decade. These three goals were considered as "*gateway*" goals; if students could not meet them, they would have great difficulty exiting high school, in the words of Washington, ready for college, ready for work in the global market or ready for citizenship.

The reading goal made it clear that there was an urgent need to bolster the district's elementary reading program, actually its "non-reading" program because at that time the reading program varied by school, grade and classroom! And it was not working for its new students.

Using a bottom up approach that mirrored the Madison culture for any change, the system created a new, district-wide, research-based reading program over the next several years. Wanting to make sure every teacher in grades K-3 had the skills to implement that program, it expanded professional development, ultimately providing professional development in the new reading program for all its elementary teachers, including an intensive summer induction program for all new teachers. In addition, it provided instructional coaches for all of its highest poverty schools to help all teachers incorporate the new reading strategies into their ongoing instructional practice, reduced the K-3 classrooms in those schools to 15 students, and also provided teacher tutors to help kids still struggling after experiencing the regular reading program. All these new resources – smaller class sizes, professional development, instructional coaches and teacher tutors – were supported by reallocating the resources they had been providing to their elementary schools – no new local funds were needed.

The result was a doubling over a five year time period of the percentage of low income and African-American students achieving or exceeding the proficiency level on the state's reading test, and a reduction to almost zero of the numbers of students scoring below Basic in grade 3.

The core of this story: first, dramatic instructional change in the reading program, and second, focused use of resources on three evidence-based practices for the core instructional program– class sizes of 15 in grades K-3, instructional coaches in schools who helped teachers successfully implement new instructional approaches to reading, and teacher tutors to provide intensive, extra help to students who needed it to get above Basic and towards proficiency.

But the district did not have sufficient funds to provide coaches and tutors in all schools, and when it began its efforts to enhance the mathematics program, it simply could not fund the effort because it had no resources for math coaches nor math tutors.

It should be noted, however, that because of the rising ethnic and cultural diversity of the district, it also launched a five year effort to raise the awareness and sensitivity of all district employees to these new demographic realities, and this consciousness raising continues today.

**Abbotsford, Wisconsin**[7]

Abbotsford is a rural, primarily working class town in central Wisconsin. The main industry in the area is the meatpacking plant, Abby Meats. Ever since 1991, Abby Meats has

[7] This case was researched by Rebecca Lowenhaupt and Sarah Archibald, and written up by Lowenhaupt.

attracted a steadily increasing number of Mexican immigrants to work in its two local factories. This year, after procuring the national sausage contract with Hardees, Abby Meats plans to expand, and the town anticipates another large growth of Mexican families moving here for jobs in the factory.

This shift has had an impact on the demographics in the school, which has grown from 0% to 13% Latino in just 15 years. The lower grades of the elementary school indicate an increasing trend. This past year, the entering kindergarten was 33% Latino, a record for the school, which had no students of color until 1991. Despite this steady increase in Latino students, the school has continued to serve a fairly stable population of low SES students. The percent of students eligible for Free/Reduced Price Lunch has been larger than half the school population for several years. This year, 62% of the students are eligible.

The growing population of ELL students and high percentage of low SES students have presented challenges to the school system, which has undergone significant changes in order to meet the needs of its students and the requirements of No Child Left Behind. An analysis of test score data indicates a considerable increase in the percentage of students scoring proficient and advanced over the last four years. District scores in reading have increased from 78.8% to 93.5% proficient and advanced. The percent of students scoring proficient and advanced in language arts has risen from 73% to 93.5%. In mathematics, the district scores have risen from 55% to 87.1% proficient and advanced.

While overall scores have improved, the school has had particular success with low-income students. *The percent of proficient and advanced students from low SES backgrounds increased from 31% to 82% in mathematics, and increased in both reading and language arts from 69% to 89.5%.* These scores show a significant growth in achievement in both reading and math for those students most at-risk, and demonstrate the possibility of serving all students well.

This success is largely due to reform efforts at the elementary school, where leaders have sought ways to respond to the changing needs of their students. In so doing, the school has focused on improving instruction for all students and supporting struggling students, while maintaining inclusive practices. Throughout the process, school leaders have relied on the external support of CESA 10, which has proved instrumental in funding reform strategies. The district has also depended on the internal expertise of the teachers, who have been given opportunities to shape the reform process throughout, and in so doing, have built a strong sense of professional community.

Using the expertise of CESAs. Over the last 10 years, the school has continually sought extra funding and support for improvements in instruction. In order to do this, school leaders relied heavily on CESA 10, the regional service agency that has provided information about grants and professional development opportunities, and also provides onsite consultations and coaching, and free training tailored to the needs of the district. It is important to note that while CESA 10 provided the resources, the motivation for reform came from within the district.

Literacy reform. One of the first steps in the change process was reviewing the district's reading and literacy curriculum. The district was looking for a way to meet the goal of

supporting all of its ELL and low-income students more successfully. In order to reach its higher goals, the district realized that it would need a stronger curriculum that was better equipped to meet students at their individual levels. The administration decided that the basal readers in use were not adequate for this goal and that a stronger curriculum program was needed. The district also knew that developing good reading skills was a key to student achievement in all other subject areas, including a new mathematics program that would focus more on problem solving and application.

When the leadership decided that a shift was necessary in literacy instruction, CESA 10 helped the district apply for a READS grant to support the switch to a guided reading program. The new program required an investment in professional development, engaged teachers in data based decision making using formative assessment, and focused teachers on providing individualized instruction to students. The curriculum also provides a variety of extra help strategies for students who are struggling.

Not only did the grant provide funding for the new materials, but it also included funds to dramatically expand professional development for teachers. Grant funds were used to purchase the time necessary for teachers to learn how to use the new curriculum. The principal was able to pay for substitute teachers so that teachers could participate in off-sight training, visit other schools already implementing the new curriculum, and work in grade-level teams to strategize about lesson planning together. Finally, the grant purchased time for a literacy coach, who spent considerable time in the school modeling, observing, and providing feedback to teachers using the curriculum for the first time.

In interviews, leaders expressed their views about the problems inherent in providing one-shot training for teachers. They described the importance of extensive professional development in new curriculum, in order to prevent teachers from simply returning to the old, comfortable way of doing things. The grant allowed the school to invest in extensive new professional development, which supported the successful implementation of the new curriculum, as well as instructional improvement.

The implementation strategy was designed to build new instructional expertise and support for the new literacy curriculum on a year by year basis. Rather than change the entire school at once, the principal first purchased materials for the first grade teachers, focusing the READS grant resources on those three teachers, who received training and coaching services. By the second year, they had become advocates for the program, and the upper grades were eager for their turn. After five years, the program has now been incorporated into all grades in the school.

One of the additional benefits of and emphases of the new curriculum was its inclusion of formative assessments to help teachers guide their instructional practice. One objective of the professional development the district had provided over the past years was to help teachers learn how to use formative assessment data in tailoring their instruction to the precise needs of the students in their classrooms. With the help of the coach, teachers have learned how to collect running records of what students do and do not know in the literacy curriculum, constantly checking to see how their instruction impacts each individual student. An understanding of such

micro-data allows instruction to be targeted to the exact learning needs of students and also facilitates conversations with parents, as well as helping the principal hold his teachers accountable. The generation of data by the new curriculum not only helps guide instruction, but also provides the foundation for in-depth analysis of other forms of student achievement data, including the Wisconsin's WKCE scores. Finally, the principal said that these uses of data has transformed the kinds of conversations that teachers are able to have about their work with each other and about their students.

Mathematics Reform. Simultaneously, the administration recognized a need for change in the way mathematics was taught at the school and decided it was time to throw out the old curriculum. Rather than simply adopting a new curriculum, the leadership pulled together an internal committee of the strongest math teachers in the elementary school, providing teachers a leadership role in determining the new curriculum. By giving teachers a voice in the reform process, the administration smoothed the way for successful implementation.

The committee decided to use a curriculum focused on building conceptual understanding and problem-solving skills. The increased success in literacy bolstered this choice for a mathematics curriculum, which was much more word-based than the previous curriculum. By choosing a much more hands-on approach which incorporated the use of manipulatives, teachers were encouraged to focus on building the mathematics understanding of all students, providing much more individualized instruction to everyone.

Next Steps: Science Reform. The next instructional reform planned by the district is in the science curriculum. The principal noticed that high-school ACT scores in science were low, so he has organized a team of teachers to work on the science curriculum. Recognizing the importance of elementary school science, he has included teachers from 3rd to 12th grade. When he asked CESA for help with this initiative, they offered the services of a science curriculum facilitator. She will visit and begin the process of revising the science curriculum. Her work will involve breaking down the data for science teachers and helping them re-organize the curriculum around the standards. If the experiment works with science, he plans to follow the same processes to revise other subjects as well. Again, a similar pattern of reform emerges, in which external support is coupled with internal expertise to solve the problem of science achievement. Once again, the teachers will use data to inform the design of their curriculum.

Supporting struggling students: No one slips through the cracks. Along with changes made in the curriculum, the school has also shifted its attention to its struggling students. This is another aspect of the significant increase in achievement scores for students from low SES backgrounds. By ensuring that no one slips through the cracks, the school is able to provide individualized, differentiated services to each student.

Once again, grant money played a key role in the district's reform strategy. Since 1998, the school has participated in SAGE, which has reduced class size in kindergarten through grade 3 to fifteen to one. The principal spoke about how much this has helped, especially with low-income students who can no longer slip through the cracks. In larger classes, students were getting lost in the shuffle. Quieter students, often ELL students or low SES students, were not forced to participate. The smaller class size helps ensure that everyone participates and allows

teachers to use more individualized curriculum that meets students at their own level. The principal believes this is one of the major causes for the improvement in achievement.

With money from yet another grant, the 21st Century Grant, the school has also been able to provide extensive support for students outside of the regular school day. Both before and after-school programs provide students access to tutoring from teachers. Three weeks of summer school have been developed using the same grant money. While these summer classes are optional, the teachers often lure students into academic activities, disguising extra-help academic work with appealing titles and encouraging specific students to participate. Both Title I and ELL funding provides additional tutoring for at-risk students, so those needing extra support receive some tutoring services during the day. Again, funding is central to providing sufficient tutoring resources to students. The principal explains that with more funding, he would be able to support the growing population of ELL students more successfully.

The culture of the school is one in which all students are held to the same high expectations. Those who are struggling to keep achievement up to standards are targeted for extra support. Small class sizes, plenty of opportunities for extra help, and teachers who are willing to volunteer their lunch time to help students demonstrate this emphasis on achievement for everyone. Other cultural components of the daily life of the school provide additional individual support. For example, the school provides each student with a homework assignment notebook in which both teachers and parents must sign their names each day. If a student does not complete the homework, he or she stays in during recess for a study hall, during which a teacher makes sure the student completes the missing work. These extra supports may seem insignificant, but the message they send to both the students and the school community is strong. Every student is responsible for completing all the work successfully, and if it is not done, a teacher makes sure it gets done. The expectations are held high for everyone, and the school is committed to providing the resources so that everyone can meet them.

Collaborative culture and distributed leadership. The district and school leaders have created an environment of shared decision-making at the school level. Whether making decisions about curriculum adoption, scheduling, or class lists, a team of teachers is involved. The principal believes that it is natural and important to ask for teacher expertise whenever decisions are made. This philosophy of leadership has had an impact on the school culture, creating an environment in which collaboration and conversation are encouraged and supported by the administration. Teachers are encouraged to take on leadership positions, helping one another with practice, deciding on new textbooks, and contributing to the design of the school reform. The open lines of communication and trust between faculty and administrators help the school make decisions as a community.

Philosophy of inclusion. The leadership of the school has embraced a philosophy of inclusion for students. With the growing number of ELL students, there is a temptation to create a more segregated school environment. The principal describes the scheduling conundrum faced this year, with enough Spanish-speaking students in the Kindergarten to make their own classroom. While the team recognized that it might be easier to have one bilingual classroom, the priority of inclusion drove them to split the students into integrated classrooms, rather than

segregate them. He said they were tempted, but in the end, they did what they knew would be best for the students.

While this temptation may grow as the population of Spanish-speaking students increases, the school intends to continue to prioritize integration, viewing the incoming population as an opportunity for everyone rather than a threat. There has been some anxiety in the town about the new community, but the school has focused on the benefit for all the students of growing up in a more diverse and integrated school setting.

Lessons learned. Abbotsford Elementary has successfully responded to the shifting needs of its student population by focusing on instructional improvement, supports for its struggling students, and building a culture of shared leadership and inclusion. Some of the key lessons learned from this case study include:

1. Set ambitious goals for the learning of all students. Abbotsford viewed the changing demographic of its student body as an opportunity to set high achievement goals for all of its students, including the increasing percent of students from lower income and non-English speaking backgrounds.

2. Adopt new curriculum programs. Abbotsford concluded that in order to make sufficient progress in reading, they needed to adopt a new approach to literacy instruction and math instruction and did so – with the help of their local regional service agency, CESA 10. The district is now in the process of changing its science curriculum program in order to boost student performance in science. The district understands that in order to have students do better in a given content area, they must restructure that curriculum area.

3. Invest heavily in new and intensive professional development. As the case indicates, adopting a new curriculum program is only step one. It requires concentrated, long term professional development to help teacher learn the instructional strategies to put the new program into place in their daily classroom practice. Abbotsford, with grant funding secured with the help of its CESA, expanded the number of days for teacher professional development, hired trainers to provide professional development, and put literacy coaches into their schools to help teachers incorporate all the new practices into their ongoing instructional work.

4. Engage in data based decision making. An integral part of the literacy program was learning how to collect the "running records" or "formative assessments" of students in reading, and to turn this knowledge into more focused and efficient instruction tailored to the exact needs of the students in each teacher's classroom. Training in data-based decision making also included aligning efforts with standards and state accountability measures.

5. Provide a variety of extra help strategies. Abbotsford, with grant funding, was able to provide a multitude of "extra help" strategies to students who struggled a bit more to achieve to standard. It was able to provide teacher tutoring before and after school, more intense tutoring to ELL students during the regular school day, and even three weeks of summer help to some students. These strategies reflected an understanding of two important ideas: some students need extra

help even with high quality instruction in the core classroom and that time needs to be expanded through extra help programs if all students are held to a high level of performance.

6. Collaborative decision making and professional community. Moving to a more inclusive leadership style which respects teacher expertise and provides teachers with a voice in decision-making has helped build a school culture in which everyone, teachers and administrators alike, take responsibility for improving instruction for all students.

**Columbus School in Appleton, Wisconsin[8]**

Columbus Elementary is one of 16 elementary schools in the Appleton School District in East-Central Wisconsin's Fox River Valley. Appleton is home to 77,000 residents, approximately 15,000 of whom are students attending Appleton's 23 public and 12 charter schools. The students in this district are primarily White (81% in 2005-06) but the minority population is growing – in 1995-96 89% of students were White. The largest minority group (10%) is Asian; Appleton is one of a number of cities in Wisconsin with a sizable Hmong population. The next largest is Hispanic, at five percent. Columbus Elementary has 174 students, who, as a group, are more racially and economically diverse than the district as a whole. Approximately 57% of Columbus's students are White, 26% are Asian (Hmong), 8% are Black, 6% are Hispanic and 3% American Indian. Fourteen percent of the school's Hmong students are English Language Learners (ELL). District-wide, 28% of students qualify for free or reduced-price lunch; at Columbus, 73% are eligible.

Improving test scores in the district. In 1999, only 49% of the 4th grade students at Columbus Elementary scored at the advanced or proficient level on the reading portion of the Wisconsin Knowledge and Concepts Examination (WKCE), and only 45% were advanced or proficient in math. The school received notice that it was in danger of being declared a school in need of improvement. A new principal was hired for the 1998-1999 school year after the old principal retired. The new principal initiated a needs assessment with the help of the Wisconsin Department of Public Instruction (DPI) to help identify the specific issues on which the school needed to work. She also applied for a federal, Obey-Porter Comprehensive School Reform (CSR) Grant, hoping that the extra money would enable her to make some of the necessary changes indicated by the needs assessment. Over the next six years, a combination of factors, some set in motion by the needs assessment and some a result of district, state, and federal policies, led to dramatic improvement in test scores at Columbus elementary. Although the scores on the WKCE before 2002 cannot be directly compared with the scores post-2002, comparing the scores between 2002 and 2005 shows a large improvement in both reading and math. As Figure 1 illustrates, progress on reading scores has been a steady upward trajectory, moving from 51% of students advanced or proficient in 2002 to 90% in 2005. Fourth grade math scores have also increased, from 55% in 2002 to 75% in 2005, but as Figure 1 shows, scores were even higher in 2003 and 2004 than they were in 2005. However, as Figure 2 illustrates, the percent of 4th grade students scoring at the advanced level in math had a more consistently positive trajectory, moving from 17% in 2002 to 30% in 2005. The most dramatic increase of all is also illustrated in Figure 2, and that is the growth in the percent of Columbus students scoring

[8] This case was researched and written by Sarah Archibald.

at the advanced level in reading. In 2002, only 3% scored at the advanced level, and by 2005 that percentage had increased more than tenfold, to 35%!

**Figure 1**

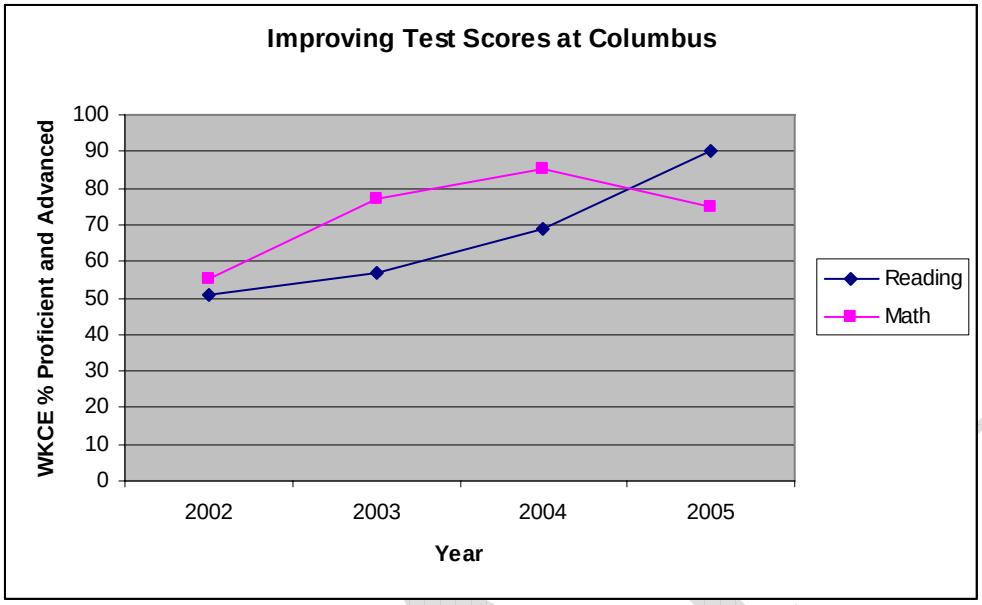
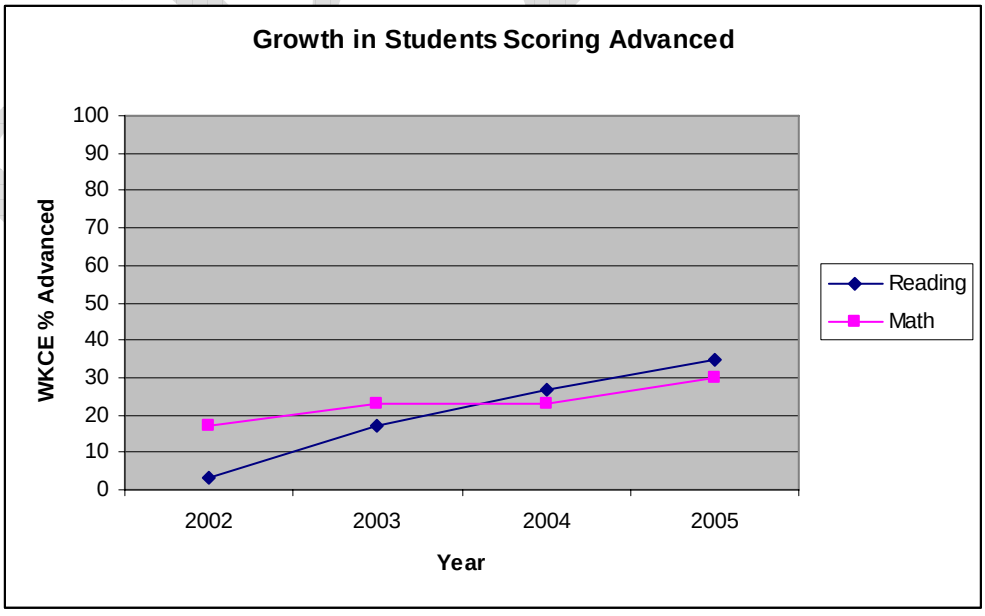



**Figure 2**



Columbus school improvement process. For Columbus Elementary, the combination of the fear of being labeled a school in need of improvement and the vigor of the new principal set in motion a process that would turn the school around.

When the new principal learned that the school was in danger of being labeled a school in need of improvement, she contacted Wisconsin's Department of Public Instruction for assistance with a needs assessment. She and a district administrator worked with DPI to analyze the school's test score data and the alignment of its curriculum with state standards. This process identified the following five needs:

1. Coordinate existing programs and resources to maximize student learning.
2. Revise the school schedule to maximize instructional time.
3. Link assessment to instruction – students will not be able to perform well on a test if they are not taught the material the test covers.
4. Have higher expectations of all students and their ability to develop higher order thinking skills.
5. Coordinate staff development so that it is linked to what teachers need to improve instruction.

The principal decided that to accomplish these tasks, the school would need resources to finance the improvement process. She applied for a comprehensive school reform grant in January of 1999, and the grant was awarded in July of that same year. This grant provided the school with an additional $75,000 per year, renewable for up to three years, conditional on the selection and successful implementation of a comprehensive school reform program.

Other changes during this period contributed to the school's dramatic improvements in performance, including becoming a SAGE school, which provided the resources to reduce class sizes in grades K-3 to 15 students, becoming a 21st century school, which provided the resources to offer an after school program staffed with certified teacher tutors, obtaining additional funding to hire certified teacher tutors to work after school with homeless students, and building formative assessments into the school year so that students in need of extra help were identified early.

Along the way, and perhaps most critical to the turnaround process, was creating and maintaining an atmosphere of collegiality, a sense that they were all in it together, and as a group, their unwavering focus was student learning and relentless work to produce it.

Choosing a comprehensive school design with extensive staff development. Having conducted a needs assessment, the staff knew that the school needed to find a comprehensive instructional program that would help them address the needs of the English language learners while also changing the attitude of the teachers responsible for teaching these and other more challenging students. The staff researched different designs and selected Different Ways of Knowing, a product of the Galef Institute that had proven to be successful with students who were English language learners. The principal cited the staff development that accompanied the design as being key to transforming both the expectations for students and their instructional

methods. The annual staff development contract with the Galef institute included three days of training during the summer with two developer coaches, six on-site coaching days, two full-day and two half-day workshops, and leadership training in Michigan for three staff members. To make the most out of this staff development, the principal made important decisions such as sending different staff members to statewide meetings on Comprehensive School Reform, thereby increasing the level of expertise of as many teachers as possible rather than concentrating it in one or two leaders. The school was also lucky enough to work with the same coach over all three years, which provided consistency and allowed a trust to build between the coach and the teachers. The coach modeled teaching methods for teachers and evaluated teachers' efforts to implement the program in a constructive, non-results oriented way that was helpful and non-threatening to teachers.

Developing and maintaining a professional school community**.** The atmosphere created by the process of undergoing a needs assessment, researching different school designs and selecting one as a staff facilitated a sense of unity among the staff at Columbus that developed into a true professional community over time. The selection of Different Ways of Knowing and all of the professional development that it involved, in particular the days on-site with the same coach, helped build an atmosphere of openness in the school. The coach encouraged teachers to spend time in each others' classrooms, learning from and helping each other, and the comprehensive school reform grant provided the extra funding that enabled teachers to get substitutes so that they could be observers in each others' classrooms. The knowledge and skills that the teachers gained from the staff at the Galef Institute helped build their sense of efficacy with all students, particularly the ELL and other struggling students that they had not been as successful with in the past. When test scores began to rise, teachers were further buoyed, renewing their commitment to helping all children learn.

Successfully involving parents in their students' education**.** The school redoubled its efforts to involve parents during the comprehensive school reform process. For example, they offered parenting courses while providing dinner and child care, helping parents feel more a part of the school community. Another way that the principal helped parents feel comfortable was to have the necessary translators on staff so that parents could communicate with the school. Finally, providing resources such as Math-at-Home backpacks gave parents the necessary tools to reinforce at home what students were learning at school.

Provide additional supports for struggling students**.** The student demographics at Columbus were atypical for the district, which meant that the principal needed to find creative ways to fund the additional supports that her students needed to succeed. In one example of this creativity, the principal found a way to accept SAGE funding to reduce class sizes by renting space for additional classrooms from the building across the street. Another example was applying for and receiving two grants that helped pay for support for struggling students after school. One was a 21st century schools grant, which provided funds for an afterschool program. The principal collaborated with the grant partner, the Boys and Girls Club, to talk about the goals and budget for the program. Doing so gave the school the opportunity to impress upon their grant partner that the most important aspect of this afterschool program would be learning, and in the budget for the program, two certified teachers were included to provide tutoring to struggling students. The principal assisted in obtaining additional funding to help serve the homeless

students at the school, with which two additional certified teachers were hired to tutor homeless students for after school. During the regular school day, formative assessments helped teachers identify students in need of extra help, and those students were assigned to work with the Title I reading specialist in a tutoring capacity. First graders also worked with tutors from a district program called United for Reading Success, in which volunteers were trained to work one-on-one with students struggling to learn to read. All of these supports helped ensure that students' needs were met, increasing their capacity to learn and subsequent academic success.

Strong, ingenuous leadership to guide the process**.** It is also important to highlight that a key element of the schools' success was the leadership provided by the principal hired just as it was being placed on a list of schools in danger of being labeled in need of improvement. Her we-can-do-it attitude helped inspire staff and her tireless efforts to obtain additional funding were what made many of the important changes at Columbus possible.

Lessons learned. The success of administrators, teachers and students at Columbus elementary is the result of a combination of factors, from which the following can be learned:

1. Use data to determine what improvements are most important. The needs assessment allowed the new principal to focus her efforts on what was most urgently needed: changes in both the instructional program and staff expectations so that students could learn the skills they needed to perform well on standardized tests.

2. Raise the expectations for all students regardless of background. Columbus teachers needed a new way to teach students who did not know English; they needed to see that it was possible for these children to learn and to believe they could teach them. Working with the staff of their chosen new comprehensive instructional program, Different Ways of Knowing, allowed teachers to make this shift.

3. Adopt new curriculum and teaching philosophy to meet the needs of the student body. The selection of Different Ways of Knowing allowed the school to use the new curriculums selected by the district (Harcourt for literacy and Houghton Mifflin for math) while bringing the high expectations and methods that helped their students succeed with the thinking, problem solving and application aspects of that curriculum.

4. Invest heavily in new and intensive professional development. The prior experience of the principal told her that in order to change how teachers taught, extensive staff development would be needed. The comprehensive school reform grant was critical in providing the resources necessary to allow teachers to see the new method of instruction demonstrated, practice it in their own classrooms, conduct and receive formative evaluations from peers and consultants – the kind of professional development that leads to instructional change.

5. Lower class sizes in the early grades. When the new principal started in 1999, she learned that although Columbus qualified for SAGE, Wisconsin's class-size reduction funding for schools serving students in poverty, the school had previously turned away funds because of a "lack of space." Knowing the critical importance of smaller class sizes to

learning in the early grades, the new principal found a way to make their school a SAGE school by renting space from the building across the street. As a result, the school has classrooms of 15 or fewer students in grades K-3.

6. Build in formative assessments to ensure struggling students get help early. The principal attributed much of the schools' success in literacy to the use of running records, which allowed teachers to identify what students knew and what they still needed to learn, enabling teachers to be much more efficient in their instruction. They did not need to spend time reviewing material students already knew and could spend more time in areas where students were weaker. They could also refer students for extra help when they needed more than could be provided in the classroom.

7. Provide a variety of extra help strategies to support struggling students. Providing support to students from low-income backgrounds is essential to their success, and to the success of any struggling student. At Columbus, multiple supports were in place, including a program for first graders called United for Reading Success (URS) where volunteers trained by the district work one on one with students struggling to learn to read. Columbus also offers an after school program staffed with two certified teachers to tutor students for one hour, with additional certified teacher tutors to work with homeless students. The school also has a reading specialist to help students during the school day who need small-group or one-on-one instruction.

8. Create an atmosphere of collaborative decision making and professional community. The principal knew the importance of involving multiple staff members in any training or leadership opportunity she was offered. She purposely took a different teacher with her each time she traveled to either state or district professional development or to programs offered by the Galef Institute. This allowed information to flow horizontally through the school, from one teacher to another, rather than vertically, from administration to staff.

9. Invite and support parent and community involvement. The staff at Columbus knew that it was vital to the success of their students to have parents partner with the school to support student learning. Programs such as Math at Home, where backpacks, available for check-out, contain manipulatives, flashcards, measuring tools and other learning materials that parents can use to help reinforce what students learn at school.

**Victory School in Milwaukee, Wisconsin[9]**

We are developing a case on this Milwaukee school and it is not yet completed.

**Doubling Student Performance at the Advanced Level: Monroe, Wisconsin[10]**

For the 2005-06 school year, Monroe School District had approximately 2,500 students in its seven schools: one high school, one middle school, three elementary schools, and two charter

[9] This case was researched and written by Sarah Archibald.
[10] This case was researched and written by Sarah Archibald.

schools, one of which is a virtual charter school. Monroe is a small town, home to approximately 10,000 residents, located in southern rural Wisconsin, about 45 miles from Madison. In the year 2000, the median household income was $36,922, and the median housing value was $90,100. In the 2005-06 school year, 95 percent of students in the district were White, while the remaining students came from a variety of other ethnic backgrounds, including Hispanic, Black, Asian and American Indian. Although it is still a small percentage, the minority population has grown over the past ten years – in 1996-97, 98 percent were White. Twenty-three percent of students participate in the free or reduced-price lunch program, 16 percent are eligible for special education services and one percent are English language learners.

The focus of this case study is on the success of the instructional interventions in math at two of the district's elementary schools, Seaside and Yellowstone; the demographics of both schools are shown in Table 1. Although some changes were made at the middle and high school level, the most intensive interventions were focused on the elementary schools. These interventions included an analysis of test score data, extensive research culminating in the selection and implementation of a new curriculum, and school-based instructional coaches.

**Table 1**
**Student Demographics at Northside and Parkside Elementary Schools**

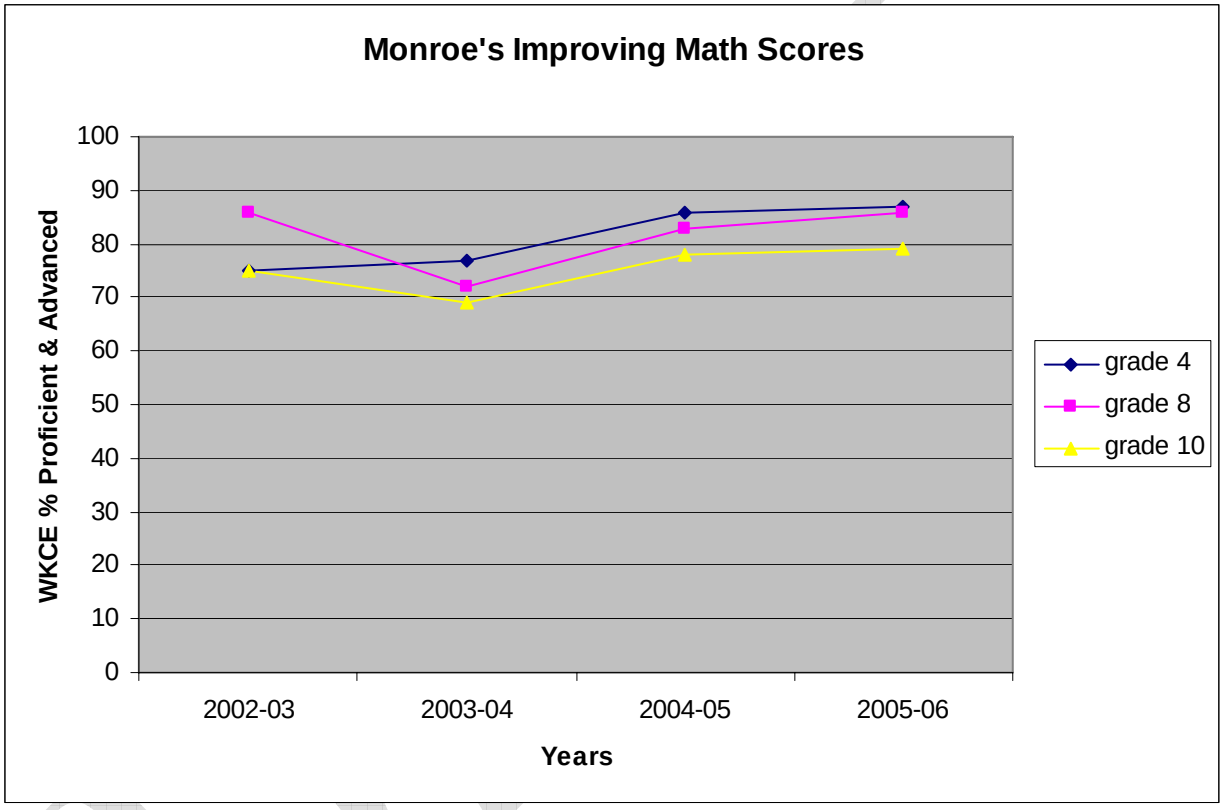
| | District | Northside | Parkside |
|---|---|---|---|
| Enrollment | 2501 | 418 | 355 |
| Grade Span | 4K-12 | 4K-Grade 5 | 4K-Grade 5 |
| % FRL | 23% | 19% | 36% |
| % Special Ed | 16% | 16% | 24% |
| % ELL | 1% | 0% | 2% |

Improving Test Scores in the District. In the 2000-2001 school year, 68 percent of Monroe's 4th grade students scored at the proficient or advanced level on the math portion of the Wisconsin Knowledge and Concepts Examinations (WKCE), compared to 65 percent statewide.[11] At the 8th grade level, 37 percent were proficient and advanced compared to 39 statewide, and at the 10th grade level, the district's students scored at the statewide average of 46 percent proficient and advanced in math. The district decided to improve these scores, so starting in the 2002-03 school year the district implemented a new curriculum, *Everyday Math*, and placed a full-time mathematics instructional coach in each of the elementary schools to help teachers use the new curriculum effectively. Figure 1 displays four years of math test score data for the entire district, from November 2002 through November 2005, with the three different lines representing the three grade levels tested. As stated previously, the interventions were most intensively focused on the elementary schools, and the most impressive growth in student performance occurred at the elementary level – an aggregate rise of 12 percentage points across the time period shown from 75 percent at or proficient or advanced in 2002-03 to 87 percent in 2005-06.

[11] The focus of the improvement efforts documented in this case study is math; see Appendix A for WKCE scores on other subjects for 2000-2001 as well.

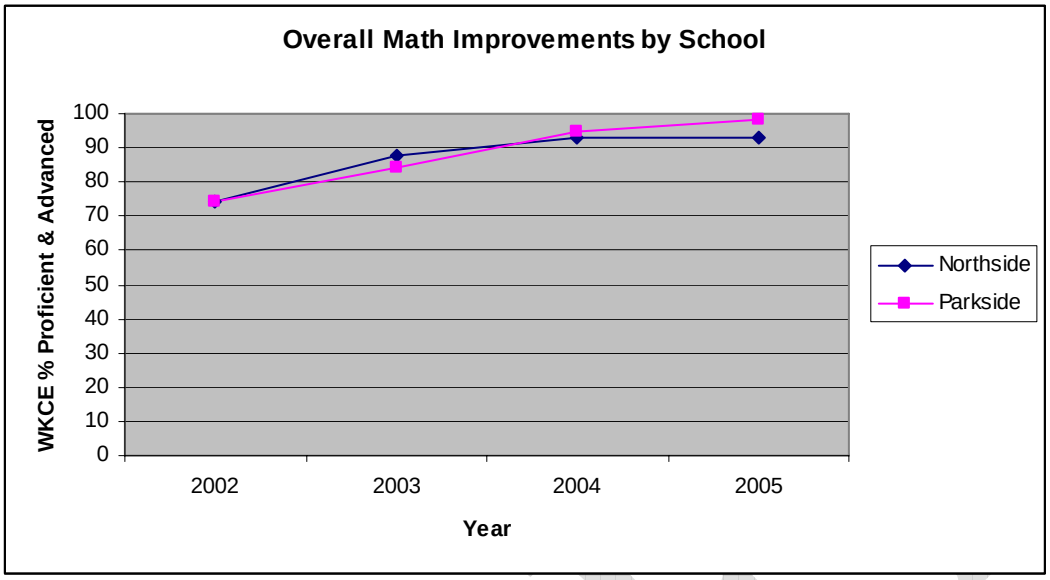
District leaders believed that having a strong foundation in elementary school mathematics would help raise test scores at the middle and high school levels. Not enough time has lapsed between the beginning of the elementary math interventions and the current year to determine the extent to which that carryover to middle and high schools will occur. However, the test score rises at the elementary level portend large possible increases in student performance at the middle school in the future.

**Figure 1**



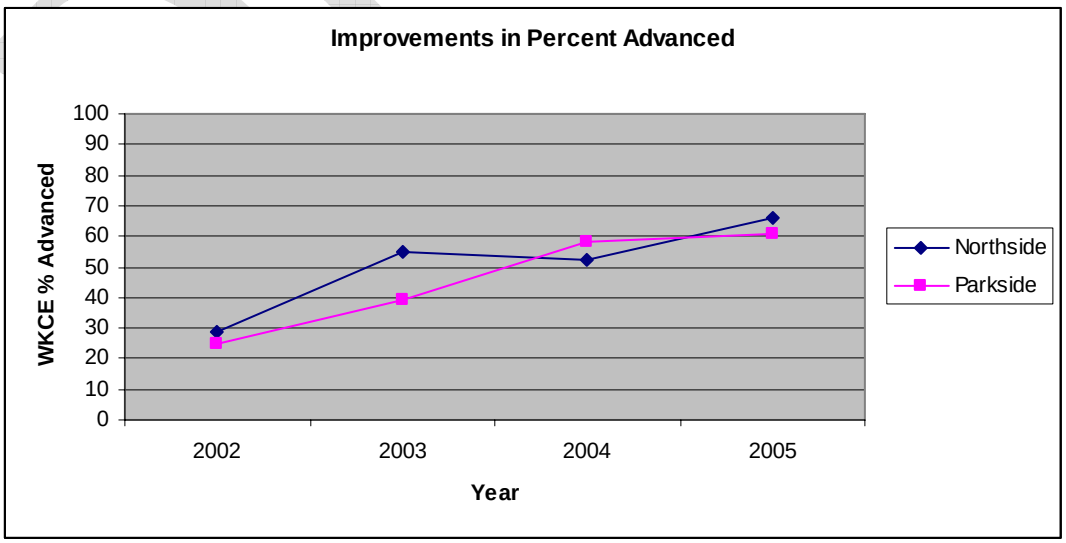

Since most of the student achievement growth occurred at the elementary level, it is most useful to examine the improvement seen in Figure 1 at the school level. Figure 2 shows the overall improvement in test scores, where the percent proficient and advanced are added together. Yellowstone went from 74 percent in 2002 to 93 in 2006, a rise of 19 percentage points, and the scores at Seaside rose by 24 percentage points from 74 percent to 98 percent.

**Figure 2**




However, combining the scores at proficient *and advanced* levels masks the most impressive improvements. Indeed, the growth in elementary school mathematics achievement in terms of the percent scoring at the advanced level is even more dramatic. Figure 3 shows that the percent scoring at the advanced level at Yellowstone rose from 29 percent in 2002 to 66 in 2005, and the percent advanced at Seaside soared from 25 to 61 percent – *both more than doubled*! The results show that a sustained focus on improving student performance in the thinking and problem solving domains can produce dramatic improvements in student performance at the advanced levels – the ultimate objective for many Wisconsin students. Other Wisconsin districts could produce similar increases if they followed the strategies used by Monroe.

**Figure 3**



Monroe school district improvement process. In the summer of 2001, the Monroe school district hired a new curriculum director. The curriculum director position was part of the administrative team, which also included the superintendent and the building principals. The new curriculum director led the administrative team in a review of the district's test scores. In terms of the percent proficient and advanced, the district's math scores were lowest, so the district made the decision to focus on improving its math instruction as the strategy for improving their students' mathematic achievement and test scores. Coincidentally, the district had recently put in place a rotating, seven-year replacement cycle for instructional materials, and it was time to purchase new mathematics materials. The curriculum director then formed a math curriculum committee and charged it with examining math test scores in more detail and researching and selecting a new math curriculum. This committee was comprised of 10 math teachers, carefully selected to ensure that all categories of teachers had a "voice" on the committee – new teachers, veteran teachers, teachers from each school, special education teachers, Title I teachers – as well as building principals and the curriculum director, who served as the committee chair. The following paragraphs, separated into themes, describe the improvement process.

Educational leadership. Although the superintendent had been with the Monroe School District for many years, the district made what proved to be an important change in educational leadership by hiring a new curriculum director in the summer of 2001. This person had extensive experience with data analysis, which the district had not used in a strategic way up to that point. Her leadership in this area on the administrative team as well as on the math curriculum committee was instrumental in focusing the effort on research-based practices *and* the specific instructional needs of the district. The carefully selected math curriculum committee was also a result of her knowledge of the change process, how to get teachers to feel that their voices are being heard, and how to get teachers to embrace the new curriculum and feel energized about the work involved in teaching in more powerful ways.

After the implementation of the new program, the principals in the two successful schools also proved vital to the improvement process. They made such essential changes as shifting the focus at staff meetings to math discussions led by the instructional coaches. The school leaders also conducted all formal evaluations during math classes for the first year of the program, which were essential to their success with *Everyday Math*.

Setting new goals. When the new math program was adopted, the district set a goal of 90 percent of the students scoring at proficient or advanced. The district believed 90 percent was a high, but attainable goal. What they found in the process of implementation was that an even more ambitious goal was attainable – doubling the percentage of students achieving at the advanced levels.

Choosing a new curriculum. After disaggregating the math data and performing an item-level analysis of the district's strengths and weaknesses in teaching mathematics, the math curriculum committee determined that the district's math teachers were succeeding at teaching number computations but they were not as successful at teaching students how to reason algebraically or understand mathematical processes. With these shortcomings in mind, the

members of the committee reviewed the state and national math standards, read books and journals articles, attended a national mathematics conference, tried textbooks, and visited other districts. Through this process, the committee decided that the district needed a new, and more powerful mathematics curriculum program. They selected *Everyday Math*, because it was the curriculum that most closely matched the list of best practices identified in their review of the literature. Some of these best practices include a focus on thinking, problem solving and application, encouraging students to use multiple strategies to solve problems, and using multiple assessments throughout the school year.

Professional development. The curriculum director also knew the vital importance of professional development in supporting changes to classroom instruction, and realized that school-based instructional coaches were the key – although expensive – factor that could significantly impact change in classroom instructional practices that would be linked to student learning gains. Coming up with the money to fund school-based instructional coaches meant reallocating district and Title I resources to provide instructional coaches to each elementary school instead of certified math tutors during the first year of implementation. The curriculum director provided the rationale for and research on the effects of instructional coaches, and convinced the administrative team that school-based instructional coaches were necessary to support teachers during implementation in order to help them integrate into their ongoing classroom practice the strategies they were beginning to learn through professional development sessions on *Everyday Math* in the summer prior to implementation. Another key element was common planning time for teachers to have collaborative discussions about mathematics instruction. This, and the other professional development necessary to prepare for and implement the new curriculum, is summarized below:

*a. Introduction to New Program/Textbook:*

- ½ day in-service in spring 2002 (1 ½ hours DPI math consultant overview of math education, 1 ½ hours Everyday Math consultant)
  *Cost to District: $2000 Everyday Math consultant, including mileage & hotel, plus teacher time, included in the contract*
- 1 day in-service in August 2002 with Everyday Math consultants
  *Cost to District: $300 for consultant plus teacher time, included in the contract*

*b. Planning/Collaboration Time:*

- 1 day in-service in August 2002 for planning and collaborating with grade level colleagues
  *Cost to District: teacher time, included in the contract*

- 2 hours/month per grade level to meet and have common planning time
  *Cost to District: $6,318 – this time was outside the contract*

*c. Additional Support:*

- 1 differentiation and follow-up in-service with Everyday Math consultants regarding how to meet the needs of all students in the classroom
  *Cost to District: $4,000 ($1500 - 3-5, $1000 - 1&2, $750 – K plus mileage and hotel)*
- 3 Instructional Coaches (1 per building)

*Cost to District: $180,000 (60,000 per coach for salary & benefits)*

- 3 Day Training in Chicago for Instructional Coaches
  *Cost to District: $1,500*3= $4,500*

Total Cost (for one year), excluding teacher time already in the contract: $197,118

Developing a common language around good math instruction. As a result of the ten teachers on the mathematics curriculum committee reading the research on math instruction and presenting it to colleagues, followed by regularly scheduled[12] grade-level meetings where this same language was used and mathematics instruction was discussed, the district developed a common language with which to talk about math instruction. This language was based on a research-proven curriculum, and the teachers had all seen the data that proved to them that they needed to try different strategies to get their students to learn to the standards.

Building a professional community. An essential piece of ongoing professional development has been the regularly scheduled grade-level team meetings for teachers that totaled two hours per month. Since the teacher contract did not include time that could be used for such purposes, district leaders decided to pay teachers an additional stipend to ensure that teacher meetings around instruction took place. After the first year of implementation, each building principal built collaboration time into the school day. The amount of collaboration time varies by grade level and building, but the intent is to continue discussing how to best meet the needs of all the students.

Lessons Learned. Several elements were critical to the dramatic improvement in Monroe's math scores at these elementary schools:

- New district leadership, with training in data-driven decision making, was an important stimulus for change in the district
- Another important step was to set high, but achievable goals to aspire to – which in this case was the goal of having 90 percent of students in the district proficient or advanced in mathematics. The district and its elementary schools might have made even more progress at the advanced levels if improvements in students achieving to this higher level had been more explicit.
- The extensive analysis of math test scores, including an item-level analysis of where, specifically, math instruction in the district was weak, to help create an understanding that change was needed, to help focus the search for a new mathematics curriculum to one that focused on higher level mathematics and problem solving, and to aid the search for a new curriculum
- The careful selection of a representative group of teachers to serve as the math curriculum committee, ensuring that all teachers in the district had at least one teacher on the committee to whom they could relate
- The data-driven and research-based selection of a new curriculum, *Everyday Math*, to specifically meet the needs of the students in this district
- Providing the initial training necessary for teachers to learn about the new curriculum

[12] Some grade levels met ½ hour weekly, some met 1 hour every two weeks, and some met 2 hours monthly.

- Placing instructional coaches in the schools to help teachers implement the new curriculum in their classrooms – although a shortage of resources necessitated reallocating teachers from tutoring students to coaching teachers – this was a vital part of their success
- Placing teacher tutors in the schools to help struggling students stay with the core curriculum
- Providing regularly scheduled time for grade-level teams to meet and discuss mathematics instruction using the common language created by the improvement process
- Principals who shifted the focus of staff meetings to mathematics instruction, providing the necessary leadership to help shepherd the reform

**Doubling Performance for Low Income and Minority Students: The Federal Reading First Initiative in the State of Washington**

Finally, we provide an example of an important and successful initiative in anther state, one with similar ambitious as Wisconsin. The Washington state Reading First initiative, which focuses on students in kindergarten through grade 3, shares many similarities with the Madison reading initiative discussed above – including the use of focused resources – and also has produced good results across the country. The goal of the program is to produce students who read at or above grade level by the end of third grade. The core of the Reading First process is a scientific research-based reading program; schools are able to select one program from a menu of programs that have been documented through rigorous research, to produce reading proficiency. We note that any educational initiative that is designed to impact student academic achievement, reflected in scores on state student achievement tests, must begin as a curriculum and instructional initiative. Designers of the federal Reading First program claim – validly from our perspective – that the country has sufficient professional knowledge to insure that all students exit third grade with proficiency in reading in English.

We next show how this national program looks in one state – Washington. The Washington Reading First process takes a systemic, district approach. The K-3 comprehensive reading programs used by the schools in the program align with the state's standards in reading, and provide detailed instructional advice to all staff involved in daily reading instruction including teachers and paraprofessionals. At the heart of the Reading First process is the development of a comprehensive assessment system. This system includes screening, progress monitoring, diagnostic, and program assessments. Program or "formative" assessments are commonly linked to the state's reading test, but provide more detailed data to teachers on the exact knowledge, skills and understandings of students in reading at each different grade level. These assessments are then used as guides by teachers who identify specific reading objectives and deploy explicit instructional strategies that are linked both to the state and district reading standards and to the status of the individual teachers' students reading proficiency levels. This intense classroom focus is then bolstered by a district level reading coordinator, reading coaches in all Reading First elementary schools, and two tiers of intensive intervention for struggling students. These interventions include very small group tutoring provided by teacher tutors or trained and supervised para-professionals. The Reading First process is then embedded within a school that hopefully is designed to reflect the nine research-based elements of effective schools.

In K-3 Reading First classrooms, students receive 90 minutes of uninterrupted minutes of reading instruction daily. This day-to-day instructional treatment, of course, is the core of the program. And if implemented well, it should educate the bulk of K-3 students – including low income and minority students – to reading proficiency in English by the end of third grade. To insure that all staff providing reading instruction and interventions (including teachers and paraprofessionals) have the instructional expertise and capacity to deliver high- powered reading instruction, Reading First includes intensive professional development each year for its sub-grantees. There are several days of intensive professional development during the summer, and ongoing professional development each month during the school year for district coordinators, principals, reading coaches, teachers and paraprofessionals. Districts and school use their Reading First grant funds to pay for local professional development in reading and for their staffs to attend state-level training events. The Reading First program provides the funds for the trainers for state-level professional development activities. Further, and very important, Reading First requires at least one reading coach in every school; the role of the coach is to work with teachers in grades K-3 to help them implement all the new instructional strategies into their daily teaching practice.

Further, Reading First recognizes that no matter how powerful the K-3 core reading instruction program, some students will need extra help to achieve to the proficiency level. Thus, Reading First also provides funds for two tiers of intervention – 30 minutes of small group (3-5 students) tutoring for students with mild struggles, and an additional 30 minutes of small group tutoring for students with more complex difficulties. Most of the instructors for these extra help interventions are licensed teachers, but in some cases they are specially selected, trained and supervised para-professionals.

The program has produced remarkable results, equal in magnitude to those in Madison. It should be noted that most Washington Reading First schools have large numbers of students from low income and minority backgrounds, so present the toughest educational challenges. Producing performance gains in these schools, which have had the lowest levels of student academic achievement, is critical if Washington is to produce students capable of working in the knowledge- and high-skilled economy of the 21st century. The following table summaries the outcomes:

**Student Performance Outcomes in Washington's 51 Reading First Elementary Schools**

| Performance Standard | Percent of students at this level in 1997 | Percent of students at this level in 2003 | Percent of students at this level in 2005 |
|---|---|---|---|
| **Below Basic** | 26 | 17 | 11 |
| **Basic** | 43 | 42 | 25 |
| **Proficient, Met Standard** | 19 | 32 | 45 |
| **Exceeded Proficiency Standard** | 6 | 8 | 18 |

Washington Reading First was introduced to these schools in 2003. The numbers show that although the schools had been making some progress over the six years from 1997 to 2003, the Reading First intervention dramatically accelerated the progress. The percent of students scoring below the basic level declined by 9 points (1.5 points a year) over the six years from 1997 to 2003, but then declined by 6 points (3 points per year) in the first two years of Reading First, or double the previous trend. Similarly although the percent scoring at the proficient level rose from 19 to 32 percent in the six years from 1997 to 2003 (13 points or about 2 points a year), that percent accelerated after 2003, rising by the same total amount (13 points) but at three times the annual rate (6 points a year), compared to the previous trend. And finally, the percent scoring at or above proficient or standard rose by 15 points from 25 to 40 percent from 1997 to 2003, but then jumped by 23 points to 63 percent in just two years from 2003 to 2005. The data showed that gains similar to these were made by all minority sub-groups in the Reading First schools – African Americans, Hispanics, and Native Americans. These significant results – on the state testing system – show that Reading First is an outcome oriented strategy that weaves together a set of resources to produce student achievement results.

But as just noted, these impressive student achievement results required resources. First, the results were anchored by a restructured reading system that reflected national and international evidence on how to teach reading effectively. Student achievement in any content area is unlikely to rise if the instruction in that content area is not altered and improved. Second, it required extensive professional development, including resources for up to ten days per year of professional development for staff providing reading instruction and intervention (including teachers and paraprofessionals), funds for the trainers, instructional/reading coaches in every school, and additional resources to support small group and more individualized tutoring of students who struggled more and needed extra help meet state reading standards. These resources are quite similar to the resources in the Madison initiative, and all are included in the evidence-based model recommendations that are developed in the next sections of the report. Without all the resources, performance might have continued at a modest pace but not at the accelerated pace Washington's – or Wisconsin's – economies need.

Similar efforts will be needed to improve student achievement in the other core content areas – mathematics, science, history and world language – and in middle and high schools. And such efforts will require similar targeted resources, all of which are included in the evidence-based model developed in the next sections of this report.

**Seven Steps to Doubling Performance**

These powerful stories of actual districts or schools doubling performance show that there is knowledge about how to dramatically improve student performance results – which we summarize by saying doubling performance – and that the schools followed a similar set of six steps after setting new, rigorous performance targets:

1) Set higher goals, many times trying to educate 95 percent to at least proficiency and a significant portion to the advanced achievement levels.

2) Analyzed student data to become deeply knowledgeable about performance issues and the nature of the achievement gap. This step underscores the importance of formative assessments. The test score analysis over time included state test results as well.

3) Reviewed evidence on good instruction and effective curriculum. All the schools threw out the old curriculum and replaced it with a different and more rigorous curriculum.

4) Invested heavily in teacher training that included intensive summer institutes and longer teacher work years, as well as resources for trainers and most importantly, instructional coaches in all school.

5) Provided extra helps for struggling students, and with a combination of state funds and federal Title 1 funds provided some combination of tutoring in a 1-1, 1-3, or 1-5 format, and sometimes extended days, summer school, and though not highlighted, English language development for all ELL students.

6) Created smaller classes in early elementary years often lowering class sizes in grades K-3 to 15 citing research from randomized trials

7) Supported by strong leadership around data-based decision making and improving the instructional program, by both the superintendent and principal

However, all the examples were of schools that have boosted student performance in one or two content areas, and at one or maybe two education levels, through a combination of new grants and reallocating extant resources. Now the schools have no more resources to reallocate and they need similar resources to produce similar results in all 5 core content areas and in all elementary, middle and high schools. The evidence-based report is focused on identifying the resources needed by all schools to double student performance in the medium future.

# 2. Applying the Evidence-Based Approach in Wisconsin

This section of the report presents a school finance adequacy study. Since 1990, the school finance community has developed a number of alternative methods for determining school finance adequacy. These are summarized in Odden (2003), an article that identifies strengths and weaknesses of each approach. We believe that the most substantively sound methodology is the Evidence–Based approach.

The Evidence-Based approach identifies a set of school-level components that are required to deliver a comprehensive and high-quality instructional program within a school and the evidence on their effectiveness, and then determines an adequate expenditure level by placing a price (e.g. an appropriate salary level for personnel) on each component and aggregating the components to a total cost. More explicitly, this approach is based on evidence from three sources:

1. Research with randomized assignment to the treatment (the "gold standard" of evidence)
2. Research with other types of controls or statistical procedures that can help separate the impact of a treatment
3. Best practices either as codified in a comprehensive school design (e.g., Stringfield, Ross & Smith, 1996) or from studies of impact at the local district or school level.

The Evidence-Based approach to determining school finance adequacy defers to evidence on the level of resources needed to meet pre-determined performance goals much more strongly than on the professional judgment of educators, though professional educator input is solicited.

The following sections of the report take this approach, with which the lead for this study, Professor Allan Odden in the Department of Educational Leadership and Policy Analysis in the School of Education at the University of Wisconsin-Madison and his colleague Professor Lawrence O. Picus at the University of Southern California have been associated for several years (Odden, Picus, Fermanich & Goetz, 2004, Odden, Picus & Fermanich, 2003; Picus, Odden & Fermanich, 2003; Odden, 2000). It describes how this approach would be used to identify the core educational resource needs of prototypical elementary, middle and high schools in Wisconsin – resources that would be adequate for schools to educate their students to state performance standards. It concludes with Table 1 that identifies an initial set of adequate resources for Wisconsin elementary, middle and high schools. Appendix A summarizes proposals from professional judgment panels in a few other selected states, which are sometimes referenced in the report.

### DEFINITION OF ADEQUACY

Before proceeding, we should note that we have proposed a definition of education adequacy, and that definition serves as a basis for identifying the resources required for adequate funding. The definition of educational adequacy is:

a. The expectations included in Wisconsin's Academic Standards, which define what all Wisconsin's students are to be taught.
b. The standards included in the state's testing system, which include a definition of what would be considered a proficient score for each test. The goal is to have all, or all but the most severely disabled, students perform at or above proficiency on these tests (with the proficiency standard calibrated overtime to those of the NAEP), and to boost the percentage of those performing at the advanced levels – particularly in mathematics and science.
c. The standards implied by the state's accountability system, and the federal No Child Left Behind law, which further require improvement for students at all levels in the achievement range, for all income levels, for all ethnicities, and which also aspire to enhance the learning of the top scoring students as well.
d. Sufficient funding to provide the resources identified in the resource matrix contained in Table 1 of this report.

Full implementation of this definition of an adequate education program with the proposed resources will require that each school rethink, if not restructure, its entire educational program and reallocate all current and any new resources to this restructured and more effective educational program. Such a system also will work best if it is accompanied by a clear accountability and monitoring program.

## GENERAL RECOMMENDATIONS

This section covers pre-school, counting students, full day kindergarten and school size.

### PreSchool

Current Wisconsin policy. Wisconsin does not have a comprehensive preschool policy. It provides a variety of subsidies for early child care and has developed standards for such programs, but most preschool services are locally or privately funded and operated.

The evidence. Research shows that high quality preschool, particularly for students from lower income backgrounds, significantly affects future student academic achievement as well as other desired social and community outcomes (Barnett, 1995, 1996, 1998, 2000; Karoly et al., 1998; Reynolds, et al., 2001; Slavin, Karweit & Wasik, 1994). Indeed, 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. The research shows that there is a return over time of *eight to ten dollars* for every one dollar invested in high quality preschool programs.

A published study of state-financed pre-school programs in six states – California, Georgia, Illinois, Kentucky, New York and Ohio – found, similar to the above studies, that children from lower income families start catching up to their middle income peers when they attend a pre-school program (Jacobson, 2003).

For the High/Scope Perry Preschool Program, the most recent long term study of preschool program impacts found that adults at age 40 who had the preschool program had higher earnings, were more likely to hold a job, had committed fewer crimes, and were more likely to have graduated from high school than adults who did not have preschool (Schweinhart, 2005).

Recommendation. Given these research findings, we recommend that the state fully fund full-day preschool for 3 and 4 year olds, at least for children from families with an income at or below 200 percent of the poverty level. According to the National Association for the Education of Young Children, preschool standards generally call for one teacher and one teacher assistant for each pre-school group of 15 students. Furthermore, there is increasing recognition that preschool should be provided for all students; research shows that this strategy produces significant gains for children from middle class backgrounds and even larger impacts for students from lower income backgrounds (Barnett, Brown & Shore, 2004). Over time, Wisconsin should consider this possibility.

Because preschool quality is linked to impact, and quality is largely a function of staff (Whitebrook, 2004), including preschool students in a district's pupil count for state aid purposes is the most straight forward way to fund preschool services and would require preschool providers to pay a salary according to the salary schedule in the district in which the preschool program is provided, or consistent with the state's average teacher salary. In this way, preschool providers would be able to recruit highly-qualified teachers for all preschool programs. At the same time, if this funding and salary approach were followed, districts should be required to allow multiple institutions and organizations to provide preschool services, not just the public schools.

Since students eligible for preschool are not covered in the state's education clause, *we will not include preschool costs in our analyses of the costs of our recommendations*. The cost figures will pertain to students in kindergarten through grade 12 only. However, *we will retain the state's current four year old kindergarten program in our costing the recommendations*.

**Student Count for Calculating State Aid**

Current Wisconsin policy. Students are counted on a Full Time Equivalency basis (FTE) for the current Wisconsin school finance formula, and the formula actually uses a variety of student counts in calculating state aids. The basic student count is determined from the September and January student count dates and a summer school FTE adjustment. Further, the state uses a count of resident students in determining the pupil counts used for state aid calculations. However, in calculating the revenue limit, the FTE count actually used is the average of the current and two previous years' FTE, in order to cushion the impact of declining enrollments.

The evidence. An FTE (or average daily membership in other states) count of students increasingly is the pupil count used by most states in their school finance formulas. A Full Time Equivalency count is the best approximation of the number of students actually needing education services in schools and districts.

With choice programs such as Wisconsin's Open enrollment, however, using a resident student count makes state aid calculations complex, particularly when an additional administrative system is then needed to move dollars across districts when students choose to attend a school in a district outside of their actual residence. The easiest way to address student choice of school and appropriate flow of funds is simply to count each student in the school (and district) that they attend. This insures that dollars follow the student and it eliminates the need for a separate administrative system for transferring funds across districts to accommodate student choice of school.

During Task Force discussion of this issue, there seemed to be some misunderstanding of how school finance formulas work, and whether an attendance count of students would actually transfer just the state aid, or the local per pupil amount, or how exactly how a attendance count of students would work in terms of moving money around. The purpose of this side-note is to help clarify the situation to ensure full understanding whatever one's position on the issue.

For simplicity, this note will use a foundation formula. The results would be the same with a guaranteed tax base formula, such as that used in Wisconsin, but the calculations would be much more complicated.

Take two districts, each with 1000 students. Assume District A's assessed valuation per pupil is $600,000, which would give it total valuation of $600,000,000, and District B's assessed valuation per pupil is $400,000, which would give it total valuation of $400,000,000. Assume the required tax rate for the foundation formula is 5 mills and that the foundation expenditure per pupil level is $8000 a student.

There are two ways to calculate the revenues.

**For District A:**

On a per pupil basis, state aid per pupil = $8000 – (5 mills x $600,000)
= $8000 – ($3000) = $5000 per pupil.

So total state aid would be $5,000,000 (1000 students times $5000 in per pupil state aid).
And total local revenues would be $3,000,000 (1000 students times $3000 in local revenues per child).

The second way to calculate total state aid would be:
Foundation expenditure per pupil level x # students – (required tax rate x total local valuation)
$8000 x 1000 – (5 mills x $600,000,000)
$8,000,000 – 3,000,000 = $5,000,000, the same amount identified above.
Total local revenues stay at $3,000,000.

**Now, let's say District A lost 5 students to District B.**

The attendance count of students would be 995 in District A.

Using the second, and simpler method of calculating state aid, the calculations would be:
$8000 x 995 – (5 mills x $600,000,000)
$7,960,000 – 3,000,000 = $4,960,000, or $40,000 less state aid.

This reduction in state aid is the same as the number of students lost, 5, times the foundation expenditure per pupil amount of $8000, or $40,000.

In short, if the attendance pupil count is used, it changes the amount of aid by the full foundation expenditure per pupil level. It doesn't make any difference what the local or state revenue per pupil portion was; an attendance pupil count moves the full amount of the foundation expenditure level.

This happens even if we would calculate the state aid on a per pupil basis.
First, the total valuation of $600,000,000 is now divided by 995 students to get a valuation per pupil; the new number would be $603,015.
On a per pupil basis, state aid per pupil = $8000 – (5 mills x $603,015)
= $8000 – ($3015) = $4985 per pupil.
So total state aid would be $4,960,000 (995 students times $4985 in per pupil state aid), or the same $40,000 less by the previous method of calculation.
And total local revenues would be the same $3,000,000 (995 students times $3015 in local revenues per kid).

Now, let's do the calculations **for District B:**
On a per pupil basis, state aid per pupil = $8000 – (5 mills x $400,000)
= $8000 – ($2000) = $6000 per pupil.
So total state aid would be $6,000,000 (1000 students times $6000 in per pupil state aid).
And total local revenues would be $2,000,000 (1000 students times $2000 in local revenues per child).

The second way to calculate total state aid would be:
Foundation expenditure per pupil level x # students – (required tax rate x total local valuation)
$8000 x 1000 – (5 mills x $400,000,000)
$8,000,000 – 2,000,000 = $6,000,000, the same state amount identified above.
Total local revenues stay at $2,000,000.

**Now, District B gains 5 students from District A.**

The attendance count of students would be 1005.

Using the second, and simpler, method of calculating state aid, the calculations would be:
$8000 x 1005 – (5 mills x $400,000,000)
$8,040,000 – 2,000,000 = $6,040,000, or $40,000 more state aid.
This increase in state aid is the same as the number of students gained, 5, times the foundation expenditure per pupil amount of $8000, or $40,000.

In short, if the attendance pupil count is used, it changes the amount of aid by the full foundation expenditure per pupil level. It doesn't make any difference what the local or state revenue per pupil portion was; an attendance pupil count moves the money, and moves the money whether the district loses or gains students.

This happens even if we would calculate the state aid on a per pupil basis.
First, the total valuation of $400,000,000 is now divided by 1005 students to get a valuation per pupil; the new number would be $398,010.
On a per pupil basis, state aid per pupil = $8000 – (5 mills x $398,010)

= $8000 – ($1990) = $6010 per pupil.

So total state aid would be $6,040,000 (1005 students x $6010 in per pupil state aid), or the same $40,000 more as by the previous method of calculation.
And total local revenues would be the same $2,000,000 (1005 students times $1990 in local revenues per kid).

We should also note that no local dollars move; in all examples, the local amount spent on education does not change. So whether a district gains or loses students, if the attendance count of students is used, the local contribution remains the same and it is changes in state aid that moves the funding to or from the districts that gain or lose students.

Of course in Wisconsin, choice students do not receive the full foundation, or secondary guarantee amount; they receive less. So an administrative transfer system has been created. We would argue that if a choice program exists, it should support the full fiscal cost of the movement of student by providing the full foundation amount. And in that case, using an attendance count of students does the job and no administrative revenue transfer system is needed. Further, under an adequacy policy, it would not make sense to provide less money for a choice student than a student that did not choose to attend a school outside of the district of residence. Still, this is a policy issue Wisconsin would have to address.

So apart from whether one supports an open enrollment policy, the point of this note is to show that the easiest way to transfer the funds is to use an attendance count of students; it itself moves the money and no administrative transfer system is needed.

Finally, using a three year rolling average student count to cushion the fiscal impact of declining student numbers is a common practice across the country. This was an approach recommended by Cavin, Murnane & Brown (1985) in a study of this issue in Michigan.

However, a rolling three year average was generally not intended for use in all schools, especially those schools experiencing enrollment growth, even though there are fewer rising enrollment than falling enrollment schools in Wisconsin. Schools with rising enrollments should be able to use their actual student count so they have the resources to expand educational services as they grow in student FTE.

Recommendation. We recommend that Wisconsin continue to use an FTE student count for the aid formula. We also recommend that the state use one pupil count for all elements of the program – determining property wealth per pupil, calculating state aid, and calculating the revenue limit if one remains. We also recommend that the state simplify the student counting system and use a count of students in the school and district where they actually attend school. We believe that most of the members of the Task Force do not agree with this recommendation. Finally, since it is more appropriate to use a rolling three year average FTE count when student decline exists, but the actual FTE for schools with stable or rising student counts, we recommend that the FTE count for the formula be the average of the current and past two years' FTE or the current year's FTE, whichever is larger.

Given the current data the state collects, however, we will not be able to fully implement the recommendation to use an attendance count of students in our costing analyses. The state collects FTE resident counts at the district level, but only headcounts of students actually

attending a school by grade level. What is needed is an FTE count at the school by district. Since we need grade level numbers for the costing analysis, we will use the school level headcounts to indicate grade level enrollments, but adjust the totals to equal the number of FTE students at the district level. Thus, in reality, our costing will use an FTE count of resident students.

**Full Day Kindergarten**

Current Wisconsin policy. Currently, Wisconsin allows districts to count a student attending a full or half-day 5-year old kindergarten as 1.0 or 0.5 student, respectively, for state aid purposes. Further, the state also allows districts to count 4-year old students who attend full or half-day programs, but each such student is counted as no more than 0.5 student for aid purposes (0.6 student if the program includes outreach activities) even if the program is full-day. In addition, the state allows districts to count a 3 year-old, who is enrolled in a program for children with disabilities, as 0.5 pupil.

The evidence. Research shows that full-day kindergarten, particularly for students from low-income backgrounds, has significant, positive effects on student learning in the early elementary grades (Fusaro, 1997; Gulo, 2000; Slavin, Karweit & Wasik, 1994). Children participating in such programs do better in learning the basic skills of reading, writing, and mathematics in the primary grades of elementary school than children who receive only a half-day program or no kindergarten at all. The most recent study of such effects was released in mid-2003 by the National Center for Education Research (Denton, West & Walston, 2003). This nationally-representative, longitudinal study showed that children who attended full-day kindergarten had a greater ability to demonstrate reading knowledge and skill than their peers in half-day programs, across the range of family backgrounds. This study also found that the more children were exposed to literacy activities in the home, the more likely they were to perform well in both kindergarten and first grade. Funding full day kindergarten for 5 year-olds as well as for 4 year-olds is an increasingly common practice among the states (Kauerz, 2005).

The effectiveness of full-day kindergarten on student achievement is well established. In the most recent meta-analysis of 23 studies comparing the achievement effect of full-day kindergarten to half-day kindergarten programs, Fusaro (1997) found an average **effect size** of **+0.77**, which is quite substantial.

Recommendation. We support continuing Wisconsin's commitment to full-day kindergarten programs. Since recent research suggests that children from all backgrounds can benefit from full-day kindergarten programs, we recommend that the state continue its support for a full day program for all students, at least for those parents who want their child to have such a program.

The most direct way to implement this recommendation is to have the state school finance system allow each district to count each student in a full day kindergarten program as a full 1.0 student in the formula in order to fully fund a full-day kindergarten program.

We also recommend that Wisconsin at least retain its current policy of allowing districts to include 4 year-olds and disabled 3 year-olds in each district's pupil count.

**School Size**

Current Wisconsin policy. Wisconsin has no specific school policy on school size. And school sizes differ substantially across the state. We will be developing resources for prototypical elementary, middle and high schools, and need to suggest a size in order for the prototypes to indicate the relative level of resources in the schools. Thus we will make recommendations on the most effective school sizes. When the recommendations are for sizes smaller than currently existing school sites, we will propose that schools divide themselves into schools-within-schools (SWS), and have each SWS operate as semi-independent units. We will not recommend that the state replace all school sites with smaller buildings.

The evidence. Research on school size is clearer than research on class size. Most of the research on school size addresses the question of whether large schools – those significantly over 1,000 students – are both more efficient and more effective than smaller school units (schools of 300 to 500) – and whether cost savings and performance improvements can be identified for consolidating small schools or districts into larger entities. The research generally shows that school units of roughly 400-600 elementary students and between 500 and 1000 secondary students are the most effective and most efficient.

The following is a quote from the third edition of the school finance text of Odden and Picus on this issue (Odden & Picus, 2004, Chapter 6):

> Analysts, however, argue that the expected cost savings from the massive school and district consolidation have not been realized (Guthrie, 1979; O'Neill, 1996; Ornstein, 1990) and that consolidation might actually harm student performance in rural schools (Sher & Tompkins, 1977) as well as have broad negative effects on rural communities (Coeyman, 1998; Seal & Harmon, 1995). If small schools or districts indeed cost more, but consolidation reduces performance and disrupts communities, the better policy choice might be to resist consolidation and provide special adjustments to compensate for the higher costs.
>
> The research on diseconomies of small and large scale generally does not support a consolidation policy. From an economic perspective, the concept of diseconomies of scale includes both costs and outputs. The issue is whether costs per unit of output are higher in small schools or districts, or put differently, whether costs can be reduced while maintaining output as size rises. In an extensive review of the literature, Fox (1981) concluded that little research had analyzed output in combination with input and size variables, and Monk (1990) concluded after assessing the meager extant research that there was little support for either school or district consolidation.
>
> For elementary schools, research knowledge is thin, but data suggest that size economies that reduce costs by more than one dollar per pupil exist up to but not beyond 200 pupils (Riew, 1986). Thus, very small schools experience diseconomies of small size and,

except in isolated rural areas, potentially could be merged into larger ones. But the real opportunities for cost savings from school consolidation from these small sizes are not great, precisely because many such schools are located in isolated rural areas and there are no other schools nearby with which to consolidate.

At the secondary level, the data are more mixed. Few studies exist that simultaneously assess both size and output, so scale diseconomies have not been adequately studied. Riew (1986) found that there were cost savings, below one dollar per pupil, for middle schools with enrollments above 500; again, many middle schools already enroll more than this number. In analyzing whether larger secondary schools actually provided more comprehensive programs, an argument for larger size, Monk (1987) concluded in a study of New York that program comprehensiveness increased consistently in secondary schools only for size increases up to but not beyond about 400 students. In subsequent research, Haller, Monk, Spotted Bear, Griffith, & Moss (1990) found that while larger schools offered more comprehensive programs, there was wide variation among both smaller and larger schools, and there was no clear [size] point that guarantees program comprehensiveness. Further, Hamilton (1983) shows that social development is better in small high schools.

Studies of district size generally analyze expenditures per pupil as a function of size without an output variable, such as student achievement (Fox, 1981). To document diseconomies of district size, however, expenditures, size, and output need to be analyzed simultaneously, since the goal is to determine if costs per unit of output decrease as the number of students in the district increases. Again, in reviewing the literature, Monk (1990) concluded that definitive statements could not be made about district consolidation.

In the most recent review of scale economies and diseconomies, Andrews, Duncombe & Yinger (2002) assessed both cost function and production function research. The studies reviewed generally assessed costs in tandem with student achievement outputs. The authors concluded that there were potential but modest cost savings that could be realized by consolidating districts smaller than 500 students into districts with 2,000-4,000 students; of course this would be an option only for small districts a short distance from each other and not for rural, isolated small districts. The authors also found that the optimum size for elementary schools was in the 300-500 pupil range, and for high schools was in the 600-900 range (see also, Lee & Smith, 1997, on high school size). Both findings suggest that our very large urban districts and schools are far beyond the optimum size and need to be somehow downsized.

In other words, research suggests that elementary school *units* be in the range of 400-500 students and that secondary school *units* be in the range of 500-1000 students (Lee & Smith, 1997; Raywid, 1997/1998). Evidence from comprehensive school designs, however, generally suggests school sizes of about 500 students for both elementary and secondary schools, which we would argue falls within the range of the research findings (Odden, 1997; Stringfield, Ross & Smith, 1996). Such school designers also suggest that larger schools be divided into "sub-schools," and run as "schools within schools." So a secondary school with 2,000 students would

be organized into two, 1000-student or four 500-student "sub-schools," each with a separate student body, separate principal and separate entrance, if possible (see also Murphy, Beck, Crawford, Hodges & McGaughy, 2001). Teaming within larger schools is another way to enhance personalization of the social and academic environment for students.

Though some of the research on "schools within a school" is mixed, the bulk of research shows that when such efforts *are implemented well*, student performance and other outcomes do rise. The recent Borman, Hewes, Overman and Brown (2003) meta-analysis of comprehensive school designs, many of which are implemented as schools within school buildings, is one body of evidence and documents significant positive impacts for fully implement programs. A policy brief by Wonacott (2002) from the Career and Technical Education National Dissemination Center provides an overview of the impacts of smaller learning communities generally and specifically for secondary career academies. The small-school initiative of the GATES foundation is another support for smaller schools; indeed; GATES is providing tens of millions of dollars all around the country for large high schools to break themselves into small school units (see Dobbs, 2003, for example). Wisconsin has several excellent examples of effective schools-within-schools, and its two largest city districts – Milwaukee and Madison – are in the process of creating SWS within their larger high school buildings.

Astute readers would have noted that the above conclusions were for school units, not necessarily school buildings. And many Wisconsin districts already have built numerous school buildings larger than the above numbers. Evidence on effectiveness would suggest that the districts build smaller school buildings, but this would increase the cost of education facilities. Further, some parents and students prefer large school buildings, believing such schools offer a larger variety of courses, and more extra curricular activities. At the same time, some districts in Wisconsin have built school buildings of a variety of sizes, reflecting the above research findings. Finally, for those who want students to attend school in small buildings, Wisconsin also offers the charter school approach.

Going forward, we would recommend that districts build smaller buildings when new schools, especially secondary schools, are needed. We also suggest that districts divide some but not all of their current large school sites into smaller school-units, thus providing smaller, and more personalized learning environments for some students. And we further suggest that parents and students be allowed to attend their school of choice: a large comprehensive high school, a school within a larger school building, or a charter school. In this way, Wisconsin could provide parents and children options for the "size" of the educational environment in which students are educated.

Although we recognize that the above level of school choice may not in fact exist in sparse, rural areas, and that in lower income areas, parents often do not have the time or resources to avail themselves of choice were it to be provided, we believe these conclusions about the issue of school size are sound, nevertheless.

In addition, for secondary schools, research also finds that curriculum offerings should emphasize a solid core of academic classes for all students (Bryk, Lee & Holland, 1993; Lee, Croninger & Smith, 1997; Newmann & Associates, 1996). This research shows that the most

effective strategy for having all students perform to proficiency on state standards and to close the achievement gap between minorities and non-minorities is for high schools to offer a strong set of core academic courses in mathematics, science, language arts, history/social science and foreign language and require all students to take the bulk of their courses from this core (Clune & White, 1992; Lee, Croninger & Smith, 1997; Madigan, 1997; Public Agenda, 1997; Steinberg, 1997), excluding altogether such low-level classes as general and consumer math. Indeed, the Education Trust argues that one of the top two strategies for closing the achievement gap between low-income students and students of color from other adolescent Americans is having high schools prepare all students for college, i.e., to take a core of solid academics (Education Trust, 2003; ACT and Education Trust, 2004).[13] As implied by the introduction to this report, this is the kind of secondary education required for full participation in any and all post-high school activities, whether it is taking a job, enrolling in a two-year post secondary institution, or attending a college or university.

Recommendation. To indicate the relative level of resources in schools, we will use prototypic school units of 432 elementary students (grades K-5), 450 middle school students (grades 6-8) and 600 high school students (grades 9-12). As discussed in the class size section below, these numbers allow for a whole number of teachers (as opposed to partial FTEs) and facilitate staffing discussions for schools fewer students. Though these numbers are larger than many of the "small" high school programs that are developing across the county, they more accurately reflect the research on the most effective school sizes (Iatarola, 2005). In other reports, we have used prototypical school sizes of 500 for all schools. An explanation for the change in proposed school unit size is presented in the next section.

## RECOMMENDATIONS FOR THE PERSONNEL ELEMENTS IN PROTOTYPICAL SCHOOLS

This section covers all personnel recommendations: core teachers, specialist teachers, teachers for struggling students – tutors, English language learners (ELL), extended day and summer school, pupil support professionals, librarians, administrators, and secretaries.

### 1. Core Teachers/Class Size

Current Wisconsin policy. Wisconsin does not have a statewide policy on class size for all grades. However, the Student Achievement Guarantee in Education (SAGE) program provides school districts $2000 for every student in grades K-3 who is eligible for free and reduced-price lunch in a school if the school and its district commits to use those and other funds to reduce class sizes to 15 in grades K-3. Other than this focused categorical program, the school finance formula does not assume or support specific class sizes.

In staffing schools and classrooms, however, superintendents and principals must make decisions on class sizes for core teachers – the grade (or multi-grade) teacher in elementary schools, and the core subject (e.g., mathematics, science, reading/English/language arts, and social studies) teachers in middle and high schools.

[13] The other strategy is to provide a quality teacher in every classroom, a topic addressed later in this report.

The Evidence. Research on class size shows that small classes of *15* (not a class of 30 with an instructional aide or two teachers) in kindergarten through grade 3 have significant, positive impacts on student achievement in mathematics and reading (Achilles, 1999; American Educational Research Association, 2003; Gerber, Finn, Achilles & Boyd-Zaharias, 2001; Grissmer, 1999; Mishel & Rothstein, 2002; Molnar, 1999; Nye, Hedges & Konstantopoulos, 2002). It is commonly also concluded that the impact of small class size is even larger for students from low-income and minority backgrounds (Finn & Achilles, 1999; Krueger & Whitmore, 2001). The current Wisconsin practice of limiting financial support for class size reduction to schools with the highest concentrations of low income/minority students reflects the evidence that the impact of small classes in the early grades is the largest for this group. But because a small class policy would benefit all children, we view the evidence as supporting a policy to provide class sizes of 15 in all the state's classrooms for kindergarten through grade 3.

Over time, different analysts have reached different conclusions on the role of resources generally and specifically the role of class size on student achievement. In a late 1970s meta-analysis of the class size research, Glass and Smith (1979) concluded that class sizes needed to be reduced to at most 15 students before an impact on achievement could be produced. However, in a re-analysis of that research, Odden (1990) noted that Glass and Smith had no sample studies of class sizes of 14-17 that actually improved student achievement, and that the class size of 15 finding was a statistical artifact of little if any impact of class size of any size until individual tutoring was provided. And Hanushek (2002) has always questioned the efficacy of small class sizes.

But research in the late 1980s and early 1990s provided new evidence of the impact of class size on achievement. The "gold" standard of educational research is randomized experiments, which provide scientific evidence on the impact of a certain treatment (Mosteller, 1995). Thus, the primary evidence on the impact of small classes today is the Tennessee STAR study, which was a large scale, randomized experiment of class sizes of 15 for kindergarten through grade 3 (AERA, 2003; Finn and Achilles, 1999; Word, et al., 1990). The results showed that students in the small classes achieved at a significantly higher level (**effect size** of about **0.25** standard deviations) than those in regular class sizes, and that the impacts were even larger(**effect size** of about **0.50**) for low income and minority students (Achilles, 1999; Finn, 2002; Grissmer, 1999; Krueger, 2002). The same research showed that a regular class of 24-25 with a teacher and an instructional aide *did not* produce a discernible positive impact on student achievement, a finding that undercuts proposals and wide spread practices that place instructional aides in elementary classrooms (Gerber, Achilles, & Boyd-Zaharias, 2001).

Subsequent research showed that the positive impacts of the small classes in the Tennessee study persisted into middle and high school years, and even the years beyond high school (Finn, Gerger, Achilles & Zaharias, 2001; Krueger, 2002; Mishel & Rothstein, 2002; Nye, Hedges & Konstantopoulos, 2001a, 2001b). Thus, although differences in analytic methods and conclusions characterize some of the debate over class size (see Hanushek, 2002 and Krueger, 2002), we side with those concluding that class size does make a difference. Specifically, we conclude that the research shows only that class sizes of 15 students and only for kindergarten through grade 3 boost student performance (Achilles, 1999; Finn, 2002; Grissmer, 1999; Krueger, 2002).

Similar research supporting the above findings on the effect of class size of 15 for students in kindergarten through grade 3 was produced by Project Prime in Indiana (Chase, Mueller & Walden, 1986) and, as cited above, Wisconsin's SAGE program (Molnar, 1999).

Following California's experience, we would urge the state to phase-in these smaller class sizes to insure that quality teachers are available to staff those classes; California discovered that a fast phase-in required many districts, particularly the large urban districts, to staff class with unqualified teachers, which detracted from the efficacy of the small class size.

Two main mechanisms have been proposed through which class size reduction effects may operate. Some have suggested that teachers may alter their instructional methods in smaller classes, making greater use of small groups, for example, or assigning more writing. However, several studies including those tied to Project STAR have failed to find consistent teaching differences related to class size (e.g., Betts & Shkolnik, 1999; Evertson & Randolph, 1989; Rice, 1999). A more likely operating mechanism is that students respond better to the same instruction in smaller classes. With fewer students per teacher, less time is needed for disciplinary matters and students may be more engaged (Betts & Shkolnik, 1999; Finn & Achilles, 1999; Finn, Pannozzo & Achilles, 2003). Particularly in the early elementary grades, smaller classes facilitate forming social relationships among teachers, students, and their families that may be essential for school success.

Evidence on the most effective class sizes in grades 4-12 is harder to find. Most of the research on class size reduction has been conducted at the elementary level. Thus, we look for evidence on the most appropriate secondary class size from typical and best practices to make a recommendation for class sizes for these grades. First, the national average class size in middle and high schools is about 25. Second, nearly all comprehensive school reform models are developed on the basis of a class size of 25 (Odden, 1997; Odden & Picus, 2000; Stringfield, Ross & Smith, 1996), a conclusion on class size reached by the dozens of experts who created these whole-school design models. Although many professional judgment panels in other states have recommended secondary class sizes of 20, none cited research or best practices to support such a proposal. Thus, we use evidence of best practice to recommend that class sizes in grades 4-12 should be no larger than an average of 25.[14]

Recommendation. We recommend that schools be resourced for class sizes of 15 for grades K-3 and 25 for grades 4-12.

With these class size recommendations, a K-5 elementary school would have an average class size of 18. With this resourcing formula, an elementary school of 432 students would receive 24 teachers (4 teachers for each of six grade levels), a middle school of 450 students would receive 18 core teachers, and a high school of 600 students would receive 24 core

[14] Many in Wisconsin and other states have argued not to bump class size from 15 in grade 3 to 25 in grade 4 and subsequent grades, and that class sizes in those grades should be closer to 20. We would encourage the state to sponsor some experiments with various class sizes in grades 4-12 to see if smaller sizes would indeed impact student performance. Whatever the results, the conclusions could provide stronger evidence for what size classes should be at those grade levels.

teachers. *These core teachers would not be the only teaching staff in these schools. Several of the following sections recommend a variety of additional teachers for all school levels.*

Fractional teacher units and grouping students for instruction. An issue that often emerges is how to calculate the number of teachers when the number of students in a school, grade level or class is not so neatly divided by 15, 25 or 18, particularly at each grade level for a school. For example, if an elementary grade had 18 students, a 1.0 FTE teacher position is provided. But what would happen if there were 19 students? Would that trigger an additional full FTE teacher, or just a small fraction of an additional teacher? We would suggest that the formula would trigger just the additional fraction, and that all teacher FTE would need to be considered when organizing a school's instructional program. In other states, individuals have suggested a "rounding up" of each calculation so that any small fraction would produce an additional 1.0 FTE teacher; this would allow an elementary grade with 19 students to trigger 2.0 FTE teacher positions. But many view such an approach as too generous – that the additional teacher should be triggered at 22 or 24. That approach would create the "step" function, as the state would need to distinguish clearly between a grade with 21 students that triggered just 1.0 FTE teacher and a grade with 22 students that triggered 2.0 FTE positions. A formula that simply calculated FTE teachers to the nearest tenth (or hundredth) by dividing the student count by 18 (or 25 for middle and high schools) would solve the "step" function problem but not the numbers of students in the class problem.

The issue here, as well as for very small elementary schools, is how students are grouped for instruction. If students are grouped by grade level, the fact that each grade level does not have a number of students evenly divided by 15, 18 or 25 produces an issue of student placement and numbers of teachers. On the other hand, if schools adopt a multi-age approach, and in elementary schools, for example, create K-1, 1-2, 2-3, 3-4, and 4-5 classes[15] then it would be much easier to create classrooms of approximately 18 students, regardless of the specific number of students in each grade. This approach also would allow for differential placement of students according to their developmental progress, since it is a truism that there is great variability among elementary students in their academic development, even when they are of similar ages, a phenomenon that grade level grouping of students ignores.

Furthermore, research shows that multi-aging of students in elementary classrooms actually is better for students; students in multi-age classrooms achieve at least as much as students in age-grouped classes and usually learn more with **effect sizes** ranging from 0.0 **to 0.5** (Gutierrez & Slavin, 1992; Mason & Burns, 1996; Madon & Stimson, 1996; Pavan, 1992; Veenman, 1995). The reasons for increased student achievement are at least twofold. First, as just stated, classes can be organized so that the academic development of children in each class is more homogeneous thus allowing teachers to provide more whole group instruction, which allows teachers to provide more instruction during each day. Second, if teachers stay with a student group over a two-year time period, a process called "looping," then the teacher knows the student for the second year and less time is lost in starting the school year, determining how to organize and manage the class, and learning the academic achievement status of each student. Moreover, a recent report from the Rural School and Community Trust on school finance

[15] Or in the case of smaller schools, groupings such as K-1, 2-3 and 4-5.

adequacy (Malhoit, 2005) lists the prevalence of multi-age classrooms in rural schools as one of several advantages that small, rural schools provide.

Multi-aging, though, works best if the teacher instructs the entire class as a group and essentially has a two-year curriculum that all students are taught over a two-year time period. Multi-age classrooms run as "combination" or "multi-grade" classes, in which the teacher provides half a day of instruction for one grade, and instruction for the other half of the day to the other grade, can be a detriment to student learning, in part because each student might receive only a half day instead of a full day of instruction, with effect sizes ranging from -0.1 to 0.0. In short, the way multi-age classrooms are taught impacts whether they are more or less effective for students.

Some states, such as Kentucky, use this research and actually mandate the use of multi-age grouping of students in elementary schools. Though we are not hinting that Wisconsin should mandate multi-age classrooms, we are stating that such an approach is a very effective way to group students for instruction and addresses the fact that the resourcing formulas will not produce a "whole" number of teachers, thus making age grouping of students problematic. We are suggesting that the answer is multi-age grouping of students, not providing more teacher resources, and that this solution has ancillary benefits.

**2. Specialist Teachers and Planning and Preparation Time/Collaborative Professional Development**

Current Wisconsin policy. There is no specific provision for such staff in Wisconsin education or school finance policy. It is a personnel resource that districts and schools can and do buy with local and state equalization dollars in the general fund.

The evidence. Teachers need some time during the regular school day for collaborative planning, job-embedded professional development, and ongoing curriculum development and review. Schools also need to teach art, music, library skills, vocational and physical education, implicitly required by the adequacy standard in Wisconsin Supreme Court's 2000 *Vincent* v *Voight* decision. Providing each teacher one period a day for collaborative planning and professional development focused on the school's curriculum requires an additional 20 percent allocation of specialist teachers needed to provide those planning periods while maintaining the above class sizes. These teachers could teach the above or other specialist content classes.

The 20 percent additional staff is adequate for elementary and middle schools, but a different argument could be made for high schools. If the goal is to have more high school students take a core set of rigorous academic courses, and learn that material at a high level of thinking and problem solving, one could argue that a block schedule that allows for longer class periods would be a better way to organize the instructional time of the school. And typical block scheduling for high schools requires an additional 33 percent of specialist teachers, as the school creates a four 90-minute block schedule, with teachers providing instruction for just three of those 90-minute blocks and having one block – or 90 minutes – for planning and preparation each day. This type of block schedule could be operated with students taking four courses each semester attending the same classes each day, or with students taking eight courses each

semester while attending different classes every other day. Such a schedule could also entail some "skinny" blocks for some classes. Each of theses specific ways of structuring a block schedule, however, would require an additional 33 percent of specialist teachers to provide the regular teacher with a "block" for planning and preparation each day.

Based on the findings from cognitive research on how kids learn complex materials (Bransford, Brown & Cocking, 1999; Donovan & Bransford, 2005a, 2005b, 2005c), which suggest longer, more concentrated times for learning, and the rigorous but needed performance expectations for high school students in Wisconsin, we would recommend such block scheduling for high schools, and thus more specialist teachers for high schools to permit this scheduling. Block schedules also would allow teachers of English and writing to give more writing assignments and have the time to provide detailed feedback to students, which is needed to help students write better, but is very time consuming with large numbers of students. We should note that a school could provide 60 minutes of this preparation time for planning, preparation and collaborative work with colleagues, and also require that teachers use 30 minutes of this time to provide additional help for struggling students, which could be organized in many different ways by a school.

We should also note that the primary way to provide job-embedded professional development is to provide for and use a significant portion of planning and preparation time within the normal school day for this purpose (see Odden and Archibald, 2001 for examples). This means that the planning and preparation time needs to be provided as 45-60 minutes of uninterrupted time, not 15-30 minutes at different times during the day. Such professional development should provide between 100 and 200 hours of professional development annually for each teacher (we would recommend closer to 200 hours), include extensive coaching in the teacher's classroom (provided by the site-based instructional facilitators/coaches/mentors discussed above), incorporate all faculty and administrators in a school, focus heavily the content and curriculum that each teacher teaches, and be aligned with state/district content standards and student tests (Birman, Desimone, Porter & Garet, 2000; Cohen & Hill, 2001; Desimone, Porter, Garet, Yoon, & Birman, 2002, Desimone, Porter, Birman, Garet & Yoon, 2002; Garet, Birman, Porter, Desimone & Herman, 1999). Again, we expand on the structure and costs of effective professional development below.

Recommendation. We recommend that elementary and middle schools receive an additional 20 percent of the number of core teachers for specialist teachers, and that high schools receive an additional 33 percent, in order to teach specialist classes and also to provide time for teachers to engage in collaborative planning and preparation as well as job-embedded professional development during the period when they do not teach. The 20 percent formula provides an additional 4.8 FTE positions for the prototypical 432 student elementary school, 3.6 FTE positions in the prototypical 450 student middle school, and the 33 percent formula provides an additional 8.0 positions in the prototypical 600 student high school.

In totaling the core plus the specialist teachers from the recommendations above, our recommended total teaching staff for prototypical schools are 28.8 for the prototypical 432 FTE elementary, 21.6 for the 450 FTE middle and 32 for the prototypical 600 FTE high school.

*Again, we note that the next set of recommendations provide a variety of additional staff for all schools. These are not the only professional staff or the only teaching staff for each school.*

**3. Instructional Facilitators/School-Based Coaches/Mentors**

Current Wisconsin policy. There is no specific provision for such staff in Wisconsin education or school finance policy. It is a personnel resource that districts and schools can buy with local and state equalization dollars in the general fund.

The evidence. Most comprehensive school designs, and the Evidence-Based studies conducted in Kentucky (Odden, Fermanich & Picus 2003), Arkansas (Odden, Picus & Fermanich, 2003), and Arizona (Odden, Picus, Fermanich & Goetz, 2005), call for school-based instructional facilitators or instructional coaches (sometimes called mentors, site coaches, curriculum specialists, lead teachers). The technology intensive designs also require a technology coordinator (see Stringfield, Ross & Smith, 1996). Further, several designs suggest that while one facilitator might be sufficient for the first year of implementation of a school-wide program, in subsequent years an additional 0.5 to 1.0 FTE facilitator is needed. Moreover, the technology designs recommend a full-time facilitator who spends at least half-time as the site's technology expert. Thus, drawing from all programs, we conclude that about 2.5 FTE instructional facilitators/technology coordinators are needed for each school unit of 500 students. This resourcing strategy works for elementary as well as middle and high schools.

These individuals would coordinate the instructional program but most importantly would provide the critical ongoing instructional coaching and mentoring that the professional development literature shows is necessary for teachers to improve their instructional practice (Garet, Porter, Desimone, Birman, &Yoon, 2001; Joyce & Showers, 2002). This means that they spend the bulk of their time in classrooms, modeling lessons, giving feedback to teachers, and helping improve the instructional program. We expand on the rationale for these individuals in our section on professional development below, but include them here as they represent teacher positions. The technology staff would provide the technological expertise to fix small problems with the computer system, install all software, connect computer equipment so it can be used for both instructional and management purposes, and provide professional development to embed computer technologies into the curriculum at the school site.

The impact of coaches as part of the professional development program is very large. Joyce and Calhoun (1996) and Joyce and Showers (2002) found that when teachers had sufficient time to engage in professional development that was embedded in classrooms with the aid of instructional coaches, teacher practice changed significantly, with **effect sizes** of **1.68** in the transfer of training to classrooms, **1.25** for skill-level objectives, and **2.71** for knowledge-level objectives. Effects were almost negligible without the classroom-based coaching.

Recommendation. We conclude the evidence suggests allocating 2.5 FTE instructional coaches for a school of 500 students, or 1 instructional coach for every 200 students. Two of the facilitator positions would be for content coaches, and the allocation provides 0.1 FTE per 100 students or a total of 0.5 in the 500 student school for a technology coach. This would translate into 2.2 FTE facilitators for the 432 student prototypical elementary school, 2.25 FTE facilitators

for the 450 student middle school, and 3.0 FTE facilitators for the 600 student high school. This formula would produce a 0.5 facilitator for a small 108 student elementary (1/4th the size of the prototype), a 0.75 facilitator for a 150 student middle and high school (1/3rd the size of the middle school prototype and 1/6th the size of the high school prototype).

Although these positions are identified here as FTE slots, schools could divide the responsibilities across several individual teachers. For example, the 2.2 positions in elementary schools could be structured for 4 teacher/instructional facilitators providing instruction 50 percent of the time, and functioning as a curriculum coach in reading, mathematics or technology for 50 percent of the time. The same allocation of functions across individuals could work for the middle and high schools.

**Strategies for Struggling Students**

Because not all students will learn to performance standards with just the core instructional program, districts and schools should design a powerful sequence of additional effective strategies for struggling students, *i.e*., students who must work harder and who need more time and help to achieve to the state standards. Rather than simply provide a pot of dollars, or a pupil weight, we recommend a series of specific, cost-based extra-help programs for struggling students:

- Tutoring, i.e., immediate, intensive assistance to keep struggling students on track
- Sheltered English and ESL instruction for English Language Learning (ELL) students
- Extended day programs
- Summer school for struggling students still needing extra help to achieve to state standards
- An Alternative Learning Environment (ALE) mainly for secondary students who need an environment outside of the regular school structure to succeed.
- A new approach to funding special education.

Finally, we also note that we propose to increase pupil support resources as the numbers of struggling students in a school increases.

Current Wisconsin policy. Wisconsin has three major programs in this area, in addition to special education. The first is the SAGE program, discussed in a previous section, which is a program to lower class size in grades K-3 for schools with concentrations of students from low income backgrounds. First implemented in the 1996-97 school year, this program provides $2,000 for every grade K-3 student who qualifies for free and reduced price lunch in an eligible school if the school, and its district, as a condition of receiving a SAGE grant, commits to lowering or maintaining class sizes in grades K-3 to no greater than 15 students; keeping the school open for extended hours and collaborating with community organizations; and providing a rigorous academic program and staff development activities . Initially, these competitive grants were provided to a maximum of one school per district (10 for Milwaukee Public Schools) whose poverty concentration, as measured by the free and reduced-price lunch count, was above 30 percent, provided that the district had at least one school with a low-income enrollment of at least 50 percent. These low-income percentage limitations were removed beginning with the

2000-01 school year. In 2004-05, 524 schools in 227 districts participated in SAGE. Under current law and because of funding limits, no new schools are permitted to participate in SAGE.

The second is a small program to provide special classes for students who come from a family in which English is not the primary language. Wisconsin's Bilingual-Bicultural Education program is for English language learners (ELL). Under current law, schools that enroll 10 or more ELL pupils from the same language group in grades K-3, or 20 or more pupils in grades 4-8 or grades 9-12 are required to provide special classes. School districts subject to this requirement are eligible to receive state aid on a flat percentage basis, which in 2004-05 reimbursed an estimated 12 percent of program costs. This compares to a state share of 33 percent in 1993-94. In 2004-05, the state program served an estimated 24,000 of the state's 37,000 ELL pupils.

The third is summer school. Through the general equalization aid formula, Wisconsin also shares in the cost of school district summer school programs, based on their cost and the number of full-time equivalent pupils attending summer school. To be eligible for equalization aid, summer school programs must be academic summer classes or laboratory periods that are necessary for academic purposes. The learning experience must be related or similar to instruction that is offered during the rest of the school year. Costs associated with summer school become part of the school district's shared cost for which equalization aid is paid. The amount of increased student count is determined as follows:

- Calculate the district's total summer school resident pupil membership minutes
- Divide that total by 48,600 and round to the nearest whole number.

That whole number represents the full-time equivalency (FTE) students for summer school, which is added to the school district's FTE for state aid.[16]

Wisconsin does not provide assistance for extended day programs.

The state also reimburses a portion of local expenditures for special education services. Wisconsin fully reimburses costs for children in hospitals and convalescent homes for orthopedically disabled children. Other eligible costs (generally the costs for school districts to provide special education programs and services) are reimbursed on a flat percentage basis. The estimated reimbursement rate for the 2004-05 school year was 29 percent. Similar to the trend in Bilingual-Bicultural aid, the state's share has declined from 45 percent in 1993-94.

Indicator of struggling students. In terms of an indicator of the presence of struggling students, Wisconsin currently collects data by school on the number of students who are eligible for free and reduced-price lunch, which nationally is the most used variable to indicate the number of struggling students in a school. We will use that student count to indicate the number of students who might need extra help to achieve to proficiency standards or above. However, it

[16] Technically, summer school FTE is considered FTE for the next academic year, so summer FTE for summer 2005 would be added to the district's FTE count for the 2005-2006 school year. Further, in calculating the revenue limit, only 40% of each district's allowed revenue limit per pupil is provided for summer school, generally under the assumption that summer school costs per pupil are approximately only 40% of costs over the entire school year.

is well known that fewer high school students who are eligible for the federal free or reduced-price lunch program apply for such support than the totals that are eligible. Thus, we were encouraged by our Policy Analyst Group to adjust the high school figures to more accurately reflect the number of such students (eligible but not participating) in each school. We will do that by comparing the free and reduced-price lunch count to the poverty count, from the last Census, and use that relationship to adjust the high school free and reduced-price lunch count.

**4. Tutors**

Current Wisconsin policy. There is no specific provision for such staff in Wisconsin education or school finance policy. It is a personnel resource that districts and schools can buy with local and state equalization dollars in the general fund.

The evidence. The most powerful and effective strategy to help struggling students meet state standards is individual one-to-one tutoring provided by licensed teachers (Shanahan, 1998; Shanahan & Barr, 1995; Wasik & Slavin, 1993). Students who must work harder and need more assistance to achieve to proficiency levels (i.e. students who are ELL, low income, or have minor disabilities) especially benefit from preventative tutoring (Cohen, Kulik, & Kulik, 1982). Tutoring program effect sizes vary by the components of the approach used, e.g. the nature and structure of the tutoring program, but **effect sizes** on student learning reported in meta-analyses range from **0.4 to 2.5** (Cohen, Raudenbush & Ball, 1982; Mathes & Fuchs, 1994; Shanahan, 1998; Shanahan & Barr, 1995; Wasik & Slavin,1993), with an average of about 0.75 (Wasik & Slavin, 1993).

The theory of action for why individual one-to-one tutoring, as well as other very small student groupings, boosts student learning follows. First, tutoring intervenes immediately when a student is trying to learn. Second, tutoring is explicitly tied to the specific learning problem. Third, when provided by a trained professional, tutoring provides the precise and appropriate substantive help the student needs to overcome the learning challenge. Fourth, tutoring should thus remedy short-term learning problems, and in many cases may not be needed on a continuing basis. In short, though potentially expensive, the ability of tutoring to intervene quickly, precisely and effectively to undo an individual's specific learning challenge gives it the ability to have large effects, particularly when the specific learning challenge or challenges are key concepts related to a student's learning the grade-level expectations for a specific content area.

The impact of tutoring programs depends on how they are structured. The alignment between what tutors do and the regular instructional program is important (Mantzicopoulos, Morrison, Stone, & Setrakian, 1992; Wheldall, Coleman, Wenban-Smith, Morgan & Quance, 1995). Who conducts the tutoring matters, as does the intensity of the tutoring (Shanahan, 1998). Poorly organized programs in which students lose instructional time moving between classrooms can limit tutoring effects (Cunningham & Allington, 1994). Researchers (Cohen, Kulik, & Kulik, 1982; Farkas, 1998; Mathes & Fuchs, 1994; Shanahan, 1998; Shanahan & Barr, 1995; Wasik & Slavin, 1993) have found greater effects when the tutoring includes the following mechanisms:

- 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 provided for the tutoring
- Highly structured programming, both substantively and organizationally.

An important issue is how many tutors to provide for schools with differing numbers of at-risk students. The standard of many comprehensive school designs is a ratio of one fully licensed teacher-tutor for every 100 students in poverty, with a minimum of one for every prototypical school. Using a Wisconsin count of the adjusted number of students eligible for free and reduced price lunch, this standard would provide from one to four-plus professional teacher-tutor positions for the prototypical elementary and middle schools, and up to six for the high school.

We note several characteristics of an effective one-to-one tutoring strategy. First, each tutor would tutor one student every 20 minutes, or three students per hour. This would allow one tutor position to tutor 18 students a day. (Since tutoring is such an intensive activity, individual teachers might spend only half their time tutoring; but a 1.0 FTE tutoring position would allow 18 students per day to receive 1-1 tutoring.). Four positions would allow 72 students to receive individual tutoring daily in the prototypical elementary and middle schools. Second, most students do not require tutoring all year long; tutoring programs generally assess students quarterly and change tutoring arrangements. With modest changes such as these, close to half the student body of a 400 pupil school unit could receive individual tutoring during the year. Third, not all students who are from a low-income background require individual tutoring, so a portion of the allocation could be used for students in the school who might not be from a lower income family but nevertheless might have a learning issue that could be remedied by tutoring.

Though we have emphasized *individual* tutoring, schools could deploy these resources provided for intensive intervention in evidence-based ways other than just individual 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 can be combined for different students to enhance their chances of learning to read successfully. One-to-one tutoring would be reserved for the students with the most severe reading difficulties, scoring say, at or below the $20^{th}$ or $25^{th}$ percentile on a norm referenced test. Intensive instruction for groups of three-to-five students would then be provided for students above that level but below the proficiency level.

The instruction for all groupings, though, needs to be more explicit and sequenced than that for other students. Young children with weakness in knowledge of letters, letter sound relationships and phonemic awareness need explicit and systematic instruction to help them first decode and then learn to read and comprehend. As Torgeson (2004: 12) states:

> Explicit instruction is instruction that does not leave anything to chance and does not make assumptions about skills and knowledge that children will acquire on

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

If the recommended numbers of tutors are used for such small groups, a one FTE reading position could teach 30 students a day in the one-to-three setting with 30 minutes of instruction per group, and 30+ students a day in the one-to-five setting with 45 minutes of instruction per group. Four FTE tutoring positions could then provide this type of intensive instruction for up to 120 students daily. In short, while we have emphasized 1-1 tutoring, and some students need 1-1 tutoring, other small group practices can also work, with the length of instruction for the small group increasing as the size of the group increases. The interventions only help students to learn to read if they provide the type of explicit instruction described above.

While Torgeson (2004) states that similar interventions can work with middle and high school students, the effect, unfortunately, is smaller as it is much more difficult to undo the lasting damage of not learning to read when students enter middle and high schools with severe reading deficiencies.

Overall, 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 et al., 1982; Mathes & Fuchs, 1994; Shanahan, 1998; Wasik & Slavin,1993; Shanahan & Barr, 1995), with an average about **0.75** for one-to-one tutoring programs based on an meta-analysis of sixteen one-to-one tutoring programs (Wasik & Slavin, 1993).

Recommendation. We recommend that each prototypical school be provided one tutor FTE position for every 100 adjusted students eligible for free and reduced price lunch, with a minimum of one in every prototypical school.

Given all of the above recommendations, we want to note the multiplicity of recommendations *so far* that are focused on getting students to read proficiently by the end of the third grade and to perform at proficiency levels after that:

- Full-day kindergarten
- Classes of 15-18 students for the first four years of school, K-3
    - Perhaps even smaller classes if schools had all licensed staff in an elementary school teach reading during a 90 minute reading block
- At least 90 minutes of regular reading instruction daily
- An evidence-based reading curriculum, with a balance of phonics, phonemic development, writing and comprehension
- More effective teachers with access to rigorous professional development
- Individual and small group tutoring if all of the above still leave the student struggling.

In sum, our initial recommendations for immediate and intensive extra help for students from lower income backgrounds and struggling to learn to standards comes "after" a series of other evidence-based strategies, all designed and proposed to help the student learn to proficiency.

As is clear below, these strategies are further augmented by some additional services for ELL students, extended-day programs, summer school for struggling students who need even more help to learn to state standards, ALE programs, additional assistance for disabled students, and extra pupil support and parent outreach resources based on poverty student counts.

**5. English Language Learning (ELL) Students**

Current Wisconsin policy. Wisconsin's policy for these students was described in the above section on struggling students.

The Evidence. Next to providing extra teachers for English as a second language instruction to students for whom English is not their primary language, research shows that ELL students need a solid and rigorous core curriculum as the basis from which to provide any extra services. For example, a recent study of what is needed to help English language learners achieve to high performance standards (Gandara, Rumberger, Maxwell-Jolly, & Callahan, 2003) suggested that what is in the core or base program is critically important. That study concluded that LES students need:

- Qualified teachers – a core goal of all the recommendations in the report
- Adequate instructional materials and good school conditions, included below for each prototypical school model
- Good assessments of ELL students so teachers know in detail their English language reading and other academic skills, and less segregation of ELL students

- Rigorous curriculum and courses for all ELL students, and affirmative counseling of such students to take those courses
- Professional development for all teachers, focusing on sheltered English teaching skills.

Research shows that it is the English language learners from lower income, and generally less educated, backgrounds who struggle in school and need extra help. Triggering tutoring resources on the basis of the economic background of students as previously recommended would provide some extra help resources needed for struggling English language learners. However, research, best practices and experience also show that when students are both from a low-income background and English language learners, some additional assistance is needed that 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 that arrive at different times during the school year.

In studying specific strategies to provide ESL instruction during the regular school day by having the ELL students take such a course rather than an elective course, it was clear that additional staff were needed. For example, during one middle school's 7 period daily schedule, the school was providing ESL, i.e., English as a second language, class to its ELL students instead of an alternative, elective class offering. Although initially, we believed that strategy did not require any additional resources – ELL students were simply taking an ESL class (yes, the teacher needed ESL skills) rather than another class – we came to understand that additional resources for this strategy were necessary. Because the district has determined that the ELL students were best served through three levels of ESL classes (each taught during a different period of the day), enrollment in any one of those classes was insufficient to enable the school to reduce the number of non-ESL classes in that time slot. Instead, between two and four ELL students were pulled from each class. ESL classes were organized to accommodate the number of students requiring service, and additional teacher resources were needed to meet this need.

Although there may be the potential to cancel some classes if sufficient numbers of the same class have sufficient numbers of ELL students pulled out, it was generally agreed that if the ELL formula triggered an additional 1.0 FTE position for every 100 ELL students, the staffing resources would be sufficient to allow the provision of the ESL classes. We should note that this school was providing structured English immersion for all ELL students, with ESL as an additional course, and not a bilingual education program. Thus, the pull-out class provided ELL students with an additional "dose" of English instruction, reinforcing the key goal of the program as having the ELL students learn English so they could continue their schooling in English language instruction classrooms. Bilingual transitional programs, though, require the same level of additional resources.

In a best-evidence synthesis of 17 studies on bilingual education, Slavin & Cheung (2005) found that ELL students in bilingual programs outperformed their non-bilingual program peers. Using studies focused primarily on reading achievement, the authors found an **effect size** of **+0.45** for ELL students.

Recommendation. We recommend that the ELL formula provide an additional 1.0 FTE teacher positions for every 100 ELL students.

It bears repeating that these are not the only resources provided for ELL students. All ELL students from lower income backgrounds (most ELL students) are included in the free and reduced price lunch counts, which trigger tutoring, extended day and summer school resources (see following discussion), so all of these resources would also be available for ELL students too. For example, if a 100 poverty student count were comprised of just free and reduced price lunch and no ELL students, it would trigger 1.0 tutor position, plus the extended day and summer school resources below. But if the 100 poverty student count consisted of ELL students, it would trigger the initial 1.0 tutor position, the extended day and summer school resources below, *plus an additional 1.0 teacher position*.

**6. Extended-day programs**

Current Wisconsin policy. Wisconsin has no specific policy on extended day programs.

The evidence. Beginning in elementary school and particularly in secondary schools, after-school or extended-day programs might be necessary for some students. After-school programs are created to provide a safe environment for children and adolescents to spend time after the school day ends, as well as to provide academic support. In a review of research, Vandell, Pierce and Dadisman (2005) found that well designed and administered after-school programs yield numerous improvements in academic and behavioral outcomes (see also, Baker & Witt, 1996; Dishion, McCord, & Poulin, 1999; Mahoney, Stattin, & Magnusson, 2001; Posner & Vandell, 1994; Schinke, Cole, & Poulin, 2000; Tierney, Grossman, & Resch, 1995; White, Reisner, Welsh, & Russell, 2001).

Several recent experimental studies have documented the potential of extended-day programs. Cosden, Morrison, Albanese & Macias (2001) found that the Gervitz Homework Project improved sixth grade SAT-9 math and reading scores for participants in the high-program attendance group versus those in the low-program-attendance group, though a third of the control group participated in other after-school programs and over half the program students dropped out. Philliber, Kaye & Herrling (2001) found that the Children's Aid Society Carrera-Model Teen Pregnancy Prevention Program produced significantly higher PSAT scores for program versus control youth. An evaluation of the Howard Street Tutoring Program (Morris, Shaw, & Perney, 1999) claimed significant differences between the treatment and control group in gains on basal word recognition, basal passages, and two measures of spelling. Lastly, an evaluation of the Quantum Opportunities Program (Hahn, Leavitt & Aaron, 1994; Lattimore, Grotpeter & Taggart, 1998) found that program members were much more likely than control group members to have graduated from high school and to be in a post-secondary school. The rate of four-year college attendance among members was more than three times higher than the control group rate and their rate of two-year college attendance was more than twice as high. After two years, experimental group average scores for five of the 11 academic functional skills were significantly higher than control group scores. On the other hand, the 21st Century Community Learning Centers (CCLC) Program study evaluation (Dynarski et al., 2003), though hotly debated, indicated that for elementary students, programs did not appear to produce

measurable academic improvement. Though critics of this study (Vandell, Pierce & Dadisman, 2005) argued that the control groups had higher pre-existing achievement, thus reducing the potential for finding a program impact, and that the small impacts had more to do with lack of full program implementation during the initial years than with the strength of the program.

Overall, these studies documented positive causal effects on the academic performance of students in select after-school programs, but the evidence is mixed both because of research methods (few randomized trials) and poor program quality and implementation.

*Theory of action and key operation mechanisms.* Several developmental theories have been used to understand how effective after-school programs work, including ecological systems theory, stage-environment fit theory, flow theory, and attachment theory in addition to the roles and function of relationships with peers (Vandell, Pierce & Dadisman, 2005). Using these theoretical frames applied to various programs that have been studied and focusing on the developmental and learning needs of children and adolescents, Vandell and her associates identified positive relationships between program staff and students, rich content-based program activities, and learning- and mastery-oriented content delivery strategies as the major features of effective after-school and extended-day programs (See Figure 3 below). A widely referenced review of extended-day and after-school programs identifies academic, recreational, and cultural components of an effective after-school program with an emphasis on training staff for effective implementation (Fashola, 1998).

These researchers identified several structural and institutional supports necessary for effective after-school programs including:

- 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)
- Financial resources and budget (dedicated space and facilities that support skill development and mastery, equipment and materials to promote skill development and mastery; curricular resources in relevant content areas; location that is accessible to youth and families)
- Program partnerships and connections (with schools to connect administrators, teachers and programs; with larger networks of programs, with parents and community);
- Program sustainability strategies (institutional partners, networks, linkages; community linkages that support enhanced services; long term alliances to ensure long term funding).

**Figure 3**
**Process and Content Features Characterizing Effective Extended Day Programs**

| PROCESS ISSUES | |
|---|---|
| **Positive staff-child relationships** | • Staff treat children/youth with warmth, acceptance and respect<br>• Staff provide emotional support to children/youth<br>• Staff communicate high expectations/positive norms for child/youth behavior and mastery<br>• Staff set age-appropriate limits for children/youth<br>• Staff affirm cultural identity |
| **Positive peer relationships** | • Staff promote tolerance, understanding, and appreciation of differences<br>• Staff promote positive social interactions and communication among youth<br>• Staff encourage inclusion and use strategies for building group identity and focusing group(s) of children/youth on common goals<br>• Staff help youth to develop conflict resolution skills and strategies for addressing threatening/bullying behavior<br>• Staff promote understanding of cultural identity and diversity |
| **Connections with families and the community** | • Staff communicate with family about youth experiences<br>• Families are welcome to volunteer and visit the program<br>• Activities for youth connect them with neighborhood resources and to community mentors and leaders |
| **PROGRAM CONTENT AND ACTIVITIES** | |
| **Content-based learning opportunities that include a mix of academic and nonacademic skill-building activities** | • Arts, aesthetics, culture<br>• Homework and tutorial assistance<br>• Community service<br>• Interdisciplinary and applied content<br>• Opportunities to use written and expressive language to convey ideas, perspectives, and interests in varied contexts<br>• Opportunities to read and exchange ideas about books for varied purposes<br>• Activities and games for practicing and applying everyday and school mathematics<br>• Opportunities to develop planning, decision-making, information-seeking, and critical thinking |
| **Physical/recreation activities** | • Formal or informal sports/fitness activities<br>• Recreational activities |
| **DELIVERY STRATEGIES** | |
| **Structured and unstructured learning opportunities** | • Coaching/tutoring/Co-learning/collaboration/cooperation<br>• Active/hands-on and interactive activities and project-based learning<br>• Discourse, debate, and discussion with peers and adults<br>• Multimodal communication (language, writing, art, music, performance) |
| **Mastery orientation** | • Sustained activities and opportunities for practice and skill development<br>• Goal setting, reflection, self-evaluation<br>• Culminating activities |
| **Opportunities for autonomy, choice, and leadership** | • Opportunities for making choices, solving problems, setting priorities<br>• Formal and informal leadership opportunities |

Recommendation. We recommend that an extended-day program be included in the Wisconsin school prototypes. The resources would be used to provide students in all elementary grades and in secondary schools with additional help – during the school year but after the normal school day – to meet academic performance standards. Because not all poverty students will need or will attend such a program, we recommend that resources be provided for 50 percent of the adjusted free and reduced-price lunch pupil count, a need and participation figure suggested by a recent study (Kleiner, Nolin & Chapman, 2004). We suggest providing one teacher position for every 15 eligible students (defined as 50 percent of the adjusted free and reduced-price lunch pupil count) and paid at the rate of 25 percent of the position's annual salary to offer a 2 ½ to 3 hour extended-day program 5 days per week. These resources could be used for a different mix of teachers and other non-certified staff, with teachers providing at least one hour of homework help or after school tutoring.

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. We also recommend the state 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, to develop a knowledge base about which after-school program structures have the most impact on student learning.

**7. Summer School**

Current Wisconsin policy. Wisconsin's policy for these students was described in the above section on struggling students.

The evidence. Like many other states, Wisconsin has set high standards for student achievement. Many educators in Wisconsin and other states view summer school programs as having promise to give struggling students the additional time and help to achieve to standards and earn academic promotion from grade to grade (Borman, 2001). Providing additional time to help all students master the same content is an initiative that is grounded in research (National Education Commission on Time and Learning, 1994).

Research dating back to 1906 shows that students, *on average*, lose a little more than a month's worth of skill or knowledge over the summer break (Cooper, Nye, Charlton, Lindsay, & Greathouse, 1996). Summer breaks have a larger deleterious impact on poor children's reading and mathematics achievement, which falls further over the summer break than does that of middle-class students. 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, moreover, showed that these family 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 (Alexander & Entwisle, 1996). As a result of this research, there is emerging consensus that what happens during the summer can significantly impact the achievement of students from low-income and at-risk backgrounds, and thus reduce the poor and minority achievement gaps in the United States (see also Heyns,1978).

Evidence on the effectiveness of summer programs in attaining either of these goals, however, typically has been of poor quality. 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.

Two reviews of summer school programs (Ascher, 1988; Austin et al., 1972) concluded that summer school programs in elementary mathematics and reading generally produced modest achievement gains, but noted the findings were tentative because none of the evaluations employed random assignment. Austin et al. (1972) also stated that few summer programs established clear academic goals that were easily evaluated, and in many cases funding arrived too late for a full summer program, thus diminishing potential impact. On the other hand, a more recent meta-analysis of 93 summer school programs (Cooper, Charlton, Valentine, & Muhlenbruck, 2000) found that the average student in summer programs outperformed about 56% to 60% of similar students not receiving the programs. Again, 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.

Nevertheless, research generally suggests that summer school is needed and can be effective for at-risk students. Studies suggest that the effects of summer school are largest for elementary students when the programs emphasize reading and mathematics, and for high school students when programs focus on courses students failed during the school year. The more modest effects frequently found in middle school programs can be partially explained by the emphasis in many middle school summer school programs on adolescent development and self efficacy, rather than academics.

Although Cooper et al.'s (2000) meta-analysis found students who participated in summer school outperformed other students, program effects varied significantly because the nature of the programs varied so widely. Wisconsin should look to those programs with quality research supporting the academic improvement of summer school participants. For example, using a randomize sample of 325 students who participated in the Voyager summer school program, research found that these students showed gains in reading achievement, with an **effect size** of **0.42** (Roberts, 2000).

*Theory of action*. Though learning at a similar rate during the regular school year, low-income and many minority children experience academic learning losses over the summer, with the losses accumulating every summer leading to larger and larger achievement gaps. A summer school program that focuses on improving mathematics and reading achievement, and courses failed in high school, would help curtail the growth of the achievement loss and help these students learn to state performance standards over time. Cooper et al. (1996) suggest a focus on reading only if the intent is just to close the achievement gap; a focus on both reading and mathematics will help lower-income students make progress in learning to all state standards.

*Key operating mechanisms*. Ascher (1988), Austin et al., (1972) and Heyns (1978) identified several programmatic characteristics that undercut program impacts and thus produced the modest effects research has documented so far. They include short program duration

(sometimes a result of funding delays and late program start dates), loose organization, little time for advanced planning, low *academic* expectations for either mathematics or reading, discontinuity between the summer curriculum and the regular-school-year curriculum, teacher fatigue, and poor student attendance. In their meta-analysis of summer-program effects, Cooper et al. (2000) noted several program components that are related to improved achievement effects for summer program attendees. These are supported by the recommendations in the most recent book on summer school and how to enhance its impacts (Borman & Boulay, 2004):

- Early intervention during elementary school
- A full 6-8 week summer program
- A clear focus on mathematics and reading achievement, or failed courses for high school students
- Small-group or individualized instruction
- Parent involvement and participation
- Careful scrutiny for treatment fidelity, including monitoring to ensure good instruction in reading and mathematics is being delivered
- Monitoring student attendance.

Summer programs that include these elements hold promise for improving the achievement of at-risk students and closing the achievement gap.

Recommendation. We recommend that the Wisconsin school prototypes include a summer school provision for 50 percent of all adjusted free and reduced price lunch students in all grades K-12, as an estimate of the number of students still struggling to meet academic requirements (Capizzano, Adelman & Stagner, 2002). We provide resources for a program of eight weeks in length, class sizes of 15 students, and a six hour day, which allows for four hours of instruction in reading and mathematics, though the specific academic focus could be different for high school students. A six hour day would also allow for two hours of non-academic activities. The cost of each FTE teacher position would be estimated using a stipend equal to 25% of his/her annual salary. The 50% estimate of at-risk student need should be monitored over time to determine the degree to which it correctly estimates the number of at-risk students who need a summer school program.

Thus, our overall recommendations for most at-risk students is a sequenced set of connected and structured programs that begin in the early elementary grades and continue through the upper elementary, middle and high school levels. We are proposing that the most academically deficient at-risk students receive one-to-one tutoring, that the next group receives intensive and explicit instruction in groups of three or five, that students still struggling to meet proficiency standards then receive an extended day program that includes an academic focus, and that kids needing even more help then be offered a summer school program that is structured and focused on academics – reading and mathematics for elementary and middle school students, and failed courses for high school students.

Since the exact combination of services that will bring the vast proportion of at-risk students achieving to a proficiency level is not precisely known at this time, we also recommend that Wisconsin add accountability and reporting requirements to receipt of these funds. Schools

should be required to identify the students that receive any and all of these interventions, data should be kept on their performance when they enter and when they exit the programs, and data on program structure and content should also be reported. In this way, the state over time will be better able to identify what features of each of these interventions is most effective in Wisconsin, how much learning gains are produced by the various programs, and also perhaps what sequence of interventions works best for which types of struggling students. In this way, the state can be both providing resources to meet the needs of struggling students and simultaneously learning how to provide these services more effectively over time. Without such a reporting requirement, money will be spent but knowledge about the programs, their design and their effects would be lost.

**8. Alternative Schools**

Current Wisconsin policy. Though several school districts have Alternative Schools for high school students who for multiple reasons do not function well in a regular high school, there is no specific state aid program for operating such schools.

The Evidence. A small number of students have difficulty learning in the traditional school environment. These students, many of whom have some combination of significant behavioral, social and emotional issues, often do much better in small "alternative learning environments." As just stated, many Wisconsin school districts have various versions of "alternative schools" for such students but there is no extra funding for them, even though they generally are more expensive to operate per pupil than "regular" high schools. We recommend that it is time for Wisconsin to formally create an alternative funding formula.

In our work in other states, the funding formulas differ substantially. But in many such schools, the average staffing ratio is about one administrative position and one teacher position for every seven students. Since alternative high schools a special "at-risk" type of school, we conclude that it is time to recognize them with a separate funding formula and to have the state encourage districts that operate such programs within the regular high school to begin designating these as separate programs, so their students can trigger alternative school resources.

Recommendation. We recommend that Wisconsin provide resources for Alternative high schools through the new school finance system by providing them with one administrative position (priced at the level of an assistant principal) plus one teacher position for every seven alternative school students. This staffing ratio would cover all certified staff in the school – administrators, teachers, specialists, tutors, extended day, summer school, pupil support, and any other staff.

If such a funding formula is accepted, it would also be wise for the legislature to ask the Wisconsin Department of Education to develop rules and regulations for alternative school designation and allow them to be schools in their own right.

**9. Special Education**

Current Wisconsin policy. Wisconsin's policy for these students was described in the above section on struggling students.

The Evidence. Providing appropriate special education services, while containing costs and avoiding over-identification of students, particularly minority students, presents several challenges.

First, many mild and moderate disabilities, particularly those associated with students learning to read, are correctable through strategic 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 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. That is why our previous recommendations for extended learning opportunities are so important; they are the first service strategy before special education services are needed. This sounds like a common sense approach that would be second nature to school people, but in many cases they have heretofore been rooted in a "categorical culture" that must be corrected through staff development and strong leadership from the district office and the site principal. Allocating a fixed census amount (about 3.0 FTE for a Wisconsin school of about 432 students) would work for mild and moderate disabilities only if a functional, collaborative early intervention model as outlined above could be implemented.

Second, for more severely handicapped students, clustering them to achieve economies of scale is generally the most effective strategy and provides the greatest opportunity to find ways to mainstream them (to the extent feasible) with regular education students. In very sparsely populated areas this is often not feasible but should at least be worth exploring. Students in these categories generally include: severely emotionally disturbed (ED); severely mentally and/or physically handicapped; and children with the spectrum of autism. The ED and autism populations have been increasing dramatically across the country, and it is likely that this trend will continue in the future. To make the provision of services to these children cost-effective it would make sense to explore clustering of services where possible and design cost parameters for clustered services in each category. In cases where due to geographic isolation students need to be served individually or in groups of two or three it would be helpful to cost out service models for those configurations as well.

Particularly in the case of ED and autism it is well worth building in the capacity to examine at the state level the service models, their effectiveness, and ways to make them more efficient and effective over time. Research on effective service models is growing in both areas and helpful hints for districts on improving services could potentially improve both quality and efficiency. For example, recent research on autism strongly indicates that very early intervention after the onset of the condition (usually between 18 months and 3 years) yields far better outcomes than simply starting services when the child enters school. Federal funding supports special education infant/preschool programs and the strategic application of these services, coupled with ongoing analysis of school programs, could avert costs down the road. If there is

no state capacity to do this it may be cost effective for the state to contract for these research/advisory services.

One new way states have begun to fund special education services is the "census" approach. The census approach, which can be simply funded by providing additional teacher resources for prototypical schools, assumes the incidence of these categories of disabilities is approximately equal across districts and schools and includes resources for providing needed services at an equal rate for all schools and districts. The census approach has emerged across the country for several reasons:

- The continued rise in the number and percentage of "learning disabled" and continued questioning by some of the validity of these numbers
- Under funding of the costs of severely disabled students
- Over labeling of poor, minority, and ELL students into special education categories, which often leads to lower curriculum expectations, and inappropriate instructional services
- Reduction of paper work.

Moreover, all current and future increases in federal funding for disabled students are to be distributed on a "census" basis. As a result, diverse states such as Arkansas, Arizona, California, and Vermont have moved to provide resources for students with mild disabilities through this strategy.

Recommendation: We recommend that Wisconsin adopt a census approach to funding special education services for the high incidence and lower cost services for the disabled, and for the state to reimburse districts for 100 percent of the costs for the severely disabled, minus Federal Title VIb funds for such students. For the census funding, we recommend adding three teacher positions for the 432 and 450 prototypical elementary and middle school, and 4 positions for the 600 student prototypical high school.

### 10. Gifted, Talented, Able and Ambitious Students[17]

Current Wisconsin policy. Current law requires school districts to provide access to appropriate programs for gifted and talented students. No categorical aid is provided.

The evidence. A sound analysis of educational adequacy should include the gifted, talented, and able and ambitious student, most of who perform above state proficiency standards. Indeed, this is important for Wisconsin as its citizens desire improved performance for students at all levels of achievement, not just that all students achieve to or above a proficiency standard. Research shows that developing the potential of gifted and talented students requires:

- Effort to discover the hidden talent of low income and/or culturally diverse students

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

- Curriculum materials designed specifically to meet the needs of talented learners
- Acceleration of the curriculum
- Special training in how teachers can work effectively with talented learners.

Discovering hidden talents in low-income and/or culturally diverse high ability learners. Research studies on the use of performance assessments (Baum, Owen & Oreck, 1996; VanTassel-Baska, Johnson & Avery, 2002), nonverbal measures (Naglieri & Ford, 2003; Naglieri & Ronning, 2000), open-ended tasks (Scott, Deuel, Jean-Francois & Urbano, 1996), extended try-out and transitional periods (Borland & Wright, 1994; Maker, 1996), and inclusive definitions and policies (Gallagher & Coleman, 1992) document increased and more equitable identification practices for high ability culturally diverse and/or low-income learners. However, identification is not sufficient; it must be accompanied by services (Rito & Moller, 1989). 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 than a comparable group of high ability students who did not participate (Struck, 2003). Gains on other measures of school achievement were reported as well.

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

Access to acceleration. Because academically talented students learn quickly, one effective option for serving them is acceleration of the curriculum. Many educators and members of the general public believe acceleration always means skipping a grade. However, there are at least 17 different types of acceleration ranging from curriculum compacting (which reduces the amount of time students spend on material they already know) to subject matter acceleration (going to a higher grade level for one class) to high school course options like Advanced Placement or concurrent credit (Southern, Jones & Stanley, 1993). In some cases, acceleration means content acceleration, which brings more complex material to the student at his or her current grade level. In other cases, acceleration means student acceleration, which brings the student to the material by shifting placement. Reviews of the research on different forms of acceleration have been conducted across several decades and consistently report the positive effects of acceleration on student achievement (Kulik & Kulik, 1984; Southern, Jones &

Stanley, 1993), including Advanced Placement classes (Bleske-Rechek, Lubinski & Benbow, in press). Other studies report participant satisfaction with acceleration (Swiatek, 2002) and benign effects on social and psychological development (Rogers, 2002).

Access to trained teachers. Research and teacher reports indicate that general classroom teachers make very few, if any, modifications for academically talented learners (Archambault et al, 1993; Westberg, Archambault, Dobyns & Salvin, 1993), even though talented students have mastered 40 to 50 percent of the elementary curriculum before the school year begins (Reis et al, 1993). In contrast, teachers who receive appropriate training are more likely to provide classroom instruction that meets the needs of talented learners; students report differences and independent observers in the classroom document them (Hansen & Feldhusen, 1994). Curriculum and instructional adaptation requires the support of a specially trained coach at the building level, which could be embedded in the instructional facilitators recommended above (Reis et al, 1993; 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 (Delcourt, Loyd, Cornell & Golderberg, 1994), which could be accomplished with the professional development resources recommended below.

Research on gifted programs indicates that the effects on student achievement vary by the strategy of the intervention. Enriched classes for gifted and talented produce **effect sizes** of about +0.40 and accelerated classes for gifted and talented produce somewhat larger effectives sizes of **+0.90** (Kulik & Kulik, 1984; Kulik & Kulik, 1992; Gallagher, 1996).

Summary and program and policy implications. Our understanding of the research on best practices in serving gifted and talented students is, at the elementary and middle school level, 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, have these students skip grades in order to be exposed to accelerated instruction. Research shows that neither of these practices produce social adjustment problems; indeed, many gifted students get bored and sometimes restless in classrooms that do not have accelerated instruction. Both of these strategies are essentially no cost, except for scheduling and training of teachers.

The primary approach to serve gifted students in high schools is to enroll them in advanced courses – advanced placement (AP), International Baccalaureate (IB) – to participate in dual enrollment in postsecondary institutions (which is already funded by Wisconsin), or to have them take courses through distance learning mechanisms.

Larger districts in Wisconsin and other states operate programs that reflect the best practices approach for elementary and middle schools– pull out and acceleration. For example, Natrona (WY) has created three accelerated classes for gifted children: a K-3 class, a grade 4-5 class and a grade 6-8 class, with the first two having about 16 students and the third about 21 students, all at that state's average funding for elementary and middle schools. This approach was essentially a no-cost approach, except possibly for some professional development for teachers (which can easily be accommodated within our professional development

recommendations) and some supplies, which could be purchased with a modest per pupil state grant.

However, Natrona was able to have sufficient numbers of students for these accelerated classes for gifted students principally because of its larger size. Smaller districts can identify gifted students but do not have sufficient numbers of students to operate a full accelerated class at normal class sizes for such students; grade-skipping would be a service option for them.

Even though supported by research as the "next best" service approach, many educators tend not to like the grade-skipping approach for gifted students in elementary and middle schools where there were insufficient numbers of such students to organize special gifted and accelerated classes district wide. Thus, most districts that provide special services for gifted students but not through accelerated classes do so through central office staff who travel to different schools to provide enrichment and pull out services for the identified students. These programs roughly cost between $75 and $100 per student. Most districts also place gifted high school students in AP or IB classes, or had them engage in post secondary dual enrollment.

Some districts have gifted students enroll in advanced courses provided on the Internet, which are available for students at essentially all grade levels. These approaches are very cost effective

To double check our understanding of best practices for the gifted and talented, we contacted directors of three of the Gifted and Talented research centers in the country: Dr. Elissa Brown, Director of the Center for Gifted Education, College of William & Mary; Dr. Joseph Renzulli, The National Research Center on the Gifted and Talented at the University of Connecticut; and Dr. Ann Robinson, Director of the Center for Gifted Education at the University of Arkansas at Little Rock.

The College of William and Mary Center was in the midst of developing a literature and best practices review, together with analyses of effect sizes of various approaches to serving the gifted and talented, and their relative costs. Their analyses, not yet published, showed that **effect sizes** for placing students into homogeneous classes of gifted students and accelerating instruction, as well as grade skipping, were between **0.5 and 1.0**. Their analyses further concluded that neither approach produced negative social or emotional impacts for students, and many times, enhanced social and emotional adjustment. In addition, they ranked these approaches high to low impact and high to low cost. Their analyses showed that enrichment programs, in which staff worked with gifted students in smaller groups, could have nearly the same high level effects but were more costly, thus ranking these approaches high impact and medium cost, while the accelerated classes and grade skipping were ranked high impact and low cost.

Dr. Ann Robinson of the University of Arkansas, Little Rock agreed with all these points.

The University of Connecticut center also agreed with these conclusions and has also developed a very powerful Internet-based platform, Renzulli Learning, which could provide for a wide range of programs and services for gifted and talented students. This system takes students

through about a 25-30 minute detailed assessment of their interests and abilities, which produces an individual profile for the student. The student is then directed, via a search engine, to 14 different Internet data systems, including interactive web-sites and simulations that provide a wide range of opportunities to engage the student's interests. Renzulli stated that such an approach was undoubtedly the future for the very bright student. The estimated retail cost of this program is $25 per pupil but the director said that they would be very interested in negotiating a lower figure if Wisconsin were to adopt this program for statewide use.

Recommendation. We recommend that the needs of Wisconsin's gifted, talented, able and ambitious students be met. But we also conclude that such services can be provided with modest additional funding. Thus, we recommend that the state provide $25/ADM for districts to create programs for gifted and talented students, which could include purchasing access to the Renzulli Learning Program. The Renzulli program appropriately reflects Wisconsin law, which defines gifted and talented students as those pupils demonstrating evidence of high performance capability in intellectual, creative, artistic, leadership or specific academic areas and who need services or activities not ordinarily provided in a regular school program in order to fully develop such capabilities.

Moreover, many of the proposals already made are directly related to the above recommendations for gifted and talented students, such as intensive professional development. Further, several proposals that might not have a specific rationale for gifted and talented students but will positively impact them, include:

- Classes of 15 students in grades K-3
- Classes of 25 in grades 4-12
- Smaller school size, and smaller schools-within-schools, so a more personalized learning environment would help the teacher identity and respond to gifted, talented, and able and ambitious student needs
- The intensive professional development that over time should include skills to differentiate instruction for the needs of all children, including the top learners
- Improved classroom instruction that focuses on ambitious learning goals of learning to understanding.

**11. Career and Technical Education**

Vocational education, or its modern term, career and technical education, has been experiencing a shift in its focus for the past several years. Traditional vocational education focused on practical, applied skills such as those needed for wood and metal working, automobile mechanics, typing and other office assistance careers, and "home economics." Today, many argue that voc-tech is info-tech, nano-tech, bio-tech, and health-tech. The argument is that career technical education should begin aggressively to incorporate courses that prepare students, still with applied skills, but for new work positions in the growing, higher-wage economy that includes 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 these careers can be entered directly from high school. Indeed, the American College Testing company just completed a study

finding that the knowledge, skills and competencies needed for college and for work in these higher-wage, growing jobs of the evolving economy are quite the same.

In a paper prepared for the Wisconsin School Finance Adequacy Task Force, a national expert on career and technical education, made the same argument (Phelps, 2006). Further, Phelps implied that designing such applied career-technical courses would not require any additional funding; the major task was to redesign a mathematics course so that it covered, for example, the knowledge and skills for an algebra-trigonometry class but in an applied, engineering format. The same would be true for biology and health science courses for jobs in the bio-tech and health areas.

Though these positions can be challenged – both the new focus of career-technical education and the claim for no extra costs – this argument is developing across the country. Even in places that provide some additional resources, the approach can be to weight full-time equivalent career-technical education students an additional 0.3 for smaller class sizes, and to provide a sum of money, approximately $7,000, for every career-technical education teacher (Odden, Picus, Goetz, et al., 2005).

**12. Substitute Teachers**

Current Wisconsin policy. There is no specific provision for such staff in Wisconsin education or school finance policy. It is a personnel resource that districts and schools can buy with local and state equalization dollars in the general fund.

The evidence. Schools need some level of substitute teacher allocations in order to cover classrooms when teachers are sick for one or two days, absent for other reasons, on long term sick or pregnancy leave, etc. In many other states, substitute funds are provided at a rate of about ten days for all teachers, which is very close to providing an additional 5 percent of teachers for substitute services.

Recommendation. Based on other studies, we recommend that each school receive an amount of money equal to 10 days for all teachers in Sections 1-11 above, funded at the level of $125 per day, plus social security and state retirement benefits, for a total of $134.56. This recommendation does not mean that each teacher is provided ten substitute days a year; it means the district needs 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 1-2 days, absent for other reasons, on long term sick or pregnancy leave, etc. This recommendation also is not for 10 days above what is currently provided; it simply is a recommendation for an amount of money for substitute teachers estimated at 10 days for each teacher on average.

**13. Student Support/Family Outreach**

Current Wisconsin policy. There is no specific provision for such staff in Wisconsin school finance policy. It is a personnel resource that districts and schools can buy with local and state equalization dollars in the general fund. However, 121.02 School District Standards require that "each school board shall .... provide guidance and counseling services."

The evidence. Schools need a student support and family outreach strategy. Various comprehensive school designs have suggested different ways to provide such a program strategy (Stringfield, Ross & Smith, 1996; for further discussion, see Brabeck, Walsh & Latta, 2003). In terms of level of resources, the more disadvantaged the student body, the more comprehensive the strategy needs to be. The general standard is one licensed professional for every 20 percent of students from a low-income background, with a minimum of one for each school.[18]

Although there are many ways schools can provide outreach to parents, or involve parents in school activities – from fund raisers to governance – research shows that school sponsored activities that impact achievement address what parents can do at home to help their children learn. For example, if the education system has clear content and performance standards, which Wisconsin's does, helping parents and students to understand both what needs to be learned and what constitutes acceptable standards for academic performance would be helpful. Put succinctly, parent outreach that explicitly and directly addresses what parents can do to help their children learn, and to understand the standards of performance that the school expects, are the types of school-sponsored parent activities that produce discernible impacts on student's academic learning (Steinberg, 1996, 1997).

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

At the elementary school level, the focus for parent outreach and involvement programs should concentrate on what parents can do at home to help their children learn academic work for school. Too often parent programs focus on fund raising through the parent-teacher organization, involvement in decision making through school site councils, or other non-academically focused activities at the school site. Although these school-sponsored parent activities might impact other goals – such as making parents feel more comfortable being at school or involving parents more in some school policies – they have little effect on student academic achievement. Parent actions that impact learning would be to: 1) read to them at young ages, 2) discuss stories and their meanings, 3) engage in open ended conversations, 4) set aside a place where homework can be done, and 5) ensure that their child completes homework assignments.

[18] In the resource matrix recommended, funding for these staff are estimated using a ratio of one professional position for every 100 students who qualify for free and reduced price lunch, with a minimum of one per school.

In addition, middle and high schools need some level of guidance counselor resources. Our recommendation below uses the standards from the American School Counselor Association, which is one counselor for every 250 secondary students. Basic pupil support staff also often includes nurses to provide in-school health services. Standards developed by the American Nurses Association and the National Association of School Nurses require 1.0 nurse for every 750 students

Recommendation. Our general recommendation is to provide one teacher position for every 100 adjusted students eligible for free and reduced price lunch, with a minimum of one for each of the prototypical school models (432 student elementary, 450 student middle and 600 student high school). In addition, we would recommend providing an additional 1.8 guidance counselor position and an additional 2.4 guidance counselor positions in the prototypical middle and high school models, respectively, based on the ASCA standards.

This recommendation would enable districts and schools to allocate FTE staff across guidance counselors, nurses, as well as social workers, in a way that best addresses such needs from the perspective of each district and school.

Readers should note that this recommendation provides substantial and adequate resources for parent outreach and involvement, as well as counseling for students. For an all poverty school, our recommendations would provide 4.3 staff positions for an elementary school of 432 students (so it could have a nurse, counselor, social worker and parent liaison team) and the same staff plus 1.8 additional counselors at the middle school and 6 positions plus an additional 2.4 counselors for the prototypic all poverty high school.

The resources are adequate to create and deploy the ambitious and comprehensive parent involvement and outreach programs that are part of two comprehensive school designs: Roots and Wings/Success for all and the Comer School Development Program. The Roots and Wings program would include a family outreach coordinator, a nurse, social worker, guidance counselor and education diagnostician. This group would function as a parent outreach team for the school, would serve as case managers for students who needed non-academic and social services of whatever sort, and usually also include a clothing strategy to ensure that all students, especially in cold climates, had sufficient and adequate clothes, and coats, to attend school.

The Comer Program is created on the premise of attaching schools more to their communities. It's Parent-School team would have a somewhat different composition and would be focused on training parents to raise expectations for their children's learning, to work with social service agencies and sometimes to even co-locate on school site premises the provision of a host of social services, and to work with the school's faculty to raise their expectations for what students can learn.

All effective parent outreach programs would have several workshops training parents on what specifically they could do at home to help their children learn.

**14. Aides**

Current Wisconsin policy. There is no specific provision for such staff in Wisconsin state education or school finance policy. It is a personnel resource that districts and schools can buy with local and state equalization dollars in the general fund.

The evidence. Elementary, middle and high schools need staff for such duties as lunch duty, before and after school playground supervision, helping elementary students get off the bus in the morning and on the bus at the end of the school day, etc. We generally have provided funds for such aides at about the rate of 2.0 FTE aide positions for a school of 500.

But the research is not supportive of instructional aides. As noted above, the Tennessee STAR study, which produced solid evidence through field-based randomized trails that small classes work in elementary schools, also produced evidence that instructional aides in schools do not add value, *i.e*., do not positively impact student academic achievement (Achilles, 1999; Gerber, Finn, Achilles & Boyd-Zaharias, 2001).

At the same time, districts may want to consider a possible use of instructional aides that is supported by research. There are two studies that show how instructional aides could be used to tutor students. Farkas (1998) has shown that if aides are selected according to clear and rigorous literacy criteria, are trained in a specific reading tutoring program, provide individual tutoring to students in reading, and are supervised, then they can have a significant impact on student reading attainment. Some districts have used Farkas-type tutors for students still struggling in reading in the upper elementary grades. Another recent study by Miller (2003) showed that such aides could also have an impact on reading achievement if used to provide individual tutoring to struggling students in the first grade.

We should note that neither of these studies supports the typical use of instructional aides as teacher helpers. Evidence shows that instructional aides can have an impact but only if they are selected according to educational criteria, trained in a specific tutoring program, deployed to provide tutoring to struggling students, and closely supervised.

Recommendation. We recommend that funds in the amount of 2.0 FTE aide positions be provided to the prototypical elementary and middle school, and 3.0 FTE aide positions for the prototypical high school, to be used for relieving teachers from lunchroom, playground and other non-teaching responsibilities.

We do not recommend funds be provided for instructional aides. A school or district could decide to use resources, including some of those recommended for at-risk students, provided in the Block Grant for Farkas-type reading tutors, but to be effective they would need to follow his suggestions for training, focus and supervision.

**15. Librarians**

Current Wisconsin policy. There is no specific provision for such staff in Wisconsin education or school finance policy. It is a personnel resource that districts and schools can buy with local and state equalization dollars in the general fund.

The evidence. Most schools have a library, and the staff resources must be sufficient to operate the library and to incorporate appropriate technologies into the library system. Further, some elementary librarians could teach students for some of the day as part of special subject offerings.

Recommendation. We recommend that each prototypical school be provided a librarian, and that the high school also be provided a library media technician.

**16. Principal**

Current Wisconsin policy. There is no specific provision for such staff in Wisconsin education or school finance policy. It is a personnel resource that districts and schools can buy with local and state equalization dollars in the general fund.

The evidence. **Each school unit needs a principal**. There is no research evidence on the performance of schools with or without a principal. The fact is that essentially all schools in America, if not the world, have a principal. All comprehensive school designs, and all prototypic school designs from all professional judgment studies around the country (see for example, Appendix A), include a principal for every school unit. However, few if any comprehensive school designs include assistant principal positions. And very few school systems around the country provide assistant principals to schools with 500 students or less. Since we also recommend that instead of one school with a large number of students, school buildings with large numbers of students should be sub-divided into multiple school units within the building, we recommend that each unit have a principal. This implies that one principal would be required for each school unit.

Given these recommendations, we note that the prototypical elementary and middle school leadership team would consist of the principal and the 2.3 instructional coach positions, the high school leadership team would consist of the principal and 3 instructional coaches. Schools could organize this leadership team differently than the recommendations, according to the needs and administrative philosophies of the school.

The importance of instructional leadership. The key role of a school's principal and the importance of instructional leadership is uniformly accepted, but the nature of principal leadership and how that impacts instructional practice has been only partially understood (Hallinger & Heck, 1996, 1998). Most researchers and policymakers agree that principals play important roles in schools' successes (Hallinger & Heck, 1996, 1998). This is particularly true for restructuring schools, an assumed need for all schools in this report, where Murphy has identified a key role of the principal to be enabling and supporting teacher success (Murphy, 1994).

Although studies have found that principal leadership alone may account for a significant portion of the variation in student test scores among schools, research generally finds that principals have little or no *direct* effect on student achievement. Instead, principals influence school success through indirect means (Hallinger & Heck, 1996, 2002, 2003). In particular, it is the principal's influence on a school's instructional climate and organization that is crucial, and this is especially true for high schools (Murphy, Beck, Crawford, Hodges, & McGaughy, 2001). Principals influence the learning climate within which a school's teachers work by:

- establishing clear instructional goals
- providing programmatic coherence
- communicating relevant information, including best practices, to their teaching staff
- establishing accountability for student learning
- fostering collaboration and building professional community, and
- maintaining student discipline (Bossert, Dwyer, Rowan, & Lee, 1982).

They also support the professional growth of individual teachers through direct classroom supervision, including teacher observation and feedback, and creating professional development opportunities (Hallinger & Heck, 1998, 2002, 2003; Heck, Larsen, & Marcoulides, 1990).

One of the most important aspects of principal instructional leadership is creating a professional community within schools (Halverson, 2003). Professional community has been shown to increase the intellectual quality of instruction as well as the overall level and distribution of student achievement by strengthening the instructional capacity and focus of schools (Louis & Marks, 1998; Newmann & Wehlage, 1995). Newmann and Wehlage (1995) describe professional community as possessing three general traits, in which teachers:

1) pursue a shared sense of purpose for student learning
2) engage in collaborative activities to achieve this purpose; an
3) take collective responsibility for student learning.

Others have identified de-privatization of practice and reflective dialogue as additional elements of professional community (Louis & Marks, 1998; Louis, Marks & Kruse, 1996).

Shared sense of purpose refers to a consensus among school staff as to the mission and principles by which the school operates. Collaborative activity describes the extent to which teachers engage in cooperative practices to achieve the school's goals. Collective responsibility refers to the degree to which all teachers share responsibility for the academic success of all a school's students. De-privatization of practice refers to the practice of teachers interacting professionally, for example observing and providing feedback on each others' teaching. Reflective dialogue is the professional conversation teachers have about specific issues of instructional practice (Louis & Marks, 1998).

In short, a school's instructional team is critical to the success of schools in producing high levels of student achievement. Principals provide instructional leadership by creating professional communities in which teachers provide considerable instructional leadership (see also Spillane, Halverson & Diamond, 2001), developing professional development opportunities

for teachers, signaling that instructional improvement and student achievement are core goals, and helping the school as a whole to take responsibility for student achievement increases or decreases, while also managing the non-instructional aspects of the school.

Recommendation. We recommend that each school be provided a principal, that elementary schools with FTE down to 108 also receive a principal, and that middle and high schools with FTE down to 150 also receive a full time principal. We recommend that the principal positions for schools larger than the 432, 450 and 600 prototypes be prorated up from the1.0 position. We recommend that the principal position for elementary schools with fewer than 108 students and middle and high schools with fewer than 150 students be prorated down by pupil counts.

School buildings with 2 or more school-unit principals could organize themselves so there was one "super-ordinate" principal in charge. Larger schools with several schools-within-a-school could field combined athletic teams. Our point in providing resources is simply to provide resources for groupings of students in prototypic elementary, middle and high schools, with such resources to include a principal-level position for each of those school units.

**17. School Site Secretarial Staff**

Current Wisconsin policy. There is no specific provision for such staff in Wisconsin education or school finance policy. It is a personnel resource that districts and schools can buy with local and state equalization dollars in the general fund.

The evidence. Every school site needs secretarial support to provide clerical and administrative assistance support to administrators and teachers, to answer the telephone, greet parents when they visit the school, help with paper work, etc.

Recommendation. We recommend that the prototypical elementary and middle schools be provided one senior secretary and one clerk/typist position, and that the prototypical high school be provided one senior secretary and 3 clerk/typist positions.

**Effect Sizes of Major Recommendations**

Throughout the report, we have identified "effect sizes" of the programmatic proposals. 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 did not. An effect size of 1.0 would indicate 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. The effect sizes of the major recommendations are presented in Figure 4.

**Figure 4**

**Estimated Effect Sizes of Major Recommendations**

| Recommended Program | Effect Size |
|---|---|
| Full Day Kindergarten | 0.77 |
| Class Size of 15 in Grades K-3 | |
| Overall | 0.25 |
| Low income and Minority Students | 0.50 |
| Multi-age classrooms | |
| Multi-grade Classrooms | -0.1 to 0.0 |
| Multi-age Classrooms | 0.0 to 0.50 |
| Professional Development with Classroom Instructional Coaches | 1.25 to 2.70 |
| Tutoring, 1-1 | 0.4 to 2.5 |
| English-Language Learners | 0.45 |
| Extended-Day Programs | No consistent impact given wide variation in program focus and quality |
| Structured Academic Focused Summer school | 0.45 |
| Embedded Technology | 0.30 to 0.38 |
| Gifted and Talented | |
| Accelerated Instruction or Grade Skipping | 0.5 to 1.0 |
| Enrichment Programs | 0.4 to 0.7 |

## Recommendations for the Dollar per Pupil Elements

This section addresses areas that are funded by dollar per pupil amounts, including professional development, instructional materials and supplies, computers and other technology, etc.

### 18. Intensive Professional Development[19]

Current Wisconsin policy. There is no specific provision for such funds in Wisconsin education or school finance policy. It is an educational strategy that districts and schools can buy with local and state equalization dollars in the general fund, or with federal funds.

The evidence. All school faculties need ongoing professional development. Indeed, improving teacher effectiveness through high quality professional development is arguably as important as all of the other resource strategies identified; better instruction is the key aspect of the education system that will improve student learning (Rowan, Correnti & Miller, 2002; Sanders & Horn, 1994; Sanders & Rivers, 1996; Webster, Mendro, Orsak & Weerasinghe, 1998).

Moreover, all the resources recommended in this report need to be transformed into high quality instruction in order to increase student learning (Cohen, Raudenbush & Ball, 2002). And effective professional development is the primary way those resources get transformed into effective and productive instructional practices. Further, as we have stated many times, while the key focus of professional development is for better instruction in the core subjects of mathematics, reading/language arts, history and science, the professional development resources are adequate to address the instructional needs for gifted and talented and English language learning students, for embedding technology in the curriculum, and for administrators as well. Finally, all beginning teachers need intensive professional development, first in classroom management, organization and student discipline, and then in instruction.

Fortunately, there is recent and substantial research on effective professional development and its costs (e.g., Elmore, 2002; Joyce & Showers, 2002; Miles, Odden, Archibald, Fermanich & Gallagher, 2002). Effective professional development is defined as professional development that produces change in teachers' classroom-based instructional practice, which 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. These studies include, among others, the long-term efforts of Bruce Joyce (Joyce & Calhoun, 1996; Joyce & Showers, 2002), research on the change process (Fullan, 2002), a longitudinal analysis of efforts to improve mathematics in California (Cohen & Hill, 2001), Elmore's study of District #2 in New York City (Elmore & Burney, 1999), the Consortium for Policy Research in Education longitudinal study of sustained professional development provided by the Merck Institute for Science Education (Supovitz & Turner, 2000), studies of comprehensive professional development to improve science teaching and learning

[19] This draws from Odden, Archibald, Fermanich & Gallagher, 2002.

(Loucks-Horsley, Love, Stiles, Mundry & Hewsen, 2003), and an evaluation of the federal Eisenhower mathematics and science professional development program (Garet, Birman, Porter, Desimone & Herman, 1999).

Combined, these studies 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 that 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 that participants are expected to spend in the activity, as well as the span of time over which the activity takes place. The above research has shown the importance of continuous, ongoing, long-term professional development that totals a substantial number of hours each year, at least 100 hours and closer to 200 hours.

3) The degree to which the activity emphasizes the **collective participation** of teachers from the same school, department, or grade level. The above research suggests that effective professional development should be organized around groups of teachers from a school that over time includes the entire faculty (e.g., Garet, Birman, Porter, Desimone & Herman, 1999).

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 above research concludes that teachers need to know well the content they teach, need to know common student miscues or problems students typically have learning that content, and effective instructional strategies linking the two (Bransford, Brown & Cocking, 1999; Kennedy, 1998).

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 and refining a standards-based curriculum unit. The above research has shown that professional development is most effective when it includes opportunities for teachers to work directly on incorporating the new techniques into their instructional practice (e.g., 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, inter-related change process focused on improving student learning.

Form, duration, and active learning together imply that effective professional development includes some initial learning (*e.g*. a two-week – 10 day – summer training institute) as well as considerable longer-term work in which teachers incorporate the new methodologies into their actual classroom practice. Active learning implies some degree of coaching during regular school hours to help the teacher incorporate new strategies in his/her normal instructional practices. It should be clear that the longer the duration, and the more the coaching, the more time is required of teachers as well as professional development trainers and coaches. Content focus means that effective professional development focuses largely on subject matter knowledge, what is known about how students learn that subject, and the actual curriculum that is used in the school to teach this content. Collective participation implies that the best professional development includes groups of and at some point all teachers in a school, who then work together to implement the new strategies, and in the process, help build a professional school community. Coherence suggests that the professional development is more effective when the signals from the policy environment (federal, state, district, and school) reinforce rather than contradict one another or send multiple, confusing messages. Coherence also implies that professional development opportunities should be given as part of implementation of new curriculum and instructional approaches. Note that there is little support in this research for the development of individually oriented professional development plans; the research implies a much more systemic and all-teachers-in-the-school 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 costs.

From this research on the features of effective professional development, we conclude that the resources needed to deploy this kind of professional development, which is key to transforming all the resources we recommend into student learning, are:

a. **Time during the summer for intensive training institutes**. This training can most easily be accomplished by ensuring that approximately 10 days of the teacher's normal work year will be dedicated to professional development. Due to the fact that the current average number of Wisconsin annual teacher work days is about 185 and includes about 5 days for professional development, this recommendation requires an increase of 5 days, to produce the minimum number of 10 days for intensive training.

b. **On-site coaching for all teachers** to help them incorporate the practices into their instructional repertoire. The instructional facilitators described earlier in this report would provide this function.

c. **Collaborative work with teachers in their schools during planning and preparation periods** to improve the curriculum and instructional program, thus reinforcing the strategic and instrumental need for planning and preparation time during the regular school day. This will require smart scheduling of teachers during the regular school day and week.

d. **Funds for training** during the summer and for ongoing training during the school year, the cost of which is about $50,000 for a school unit of 500 students, or $100/pupil.

Recommendation. For professional development we recommend:

- The number of teacher days should be extended by __ days to provide a total of 10 days for intensive summer institutes
- The instructional facilitators included above would provide the instructional coaching
- Collaborative work should be conducted during the planning and preparation time that is included above
- An additional $100 per student, or about $43,000 in the prototypical elementary, $45,000 in the prototypical middle schools and $60,000 for the prototypical high school, would be needed for trainer and other miscellaneous professional development costs.

These professional development resources should be adequate for all professional development needs of all teachers over time.

**19. Technology and Equipment**

Current Wisconsin policy. There is no specific provision for such resources in Wisconsin education or school finance policy. It is a resource that districts and schools can buy with local and state equalization dollars in the general fund.

The evidence. Over time, schools need to **embed technology in instructional programs and school management strategies**. Although the use of technology in schools may seem vital to most, the effect it produces depends on how it is used, and the training that is provided for that use. In general research has identified four areas in which education technology can benefit students: 1) student preparation to enter the workforce or higher education, 2) student motivation, 3) student learning or increased academic achievement, and 3) teacher/student access to resources (Earle, 2002).

Student preparation for *higher education or the workforce* concerning technology includes technology literacy and the ability of students to find, sift, manipulate and communicate information using the latest versions of the software. Government organizations, both inside and outside education, view technology use in schools as workforce preparation. In 1991, the Secretary's (of Labor) Commission on Achieving Necessary Skills (SCANS) issued a report that underscored the need for students to be able to select technical equipment and tools, apply technology to specific tasks, and maintain and troubleshoot computers. The 21st Century Workforce Commission (U.S. Department of Labor, 2000) called for students to have technological proficiency to compete in a "highly-skilled" workforce. Dede (2000a, 2000b) echoed this view in an article written for the Council of Chief State School Officers emphasizing

the importance of informational and technical literacy. Glister (2000) argued that technology skills go beyond informational and technical literacy, encompassing what he calls *digital literacy*. Most recently, the *National Education Technology Plan* released by the U.S. Department of Education (2004:6) emphasized the need "to help secure our economic future by ensuring that our young people are adequately prepared to meet these challenges [competition in the global economy]." Developing technology expertise is also a goal in Wisconsin.

Aspects of *increased student motivation* include gains in student attitude toward schoolwork, time on task, quality of work, and/or improved attendance. Becker (2000) found that teachers who structure the right type of assignments using technology motivate students to spend more time on them. Teaching methods that encourage students to create their own learning path, a "natural" for good technology (think of the popularity of many complex computer games), produce more excitement than drill-and-practice types of activities (Becker, 2000; Lewis, 2002; Valdez et al, 2000).

The third impact of technology is increased student achievement. There are mixed results on the impact of technology on student achievement, (Archer, 2000; Earle, 2002; Kulik, 2003; Kulik, 1994). Many studies are based on small cases, evidence in several studies is anecdotal, too many programs are of short duration and not tested through replication, and many studies lack appropriate control groups. Thus, it is difficult to get a clear picture of the impact of technology on student achievement from the studies that exist.

Nevertheless, the reviews document **effect sizes** from embedded technology in instructional programs and school management strategies that range from **0.30** (Waxman, Connell & Gray, 2002) to **0.38** of a standard deviation improvement in test scores (Murphy, Penuel, Means, Korbak, Whaley & Allen, 2002), thus approximating the effects of class size reduction in the early grades.

In addition, there are several recent reviews of studies that can help. The Milken Family Foundation (1999) reviewed five large-scale studies of the impact of education technology on student achievement: 1) the 1994 Kulik study, 2) Sivin-Kachala's (1998) research review, 3) Apple Classrooms of Tomorrow (ACOT) (Baker, Gearhart & Herman, 1994); 4) West Virginia's Basic Skills/Computer Education (BS/CE) Statewide Initiative (Mann, D., Shakeshaft, C., Becker, J., & Kottkamp, R. 1999), and 5) Wenglinsky's National Study of Technology's Impact on Mathematics Achievement (1998). Positive effects were found in all of these studies but all studies had caveats. For example, in the Wenglinsky study (1998), eighth grade students using computer simulations had measurable gains in mathematics scores but only if the computers were used correctly and teachers had been trained in, and implemented correctly, proper teaching techniques. The ACOT study showed measurable gains in student *attitude* but no measurable increases in learning. And, in the West Virginia study, scores on the Stanford 9 for 5$^{th}$ graders increased, but it is not clear if technology was the sole cause for the gains.

In qualifying their generally positive conclusions, the Milken (1999:10) study wrote that although gains were shown in all studies, "learning technology is less effective or ineffective when learning objectives are unclear and the focus of technology is diffuse." In other words, if a teacher does not know exactly what to do with a computer, how to use the right teaching method

designed to fit a specific goal, and what software is effective for that goal, then limited or no learning gains will result.

Other research has reached more optimistic findings about the impact of technology on student achievement, specifically a positive impact on student test scores of curriculum programs that embed technology into the instructional delivery system. The reviews documented effect sizes from 0.30 (Waxman, Connell & Gray, 2002) to 0.38 of a standard deviation improvement in test scores (Murphy, Penuel, Means, Korbak, Whaley & Allen, 2002), thus approximating the effects of class size reduction in the early grades.

In one of the most recent meta-analyses of the impact of specific technology programs, Kulik (2003) found that "integrated learning systems," i.e., programs tailored to individual students with ongoing diagnoses and feedback, had average effects of 0.38 in mathematics but much lower (0.06) in reading, although the effects were higher for the Jostens program (now called Compass Learning) – 0.37 in reading and 0.22 in mathematics. For all programs, the effect is larger the greater the amount of time the student spends on them and when students work in structured pairs. Word processing also has significant and positive effects on students' writing proficiency (Bangert-Drowns, 1993; Cochrane-Smith, 1991). Though more work is needed on designing strategies for integrating computer technologies into instruction, the emerging research suggests that doing so can have significant positive impacts on student learning when used effectively.

Finally, education technology has opened schools and their students to a world of resources that can be explored and manipulated. The Internet affords access to information, communication, opinions, simulations, current events, and academic coursework that were formerly inaccessible or delayed. Networks allow districts to communicate and share data with their schools all with the purpose of increasing student achievement.

Looking at technology outside of direct student use, computers and software also have increased importance as an administrative tool. As the demands of NCLB legislation intensify, schools have begun to rely on data as a means to achieving instructional excellence through gap analysis of student benchmark tests. Student administration systems and other programs that collect, analyze, and assist administrators and teachers to interpret student data more efficiently have become common. Edusoft, Renaissance Learning, Scantron, and other vendors provide such analytical tools. As these programs become more complex their initial and ongoing direct and indirect costs will continue to increase.

In sum, although the evidence is somewhat mixed, we conclude that technology, if used correctly, is important for preparing the student for both postsecondary education and the workforce, can increase student motivation to learn, positively impacts student achievement, and opens a new world of resources for schools and their students.

In terms of identifying the ***costs*** *of purchasing and embedding technology* into the operation of schools, significant advances have emerged over the past decade (COSN, 2001, 2004). One term that has emerged is the *Total Cost of Ownership* (TCO). *Total Cost of Ownership* is a type of calculation designed to help policy makers and administrators assess both

the direct and indirect costs of technology. The *direct costs* of technology include hardware, software, and direct labor costs. *Direct labor* refers to those individuals who are specifically hired by the district to repair, update, and maintain instructional technology. *Indirect costs* include the costs of users supporting each other, time spent in training classes, casual learning, self support, user application development and downtime costs (COSN, 2004).

TCO can vary greatly depending on district context, including the age of equipment, and the level to which the district makes education technology an integral part of the instructional and management strategies. Eight case studies conducted by COSN and the Gartner Group (2003, 2004) in various states and in urban, suburban and rural school districts found that total **direct annual costs** varied from a low of $385 per pupil in a rural district to a high of $1,242 per pupil in a suburban district, with a median at about $750. But these numbers included both direct and indirect costs.

While a total per pupil figure in the TCO model is useful, we will identify direct labor costs separately from direct technology costs, and have incorporated the training costs into our professional development recommendations, so we mainly need to identify the direct costs of purchasing, upgrading, and maintaining computer technology hardware and software. In studies that have been conducted by several states and conducted as part of several professional judgment studies (Appendix A) of this narrower aspect of technology costs, the annual costs per student are about $250 for the purchase, update, and maintenance of hardware and software (Odden, 1997; Odden, Fermanich & Picus, 2003). This figure also is almost exactly what the average direct costs would be for the 8 TCO case studies (COSN, 2004) reported above and adjusted to provide a one-to-three student-to-computer ratio.

The $250 per pupil figure would be sufficient to purchase, upgrade and maintain computers, servers, operating systems and productivity software, network equipment, and student administrative system and financial systems software, as well as other equipment such as copiers. Since the systems software packages vary dramatically in price, the figure would cover medium priced student administrative and financial systems software packages.

Allocating the $250 per pupil. Each district and school situation is unique, requiring that an individual technology plan be created at both the district and school levels. Most districts and schools already have technology plans because of the federal funding requirements in the E-Rate and EETT programs. These documents should be meaningful mechanisms used to distribute resources to the areas of most need within the school or district environment.

To assure that all technology needs are met, the recommended $250 per student figure has been assigned subcategories of spending. At the same time that these subcategories have firm dollar figures associated with them, they must be flexible enough to meet the changing needs of the organizations and the ebb-and-flow of technology purchases.

The four subcategories of need include:

1) Purchase, lease and maintenance of computers

2) Refresh of software including operating systems, productivity suites like Microsoft Office, and other essential software that give computers basic functionality
3) Purchase of networking equipment, printers, copiers, and their supplies
4) Purchase and refresh of instructional software (including one-time purchases and subscriptions) and additional hardware that enhances the instructional environment.

The allotted dollar figures are as follows:

- Computers (3-, 4-, or 5-year replacement cycle) $100
- Operating system, productivity and other non-instructional software $50
- Network equipment, printers, and copiers $50
- Instructional software & additional hardware $50

This distribution is based on what a typical school might need if that school had participated in the funding programs made available by the districts and states in the past. It assumes that campuses have been connected through Ethernet and/or fiber cabling and that Main and Intermediate Distribution Facilities (MDFs and IDFs) have been populated with the necessary active electronics (switches). It also assumes that schools own various computers between one and five years old which have a mixture of hardware, operating systems and miscellaneous iterations of instructional software.

1. Computer Purchase, Lease and Maintenance (3-, 4-, or 5-year replacement cycle) (3-to-1, or 2-to-1 student-to-computer ratio. The formula for the expenditure of funds within the subcategory of *Computer Purchase* has multiple variants based on the distinct needs of the school and district. The $100 annual per student allocation for this subcategory was calculated using and average price of $1,200 per computer. This figure may seem high for the purchase of a common workstation, but it is based on the average price of computer within a group of machines that could include desktop workstations, laptops, high-end video editing stations, and/or wireless mobile carts (20 laptops and cart $60,000) depending on school site need.

All computers should be purchased with a 3-year on-site warranty. These warranties provide benefits to both large and small school districts. Larger districts typically enter into self-servicing agreements with manufacturers to generate funds for additional parts. Smaller districts, by contrast, are served well by the "on site" technical help that warranty agreements provide because these districts lack the ability to hire highly specialized full time personnel.

When purchasing computers, districts should consider including computer monitors that are large enough to prevent eyestrain. LCD flat panel monitors generate less heat and should be considered to save energy costs in the spring and summer months. Each computer should come with the most up-to-date operating system and the latest office productivity suite pre-installed so that computers need only be reconfigured, not re-imaged, at installation.

Regarding computer replacement, for most applications in educational technology a four-year replacement cycle is adequate. There are exceptions. For example, for computers that are used for simple word processing and other such tasks, a five-year replacement cycle (especially

with the software replacement outlined below) is appropriate. But, there are various cases in which a five-year replacement cycle is not sufficient. Many classrooms, most notably at the secondary level, demand the latest technology available and should be on a three-year replacement. Examples of courses that require ever-increasing computer power include higher mathematics, art, and other courses that heavily use multimedia or multimedia editing, which can include both biology and social studies. Further, because the student to computer ratio is meant also to provide computers for administrators, "power users" in the school office, such as the individual who processes student data, may require a three-year replacement.

If districts decide that it is important to have a two-to-one student-to-computer ratio, school officials can limit the number of higher-end computers they purchase to raise the overall number of computers and lower the student-to-computer ratio. Districts could also take three-year-old computers that are ready to be replaced from more demanding course environments and redeploy these units in less demanding environments thus gaining an additional two years of use.

Using a three-to-one student-to-computer ratio to generate a denominator of 3, and placing the $1,200 cost of the average computer as the numerator, the average cost, per student, per computer becomes $400. Spreading the $400 per student cost over the four year period that a computer would be in service creates a $100 cost, per year, per student figure. Thus, the annual cost per pupil to maintain a three-to-one student-to-computer ratio is approximately $100.

2. Refresh of operating system, productivity software, and other non-instructional software. To compete well in the global economy, students should have access to the latest operating systems and productivity software. Additionally, new operating systems traditionally supply district personnel with more powerful features to secure the network and protect school and student data.

With educational discounts schools can buy the latest operating systems and productivity suites for approximately $55 each. Indispensable antivirus and anti-spyware software can be purchased on an annual basis (approximately $8 - $10 per workstation, per year for the most popular product). Software programs such as Altiris that allow teachers to monitor workstations or "push" their screens to students is expensive and should also be refreshed. Administrators or students may use the latest versions of FileMaker Pro or other databases to analyze data. Server software must also be upgraded. The cost of these upgrades depends on what services are running (e-mail, database, network security, backup software). Larger campuses have at least two servers with various services running. After averaging in the number of servers provided at the district level, the formula for this category assumes three servers per school site.

- Operating System (three years) $ 57
- Productivity Suite (three years) $ 55
- Server Software (every three years) $ 1,500 (depending on services)
- (based on 3 servers per site, average w/district)
- Database (FileMaker Pro, other) (three years) $150
- Antivirus/anti-spyware (annually) $ 10
- Other Network (Novell, Altiris, LanDesk) $ 17

Providing for the three-year refresh cycle of the first four software items on this list and assuming a three-to-one computer ratio divided over the four-year life cycle of the computer, these software refreshes calculate to $51 per year per student. The figure of $50 will be used for ease of use. (((((57+55+1,500+150)/3)+10+17)/3)/4)

This subcategory has some caveats. Depending on how often upgrades/refreshes become available and/or what functionality a new release of software holds, the annual allocation of $50 per student for software could be high or low. In years when the demand is not as heavy in this subcategory, the funds could be used in any of the other subcategories where there is a local need. School officials must be aware though that the price for these refreshes will cut into other subcategories when these upgrades for these software products become available.

Also, districts and schools will gain a year of operating system refresh if the life of a computer is four years. For example, the operating system would probably be refreshed once during the life of a computer, but a new replacement computer would come with a new operating system, effectively "giving" the school district a year of a more advanced operating system. This would also be true with the office productivity suite.

Not all districts and schools use all of the software listed above, but, they might have other software packages that they use to secure and regulate normal computing functions in the district. This formula assumes that these costs will average out.

3. Network Equipment, Printers, and Copiers. Assuming an average campus size of 400 students per site, the $50 per pupil figure for this technology subcategory provides $20,000 per year or $60,000 and $80,000 over three and four years, respectively. Since this subcategory has such diverse components, it is important that districts and schools set aside the funds necessary to meet that needs of each of these components: network equipment ($26), printers ($18), and copiers ($6).

3a. Network Equipment. To most district and school employees, the network equipment that provides connectivity to the district office, the Internet, and other specialized networks is invisible or transparent. Most networking equipment will have been purchased through facility funds or bond measures. Network equipment does not need to be refreshed as often as computers, but the larger more complex pieces of equipment should be on a maintenance contract with the manufacturer and/or a service contract with a third party vendor. In schools, most of this type of equipment will be used until it breaks or becomes obsolete. Taking this into consideration, the motivating factor for replacement usually is the speed of the product. The speed of networking equipment is measured in megabits per second. Common speeds of networking switches include 10 megabit, 100 megabit, and 1,000 megabit (commonly called gigabit). The current "standard" (or what most schools have) is 100 megabit to the desktop and 1,000 megabit on the backbone (main lines of the network). For almost any application, this is sufficient speed within a campus.

A cost of $2,200 has been assigned to replacing 10% of the school's network equipment annually. In this same school, if each piece of equipment was under a service contract, the service contract would have an approximate annual cost of $4,400 (20% of the original cost of

the equipment). Most schools find it more cost effective to contract only for the most vital network pieces and not to maintain service contracts on the smaller switches in the network. Instead, districts purchase additional smaller switches as replacements if one of these pieces of equipment fails. Calculating these figures, the networking portion of this subcategory carries an annual per pupil expenditure of $17 per pupil.

The wide area network (WAN) that provides the gateway to the Internet is one of the main administrative and instructional resources for educators. The data lines that make up this network must remain uncongested for teachers and administrators to maximize their efficiency. Most elementary campuses have at least a T-1 line to their site; middle and high schools commonly have two T-1 lines to their site. The T-1 line has a capacity of only 1.5 megabits. Many times T-1 lines reach capacity at peak times on campuses frustrating users. It is imperative that administrators, teachers, and students understand that there is a limited amount of bandwidth and that it should be used for educational purposes.

Districts usually use E-Rate funds to offset the monthly cost of their T-1 lines which, before discounts, can cost approximately $250 a month, or $3000 a year. District then have to pay an access charge to an Internet provider to provide Internet service. This cost varies by service provider, but can be estimated at around $500 per school per year. So the total school cost of linking a 400-pupil school to the Internet is $ 3,500 per year, or $ 9 per pupil.

Calculating the per-pupil price of network related expenses based on the costs of a T-1 line per site, 10% replacement annually of network equipment, and maintaining service contracts on all networking equipment, the network portion of this subcategory approximates $26 dollars per pupil annually.

3b. Printers. Computer prices listed in the *Computer Purchase* subcategory do not include the initial costs for workstation printers, but each computer must have some method available to print. Some schools purchase higher-end laser printers for each classroom instead of attaching ink-jet printers to each individual work station (laser printers are more cost effective). In addition to classrooms, each school should have at least one mid-range color laser printer for communications that are sent to community members and parents. Since most small districts do not have the in-house expertise to repair printers, we suggest that they contract with an outside vendor and common practice around the county is to so contract.

The cost of an inkjet printer is a nominal $100. A high quality laser printer suitable for heavy classroom use is $1,200. Assuming that a 400-student school contains 16 classrooms with one laser printer, and at least two laser printers in the office, each with a life cycle of four years, the initial cost per student for the printing equipment would approximate $18,000 or $45 a student. Assuming a printer life cycle of four years, the annual cost for this element is $11 per pupil. The real costs of printing depend on the frequency of use and the volume of printing done (cost of paper, ink, and toner). Teachers, students and administrators will print as much the budget can support. Assigning a cost of $7 per student annually to a 400-student campus provides the campus with an annual budget of $2,800 for supplies such as paper, ink, toners, etc. Thus, printing per pupil annually would be $18.

Depending on size, each elementary school should have a high-speed copier that can meet the demands of its teachers. Depending on size, secondary schools will need additional copiers. Most districts maintain contracts with vendors for the repair and maintenance of these machines. Many sign lease agreements and pay for service on a "per click" basis ("per click" meaning printing per page). Whether a machine is bought or leased can play a factor in the final costs. Life cycle of specific machines and the volume of copying required by leasing companies determine whether one or the other method is more cost effective for any particular school or district. When paper, toner, service contracts, leases and other costs are factored, the average cost per copy approximates $.025 per copy. Assigning a $6 per pupil per year cost for photo copies allows each student 240 copies a year or 26 copies a month (9 month school year). This may not seem like a large number but when combined with the output of the printers listed in the previous paragraph, the overall number is more than adequate.

4. Instructional Software and Hardware. This subcategory could be termed the "innovation fund." The $50 per pupil figure for this technology subcategory provides $20,000 per year for the 400-pupil school. Funds in this subcategory should be split evenly among components until sufficient hardware has been purchased (hardware $25, software $25).

Many districts only have the ability to provide the funds for the earlier three subcategories and have no funds left to purchase additional instructional hardware such as LCD projectors ($900 - $1,700), smart boards ($2,000 depending on features), document cameras ($1,500), digital cameras ($300), etc. This additional hardware allows teachers to bring multimedia resources alive. It also gives students the opportunity to bring their own experience into the classroom through digital pictures and images.

Assuming $10,000 per year ($25 per student annually for a 400 student school) for this component in the 400-student, 16-classroom school, school officials might install three LCD projectors a year (there are some installation costs), buy 10 digital cameras that could be checked out by teachers and students, and setup one smart board. With some slight variations, within four years each classroom could have an LCD projector and various other items of innovative equipment.

As these pieces of equipment are installed, there will be more opportunity to use multimedia instructional software typified in student courseware and assessment packages. Reading packages such as Accelerated Reader, writing assessments like My Access, mathematics courseware represented by River Deep, and multimedia resources such as Discovery.Com, each present digital curricular solutions. Each of these products is based on an annual subscription costing from $5 - $15 per student for each individual package.

Administrative solutions that help administrators analyze test scores include products like Edusoft. Costs of a student administration system might also be considered a part of this component. Costs of these systems vary greatly ($5-$15 annually).

If the costs of all these instructional packages were totaled, the amount would exceed the $25 per student annually assigned to this component, but not every school will use all packages. Schools and districts must analyze their needs and then rank order those packages that target the

needs of their population. Additionally, after all classrooms have been better equipped, funds from the hardware component of this subcategory can be shifted to instructional software component.

No portion of the $250 per pupil is intended for staff. Staff to help train teachers in use of technology and to do minor computer fixing and software installation is included in 0.5 FTE of the instructional facilitators. Further, a technology network manager is included in our central staff design (see Section J2).

Sources of additional funding. There are two federal sources of funding for educational technology that augment the above proposals for state support. The first is Title II D of the No Child Left Behind Act (NCLB), also known as the Enhancing Education Through Technology grant (EETT). These funds are distributed to state departments of education based on a formula which includes the number of disadvantaged students. Many states have used these funds for innovative technology programs, the fourth category below. Though the level of funding for this federal program fluctuates over time, it should be viewed as a strategic additional resource that states can deploy for whatever specific new technology needs that might arise.

The second federal support for educational technology is the E-Rate program that helps schools connect to the Internet and build internal networks within their buildings. This program is administered by the Schools and Library Division (SLD) of the Federal Communications Commission (FCC). Districts apply directly to the federal government to participate. The assistance this program provides can be significant to a district. Since funding is substantially based on the percentage of disadvantaged students within a district, this program mainly helps districts with concentrations of students from lower income backgrounds, and offers limited participation to other more economically advantaged districts. Nevertheless, this source of funding should b e viewed as a second strategic resource to augment the above core recommendations for funding for computer and related technologies.

Staff. We should note that these resources would be used effectively only if the professional development, funded above, provides training to teachers and administrators in how to embed technology into the instructional and management programs of each school. Moreover, as noted earlier in this report, a partial role for at least 0.5 FTE of the instructional facilitators is to have the skills to install software programs on a school's network and its computers, to be the onsite expert who can fix modest network and computer problems, and who can help teachers and administrators use the technology equipment effectively. Finally, we anticipate that central office staffing resources will include a position for a technology coordinator/director.

Recommendation: We recommend that each school receive $250 per pupil to keep local technology working and updated and for schools to purchase (or lease) computers, servers and software, including security, instructional and management software, in order to have an overall ratio of one computer to every two to three students. For clarity, a one-to-three ratio would be sufficient to provide every teacher, the principal, and other key school-level staff with a computer, and to have an actual ratio of about one computer for every three-to-four students in each classroom. This level of funding would also allow for the technology needed for schools to access distance learning programs, and for students to access the new and evolving local web-

based testing programs. Fortunately, Wisconsin has developed a substantial technology infrastructure over the years, so most if not all schools are linked to the Internet and to district offices and/or a state network. This allocation would be sufficient for small schools as well, particularly today when schools begin with some technology.

Many schools and districts today, however, have hired numerous staff to repair and maintain computers and might feel the need for additional staff resources for that purpose. However, many of these same schools have computers that are outdated and the high cost of fixing them is largely due to outmoded technology. In other states, educators have concluded that the $250/pupil figure would enable them to have newer equipment which would allow them to reduce their maintenance expenses.

Further, we also would recommend districts either incorporate maintenance costs in lease agreements or, if purchasing the equipment, buy 24-hour maintenance plans. 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 that the manufacturer's or contractor's problem and not the districts'. Indeed, these private sector companies often take a new computer with them, leave it, and take the broken computer to fix, which often turns out to be more cost effective than to send technicians all around to fix broken computers.

**20. Instructional Materials**

Current Wisconsin policy. There is no specific provision for such resources in Wisconsin education or school finance policy. It is a resource that districts and schools can buy with local and state equalization dollars in the general fund.

The evidence. The need for current, up-to-date instructional materials is paramount. Newer materials contain more accurate information and incorporate the most contemporary pedagogical approaches. To ensure that materials are current, twenty states have instituted adoption cycles in which they specify or recommend texts that are aligned to state learning standards (Ratvitch, 2004). Many states that adopt textbooks encourage districts to purchase recommended texts by requiring that funds specified for instructional materials be used only to purchase approved texts. Other states, like Washington, allow districts "local control" to purchase texts approved by the local school board.

Up-to-date instructional materials are expensive, but vital to the learning process. Researchers estimate that up to 90 percent of classroom activities are driven by textbooks and textbook content (Ravitch, 2004). Adoption cycles with state funding attached force districts to upgrade their texts instead of allowing these expenditures to be postponed indefinitely.

The type and cost of textbooks and other instructional materials differ across elementary, middle school, and high school levels. Textbooks are more complex and thus more expensive at the upper grades and less expensive at the elementary level. Elementary grades, on the other hand, use more workbooks, worksheets and other consumables than the upper grades. Both

elementary and upper grades require extensive pedagogical aides such as math manipulatives and science supplies that help teachers to demonstrate or present concepts using different pedagogical approaches. As school budgets for instructional supplies have tightened in the past, consumables and pedagogical aides have typically been the first items to be cut as teachers have been forced to make due or to purchase materials out of their own pockets.

The price of textbooks ranges widely. In reviewing the price of adopted materials from the states of California, Texas, and Florida patterns emerge creating price bands as shown in the figure below. Although there are texts with prices that lie outside of these bands, most publishers seem to keep within or close to these constraints. The top end of the high school price ban is notable at $120 per book. Ten to fifteen years ago such prices for textbooks at the high school level were uncommon, but as more students move to take advanced placement courses, districts have been forced to purchase more college-level texts at college-level prices.

**Costs of Textbooks and Instructional Supplies by School Level (in annual dollars per pupil)**

| | **Elementary School** | **Middle School** | **High School** |
|---|---|---|---|
| **Textbooks** | $45 - $70 ($60) | $50 - $80 ($70) | $75 - $120 ($100) |
| **Consumables and Pedagogical Aides** | $60 | $50 | $50 |
| **Subtotal Textbooks and Consumables** | $120 | $120 | $150 |

The subtotal figure for textbooks and consumables would not need to be adjusted for the size of school or school district because it is assumed that costs for adopted textbooks would be negotiated at the state level. Additionally, the total figure would also provide sufficient funds for adequate instructional materials and texts for most non-severe special education students. Modifications for severe special education cases would need to be funded from Special Education funds.

Adoption Cycle. The assumption of the purchase of one textbook per student annually allows for a six year adoption cycle. The six year adoption cycle in Wisconsin would fit nicely with the assumption of a secondary pupil's schedule of six courses in a six period day. It also comes close to matching the content areas covered at the elementary level.

| | **Wisconsin Potential Secondary Six Year Adoption Cycle** | | | | | |
|---|---|---|---|---|---|---|
| **Year** | **2006** | **2007** | **2008** | **2009** | **2010** | **2011** |
| **Content Area** | Science Health P.E. | Social Studies | Foreign Language | Fine Arts | English Language Arts | Mathematics |

At the elementary level, there are fewer subject areas to be covered leaving the opportunity for a sixth year in the cycle to be used for purchasing not only additional supplementary texts but also consumables/pedagogical aides.

| | Wisconsin Elementary Six Year Adoption Cycle | | | | | |
|---|---|---|---|---|---|---|
| **Year** | **2006** | **2007** | **2008** | **2009** | **2010** | **2011** |
| Content Area | Language Arts | Mathematics | Social Studies | Science/ Health | P.E., Visual and Performing Arts | Supplements, Consumables, Manipulative |

Library Funds. The average national per pupil expenditure for library materials in the 1999-2000 school year was $15 (excluding library salaries). This average varied by region with the West spending $14 per pupil annually and the Eastern states spending $19, and the North Central Region (of which Wisconsin is a part) spending $16.

. Reflecting the national average, for example, schools in the state of Wisconsin spent an average of $26 per pupil in that same year (excluding salaries); $15 of the $26 that Wisconsin schools spent on libraries were used to purchase books and the remainder was spent on other instructional materials and/or services such as subscriptions to electronic databases (Michie & Holton, 2005).

As the world shifts to more digital resources, libraries are purchasing or using electronic databases such as online catalogs, the Internet, reference and bibliography databases, general article and news databases, college and career databases, academic subject databases, and electronic full-text books. In 2002, 25 percent of school libraries across the nation had no subscriptions, 44 percent had 1-3 subscriptions to electronic databases, 14 percent had 4-7 subscriptions, and 17 percent had subscriptions to 7 or more. Usually larger high schools subscribed to the most services (Scott, 2004).

Electronic database services vary in price and scope and are usually charged to school districts on an annual per pupil basis. Depending on content of these databases, costs can range from $1-5 per database per year per pupil.

Thus, to adequately meet the needs of the school libraries, it is recommended that the funding system provide elementary, middle, and high schools $20, $20, and $25 respectively on a per pupil annual basis for library text and electronic services. These figures outstrip the national average allowing Wisconsin librarians to strengthen print collections. At the same time, it allows schools to provide, and experiment with, the electronic database resources on which more and more students rely (Tenopir, 2003).

Total per Pupil Apportionment for Instructional Materials. Taking the recommended apportionment for "library texts and electronic services" and adding it to the "textbook and consumables" figures, results in the totals listed in the figure below.

**Total Annual Costs Per pupil for Instructional Materials and Library Resources**

| | Elementary School | Middle School | High School |
|---|---|---|---|
| **Library Texts and Electronic Services** | $20 | $20 | $25 |
| **Textbook & Consumables Subtotal** | $120 | $120 | $150 |
| **Total Instructional Materials** | $140 | $140 | $175 |

Professional Development for Adoptions. It should be noted that these cost figures do not include the cost of the professional development necessary for teachers during the adoption process. On a six-year cycle, professional development for teachers at the secondary level only comes once every six years when their particular content area is reviewed. At the elementary level, professional development would be necessary every year since each teacher teaches each subject area. Professional development in an adoption cycle usually requires one day of initial training and then one follow-up day later in the semester after the teachers have familiarized themselves more with the use of the new materials. The professional development resources that are included in the recommended Wisconsin evidence-based funding model would be adequate to meet these needs.

Recommendation. We recommend that the Wisconsin funding model include $140, $140 and $175 per pupil for instructional materials, books, supplies, including library resources, for elementary, middle and high schools, respectively

**21. Student Activities**

Current Wisconsin policy. There is no specific provision for such staff in Wisconsin education or school finance policy. It is a set of services that districts and schools can buy with local and state equalization dollars in the general fund.

The evidence. Elementary, middle and high schools typically provide an array of after-school programs, from clubs, bands, and other activities to sports. Teachers supervising or coaching in these activities usually receive small stipends for these extra duties. Further, research shows, particularly at the secondary level, that students engaged in these activities tend to perform better academically than students not so engaged (Feldman & Matjasko, 2005), though too much extra curricular activity can be a detriment to academic learning (Committee on Increasing High School Students' Engagement and Motivation to Learn, 2004; Steinberg, 1997).

In the past, we have recommended amounts in the range of $60/pupil for middle school students and $120/pupil for high school students. But we have found that these figures are far below what districts and schools actually spend. An amount in the range of $200-250/pupil would more accurately reflect an adequate level of student activities resources.

Recommendation. We recommend that the state provide at the district level $200-250 per pupil for student activities.

**22. Supervisory and Safety Personnel**

Current Wisconsin policy. There is no specific provision for such staff in Wisconsin education or school finance policy. It is a set of personnel and services that districts and schools can buy with local and state equalization dollars in the general fund.

The evidence. Not completed.

Recommendation. Not completed.

## 3. CENTRAL OFFICE EXPENDITURES

This section covers the areas not covered in the sections above: central office administration, operation and maintenance, transportation, food services, legacy health benefits and debt service.

### 23. Central Office Administration

Current Wisconsin policy. Wisconsin does not have a specific policy on central office staff. All central office staff and services are part of the "shared costs" element of the finance formula, and cost-shared according to that system.

Evidence: The district office has the responsibility to organize and manage all aspects of the district including the curriculum and instructional program, as well as to implement national, state, and local reforms, oversee budgets, and provide necessary materials, equipment, facilities, and repairs to the schools. Its ultimate purpose is to facilitate and support the educational program at schools so that teachers are able to teach and students are able to learn. The reform group, School Communities that Work (2002), succinctly states the purposes of the central office: equity and results. The group elaborates that equity—what others may prefer to call adequacy—means to provide varying resources based on individual student's needs so that all will demonstrate achievement results. In the Washington context, the prime goals of the central office are to provide leadership for the district and insure that the district office and its schools function as an integrated system focused on increased student achievement through improved instructional practice in the core content areas.

The Cross City Campaign for Urban School Reform (Burch & Spillane, 2004), sees a district office's primary responsibility as facilitating and encouraging an exchange of information and expertise among schools and among instructional leaders. Burch and Spillane (2004) view with special significance the mid-level district staff, who exist primarily in larger districts and whose job it is to translate "big ideas like 'improving literacy district-wide' or 'closing the achievement gap' into strategies, guidelines, and procedures that are handed down to schools" (p. 1).[20] In providing these leadership and interpretive roles, district staff members can hinder or assist the efforts of classroom teachers and site administrators, and their success and assistance can mean increased achievement for children.

Some question whether or not central offices are necessary to the operation of a school district. Berg and Hall's (1997) study of central offices that had downsized and the effects of that restructured environment over a three-year period provides important evidence to support the relevance of a central office. The districts studied had downsized as a way to reduce costs due to budget constraints and in response to public criticism of bloated bureaucracies. What Berg and Hall found over the three years of the study was that initially districts seemed to take the central office reduced-staff changes in stride and even relished the idea of being more productive and efficient. Later, the euphoria employees felt often turned to burn-out as so much more individual effort and time was required to complete important tasks. Often, tasks that

[20] In some Washington districts, such mid-level managers do not exist due to the small size of the district. In such districts, this responsibility would fall to the central office administrators the district chooses to hire.

could no longer be completed at the district level were sent to principals, thus leaving them with fewer hours to be instructional leaders. The principals who were interviewed expressed feeling deserted by the central office. Some districts studied had hired back retirees temporarily or part-time as a cost-effective way to meet the demands on staff due to growing student populations or new state mandates regarding standards and assessment. The researchers reasoned that central offices are not irrelevant as some critics have insisted.

Berg and Hall (1997) conclude that central offices are necessary to complete several essential tasks, which otherwise would need to be accomplished by site personnel. One of their main findings is that the workload for these particular site personnel had become so exhausting as to be detrimental to the core purpose of teaching and learning. The researchers also find that without a fully functioning central office, districts tend to recreate one at each site, which not only diverted personnel from the core function of instruction but also reduced the efficiency they were seeking.

Relying on personal experience and consultant work, DuFour (2003) argued that central district offices are essential to the operation of a school district. She suggested that central offices can be effective role models of a learning community focusing on student improvement if they limit the number of district goals or initiatives to one or two and have their staff members all contribute toward that goal or goals. DuFour emphasized the importance of central offices as service oriented centers whose staff members collaborate and focus on results. Again these broader research conclusions are consistent with the kind of strong district leadership needed if Wisconsin is to dramatically improve student learning in the core content areas.

Flynn (1998) claimed the central office's primary role is to prepare site personnel to make decisions, largely around curriculum and instructional issues. He provides details from his own district that was restructured to provide the typical support and guidance roles to principals as well as monitoring and auditing functions. He stated that the central office must teach collegiality and cooperative relationship building so that students will benefit from the site-based decision-making model.

Indeed, as schools and districts implement versions of standards-based education reform around the country, a new appreciation for the roles of good central offices is emerging. Although the practices of many central offices fall far short of what is desired, there are virtually no proposals for eliminating central offices. Thus, the issue becomes one of design; what should the size and composition of central offices be?

The difficulty here is that little research exists to help determine what an appropriate staffing configuration might be. The problem is complicated by the frequent employment of special education administrators and federally funded administrators in district offices – many of whom are funded partially with district funds and partially with Federal and/or special education funds.

We are aware of two efforts to correct this deficiency in the research literature. In our work in Kentucky (Picus, Odden & Fermanich, 2003), we held a professional judgment panel session that attempted to estimate the appropriate staffing pattern for a prototype school district

of 3,500 pupils. The discussion bogged down over how to treat administrators for categorical programs, and a satisfactory solution to the question of appropriate numbers of central office administrators was not reached. Instead, we relied on the average per pupil spending for central administration and applied that average to each district in the state.

Recently, however, under the direction of Lawrence O. Picus, an Ed.D. student at the Rossier School of Education at the University of Southern California completed a series of focus groups in California that considered the issue of staffing for a school district's central office (Swift, 2005). Using a prototype district of 3,500 students, the focus groups suggested the central office staffing pattern depicted in the following chart.

**Composition of a Central District Office for a District with 3,500 Students: Results from Four Professional Focus Groups**

| Position Title |
|---|
| 1 Superintendent (admin)<br>1 Assistant Superintendent (admin)<br>1 Executive Assistant (clerical)<br>1 Personnel Technician (clerical) |
| 1 Director of Curriculum and Instruction (admin)<br>1 Director of Pupil Services/Special Ed (admin)<br>1 Nurse (professional)<br>1 Secretary—Special Ed (clerical)<br>1 Data Steward (clerical)<br>1 Clerk (clerical) |
| 1 Business Manager (admin)<br>1 Payroll Clerk (clerical)<br>1 Accounts Payable Clerk(clerical) |
| 1 Director of Technology (admin)<br>1 Media Technician I (tech)<br>1 Media Technician III (tech) |
| 1 Director of Maintenance/Operations (professional)<br>1 Maintenance Worker (support)<br>2 grounds keepers (support)<br>1 Director of Food Services (professional) |

The panelists identified four primary functions of a central office:

- District leadership
- Instructional leadership
- Business Operations
  - Budgeting and finance
  - Personnel
  - Maintenance and operations
- Technology

Using the model developed by Swift's focus groups (Swift, 2005) the central office of a 3,500 student district would include 6 administrative positions, 3 professional positions, and 12 clerical, technical or support positions. Both of the computer technical support positions can be eliminated because the proposed Washington evidence-based prototypical school models include 0.1 technical support position for every 100 students in the instructional facilitator allocation at the school levels. The one maintenance worker and two groundskeepers also can be eliminated because those positions will be included in the recommendations for operation and maintenance. Since food services is not being addressed and is assumed to operate on a self sustaining basis, and food services costs would include a central office food services director, we also can drop that position as well. That leaves us with 6 administrative positions, 2 professional positions and 7 clerical positions.

After querying several districts of around 3500 students in Wisconsin, we would suggest upgrading the position of personnel technician to a director of human resources in the business office and adding a secretary for that position. We also would eliminate the nurse position, assuming that kind of more specialized position could be provided in a larger district. Finally, we would provide the Director of Operations and Maintenance with a secretary. Thus, our recommended central office design is in the chart on the next page. This model would provide 8 administrative/professional and 9 secretarial/clerk positions for the central office for a district with 3500 students.

For the average Wisconsin district of 2000 students, this model would provide 4.6 senior administrative and 5.14 secretarial positions, and half that, or 2.3 senior administrative and 2.57 secretarial positions for the 1000 student district. Prorating up to the 7000 and 14,000 student district would provide 16 and 32 administrative/professional and 18 and 36 secretarial positions, respectively. It could be that central office staff resources could be less for larger districts given possible economies of large size, but we would like to discuss this issue with the Policy Advisory Task Force, and perhaps administrative leaders in larger Wisconsin school districts prior to our summer meeting in July 2006.

**Proposed Central Office Staffing for a District with 3500 Students**

| | Superintendent Office | Business Office | Curriculum and Pupil Support | Technology | Operations and Maintenance |
|---|---|---|---|---|---|
| **Administrative** | 1 Superintendent<br>1 Asst. Super. | 1 Business Manager<br>1 Human Resources Manager | 1 Director special Ed<br>1 Director Pupil Services | 1 Director of Technology | |
| **Professional** | | | | | 1 Director of Maintenance/ Operations |
| **Clerical** | 2 Senior Secretaries | 1 Payroll Clerk<br>1 Accounts Payable Clerk<br>1 Sr. Sec. | 2 Senior Secretaries<br>1 Secretary | | 1 Secretary |

In addition to these staff positions, the central office would need resources for supplies, materials, equipment, legal and insurance, and other miscellaneous items. We estimate at this point is that this would total $300 per pupil.

Recommendation. We tentatively recommend that the central office staffing be based on the above identified resources for the 3,500 student prototypical district, which we will convert to an average per pupil figure and then add $300 per pupil for miscellaneous expenses such as legal expenses, insurance, materials, supplies board of education expenses and other central office functions. This figure is $658 per pupil.

**24. Operation and Maintenance**

As stated at the July 13, 2005 meeting, there are ways to provide funds for these functions, but it requires a statewide database of school buildings, with number of rooms, square footage of space for both buildings and grounds, and those data do not exists. Thus, this function will include a statewide average carry forward amount per pupil. For the 2004-2005 school year, that amount is $938 per pupil.

**25. Transportation**

State support for transportation to and from school has remained at approximately the same level for several years. In an adequacy world, state support should increase. But given the limitations of this study, we will not conduct a transportation specific study. However, in costing the proposals in a two-tiered foundation program, we will add each district's prior year transportation expenditures to its "foundation" expenditure level.

## 26. Food Services

Few states provide assistance for food services, and assume that districts can or should run these services on a self-supporting basis, with funds from the federal free and reduced price lunch program and charges for meals for other students.

## 27. Legacy Health Benefits Costs

This is a rising cost for many Wisconsin school districts, and is a drain on the budget. If it is not addressed and the state just supports adequate funding for each school district, those districts with legacy health benefits costs for retirees will not have an adequate amount because their budget will be reduced up front by the required expenditures for such benefits.

We anticipate that in the future we will recommend that the state require each district to identify a current year, discounted value of any legacy health benefits, to bond that amount, and to levy a tax rate that would pay off that debt over time. We also would suggest that the state devised restrictions on district's ability to offer retiree benefits in the future.

## 28. Debt Service/Capital Construction

Currently, debt service is included in shared costs and supported by the equalization formula. Assuming the state adopts a separate formula for adequate operating costs, it will need an additional program or formula element to continue support for debt service. Although the state support mechanism for debt service is not understood very well, a first step is to enhance a clear understanding. Because most districts' shared costs put them into Tier 3 of the current formula, and assuming that capital costs and debt service are at the "top" of shared costs, state support for shared costs is determined largely by the operation of Tier 3.[21] For districts with a property wealth per pupil above the state average, state support is actually a negative number which reduces a district's Tier 2 aid. For districts with a property wealth per pupil at or below the state average, state support is much less than Tier 2.

In our costing out all of this report's recommendations, we will add a new program of state capital and debt service support. We will use a percentage equalizing formula, setting the state average share at 20 percent for the district of average property wealth per pupil. This formula would then set the state support at half that, or ten percent, for a district with a property wealth per pupil at double the state average, and at 40 percent for a district with a property wealth per pupil at half the state average, which is close to the wealth of the poorest district. Although this might seem like a more parsimonious program, it actually provides somewhat greater support of capital construction and debt service than the current system. If this recommendation proves to be too costly, the average percentage could be reduced.

[21] If the debt service is considered to be "buried" in a different portion of shared costs, the point is that the highest aspects of shared costs are in Tier 3, which is state supported at a much lower level than the other two Tiers.

## 4. RECOMMENDED RESOURCES FOR WISCONSIN SCHOOLS

Our initial draft recommendations for resources in Wisconsin's prototypical elementary, middle and high schools are included in Table 1. Table 2 summarizes the school-level personnel resources generated for schools at many different sizes, including very small schools.

**Table 1**
**Recommendations for Adequate Resources for**
**Prototypical Wisconsin Elementary, Middle and High Schools**

| School Element | Elementary Schools | Middle Schools | High Schools |
|---|---|---|---|
| **School Characteristics** | | | |
| School configuration | K-5 | 6-8 | 9-12 |
| Prototypic school size | 432 | 450 | 600 |
| Class size | K-3: 15<br>4-5: 25 | 6-8: 25 | 9-12: 25 |
| Full-day kindergarten | Yes | NA | NA |
| Number of teacher work days | 190 teacher work days, so an increase of 5 days. | 190 teacher work days, so an increase of 5 days. | 190 teacher work days, so an increase of 5 days. |
| % Disabled | 14.5 % | 14.5 % | 14.5 % |
| % Poverty (free & reduced lunch) | 30 % | 30 % | 30 % |
| % ELL | ~10 % | ~10 % | ~10 % |
| % Minority | 21.2 % | 21.2 % | 21.2 % |
| **Personnel Resources** | | | |
| 1. Core teachers | 24 | 18 | 24 |
| 2. Specialist teachers | 20% more:<br>4.8 | 20% more:<br>3.6 | 33% more:<br>8.0 |
| 3. Instructional Facilitators/Mentors | 2.2 | 2.25 | 3.0 |
| 4. Tutors for struggling students | one for every 100 poverty students:<br>1.30 | one for every 100 poverty students:<br>1.35 | one for every 100 poverty students:<br>1.8 |
| 5. Teachers for ELL students | An additional 1.0 teachers for every 100 ELL students who<br>0.43 | An additional 1.0 teachers for every 100 ELL students<br>0.45 | An additional 1.0 teachers for every 100 ELL students<br>0.60 |
| 6. Extended Day | 1.1 | 1.125 | 1.5 |
| 7. Summer School | 1.1 | 1.125 | 1.5 |

**Table 1 (Continued)**
**Recommendations for Adequate Resources for**
**Prototypical Wisconsin Elementary, Middle and High Schools**

| **School Element** | Elementary Schools | **Middle Schools** | **High Schools** |
|---|---|---|---|
| School Characteristics | | | |
| 8. Alternative Schools | NA | NA | 1 AP plus 1 teacher for every 7 alternative school students |
| 9. Learning and mild disabled students | Additional 3 professional teacher positions | Additional 3 professional teacher positions | Additional 4 professional teacher positions |
| 9. Severely disabled students | 100% state reimbursement minus federal funds. | 100% state reimbursement minus federal funds. | 100% state reimbursement minus federal funds. |
| 10. Teachers for gifted students | $25/student | $25/student | $25/student |
| 11. Vocational Education | Na | NA | Weight FTE Voc Ed Students by 0.29 and provide $7000 per FTE Voc Ed teacher for equipment |
| 12. Substitutes | 10 days per teacher | 10 days per teacher | 10 days per teacher |
| 13. Pupil support staff | 1 for every 100 poverty students:<br>1.3 | 1 for every 100 poverty students plus 1.0 guidance/250 students<br>3.15 total | 1 for every 100 poverty students plus 1.0 guidance/250 students<br>4.2 total |
| 14. Non-Instructional Aides | 2.0 | 2.0 | 3.0 |
| 15. Librarians/media specialists | 1.0 | 1.0 | 1.0 librarian<br>1.0 Library technician |
| 16. Principal | 1 | 1 | 1 |
| 17. School Site Secretary | 1.0 Secretary and<br>1.0 Clerical | 1.0 Secretary and<br>1.0 Clerical | 1.0 Secretary and<br>3.0 Clerical |

**Table 1 (Continued)**
**Recommendations for Adequate Resources for**
**Prototypical Wisconsin Elementary, Middle and High Schools**

| School Element | Elementary Schools | Middle Schools | High Schools |
|---|---|---|---|
| **Dollar per Pupil Resources** | | | |
| 18. Professional development | Included above:<br>Instructional facilitators<br>Planning & prep time<br>10 summer days<br>Additional:<br>$100/pupil for other PD expenses – trainers, conferences, travel, etc. | Included above:<br>Instructional facilitators<br>Planning & prep time<br>10 summer days<br>Additional:<br>$100/pupil for other PD expenses – trainers, conferences, travel, etc. | Included above:<br>Instructional facilitators<br>Planning & prep time<br>10 summer days<br>Additional:<br>$50/pupil for other PD expenses – trainers, conferences, travel, etc. |
| 19. Technology | $250/pupil | $250/pupil | $250/pupil |
| 20. Instructional materials, equipment, student activities, including textbooks | $140/pupil | $140/pupil | $175/pupil |
| 21. Student Activities | $200/pupil | $200/pupil | $250/pupil |
| 22. Security and Safety | NA | NA | NA |
| **Central Office Expenditures** | | | |
| 23. Central Administration | $658 per pupil | $658 per pupil | $658 per pupil |
| 24. Operations and Maintenance | 2004-05 expenditures: $938 per pupil | 2004-05 expenditures: $938 per pupil | 2004-05 expenditures: $938 per pupil |
| 25. Transportation | | | |
| 26. Food Services | Should be self supporting. | Should be self supporting. | Should be self supporting. |
| 27. Legacy Health Benefits | | | |
| 28. Debt Service | Cost share at same ratio in new formula as adequate costs. | Cost share at same ratio in new formula as adequate costs. | Cost share at same ratio in new formula as adequate costs. |
| | | | |

**Table 2**
**Summary of Personnel By Prototype of Various Sizes**

| Personnel Resource Category | Elementary | | | Middle | | | High School | | |
|---|---|---|---|---|---|---|---|---|---|
| School Enrollment | **108** | **216** | **432** | **150** | **300** | **450** | **150** | **300** | **600** |
| Core Teachers | 6.0 | 12.0 | 24.0 | 6. 0 | 12.0 | 18.0 | 6.0 | 12.0 | 24.0 |
| Specialist Teachers | 1.2 | 2.4 | 4.8 | 1.2 | 2.4 | 3.6 | 2.0 | 4.0 | 8.0 |
| Instructional Facilitators | 0.55 | 1.1 | 2.2 | 0.75 | 1.5 | 2.25 | 0.75 | 1.5 | 3.0 |
| Teacher Tutors (state avg.) | 0.33 | 0.65 | 1.3 | 0.45 | 0.9 | 1.35 | 0.5 | 0.9 | 1.8 |
| ELL Teachers | 0.1 | 0.2 | 0.43 | 0.15 | 0.30 | 0.45 | 0.15 | 0.30 | 0.6 |
| Extended Day Program | 0.27 | 0.54 | 1.08 | 0.375 | 0.75 | 1.125 | 0.375 | 0.75 | 1.5 |
| Summer School | 0.27 | 0.54 | 1.08 | 0.375 | 0.75 | 1.125 | 0.375 | 0.75 | 1.5 |
| Substitutes | 10 days for each ADM generated teacher positions at $125/day plus benefits for total of $134.56 | | | | | | | | |
| Aides | 0.67 | 1.33 | 2.0 | 0.67 | 1.33 | 2.0 | 0.75 | 1.5 | 3.0 |
| Pupil Support | 0.33 | 0.65 | 1.3 | 1.05 | 2.1 | 3.15 | 1.05 | 2.1 | 4.2 |
| Librarian | 0.25 | 0.5 | 1.0 | 0.3 | 0.67 | 1.0 | 0.25 | 0.5 | 1.0 |
| media technician | 0.0 | 0 | 0 | 0 | 0.5 | 0.0 | 0.25 | 0.5 | 1.0 |
| School Administration | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Secretary/ | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Clerical | 0.25 | 0.5 | 1.0 | 0.33 | 0.67 | 1.0 | 0.75 | 1.5 | 3.0 |
| Special Education | 0.75 | 1.5 | 3.0 | 1.0 | 2.0 | 3.0 | 1.0 | 2.0 | 4.0 |

**Strategies for Small School and Small District Adjustments**

Wisconsin has many elementary schools below the 108 pupil figure and many middle and high schools below the 150 pupil figures in Table 2. In addition, Wisconsin has schools that serve K-12, K-8 and 6/7-12 students, as well as a multitude of other school configurations that require special funding considerations. The current system of funding does not directly provide additional funds to take into consideration the increased costs of operating some aspects of these smaller educational organizations. The proposed model addresses the issues surrounding small schools and districts in several ways, in addition to what is indicated in Table 2.

For small schools with student FTEs from 1 to 75, the adequacy model provides resources at the rate of 1 FTE assistant principal position plus an additional 1 FTE teacher position for every 7 students, with a minimum of 2 FTE per school. This formula provides 1 assistant principal FTE and 1 teacher FTE for a 1 to 7 student school, 3 FTE positions for the 14 student school, 4 FTE positions for the 21 student school, etc., and prorated FTE for student counts in between these figures. This mechanism of resourcing is not designed to imply how to staff schools, but rather to trigger adequate total resources for schools of this size. Resources could be allocated in a variety of ways to staff these schools, (e.g teachers, aides, traveling specialists and principals, and combined positions for secretarial, custodial and other classified responsibilities).

For small elementary schools with 75 to 108 FTE students and for small middle and high schools with 75 to 150 FTE students, the model pro-rates down all staff positions from the 108 FTE school and 150 FTE, respectively, except for teachers. The model resources a minimum of 7 teachers (5 core and 2 specialist teachers) for the 75 to 150 student FTE middle and high school.

For <u>K-12, K-8 and 6/7-12 prototypes and other prototypes that cross the elementary, middle, and high school designations</u>, the model:

a. Resources small schools, whether elementary, middle or high school, or whether K-5, K-6, K-7, K-8, K-12, or 9-12, or 8-12, etc. with 75 or fewer students using the formula of 1 FTE assistant principal position plus 1 FTE teacher position for every 7 FTE students.

b. Triggers, in all cases of a school with more than 75 FTE students, principal and secretary resources at the highest level (elementary, middle or high school) of student population. If any student within the school exists in grades 9-12, these two positions are resourced at high school levels for the entire student FTEs in the school. If no 9-12 grade students exist, but 6-8 grade students exist, the model triggers middle school level resources for principals and secretaries for the entire student population of the school.

c. For non-principals and secretarial staff positions, the model resources schools configured across elementary, middle, and/or high school grades with elementary formulas for grades K-5, middle school formulas for grades 6-8, and high school formulas for grades 9-12.

d. Schools with an FTE greater than 75 and configured as K-5 and K-6 are resourced as elementary schools; schools with 5-8 and 6-9 grade configurations are resourced as middle schools; and schools with 8-12 grade configurations are resourced as high schools.

For the low number of small districts with 350 or fewer students, the model, sets a minimum for central office resources of one superintendent and one secretary. This mechanism of resourcing is not designed to imply how to staff district offices, but rather to trigger adequate central office resources for small districts. Resources could be allocated in a variety of ways to staff these offices (e.g., part-time superintendents, consultants, secretaries).

## 5. Additional Issues

In costing out the proposed models, we initially used the actual teacher, administrator and support staff salaries in 2004-2005 to determine the total cost of the proposals. We also wanted to conduct a labor market analysis of teacher salaries, as well as a study specifically focused on salaries levels that would help Milwaukee recruit and retain quality teachers. The Task Force, however, wanted us to compare salaries and benefits as part of these analyses, and we have not been able to find a data system that will allow this type of analysis. Most data bases only have salary data. We will have a labor market analysis for Milwaukee, and the results should be available sometime in 2007. In the meantime, all our cost figures will be based on actual average salaries in 2004-05, as we are estimated additional costs for 2005-06.

Initially, we also used the statewide average benefit rate as we need salaries plus benefits to price out all staff and cost all recommendations. But in the October analyses, we used a fixed and "adequate" benefit level, that included FICA, state retirement, and a health benefit rate that is equal to that for the state university system. This resulted in a drop in the overall benefit rate and a resultant drop in costs. This also turned out to be a controversial recommendation and it is likely the Task Force will continue to discuss the benefits and difficulties of costing benefits this way.

We also discussed a new model for a more skills and knowledge based teacher salary structure, with a performance assessment system that would nicely complement and strengthen Wisconsin's current initiatives in licensing teachers under PI 34. At the October 20, 2006 meeting of the Task Force, we described how such a knowledge and skills-based structure could look and operate (Odden & Wallace, 2006; Odden & Wallace, forthcoming). The Task Force advised us, however, to not retain this very complex issue on the agenda at this time and to focus on the recommendations discussed above in this report. Many suggested that the concepts could be added to the Wisconsin education agenda at some time in the future.

## 6. CONCLUSION

As Wisconsin policy makers know very well, school finance issues and structures are changing, largely in response to the more rigorous demands of the emerging, knowledge-based global economy, the restructuring of state education systems to produce the skills children need to function effectively is this future economy, and adequacy-oriented school finance court mandates. Today, a new Wisconsin education and school finance system must provide districts and sites with adequate education dollars so education leaders can deploy resources to more powerful education strategies that produce higher levels of student academic performance – with the goal to double student performance in the next 5-10 years. In general terms, the key role for the state is to determine an adequate level of education spending for each of its school districts. Districts must then allocate these dollars to schools via a needs-based per-pupil formula that ensures that each school has adequate dollars for the needs of each of its students. Schools need to use these adequate resources for the most effective education strategies, which generally will require substantial program restructuring and resource reallocation. Then, each school should be held accountable for educating students to the state's student performance standards and for using its adequate resource levels in effective and efficient ways.

Again, as stated several times above, one cannot overstate the importance of the need for schools to transform the above adequate resources into powerful and effective instructional strategies that boost student achievement. As Cohen, Raudenbush and Ball (2002) so eloquently argue, school resources are "inert" unless and until they are transformed into high quality instructional practices. So for the above resources to have more than just marginal impacts on student learning, schools need to use the dollars to purchase and implement effective curriculum programs in all content areas. Principals need to organize schools so they implement the instructional leadership that research shows is so important (Hallinger & Heck, 1996, 1998). This leadership should help teachers create a professional school culture that focuses on continuously improving the instructional program and take responsibility for the impacts of their instructional practice (Louis, Kruse & Marks, 1996; Louis, Marks & Kruse, 1996; Louis & Marks, 1998; Newmann, 1996). Finally, an intensive and effective professional development program needs to operate in ways to continually improve the instructional program. The above resources are necessary for these actions to take place.

The result will be an even more impressive Wisconsin education system. In the process, we will not only have doubled student performance but moved our "good" education system to the ranks of a "great" education. This challenge should be invigorating and taking on this challenge is well within the means of Wisconsinites; we have led the nation in many progressive movements in the past. There is no reason we cannot continue this leadership in the 21st century.

# References


Achilles, C. (1999). *Let's put kids first, finally: Getting class size right*. Thousand Oaks: Corwin Press.

Alexander, K., Augenblick, J., Driscoll, W., Guthrie, J., & Levin, R. (1995). *Proposals for the elimination of wealth-based disparities in public education*. Columbus, OH: Department of Public Instruction.

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

American College Testing Service and Education Trust. (2004). *On course for success; A close look at selected high school courses that prepare all students for college.* ACT and Education Trust. Downloaded from www.act.org or www.edtrust.org

American Educational Research Association. (2003). Class size: Counting students can count. Re*search Points: Essential Information for Education Policy*. 1(2).

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

Archambault, F.X., Jr., Westberg, K.L., Brown, S., Hallmark, B.W., Zhang, W., & Emmons, C. (1993). Regular classroom practices with gifted students: Findings from the Classroom Practices Survey. *Journal for the Education of the Gifted*, 16, 103-119.

Archer, J. (2000). The link to higher scores. In R. Pea (ed.) *The Jossey-Bass reader on technology and learning* (pp. 112-123). San Francisco: Jossey-Bass.

Ascher, C. (1988). Summer school, extended school year, and year-round schooling for disadvantaged students. *ERIC Clearinghouse on Urban Education Digest, 42*, 1-2.

Austin, G.R., Roger, B.G., & Walbesser, H.H. (1972). The effectiveness of summer compensatory education: A review of the research. *Review of Educational Research, 42*, 171-181.

Augenblick, J. (1997). *Recommendations for a base figure and pupil-weighted adjustments to the base figure for use in a new school finance system in Ohio.* Columbus, OH: Ohio Department of Education.

Augenblick, J. (2001). *Calculation of the cost of an adequate education in Maryland in 1999-2000 using two different analytic approaches.* Denver, CO: Augenblick and Meyers.

Augenblick, J., Myers, J., Silverstein, J. & Barkis, A. (2002). *Calculation of the cost of a suitable education in Kansas in 2000-2001 using two different analytic approaches*. Report prepared for the Kansas Legislative Coordinating Council.

Baker, D., & Witt, P. (1996). Evaluation of the impact of two after-school recreation programs. *Journal of Park and Recreation Administration, 14*(3), 23-44.

Baker, E.L., Gearhart, M., & Herman, J.L. (1994). Evaluating the apple classrooms of tomorrow. In E.L. Baker, and J.F. O'Neil, Jr. (Eds.). *Technology assessment in education and training.* Hillsdale, NJ: Lawrence Erlbaum.

Bangert-Drowns, R.L. (1993). The word processor as an instructional tool: A meta-analysis of word processing in writing instruction. *Review of Educational Research*, 63(1), 69-93.

Barnett, W. S. (1995). Long-term effects of early childhood programs on cognitive and school outcomes. *The Future of Children: Long-Term Outcomes of Early Childhood Programs, 5 (3),* 25-50.

Barnett, W.S. (1996). *Lives in the balance: Age-27 benefit-cost analysis of the High/Scope Perry Preschool program.* Yspilanti, MI: High/Scope Press.

Barnett, W.S. (1998). Long-term effects on cognitive development and school success. In W.S. Barnett & S.S. Boocock (Eds),. *Early care and education for children in poverty: Promises, programs and long-term outcomes* (pp. 11-44). Buffalo, NY: SUNY Press.

Barnett, W.S. (2000). Economics of early childhood intervention. In J. Shonkoff & S. Meisels (Eds.), *Handbook of early childhood intervention, 2nd edition* (pp. 589-612). Cambridge: Cambridge University Press.

Barnett, W.S., Brown, K., & Shore, R. (April 2004). The universal vs. targeted debate: Should the United States have preschool for all? *Preschool Policy Matters, Issue 6*. New Brunswick, NJ: Rutgers University, National Institute for Early Education Research.

Baum, S.M., Owen, S.V., & Oreck, B.A. (1996). Talent beyond words: Identification of potential talent in dance and music in elementary students. *Gifted Child Quarterly*, 40, 93-101.

Becker, H. J., (2000). Pedagogical motivations for student computer use that lead to student engagement. Retrieved on May 5, 2005 from http://www.crito.uci.edu/TLC/FINDINGS/spec_rpt_pedegogical/.

Berg, J., & Hall, G. (1997). *Downsizing of central office: Does anyone care?* Paper presented at the annual meeting of the American Educational Research Association, Chicago, IL. March 1997

Betts, J.R. & Shkolnik, J.L. (1999). The behavioral effects of variations in class size: The case of math teachers. *Educational Evaluation and Policy Analysis, 21,* 193–215.

Birman, B. F., Desimone, L., Porter, A.C., & Garet, M.S.. (2000). Designing professional development that works. *Educational Leadership, 57*(8), 28-33.

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

Borland, J.H., & Wright, L. (1994). Identifying young potentially gifted, economically disadvantaged students. *Gifted Child Quarterly*, 38, 164-171.

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

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

Borman, G.D. & Hewes, G. (2003). Long-term effects and cost effectiveness of Success for All. *Educational Evaluation and Policy Analysis*, 24(2), 243-266.

Borman, Geoffrey D., Hewes, Overman, Laura & Brown, Shelly. (2003). Comprehensive school reform and achievement: A meta-analysis. *Review of Educational Research*, 73(2), 125-230.

Borman, G., Rachuba, L., Hewes, G., Boulay, M., & Kaplan, J (2001). Can a summer intervention program using trained volunteer teachers narrow the achievement gap? First-year results from a multi-year study. *ERS Spectrum,19*(2), 19-30.

Bossert, S., Dwyer, D., Rowan, B., & Lee, G. (1982). The instructional management role of the principal. *Educational Administration Quarterly*, *18*, 34-64.

Brabeck, M.M., Walsh, M.E., & Latta, R. (2003). *Meeting at the hyphen: Schools-universities-communities-professions in collaboration for student achievement and well being. The One-hundred and second yearbook of the National Society for the Study of Education, Part II*. Chicago: National Society for the Study of Education.

Bransford, J., Brown, A., & Cocking, R. (1999). *How people learn*. Washington, DC: National Academy Press.

Bryk, A., Lee, V., & Holland, P. (1993). *Catholic schools and the common good*. Cambridge, MA: Harvard University Press.

Burch, P. & Spillane, J. (2004). *Leading from the middle: Mid-level district staff and instructional improvement*. Chicago: Cross City Campaign for Urban School Reform.

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

Cavin, E., Murnane, R., & R. Brown, R. (1985). School district response to enrollment changes: The direction of change matters. *Journal of Education Finance*, 10(4), 426-440.

Chase, C. I., Mueller, D. J., & Walden, J. D. (1986). *PRIME TIME: Its impact on instruction and achievement*. Indianapolis: Indiana Department of Education.

Clune, W. & P. White. (1992). Education reform in the trenches: Increased academic course taking in high schools with lower achieving students in states with higher graduation requirements. *Educational Evaluation & Policy Analysis*, 14(1), 2-20.

Cochrane-Smith, M. (1991). Word processing and writing in elementary classrooms: A critical review of related literature. *Review of Educational Research, 61*(1), 107-155.

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

Cohen, D.K., & Hill, H.C. (2001). *Learning policy: When state education reform works*. New Haven, CT: Yale University Press.

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

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

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

Consortium for School Networking [COSN] (2001). *A school administrator's guide to planning for the total cost of new technology*. Retrieved May 8, 2005 from http://classroomtco.cosn.org/tco2class.pdf.

Consortium for School Networking [COSN] (2004). Taking TCO to the classroom [website]. Retrieved May 5, 2005 from http://classroomtco.cosn.org/gartner_intro.html

Cooper, H, Charlton, K., Valentine, J.C., & Muhlenbruck, L. (2000). Making the most of summer school: A meta-analytic and narrative review. *Monographs of the Society for Research in Child Development, 65* (1, Serial No. 260).

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

Cosden, M., Morrison, G., Albanese, A. L., & Macias, S. (2001). When homework is no home work: After school programs for homework assistance. *Journal of Educational Psychology, 36,* 211–221.

Cunningham, P. & Allington, R. (1994). *Classrooms that work: They can all read and write*. New York: HarperCollins.

Dede, C. (2000a). Implications of emerging information technologies for states' education policies. In Council of Chief State School Officers, *2000 State educational technology conference papers*.

Dede, C. (2000b). Rethinking how to invest in technology (pp. 181-194). In Jossey-Bass Inc. (ed.) *The Jossey-Bass Reader on technology and learning.* San Francisco: Jossey-Bass Inc.

Delcourt, M.A.B., Loyd, B.H., Cornell, D.G., & Golderberg, M.C. (1994). *Evaluation of the effects of programming arrangements on student learning outcomes* (RM94108). Storrs, CT: The National Research Center on the Gifted and Talented, University of Connecticut.

Denton, K., West, J., & Walston, J. (2003). *Reading—Young children's achievement and classroom experiences: Findings from the Condition of Education 2003*. Washington, DC: National Center for Education Statistics.

Desimone, L.M., Porter, A.C., Garet, M.S., Yoon, K.S., & Birman, B.F. (2002). Effects of professional development on teachers' instruction: Results from a three-year longitudinal study. *Educational Evaluation and Policy Analysis 24*(2), 81-112.

Desimone, L., Porter, A.C., Birman, B.F., Garet, M.S., & Yoon, K. S. (2002). How do district management and implementation strategies relate to the quality of professional development that districts provide to teachers? *Teachers College Record 104*(7), 1265-1312.

Dishion, T. J., McCord, J., & Poulin, F. (1999). When interventions harm: Peer groups and problem behavior. *American Psychologist, 54*(9), 755-764.

Dobbs, Michael. (2003). Big schools reborn in small world. *Washington Post.* November 28, 2003.

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

Donovan, Suzanne & John Bransford. (2005b). *How students learn – mathematics in the classroom*. Washington, DC: National Research Council.

Donovan, Suzanne & John Bransford. (2005c). *How students learn – science in the classroom*. Washington, DC: National Research Council.

DuFour, R. B. (2003). Central office support for learning communities. *School Administrator*. June. Retrieved March 24, 2005 at www.aasa.org/publications/sa/2003_05/DuFour_Burnette.htm.

Dynarski, M., Moore, M., Mullens, J., Gleason, P., James-Burdumy, S., Rosenberg, L., et al. (2003). *When schools stay open late: The national evaluation of the 21st Century Community Learning Centers program.* Princeton, NJ: Mathematica Policy Research.

Earle, R. S. (2002) The integration of instructional technology into public education: Promises and challenges. *Educational Technology*, 42(1), 5-11.

Education Trust. (2003). *Zap the gap: Gap closing strategies in high-performing classrooms, schools, districts and colleges*. Washington, DC: Author.

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

Elmore, R.F. (2002). *Bridging the gap between standards and achievement: The imperative for professional development in education*. Washington, DC: Albert Shanker Institute.

Elmore, R.F., & Burney, D. (1999). Investing in teacher learning: Staff development and instructional improvement. In L. Darling-Hammond & G. Sykes (Eds.), *Teaching as the learning profession: Handbook of policy and practice*. San Francisco: Jossey-Bass.

Evertson, C.M. & Randolph, C.H. (1989). Teaching practices and class size: A new look at an old issue. *Peabody Journal of Education, 67,* 85–105.

Farkas, G. (1998). Reading one-to-one: An intensive program serving a great many students while still achieving. In Jonathan Crane, (Ed.), *Social programs that work*. New York: Russell Sage Foundation.

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

Feldman, A.F. & Matjasko, J.L. (2005). The role of school-based extracurricular activities in adolescent development; A comprehensive review and future directions. *Review of Educational Research*, 75(2), 159-210.

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

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

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

Finn, J.D., Pannozzo, G. M., & Achilles, C.M. (2003). The "why's" of class size: Student behavior in small classes. *Review of Educational Research*, 73(3), 321-368.

Flynn, P. (1998). Ready, set, decide! *School Administrator*. Retrieved March 24, 2005 from www.aasa.org/publications/sa/1998_03/flynn.htm.

Fox, W. F. (1981). Reviewing economies of size in education. *Journal of Education Finance*, *6*(3), 273-296.

Fullan, M. (2002). *The new meaning of educational change*. New York: Teachers College Press.

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

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

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

Gallagher, J. (2002). *Society's role in educating gifted students: The role of public policy* (RM02162). Storrs, CT: The National Research Center on the Gifted and Talented, University of Connecticut.

Gallagher, J., & Coleman, M.R. (1992). *State policies on the identification of gifted students from special populations: Three states in profile*.

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

Gallagher, S., Stepien, W., & Rosenthal, H. (1992). The effects of problem-based learning on problem solving. *Gifted Child Quarterly*, 36, 195-200.

Garet, M.S., Birman, B., Porter, A., Desimone, L., & Herman, R. (1999). *Designing effective professional development: Lessons from the Eisenhower Program*. Washington, DC: United States Department of Education.

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

Gartner Group (2003). Taking TCO to the classroom [website]. Retrieved May 5, 2005 from http://classroomtco.cosn.org/gartner_intro.html

Gartner Group (2004). Taking TCO to the classroom [website]. Retrieved May 5, 2005 from http://classroomtco.cosn.org/gartner_intro.html

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

Glass, G.V., & M. L. Smith. (1979). Meta-analysis of research on class size and achievement. *Educational Evaluation and Policy Analysis, 1*(1), 2-16.

Glister, P. (2000). Digital literacy (pp. 215-225). In Jossey-Bass Inc. (ed.) *The Jossey-Bass Reader on technology and learning.* San Francisco: Jossey-Bass Inc.

Greenwald, Rob, Hedges, Larry V., & Laine, Richard D. (1996a). The effect of school resources on student achievement. *Review of Educational Research 66*(3), 361-396.

Greenwald, Rob, Hedges, Larry V., & Laine, Richard D. (1996b). Interpreting research on school resources and student achievement: A rejoinder to Hanushek. *Review of Educational Research 66*(3), 411-416.

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

Gullo, D. (2000). The long-term effects of full-school-day kindergarten on student achievement: A meta-analysis. *Early Child Development and Care, 160*(1), 17-24.

Guthrie, James W. (1979). Organizational scale and school success. *Educational Evaluation and Policy Analysis, 1*(1), 17-27.

Gutierrez, Roberto & Robert Slavin. (1992). Achievement effects of the nongraded elementary school: A best evidence synthesis. *Review of Educational Research*, 62(4), 333-376.

Hahn, A., Leavitt, T., & Aaron, P. (1994, June). *Evaluation of the Quantum Opportunities Program: Did the program work?* Waltham, MA: Brandeis University.

Haller, E., Monk, D.H. Spotted Bear, A., Griffith, J., & Moss, P. (1990). School size and program comprehensiveness: Evidence from *High School and Beyond. Educational Evaluation and Policy Analysis, 12*(2), 109-120.

Hallinger, P., & Heck, R. H. (1996). Reassessing the principal's role in school effectiveness: A review of empirical research, 1980-1995. *Educational Administration Quarterly*, 32(1), 5-45.

Hallinger, P., & Heck, R. H. (1998). Exploring the principal's contribution to school effectiveness: 1980-1995. *School Effectiveness and School Improvement*, 9(2), 157-191.

Hallinger, P. & Heck, R.H. (2002). What do you call people with visions? The role of vision, mission and goals in school leadership and improvement. In K. Leithwood and P. Hallinger and Colleagues, Eds. *The handbook of educational leadership and administration (2nd Edition).* Dordrecht: Kluwer.

Hallinger, P. & Heck, R.H. (2003). Understanding the principal's contribution to school improvement. In M. Wallace and L. Poulson, Editors. *Learning to read critically in educational leadership and management.* London: Sage.

Halverson, R. (2003). "Systems of practice: How leaders use artifacts to create professional community in schools." *Educational Policy and Analysis Archives*. v11, n37. Accessible on-line at http://epaa.asu.edu/epaa/v11n37/

Hamilton, S. F. (1983). The social side of schooling: Ecological studies of classrooms and schools. *The Elementary School Journal*, *83*(4), 313-334.

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

Hanushek, Eric A. (1981). Throwing money at schools. *Journal of Policy Analysis and Management*, 1(1), 19-41.

Hanushek, E. (1986). The economics of schooling: Production and efficiency in public schools. *Journal of Economic Literature*, 24(3), 1141-1177.

Hanushek, Eric. (1989). The impact of differential expenditures on student performance. *Educational Researcher*, 18(4), 45-52.

Hanushek, Eric A. (1994). Money might matter somewhere: A response to Hedges, Laine, and Greenwald. *Educational Researcher*, 23(3), 5-8.

Hanushek, Eric A. (1997). Assessing the effects of school resources on student performance: An update. *Educational Evaluation and Policy Analysis*, 19(2), 141-164.

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

Heck, R. H., Larsen, T. J., & Marcoulides, G. A. (1990). Instructional leadership and school achievement: Validation of a causal model. *Educational Administration Quarterly, 26*(2), 94-125.

Hedges, Larry, Laine, Richard D., & Greenwald, Rob. (1994a). Does money matter? A meta-analysis of studies of the effects of differential school inputs on student outcomes. *Educational Researcher*, 23(3), 5-14.

Hedges, Larry, Laine, Richard D., & Greenwald, Rob. (1994b). Money does matter somewhere: A reply to Hanushek. *Educational Researcher*, 23(3), 9-10.

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

Iatarola, Patrice. (2005). Learning from experience: New York City's small high schools. *PEA Bulletin*, 30(1), 1-2, 3-5.

Jacobson, Linda. (2003). State-financed pre-k shows positive effect, new research says. *Education Week*, November 19, 2003.

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

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

Karoly, L., Greenwood, P., Everingham, S., Houbé, J., Kilburn, M.R.., Rydell, C.P., Sanders, M., & Chiesa, J. (1998). *Investing in our children: What we know and don't know about the costs and benefits of early childhood interventions.* Santa Monica, CA: The RAND Corporation.

Kauerz, Kristie. (2005). *Full day kindergarten: A study of state policies in the United States.* Denver, CO: Education Commission of the States.

Kennedy, M. (1998). *Form and substance in inservice teacher education, (Research Monograph no. 13).* Madison: University of Wisconsin, National Institute for Science Education.

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

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

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

Kulik, J. (1994). Meta-analytical studies of findings on computer-based instruction. In E. Baker & H O'Neil, Jr. (Eds.), *Technology assessment in education and training* (pp. 9-34). Hillsdale, NJ: Erlbaum Associates, Inc.

Kulik, J. (2003). *Effects of using instructional technology in elementary and secondary schools: What controlled evaluation studies say*. SRI Project Number P10446.001. Arlington: SRI International.

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

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

Ladd, H.F., & Hansen, J. (1999). *Making money matter*. Washington, DC: National Academy Press.

Laine, Richard D., Greenwald, Rob, & Hedges, Larry V. (1996). Money does matter: A research synthesis of a new universe of education production function studies. In L. O. Picus and J. L. Wattenbarger (Eds.), Where does the money go? Resource allocation in elementary and secondary schools (p. 44-70). Thousand Oaks, CA: Corwin Press

Landry, S. H. (1999). "Issues in developing effective interventions for children with developmental disorders." In S. Broman and M. Fletcher, (eds.) *The changing nervous system: Neurobehavioral consequences of early brain disorders*. Oxford University Press, N. Y., N. Y., pp. 341-364

Lattimore, C. B., Grotpeter, J. K., & Taggart, R. (1998). *Blueprints for violence prevention, book four: Quantum Opportunities Program*. Boulder, CO: Center for the Study and Prevention of Violence.

Lee, V., Croninger, R., & Smith, J. (1997). Course taking, equity and mathematics learning: Testing the constrained curriculum hypothesis in U.S. secondary schools. *Educational Evaluation and Policy Analysis, 19*(2), 99-122.

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

Lewis, L. (June, 2002). Teaching with technology: Creating the student-centered classroom. *From Now On*, [electronic journal]. Retrieved on May 5, 2005 from http://www.fno.org/jun02/teachingreview.html

Loucks-Horsley, S., N. Love, K. Stiles, S. Mundry & Peter Hewson. (2003). *Designing professional development for teachers of science and mathematics.* Thousand Oaks, CA: Corwin Press.

Louis, K. S., S. D. Kruse, & H. M. Marks. (1996). "Schoolwide professional community." In F. Newmann & Associates (Eds.), *Authentic achievement: Restructuring schools for intellectual quality* (pp. 179-203). San Francisco: Jossey-Bass.

Louis, K., H. Marks, & S. D. Kruse. (1996). "Teachers' professional community in restructured schools. *American Educational Research Journal*, 33(4), 757-798.

Louis, K. S., & Marks, H. M. (1998). Does professional community affect the classroom? Teachers' work and student experiences in restructuring schools. *American Journal of Education*, 106, 532-575.

Madigan, T. (1997). *Science proficiency and course taking in high school: The relationship of science course-taking patterns to increases in science proficiency between 8th and 12th grades*. Washington, DC: National Center for Education Statistics.

Mahoney, J. L., Stattin, H., & Magnusson, D. (2001). Youth recreation center participation and criminal offending: A 20-year longitudinal study of Swedish boys. *International Journal of Behavioral Development, 25*(6), 509-520.

Maker, C.J. (1996). Identification of gifted minority students: A national problem, needed changes and a promising solution. *Gifted Child Quarterly*, 40, 41-50.

Malhoit, Gregory C. (2005). *Providing rural students with a high quality education: The rural perspective on the concept of educational adequacy*. Raleigh, NC: The Rural School and Community Trust, Rural Education Finance Center.

Mann, D., Shakeshaft, C., Becker, J., & Kottkamp, R. (1999). *West Virginia's Basic Skills/Computer Education Program: An analysis of student achievement*. Santa Monica, CA: Milken Family Foundation.

Mantzicopoulos, P., Morrison, D., Stone, E., & Setrakian, W. (1992). Use of the SEARCH/TEACH tutoring approach with middle-class students at risk for reading failure. *Elementary School Journal*, 92, 573-586.

Manzo, Kathleen & Michelle Galley. (2003). Math climbs, reading flat on '03 NAEP. *Education Week*, 23(12), November 19.

Mason, DeWayne & Burns, Robert. (1996). Simply now worse and simply no better may simply be wrong: A critique of Veenman's conclusion about multigrade classes. *Review of Educational Research*, 66(3), 307-322.

Mason, D.A., & Stimson, J., 1996. Combination and non-graded classes: definitions and frequency in twelve states. *The Elementary School Journal*, 96(4), 439-452.

Mathes, P.G., & Fuchs, L.S. (1994). The efficacy of peer tutoring in reading for students with mild disabilities: A best-evidence synthesis. *School Psychology Review*, 23, 59-80.

Meyers, J., & Silverstein, J. (2002). *Calculation of the cost of a suitable education in Montana in 2001-2002 using the professional judgment approach.* Denver, CO: Augenblick & Myers, Inc.

Michie, J. and Holton, B. (2005). Fifty years of supporting children's learning: A history of public school libraries and federal legislation from 1953 to 2000 (NCES 2005-311). U.S. Department of Education. National Center for Education Statistics. Washington, DC: U.S. Government Printing Office.

Miles, K.H., Odden, A., Archibald, S., Fermanich, M., & Gallagher, H.A. (2002). *A cross-district analysis of professional development expenditures in four urban districts*. Madison, WI: University of Wisconsin-Madison, Wisconsin Center for Education Research, Consortium for Policy Research in Education.

Milken Family Foundation (1999). *The impact of education technology on student achievement: What the latest current research has to say*. Retrieved on December 26, 2001 from http://www.mff.org/pubs/ME161.pdf.

Miller, Samuel D. (2003). Partners in Reading: Using classroom assistants to provide tutorial assistance to struggling first-grade readers. *Journal of Education for Students Placed At Risk, 8*(3), 333-349.

Mishel, Lawrence & Rothstein, R. (Eds.). (2002). *The class size debate*. Washington, DC: Economic Policy Institute.

Molnar, Alex. (1999). Evaluating the SAGE program: A pilot program in targeted pupil-teacher reduction in Wisconsin, *Educational Evaluation and Policy Analysis, 21*(2), 165-177.

Monk, D. (1987). Secondary school size and curriculum comprehensiveness. *Economics of Education Review, 6*(2), 137-150.

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

Morris, D., Shaw, B., & Perney, J. (1990). Helping low readers in grades 2 and 3: An after-school volunteer tutoring program. *The Elementary School Journal, 91*(2), 133–150.

Mosteller, F. (1995). The Tennessee study of class size in the early school grades. *The Future of Children: Critical Issues for Children and Youths*, 5: 113-127.

Murphy, J. (1994). Transformational change and the evolving role of the principal: Early empirical evidence. In J. Murphy & K. Seashore Louis (Eds.), *Reshaping the*

*principalship: Insights from transformational reform efforts* (pp. 20-53). Thousand Oaks, CA: Corwin Press.

Murphy, J., Beck, L., Crawford, M., Hodges, A., & McGaughy, C. (2001). *The productive high school: Creating personalized academic communities.* Thousand Oaks: Corwin Press.

Murphy, R.F., Penuel, W.R., Means, B., Korbak, C., Whaley, A., & Allen, J.E. (2002). *E-desk: A review of recent evidence on the effectiveness of discrete educational software.* Palo Alto, CA: SRI International. Available online at: www.sri.com/policy/ctl/html/synthesis3.html

Naglieri, J.A., & Ford, D.Y. (2003). Addressing under representation of gifted minority children using the Naglieri Nonverbal Ability Test (NNAT). *Gifted Child Quarterly*, 47(2), 155-160.

Naglieri, J.A., & Ronning, M.E. (2000). Comparison of White, African-American, Hispanic, and Asian children on the Naglieri Nonverbal Ability Test. *Psychological Assessment, 12*, 328-334.

National Center for Education Statistics. (2003). The *condition of education 2003.* Washington, DC: National Center for Education Statistics.

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

Newmann, F., and Associates. (1996). *Authentic achievement: Restructuring schools for intellectual quality.* San Francisco: Jossey-Bass.

Newmann, F., & Wehlage, G. G. (1995). *Successful school restructuring: A report to the public and educators*. Madison, WI: University of Wisconsin-Madison, Wisconsin Center for Education Research, Center on Organization and Restructuring of Schools.

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

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

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

O'Neill, G. Patrick. (1996). Restructuring education : Lessons from Chicago, Edmonton and Wellington. *House 70*(1), 30-31.

Odden, A. (1990). Class size and student achievement: Research-based policy alternatives. *Educational Evaluation and Policy Analysis, 12*(2), 213-227.

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

Odden, A. (2000). Costs of sustaining educational change via comprehensive school reform. *Phi Delta Kappan, 81*(6), 433-438.

Odden, Allan. (2003). Equity and adequacy in school finance today. *Phi Delta Kappan, 85*(2), 120-125.

Odden, A. & Archibald, S. (2001). *Reallocating resources: How schools can boost student achievement without asking for more.* Thousand Oaks, CA: Corwin Press.

Odden, A., Archibald, S., Fermanich, M., & Gallagher, H.A. (2002). A cost framework for professional development. *Journal of Education Finance 28* (1), 51-74.

Odden, A., Fermanich, M., & Picus, L. O. (2003). *A State-of-the art approach to school finance adequacy in Kentucky*. Report prepared for the Kentucky State Department of Education. North Hollywood, CA: Lawrence O. Picus and Associates.

Odden, A., & Kelley, C. (2002). *Paying teacher for what they know and do: New and smarter compensation strategies to improve schools*. Thousand Oaks, CA: Corwin Press.

Odden, A., & Picus, L.O. (2000). *School finance: A policy perspective* (2nd edition). New York: McGraw Hill.

Odden, A., & Picus, L.O. (2004). *School finance: A policy perspective* (3rd edition). New York: McGraw Hill.

Odden, A., Picus, L. O., & Fermanich, M. (2003). *An Evidence-Based approach to school finance adequacy in Arkansas*. Report prepared for the Interim Legislative Committee on Educational Adequacy. North Hollywood, CA: Lawrence O. Picus and Associates.

Odden, A., Picus, L. O., Fermanich, M., & Goetz, M. (2005). *An evidence-based approach to school finance adequacy in Arizona*. Report prepared for the Rodel Charitable Trusts. Phoenix: Rodel Charitable Foundation of Arizona.

Odden, A. & M.C. Wallace. (Forthcoming). *New directions in teacher pay*.

Ornstein, Allen C. (1990). How big should schools and districts be? *Education Digest, 56*(2), 44-48.

Pavan, Barbara. (1992). Recent research on nongraded schools: The benefits of nongraded Schools. *Educational Leadership,* 50(2), 22-25.

Philliber, S., J. W. Kaye, & S. Herrling. (2001). *The national evaluation of the children's aid society carrera-model program to prevent pregnancy*. Accord, NY, Philliber Research Associates.

Picus, L.O., Odden, A., & Fermanich, M. (2003). *A professional judgment approach to school finance adequacy in Kentucky.* North Hollywood, CA: Lawrence O. Picus and Associates.

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

Public Agenda. (1997). *Getting by: What American teenagers really think about their schools.* New York: Author.

Ravitch, D. (2004). The mad, mad world of textbook adoption. Fordham Institute. Maryland: District Creative Printing. Also available at www.edexcellence.net.

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

Reis, S.M., & Purcell, J.H. (1993). An analysis of content elimination and strategies used by elementary classroom teachers in the curriculum compacting process. *Journal for the Education of the Gifted*, 16(2), 147-170.

Reis, S.M., Westberg, K.L., Kulikowich, J., Caillard, F., Hebert, T., Plucker, J., Purcell, J.H., Rogers, J.B., & Smist, J.M. (1993). Why not let high ability students start school in January? The curriculum compacting study (RM93106). Storrs, CT: The National Research Center on the Gifted and Talented, University of Connecticut.

Reschovsky, A. (2002). *Wisconsin's school finance: A policy primer*. The Robert M. La Follette School of Public Affairs. Retrieved December 8, 2004, from the World Wide Web:

Reynolds, A.J., Temple, J.A., Robertson, D.L., & Mann, E.A. (2001). Long-term effects of an early childhood intervention on educational achievement and juvenile arrest: A 15-year follow-up of low-income children in public Schools. *JAMA*, 285, (18), 2339-46.

Rice, J.K. (1999). The impact of class size on instructional strategies and the use of time in high school mathematics and science courses. *Educational Evaluation and Policy Analysis, 21*, 215–229.

Riew, J. (1986). Scale economies, capacity utilization and school costs: A comparative analysis of secondary and elementary schools. *Journal of Education Finance, 11*(4), 433-446.

Rito, G.R., & Moller, B.W. (1989). Teaching enrichment activities for minorities: T.E.A.M. for success. *Journal of Negro Education*, 58, 212-219.

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

Robinson, A., & Clinkenbeard, P.R. (1998). Giftedness: An exceptionality examined. *Annual Review of Psychology*. 49(1), 117-139.

Rogers, K.B. (2002). Effects of acceleration on gifted learners. In M. Neihart, S.M. Reis, N.M. Robinson & S.M. Moon (Eds.), *The social and emotional development of gifted children: What do we know?* (pp. 3-12). Waco, TX: Prufrock Press.

Rowan, B., Correnti, R. & Miller, R.J.(2002). What large-scale, survey research tells us about teacher effects on student achievement: Insights from the *Prospects* Study of Elementary Schools. *Teachers College Record*, (104)8, 1525-1567.

Sanders, W. L., & Horn, S. P. (1994). The Tennessee Value-Added Assessment System (TVAAS): Mixed-model methodology in educational assessment. *Journal of Personnel Evaluation in Education*, 8, 299-311.

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

Schinke, S. P., Cole, K. C., & Poulin, S. R. (2000). Enhancing the educational achievement of at-risk youth. *Prevention Science, 1*(1), 51-59.

School Communities that Work. (2002). *School communities that work for results and equity*. Providence, RI: Annenberg Institute for School Reform at Brown University.

Schweinhart, L.S. (2005) The High/Scope Perry Preschool Study Through Age 40. Ypsilanti, MI: High Scope Educational Research Foundation.

Scott, L. (2004). School library media centers: Selected results from the longitudinal study of 2002 (ELS:2002) (NCES 205-302). U.S. Department of Education. National Center for Education Statistics. Washington, DC: U.S. Government Printing Office.

Scott, M.S., Deuel, L.S.S., Jean-Francois, B., & Urbano, R.C. (1996). Identifying cognitively gifted ethnic minority children. *Gifted Child Quarterly*, 40, 147-153.

Seal, K.R., & Harmon, H.L. (1995). Realities of rural school reform. *Phi Delta Kappan*, *77*(2), 119-124.

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

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

Sher, J., & Tompkins, R.B.. (1977). Economy, efficiency and equality: The myths of rural school and district consolidation. In J. P. Sher (Ed.), *Education in rural America*. Boulder, CO: Westview Press.

Sivin-Kachala, J. (1998). *Report on the effectiveness of technology in schools, 1990-1997*. Software Publisher's Association.

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

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

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

Southern, W.T., Jones, E.D., & Stanley, J.C. (1993). Acceleration and enrichment: The context and development of program options. In K.A. Heller, F.J. Monks & A.H. Passow (Eds.), *International handbook of research and development of giftedness and talent* (pp. 387-410). Exeter, United Kingdom: Pergamon.

Spillane, J. P., Halverson, R. and Diamond, J.B. (2001). Investigating school leadership practice: A distributed perspective. *Educational Researcher*,30(3): 23-27.

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

Steinberg, Laurence. (1997). Standards outside the classroom. In D. Ravitch, (Ed)., *The state of student performance in American schools: Brookings Papers on education policy, volume 1*. Washington, DC: Brookings Institution.

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

Struck, J. (2003, April). *A study of talent development in a predominantly low socioeconomic and/or African American population.* Paper presented at the annual meeting of the American Educational Research Association, Chicago, IL.

Supovitz, J., & Turner, H.M. (2000). The effects of professional development on science teaching practices and classroom culture. *Journal of Research in Science Teaching, 37*(9), 963-980.

Swiatek, M.A. (2002). A decade of longitudinal research on academic acceleration through the study of mathematically precocious youth. *Roeper Review*, 24(3), 141-144.

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

Tenopir, C. (2003). Use and users of electronic media sources: An overview and analysis of recent research studies. Washington DC: Council of Library and Information.

Tierney, J., Grossman, J. B., & Resch, N. (1995). *Making a difference: An impact study of Big Brothers/Big Sisters*. Philadelphia, PA: Public/Private Ventures.

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

U.S. Bureau of the Census (2000). State and county quickfacts, Wisconsin quicklinks. Retrieved February 10, 2004 from http://quickfacts.census.gov/qfd/states/04000lk.html

United States Department of Education (2004). *Toward a new golden age in American education: How the Internet, the law, and today's students are revolutionizing expectations: National education technology plan.* Washington D.C: U.S. Department of Education. Also available at www.NationalEdTechPlan.org.

United States Department of Labor. (2000). *A nation of opportunity: Building America's 21st Century workforce*. Retrieved May 5, 0205 from http://www.ilr.cornell.edu/library/downloads/keyWorkplaceDocuments/21Century Workforce/combined 21st century.pdf

Valdez, McNabb, Foertsch, Anderson, Hawks and Raack (2000), Computer-Based Technology and Learning: Evolving Uses and Expectations. North Central Regional Laboratory (NCREL). Retrieved May 5, 2005 from http://www.ncrel.org/tplan/cbtl/toc.htm.

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

VanTassel-Baska, J., Bass, G., Ries, R., Poland, D., & Avery, L.D. (1998). A national study of science curriculum effectiveness with high ability students. *Gifted Child Quarterly*, 42(4), 200-211.

VanTassel-Baska, J., Johnson, D.T., & Avery, L.D. (2002). Using performance tasks in the identification of economically disadvantaged and minority gifted learners: Findings from Project STAR. *Gifted Child Quarterly*, 46, 110-123.

VanTassel-Baska, J., Johnson, D.T., Hughes, C.E., & Boyce, L.N. (1996). A study of language arts curriculum effectiveness with gifted learners. *Journal for the Education of the Gifted*, 19, 461-480.

VanTassel-Baska, J., Zuo, L., Avery, L.D., & Little, C.A. (2002). A curriculum study of gifted student learning in the language arts. Gifted Child Quarterly, 46, 30-44.

Veenman, Simon. (1995). Cognitive and noncognitive effects of multigrade and multi-age classes: A best evidence synthesis. *Review of Educational Research, 65*(4), 319-381.

*Vincent v. Voight,* 2000 WI 93, 236 Wis. 2d 588, 614 N.W.2d 388 (2000).

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

Waxman, H.D., Connell, M.L., & Gray, J. (2002). *A quantitative synthesis of recent research on the effects of teaching and learning with technology on student outcomes.* Oak Brook, IL: North Central Regional Educational Laboratory. Available online at: www.ncrel.org/tech/effects

Webster, W. J., Mendro, R. L., Orsak, T. H., & Weerasinghe, D. (1998, April). *An application of hierarchical linear modeling to the estimation of school and teacher effect*. Paper presented at the Annual Meeting of the American Educational Research Association, San Diego, California.

Wenglinsky, H. (1998). Does it compute? The relationship between educational technology and student achievement in mathematics. *Educational Testing Service Policy Information Center*.

Westberg, K.L., Archambault, F.X., Jr., Dobyns, S.M., & Salvin, T. (1993). The classroom practices observation study. *Journal for the Education of the Gifted, 16,* 120-146.

Wheldall, K., Coleman, S., Wenban-Smith, J., Morgan, A., & Quance, B. (1995). Teacher-child oral reading interactions: How do teachers typically tutor? *Educational Psychology*, 12, 177-194.

White, R. N., Reisner, E. R., Welsh, M., & Russell, C. (2001, November 1). *Patterns of student-level change linked to TASC participation, based on TASC projects in year 2*. Washington, DC: Policy Studies Associates.

Whitebrook, Marcy. (2004). *Bachelor's degrees are best: Higher qualifications for pre-kindergarten teachers lead to better learning environments for children*. Washington, DC: The Trust for Early Education.

Wisconsin Department of Education. (2002). *Superintendent's annual report for fiscal year 2001-2002*. Phoenix: Wisconsin Department of Education.

Wisconsin Department of Education. (2004). *Special education cost study*. Phoenix: Wisconsin Department of Education, Educational Services and Resources Division, Exceptional Student Services.

Wisconsin Department of Public Instruction. (2005). *Wisconsin's information network for successful schools, how are students performing academically?* [Searchable database]. Retrieved June 25, 2005 from http://data/dpi.state.wi.us/data/performance.asp

Wonacott, Michael. (2002). *Career academies as smaller learning communities: In Brief No. 20*. Columbus, OH: Career and Technical Education National Dissemination Center.

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

# Appendix A

## Other State Professional Judgment Panel Recommendations

In this Appendix, we compare the staffing and resources proposed above with similar prototypical school proposals that emerged from several recent professional judgment approaches to determining adequacy in several states around the country. We have selected five other studies, one recently completed by Picus, Odden and Fermanich (2003) for the state of Kentucky, and four completed by the firm of Augenblick and Meyers during the past 3 years for Kansas, Nebraska, Montana, and Maryland (Alexander, Augenblick, Driscoll, Guthrie & Levin, 1995; Augenblick, 1997, 2001; Augenblick, Myers, Silverstein & Barkis, 2002; Meyers & Silverstein, 2002). Tables A1, A2 and A3 display the characteristics for each of prototypical elementary, middle and high schools. This appendix is downloadable at:

http://www.wcer.wisc.edu/cpre/finance/app_a_pj_panel.pdf