MANAGEMENT ANALYSIS & PLANNING, INC.

AN EXPLORATION OF EDUCATIONAL AND DEMOGRAPHIC CONDITIONS AFFECTING NEW HAMPSHIRE'S ADEQUACY AID

Submitted to the

New Hampshire Legislature
Adequate Education and Education Financing Commission

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EXECUTIVE SUMMARY

New Hampshire is fortunate. By national standards, it appears to have good schools and it does not have a disproportionate number of students with special needs. We found no evidence of an impending statewide education performance crisis.

As a consequence of these mostly favorable conditions, state policymakers have the luxury of deliberating carefully to determine which problems should be addressed and in what sequence.

An appraisal of academic performance in New Hampshire reveals that (1) achievement declines in the upper grades—more third-grade students are meeting academic standards than are sixth- and tenth-grade students; (2) students tend to perform better in English than in other subjects; and (3) the percentage of students achieving "advanced" levels is low across all grades and subjects.

To better understand the nature of education problems in the state, the New Hampshire Adequate Education and Education Financing Commission contracted with Management Analysis & Planning, Inc. (MAP) to provide advice on issues that relate to financing.

MAP's Charge From the Commission

- Identify educational and demographic factors affecting the state's ability to provide an adequate education.
- Assess the extent to which these factors are prevalent in New Hampshire.
- Identify program strategies to address prevalent factors and raise student achievement.
- Recommend methods by which targeted programs can be incorporated into New Hampshire's funding system.
- Suggest strategies for evaluating the effectiveness of targeted programs and funding changes.

MAP specifically did not consider matters related to revenue generation, funding sources, or adequacy of state funding provided under the current school finance funding formula. Our conclusions and recommendations are made in this context.

Underlying Philosophy: Systemic Reform

Based on our experience working with several states and our reading of the available research, we recommend that a three-part model guide policymakers as they consider actions to improve education programs statewide. The model we present here is a simplified version of what has come to be known in education circles as systemic reform. The guiding principle of this model is that state policymakers view education as a system with interconnected parts and that they approach attempts to improve that system with a coherent strategy. The principal elements of this model require that the state: (1) clearly specify the important student outcomes that schools are expected to produce; (2) hold educators, schools, school districts, and students accountable for performance; and (3) provide sufficient resources to educators, schools, and school districts to meet performance expectations.

Where MAP Looked for Possible New Hampshire Problems

To fulfill our charge, we undertook analyses of multiple demographic and educational conditions that routinely result in added costs. Below is a list of such conditions explored by MAP in the New Hampshire context.

Student Demographic Characteristics
Students from low-income families
Disabled students requiring special services
English-language learners
Gifted and talented students

Teacher Factors
Market availability
Service seniority
Education level

School/District Factors
School enrollment size
District enrollment size
Transportation
Regional cost
Inflation
Capital construction

Findings

General Considerations

In the course of our analyses, we identified five major New Hampshire conditions or practices that can thwart state attempts to solve problems and target resources to schools and districts where legitimate special needs exist.

- Unclear Problem Definition. There does not seem to be sufficient agreement on the educational problems to be solved among stakeholders and policymakers. Prior to considering proposed solutions, the Commission or Legislature should engage in a deliberative process to clarify the problem or problems to be addressed. For example, the Commission may reach a conclusion that some or all of the following are candidate problems the state should address; or perhaps it will create a different list.

    - Too many New Hampshire students are underachieving.
    - Too few students are high achieving.
    - Too many students drop out of school before graduation.
    - Special education costs are encroaching on regular education programs.
    - School districts are insufficiently meeting the needs of students with disabilities.

  - Current arrangements permit targeted funds to be diverted for alternative purposes.
  - Inefficiencies result from school district organization.

- Lack of Accountability. New Hampshire has components of an accountability system (e.g., statewide testing) but is missing crucial elements. For example, insufficient data are collected from local school districts regarding student and program performance and there are few if any consequences for performance. The state should design and more fully implement a comprehensive accountability system that includes: (1) statewide performance targets for all students; (2) systematic measurement of student performance; (3) reporting on student achievement in a manner that permits changes in academic performance to be apportioned fairly to each school and its teachers; and (4) consequence for results or lack thereof.

- Supplanting. State "adequacy" revenue grants are adjusted for numbers of students from low-income families and for students eligible for special education. In practice, however, towns can use these additional state funds to supplant existing local funding and to lower local tax rates. If the current block grant supplement approach is retained, the state should impose a maintenance of effort requirement as a condition of receipt of funding associated with adjustments to the adequacy grant for low-income and handicapped students. This option would not require additional state funding, but would require certain school districts to increase expenditures.

- Imprecise Targeting. Various organizational structures of districts (single-town, multitown, nonoperating districts, in different combinations at different school levels) make it difficult for the state to target funding to where students actually attend school. To target funding more precisely, the following steps should be taken:

  - Distribution of the adequacy aid grant low-income adjustments should be based on counts of students where they attend school, not where they reside residentially.
  - District eligibility for low-income adjustments should be based on numbers of free and reduced-price lunch students attending grades K-8, rather than grades 1-12.
  - District eligibility for low-income adjustments should be on concentrations of students eligible for the federal free or reduced price lunch programs in individual schools, rather than on districtwide counts.
  - If the Legislature should decide to extend the adjustment for low-income students to secondary schools, calculations of concentrations of such students should be based on an extrapolation of the rates of students eligible for free or reduced-price lunch in elementary schools, rather than upon numbers of secondary students applying for that program.

- District Structure. Small district size and awkward organizational structure create instances of inequitable resource allocation and makes it difficult to reallocate resources when student needs shift. This report makes no specific recommendations for school

district reconfiguration. We do suggest that current structures may not be cost-effective or provide equitable services and may serve as an impediment to effective targeting of resources consistent with student need.

Student Demographic Characteristics

- Students From Low-Income Families: Based on our reading of the relevant research, the most cost-effective allocation of state supplemental resources consists of expenditures aimed at improving the performance of low-income students.

  If the state continues funding the low-income adjustment via a block grant, it should require that the entire adjustment supplement existing funding. This can be accomplished by imposing a maintenance of effort provision that requires school district expenditure per pupil be at least equal to prior years' local expenditures plus the amount of the state low-income adjustment.

  If the legislature seeks alternatives to the block grant and maintenance of effort provision, four options are offered:

  - State-directed interventions, such as preschool, kindergarten, and reduced pupil-teacher ratios. Any of these could be implemented within the current low-income adjustment of $57.7 million. See Table A below.
  - Under specified conditions, allow or require schools to implement whole-school reform from a menu of state-approved options.
  - Convert the block grant into a categorical program.
  - Provide parents of eligible students with a voucher in the per-pupil amount of the low-income grant to be used to purchase remedial instruction for their children.

  Elementary schools, particularly primary grades, should remain the highest priority for receiving additional resources.

  Eligibility for the federal free and reduced-price lunch program should be retained as the measure of poverty.

  Only schools with significant concentrations of low-income students should be eligible for the state adjustment. We advise that the adjustment be made available to schools with 25% or higher concentrations of students eligible for free and reduced-price lunch.

  The amount of the low-income adjustment should more nearly approximate the likely cost of providing an adequate program for low-performing students. We recommend that districts receive an additional $1,157 per eligible pupil, rather than the existing $1,652 for districts with moderate poverty concentrations and $3,304 for higher-concentration districts.

  Calculation of the low-income adjustment should be based on school level concentrations of low-income students, rather than concentrations in towns or school districts.

Table A: Summary of Cost Estimates for Statewide Reform Interventions

Program	**Estimated Cost** *(in millions)*
Prekindergarten	
Universal half-day	$27.1
Universal full-day	$47.2
High-poverty schools half-day	$9.3
High-poverty schools full-day	$15.5
Kindergarten	
Universal half-day	$12.7
Universal full-day	$39.5
High-poverty schools full-day	$13.8
Reduce Elementary School Pupil-Teacher Ratios	
Ratio reduced to 15.3 in all schools	$15.9
Ratio reduced to 15.3 in high-poverty schools	$3.2
Ratio reduced to 13.0 in all schools	$48.0
Ratio reduced to 13.0 in high-poverty schools	$12.4
Whole-School Reform Grants	$1 to $21
Categorical Programs	*discretionary*
Vouchers	*discretionary*

- Special Education Students: Since special education rates often correlate closely with the number of poor and minority students, the identification rate in New Hampshire is surprisingly high. Overall, 13.6% of New Hampshire students are identified as requiring special education services. This figure is higher than the national average of 12.3%. Compared to other states, New Hampshire ranks 17th in its percent of special education students. Nationally, identification rates range from just under 5% in Michigan to over 18% in New Mexico. Within New Hampshire, identification rates vary widely among school districts, ranging from 3% in New Castle to 22% in Lisbon Regional.

  The current special education funding formula seems to suffer from several deficiencies. First, there appears to be a disconnect between the state's apparent desire to target funding to school districts that experience higher costs as a result of educating disabled students and receipt of the extra funding at those school districts where such students attend. There is no assurance that a funding adjustment will be passed through intact to a school district of attendance.

  A second problem with the current funding system is that there may be an incentive operating in the catastrophic aid program to overserve some students. Districts have little incentive to control service costs when they approach eligibility thresholds for Catastrophic Aid funding.

Third, New Hampshire's practice of counting special education kindergarten students as 0.5 ADM regardless of the actual duration of each student's program may result in underfunding. Some special education kindergarten students attend full-day programs as part of individualized education plans. As a consequence, provision of a full-day program is, for these students, not optional or a matter of local preference. Thus, a case for attaching a full weight to such students would appear to be warranted.

Finally, even if the state-provided funding were to find its way to the appropriate school districts, the state may underfund special education in at least two ways. Compared to a national average per-pupil special education cost of 2.3 times *average expenditure* per non–special education student, the New Hampshire adjustment of 2.0 times the *basic adequacy grant* may undercompensate districts for true costs they incur. There is some evidence that this is the case when one compares the state grant with what districts spend to educate disabled students. Total state expenditures on special education are $105 million, whereas districts report spending $219 million in 1997-98. If the state did provide 2.3 times average regular per-pupil district expenditure, the total cost to the state would be roughly $200 million.

We recommend that the legislature and relevant stakeholders begin a process of reviewing and reforming special education funding that would more nearly meet the following criteria:[1]

- Understandable
- Adequate
- Flexible
- Placement Neutral
- Fiscal Accountability
- Cost Control
- Connection Between General Education and Special Education Funding
- Equitable
- Predictable
- Identification Neutral
- Reasonable Reporting Burden
- Cost-Based
- Outcome Accountability
- Political Acceptability

In order for policymakers to obtain reliable data upon which to base decisions we recommend that the state participate in the Special Education Expenditure Project (SEEP), operated by the Center for Special Education Finance (CSEF) at the American Institutes for Research.

- <u>Limited English Proficient (LEP) Students:</u> Very few LEP students are enrolled in New Hampshire schools. The incidence of this population is limited to a very small number of schools. Only Manchester appears to enroll LEP students in concentrations that might appreciably affect costs. We recommend that Manchester's unique situation be addressed specifically rather than through any general adjustment to the state funding formula.

[1] Adapted from Parrish (1995).

- Gifted and Talented Students: New Hampshire currently does not specifically fund programs for gifted and talented students. There is no objective definition of talent or giftedness and no professional consensus on what constitutes appropriate instruction for this population, let alone what such instruction should cost. We find no compelling reason for New Hampshire to add an adjustment to the state grant for gifted or talented students.

- All Students: The state should adopt a balanced accountability system to ensure sufficiently broad-based incentives to discourage districts from inappropriately focusing instructional resources on one or a few segments of the student population.

  The state should encourage schools to offer Advanced Placement (AP) and International Baccalaureate (IB) programs to a broader range of students. The marginal costs of these programs is small and could be accommodated in most school districts within current expenditure levels. Increased student participation in these programs is likely to be motivated by state encouragement. For example, student participation in Advanced Placement in California increased dramatically when the chief state school officer began measuring and reporting the number of students scoring at 3 or above on AP examinations at each school.

  The state should ensure the availability of high-quality statewide professional development programs systematically aimed at improving the ability of teachers—especially primary grade teachers—to address high-priority academic needs identified by the Commission or Legislature. State-sponsored professional development should not be restricted to teachers of low-income students, but rather should be aimed at minimizing failure in all schools. Reading Recovery is specifically recommended as a cost-effective program with a track record of minimizing the number of students who lack adequate reading skills by the end of second or third grade.

Teacher Factors

- Market Availability: New Hampshire teacher salaries are lower than those of its New England counterparts, except for Maine and Vermont. New Hampshire entry-level salaries are particularly low relative to those in the region. Furthermore, some school districts' recruiting and retaining efforts may be impeded by salary schedules that are significantly lower than those of their neighboring districts. Without further analyses of state tax structures and local amenities, it is not possible to ascertain whether lower salary schedules always result in lower net incomes for New Hampshire teachers. However, if total compensation for teachers is not competitive over time, some New Hampshire school districts will be forced to hire less qualified teachers.

- Service Seniority: We have assumed that the districts used in the calculation of the adequacy grants are approximately representative of all New Hampshire school districts on all important dimensions, including teacher seniority (although we have not independently verified this assumption). If this is the case, for school districts with more senior teachers than average, the adequacy aid grant will represent less than their actual

cost. School districts with fewer senior teachers than average will realize a windfall. Thus we recommend that the state implement a seniority adjustment to account for these differences in cost.

- Education Level: New Hampshire follows the United States public school convention of awarding annual salary increments linked to teachers' college course credits in excess of a bachelor's degree. There is insufficient evidence of payoff to justify continuing this procedure. We recommend a transition such that future teacher salary increments are for professional development linked to state priorities and individual performance, not college course credits.

School/District Factors

- School Enrollment Size: Approximately 150 elementary, 24 middle, and 22 high schools would reasonably be considered sufficiently small to warrant additional funding to compensate for diseconomies of scale. However, before lawmakers decide whether to adjust for the costs associated with small schools, we recommend that they determine the following:
  - Which schools are small of necessity, and which are small as a result of local preference
  - Expenditure patterns of schools of various sizes
  - The degree to which local wealth differences explain school expenditure variance
  - Which small schools are located in districts large enough to enjoy offsetting economies

- District Enrollment Size: Our analysis suggests that the current base funding level does not adequately capture the diseconomies of scale faced by small districts. However, as with small schools, it behooves policymakers to assess whether districts are small through choice or through necessity, and whether the state chooses to subsidize this local preference.

- Transportation: We make no recommendations concerning current transportation funding arrangements. In the current context it probably works well. Based on MAP experience in other states, many districts—frequently smaller districts—engage in practices that unnecessarily inflate transportation costs. Therefore, we recommend that the state conduct a systematic examination of each district's transportation expenditures.

  Members of the Commission have asked whether student transportation is a necessary component of an adequate education. Ultimately, this seems to be more of a legal constitutional question than an educational question, and therefore beyond the scope of this report. We know of no research that speaks to this question. New Hampshire law (Title 15 Chapter 189:6) presently requires school districts to furnish transportation under certain conditions, but the Legislature could repeal that law unless prohibited from changing it by some provision of the New Hampshire Constitution.

Federal law requires school districts to provide transportation for handicapped students if transportation is necessary for them to receive a free and appropriate education.

- Regional Cost: Even though an adjustment to compensate districts for higher regional costs is theoretically justified, we do not believe that the added precision of such an adjustment warrants the associated costs in the current New Hampshire context.

- Inflation: Periodic recomputation of the base adequacy grant obviates the need for an adjustment for inflation.

- Capital Construction: The primary potential problem we identified with the current New Hampshire capital construction financing provisions is that debt service is not included in the adequacy grant computation, thus understating the grant by that amount.

Evaluation

We recommend that the state establish an evaluation system that can routinely provide reliable responses to questions such as:

- What proportion of New Hampshire students at each grade achieve at varying academic performance levels (proficient, advanced, etc.)?
- How does academic achievement differ for students in the lowest and highest quartiles of performance assessment?
- How do student academic performance results differ over time?
- How do academic performance results differ by subject-matter field; by students' gender, socioeconomic status, and race; by school district geographic region; by school district; by school; by classroom; and by school per-pupil spending level?
- What is the distribution of other school outcome measures such as dropout rate, college matriculation and graduation, and Advanced Placement enrollment and performance?
- What school patterns of spending, class size, school enrollment size, and teacher qualifications are associated with varying levels of pupil performance?
- What are the operating costs of schools relative to their enrollment size?

I. INTRODUCTION

In 1997, the New Hampshire Supreme Court declared the state's education finance system unconstitutional. The court ruled that the state had an obligation to provide an adequate education, that local property taxes used to fund education were therefore a state tax, and as such were disproportionate and unreasonable since property-poor districts had to make a greater effort than wealthy districts to raise comparable revenues. The New Hampshire legislature responded by enacting a system that defined adequate levels of resources and imposed a statewide property tax to generate necessary revenues (see Appendix A for details). The newly enacted system is still being refined, and in 1999 the legislature created the Adequate Education and Education Financing Commission to recommend policy and procedural changes in the areas of education financing, improvement, and accountability.

As part of its efforts, the Adequate Education Commission contracted with Management Analysis & Planning, Inc. (MAP) to advise on educational and demographic factors to be considered in revising the finance system. MAP was not requested to comment on the adequacy of the state's overall level of per-pupil funding. Rather, MAP was asked to submit recommendations about the manner in which state resources could most effectively be targeted to areas of highest need.

Specifically, MAP was asked to:

- Conduct a thorough review of relevant research literature to identify educational and demographic factors and the resulting challenges that different communities may face in providing students with an adequate public education.

- Analyze New Hampshire's educational and demographic data to determine the extent to which factors and challenges identified through the literature search or by the Commission are likely to have an impact on the delivery of an adequate education in some or all of New Hampshire's communities and provide statistical evidence of the relationship between each factor and challenge and its impact.

- Conduct a thorough review of relevant research literature to identify targeted programs for which increased funding would most likely improve academic achievement in New Hampshire as measured by New Hampshire Educational Improvement Assessment Program tests and other measures of educational success (for example, lower dropout rates, increased graduation rates). Targeted programs should be related directly or by proxy to the factors and challenges identified through the literature search and provide statistical validation of each such relationship.

- Recommend several alternative methods by which identified factors, challenges, and targeted programs can be included in the state's adequate education funding formula or supported through supplementary funding. Recommended methods must be workable within a range of funding and must be workable in the future. Recommended changes in policy and procedure needed to implement various funding methods, as well as potential positive and negative

impacts of the various funding options and policy/procedural changes, shall also be outlined and discussed.

· Recommend procedures and data that need to be collected in order to evaluate the impact that factors, challenges, and targeted programs included in the funding formula or supported through supplementary funding have on educational performance.

This report begins by describing factors generally found to affect districts' capacity to provide an adequate education. Next, we discuss systemic reforms and provide a brief appraisal of student performance in New Hampshire, followed by a discussion of several structural impediments to targeting funding. We then focus on goal-setting and the development of an accountability system as two possible ways of addressing the impediments. The next sections of the report discuss the educational and demographic factors that are relevant in New Hampshire, and explore ways in which the state could address them in its funding arrangements. For each relevant factor, we offer options for ways in which the state could target funding, and describe advantages and disadvantages of each. Our main purpose is to provide the Commission with a range of options it can explore, rather than advocate a particular position.

MAP specifically did not consider matters related to revenue generation, funding sources, or adequacy of state funding provided under the current school finance funding formula.

II. SYSTEMIC REFORM

Traditionally, policymakers have attempted to improve education outcomes by addressing problems piecemeal—special programs for dropouts, special funding for libraries, mandated curriculum for non-English speakers, drivers' education, health education, character education, etc. This proliferation of programs and the explicit and implied goals emanating from federal, state, and local policymakers, makes it difficult if not impossible for local educators to sort the wheat from the chaff and to discern just what it is they are supposed to do. Therefore, those who want to improve student outcomes must be explicit about which among all the competing goals are the most important.

Processes or inputs such as minimum required seat time or courses required for graduation have not proven to be particularly powerful levers for advancing student outcomes, primarily because these are merely measures of quantity without any reference to quality. State policymakers around the nation have come to believe that it is necessary to explicitly state the student outcomes that they believe are most important. These statements usually take the form of specified performance levels on various assessments, attendance and graduation rates, enrollments in advanced classes, etc. Below, we discuss the need for New Hampshire policymakers to clarify the problems they perceive as highest-priority.

Once policymakers have made clear what is most valued, scorekeeping procedures need to be developed. This issue is discussed in greater detail in the Accountability section below. It is generally true that what gets measured gets attention. Therefore it is critically important to measure only that which is important. Secondly, policymakers must be mindful of the power of

measurement to shape behavior and to ensure against creating perverse incentives—incentives that encourage local educators to engage in behavior that disadvantages one or more student populations.

It is not uncommon for policymakers to ignore state assistance, the third element of the model. If the game is to be fair, all the players should have similar resources. How can a school with a high concentration of low-income or handicapped students be expected to produce the same level of student outcomes as a school with more advantaged students when both school have the same level of resources? Or when the former has less than the latter? The first priority of assistance is to ensure that all school have sufficient resources.

Virtually all educators are doing the best job they know how, but many teachers enter the profession without sufficient preparation to handle the rigors of a modern classroom, or have not kept their skills current through ongoing professional development. Local educators may want very much and try very hard to produce the desired outcomes, but if they lack the skill and knowledge to meet the needs of their students, they ultimately will fail. If the state is to hold local educators accountable for results, it is incumbent on policymakers to ensure that teachers entering the profession possess the necessary skills and knowledge as well as access to the high-quality professional development necessary to teach new curriculum or meet the needs of a changing population. This issue is discussed in more detail in the Professional Development section below.

The state also can significantly enhance the ability of local educators to meet expectations by removing state-imposed impediments such as rules, regulations, and laws that send messages about expectations that are inconsistent with what gets measured, or excessive record keeping and reporting that takes time away from the important purposes of schooling.

Based on our experience working with several states and our reading of the available research, we recommend that a simplified three-part model should guide policymakers as they consider actions to improve education programs statewide. The model we present here is a simplified version of what has come to be known in education circles as systemic reform (Smith and O'Day, 1992). The guiding principle of this model is that state policymakers view education as a system with interconnected parts and that they approach attempts to improve that system with a coherent strategy. The principal elements of this model require that the state: (1) clearly specify the important student outcomes that schools are expected to produce; (2) hold educators, schools, and school districts accountable for performance; and (3) provide sufficient resources to educators, schools, and school districts to meet performance expectations.

III. FACTORS AFFECTING DISTRICT COST

Based on a review of the national literature and MAP's previous experience with state education funding formulas, a list was assembled of 13 factors that may affect district funding needs. While these factors are generally found to affect education provision, each state is unique and not all factors apply in all instances. The factors are listed in Table 1.

Table 1: Educational/Demographic Factors
Affecting District Ability to Provide an Adequate Education

Student Demographic Characteristics
Disabled students requiring special services
Students from low-income families
English-language learners
Gifted and talented students

Teacher Factors
Market availability
Service seniority
Education level

School/District Factors
School enrollment size
District enrollment size
Transportation
Regional cost
Inflation
Capital construction

Overall, New Hampshire is in the enviable position of facing few educational challenges. The state has relatively few children in poverty and even fewer English-language learners, two populations generally thought to require additional resources to succeed in school. Over 50% of high school graduates attend four-year colleges, dropout rates are relatively low, and SAT scores are higher than the national average.

This is not to say that there are no problems with the education system. Scores on the state assessments are lower than might be expected given student demographics, and the number of students performing at an academically advanced level is low. Pockets of poverty create problems in selected areas, and several urban districts face growing concentrations of limited English speaking students. Special education costs appear to be on the rise and may be encroaching on general education expenditures. Teacher shortages are reported in some areas, and the problem may intensify in coming years. Towns that do not operate schools increasingly have difficulty finding placements for children in surrounding districts as the student population increases.

IV. APPRAISAL OF NEW HAMPSHIRE STUDENT PERFORMANCE

How does student achievement in New Hampshire compare to that of other states and the nation as a whole? This question is difficult to answer, since the state's children do not participate in

statewide, nationally normed tests or the National Assessment of Educational Progress (NAEP). Scholastic Aptitude Test (SAT) scores are slightly higher[2] than the national average (NHDOE, 1999), but this measure may be deceptive. Not all New Hampshire secondary students take the SAT, and those who do tend to be a self-selected, somewhat elite, college-bound group. Without knowing the composition (not just the percent) of the populations taking the SAT in each state or the performance of students not taking the SAT, it is impossible to compare student performance in New Hampshire directly to that of other states.

New Hampshire does have its own statewide, standardized, self-contained testing system. The state implemented uniform assessments for grade 3 in 1994, and two years later for grades 6 and 10, as part of the New Hampshire Educational Improvement and Assessment Program (NHEIAP). These criterion-referenced exams are based on the state's curriculum standards and frameworks.[3] Third-graders are tested in English language arts and mathematics, while sixth- and tenth-graders are also examined in science and social studies. Performance levels are specified as advanced, proficient, basic, and novice, and students scoring at the basic level or above are considered to have met the standards.

[2] In 1997-98, New Hampshire average scores on the SAT were 523 for Verbal and 520 for Math—higher than the national averages of 505 in Verbal and 512 in Math. This translates into a national rank of 29th in Verbal and 28th in Math. In New Hampshire, 74% of high school graduates took the SAT, compared to only 43% nationally, ranking NH 6th in participation. Among the 24 states with over 40% of high school graduates taking the SAT, New Hampshire ties for 3rd (with Alaska), coming in just behind Oregon and Washington, which each had 53% of graduates taking the exam. Source: 1999 NCES Digest of Education Statistics, Table 137.

[3] "Criterion-referenced" means that examination results are pegged to some level of expected performance or predetermined level of knowledge acquisition.

Table 2 below displays the percent of students scoring at or above each performance level in each subject area.

Table 2: 1998-99 Scores on the New Hampshire Educational Assessment[4]

Subject Area	Grade 3	Grade 6	Grade 10
English			
% Basic and above	71%	57%	68%
% Advanced	5%	2%	1%
% Novice	25%	40%	28%
Math			
% Basic and above	80%	48%	46%
% Advanced	12%	1%	3%
% Novice	18%	50%	51%
Science			
% Basic and above	NA	28%	44%
% Advanced	NA	<1%	1%
% Novice	NA	70%	53%
Social Studies			
% Basic and above	NA	48%	35%
% Advanced	NA	6%	<1%
% Novice	NA	50%	61%
Average % basic and above across subjects	76%	45%	48%

Three overall findings emerge: (1) more third-grade students are meeting the standards than are sixth and tenth-grade students; (2) students tend to do better in English than in other subjects; and (3) the percent of students performing at the advanced level is low across all grades and subjects.

There are several possible explanations for the finding that third-grade students are outperforming sixth- and tenth-graders. One is that much of the schooling older children received was prior to implementation of new state standards and assessments, while third-graders have been brought up in the new system. If this is the case, educators can expect to see sixth- and tenth-grade scores rise as the current cohort of third-graders moves through the system.

Another possibility is that standards or assessments in the higher grades are more rigorous than third-grade standards. In this case, third-grade scores cannot be directly compared to sixth- and tenth-grade scores.

Finally, it is also possible that the state's education program is stronger in the primary grades than at the secondary level. If this is true, then educators may need to concentrate on strengthening upper-grade education programs.

[4] Source: NHDOE data files obtained July 2000 (ros399.xls, ros699.xls, and ros1099.xls).

There also may be several reasons for the difference in subject area scores. Schools may be concentrating on English programs more than on other subjects. If this is the case, the state should provide incentives for schools to address their mathematics, science, and social studies programs through an accountability system and professional development opportunities. These interventions are discussed further below. Alternatively, the higher English scores, or the lower mathematics, science, or social science scores, may be an artifact of the standards or the test itself. While this issue is worth exploring further, it is outside the scope of this report. *The significance of the issue, however, is that the effectiveness of a treatment often depends upon the accuracy of a diagnosis.*

The relatively few students performing at an advanced level is notable. It is unclear why this should be the case, especially given the demographic characteristics of school children in the state. Again, it may be a result of the standards or the tests—thresholds for performing at the advanced level may be exceptionally high. However, it is also possible that the state is failing to educate its top students to the maximum of their abilities.

To further explore factors affecting student achievement, we examined the relationship between achievement and district size, school size, district property wealth, family income levels, and per-pupil expenditures. We found that only two of these variables are important in explaining differences in student achievement across schools: the percent of students eligible for free or reduced-price lunch, and expenditures per pupil. Schools with greater concentrations of children eligible for free/reduced lunch tend to have lower achievement, and schools with higher per-pupil expenditures tend to have higher achievement. Together, these factors explained roughly 40% of the variance in achievement across New Hampshire schools. Several other factors, though not important explanatory variables, displayed statistically significant correlations with achievement.[5] Our specific findings are described below.

> Size: Performance has a very slight but statistically significant negative correlation with district size: smaller districts tend to have higher performance ($r=-0.18$; $p<.05$). School size is statistically unrelated to student performance.
>
> District property wealth: Equalized value per pupil (EVPP) has a slight positive correlation with student performance: wealthier districts tend to have higher achievement ($r=0.23$; $p<.000$).
>
> Family income: There is a fairly strong negative correlation between student performance and the percent of students eligible for free or reduced-price lunch. Higher concentrations of poverty are related to lower achievement ($r= -0.49$; $p<.000$). The correlation is even stronger at the sixth-grade level ($r= -0.6$; $p<.000$).

[5] The findings described here summarize how various factors relate to the percent of third-graders performing at or above the basic level. Findings for sixth- and tenth-graders tended to follow the same pattern. When achievement was examined separately by subject area, some minor variations were found, but the same pattern held true across subjects.

District per-pupil expenditure: The amount spent per pupil is related to student achievement. Districts with higher per-pupil base costs tend to have higher achievement levels ($r=0.42$; $p<.000$). The correlation is somewhat lower at the sixth-grade level.

These findings are preliminary; a more sophisticated analysis would help puzzle out the complexities and interrelationships among variables inherent in explaining achievement variations. Family income and per-pupil expenditures have been reported to be related to student outcomes in other research cited in this study, and these relationships are assumed in several of our conclusions and recommendations.

When considering how best to raise student achievement, it is often useful to divide the problem into several components. Interventions aimed at elevating achievement levels of low-performing students may differ from effective practices targeted to average students, which in turn may differ from programs for advanced or college-bound students. We will discuss these in turn in Section VIII.

The next sections of this report discusses structural impediments to successfully implementing any substantive educational reform in New Hampshire.

V. IMPEDIMENTS TO EFFECTIVE TARGETING

MAP has identified four major conditions or practices that can thwart state attempts to solve problems and to target resources to schools and districts where legitimate student special need exists. We briefly review each issue here, and then explore two of the factors—goal setting and accountability—in more detail.

UNCLEAR PROBLEM DEFINITION

There does not seem to be sufficient agreement on the educational problems to be solved among stakeholders and policymakers. Conversations with individuals in New Hampshire who were knowledgeable about the state's education system revealed a variety of views and opinions about the nature and purpose of various provisions of the current school finance formula. It is our hope that this report will serve as a stimulus to Commission deliberations that will lead to more explicit problem and priority definition.

LACK OF ACCOUNTABILITY

Accountability in this report refers to a four-part administrative arrangement, the components of which are (1) statewide goals for student achievement; (2) measurement of student achievement; (3) reporting on student achievement in a manner that permits changes in academic performance to be apportioned fairly to a school and its teachers; and (4) consequence for results. These consequences may be positive (schoolwide bonuses for above-average student performance increases, for example) or negative (such as removing a principal or reassigning all of a school's teachers).

New Hampshire has several of these components partially in place, and the statewide testing program described in a previous section is a commendable foundation for an accountability system. There are gaps, however, such as consequences for high or low performance. Until there is a fully functioning accountability system, state policymakers can never fully be sure that the programs they design will have intended effects.

SUPPLANTING

State education funding can be used for local property tax relief. State adequacy aid grants are adjusted for numbers of local students from low-income families and for students eligible for special education. In practice, however, districts can use additional state funds to supplant existing local funding and lower local tax rates. The net result can be no net increase in resources available to the school districts providing instruction to specific higher-cost student populations.

We take no position on the need for property tax relief in some or all New Hampshire communities. Rather, we have approached our task as if state financial adjustments for concentrations of low-income students and for students with disabilities were intended to compensate school districts for those additional costs. It is from this perspective that we offer alternative options for targeting special needs funding in subsequent sections of this report.

IMPRECISE TARGETING[6]

The various organizational structures of districts (single-town, multitown, nonoperating districts, in different combinations at different school levels) makes it difficult for the state to target funding to where students actually attend school. For instance, the state formula adjusts for the number of special education students, but when towns make arrangements to send their children to other districts they do not typically include additional funding for the special education students. Similarly, the state formula adjusts for the number of students in poverty, after a threshold concentration level has been reached. However, the concentration level in the town may be different from the concentration level in the schools students actually attend, making the current targeting system imprecise at best.

To overcome this disjuncture, New Hampshire should adopt policies that measure outcomes for targeted students, control flows of added resources to operating districts, restructure its school district organizational patterns, or some combination of the three.

DISTRICT STRUCTURE

The small size and balkanized organizational structure of many school districts creates instances of inequitable resource allocation and makes it difficult to reallocate resources when student needs shift. The proliferation of small school districts all but ensures that there will be instances of surplus resources where there is little need and significant need where there are insufficient resources. District structure is discussed in more detail in Section IX.

[6] The targeting precision problem is also related to the school district organization issue. We bring it to the reader's attention again because this structural concern leads to both inequities and inefficiencies.

VI. ESTABLISHING GOALS AND FUNDING PRIORITIES

This report can help policymakers by presenting significant factors that affect the cost of providing an adequate education, assessing which of these are most germane in New Hampshire, and displaying options for remediation. However, in evaluating this information, policymakers need to determine their goals and priorities. Before they can weigh options, they must first define the problems they wish to solve. To a large extent, problem priority is determined by the state's goals. Which issues are of most concern to the state?

Frequently, it is the nature of the policymaking process that particular stakeholders view the essence of a problem differently. Some will cite low salaries for educators while others lament excessive or inequitable property taxes and still others perceive low student performance as the main concern. When the proffered solution is money, many stakeholders are willing for the problem to remain ambiguous.

We recommend that prior to considering solutions, the Commission or Legislature engage in a deliberative process to clarify the problem or problems to be addressed. For example, the Commission may reach a conclusion that some or all of the following are problems the state should address; or perhaps it will create a different list.

- Too many New Hampshire students are underachieving.
- Too few students are high-achieving.
- Too many students drop out of school before graduation.
- Special education costs are encroaching on regular education programs.
- School districts are not meeting the needs of students with disabilities.
- Current arrangements permit funds to be diverted for alternative purposes.
- Inefficiencies result from school district organization.

For each problem identified, how does one know conclusively that it is a problem?

Some of the data presented later in this report will provide evidence of the incidence of potential concerns. Many other potential concerns will require additional data and sophisticated analyses not routinely available or possible in New Hampshire. In fact, evidence of the extent and root causes of some concerns will require significant changes in the way school districts record and report data. Also, problem definition may require additional resources at the State Department of Education to ensure accuracy of district-reported data and to produce analyses in forms more useful to policymakers. For example, differences in local accounting practices, combined with broad reporting categories, presently render the New Hampshire's special education expenditure data insufficiently reliable or detailed to allow policymakers to make informed judgments about that program.

Is the identified problem a general one or is it worse in some locations?

Many social and educational problems appear intractable when viewed in their totality. For example, in 1999, 24% of the state's third-graders scored below "basic proficiency" on the New Hampshire English Language Arts Assessment. Presented in this form, the problem is so general

as to discourage design of solutions—where would one start? The situation becomes more manageable when one learns that the portion of students below basic proficiency equals or exceeds 50% in only 12 of the state's 248 primary schools. Similarly, it is not uncommon to learn that a few high schools contribute disproportionately to a state dropout rate. In such cases, instead of having a statewide shotgun intervention, it makes sense to rifle resources.

"Value Added Testing" arrangements such as those adopted in Texas and Tennessee show great promise for helping pinpoint specific schools and even specific teachers where intervention is most indicated. Neither of these statewide assessment arrangements is devoid of weaknesses, but each is aimed at enabling a state to know with far greater precision which of its schools suffer from low student performance.

If there is more than one problem, what is the priority order?

Because policymakers face finite resources of time, will, and funding with which to deal with problems, priorities are essential. The priority assigned to each problem requires deliberation that the Commission and Legislature are uniquely positioned to perform.

VII. ACCOUNTABILITY

An effective accountability system clearly signals to educators what is expected of them. As such, it is essential that measurement and consequences be tied only to that which is important. The accountability system should make clear to all participants what the rules are, how the score is kept, and how the game is won.

An artfully constructed New Hampshire accountability system can serve at least two goals. First, it can assist in accurately communicating state education policy priorities to local districts and their principals and teachers. Through appropriate goal specification by state officials, local educators will better know what they should focus on and what they will be rewarded for.

Second, a statewide accountability system that concentrates on specifying and accurately measuring outcomes can instill a performance outlook among local professional educators.

A recent RAND report (Grissmer et al., 2000) makes clear that one of the strongest correlatives of high levels of statewide pupil performance is the presence of an outcome-oriented accountability system such as we now describe.

FEATURES OF A PERFORMANCE-BASED ACCOUNTABILITY SYSTEM

A system of the type we outline below will convey to districts that the state is outcome-oriented and will enable state policymakers to track the results and appraise progress being made in achieving education priorities. In effect, the system we now outline is generic. It will be adaptable in measuring whatever priorities the state establishes or chooses to change over time.

A performance-based accountability strategy necessitates data on both performance and performers. The former involves testing programs and other outcome information collection aligned with learning expectations. The latter includes data on individual students, teachers, schools, and districts. Texas offers a good, though not yet perfect, example of the manner in which such a system should be constructed. Here are the fundamental components.

Performance Standards. Before collecting data for accountability purposes, a state must specify academic achievement goals or performance standards in a manner that translates to focused objectives for local school districts and schools. In effect, principals and teachers must know what they are expected to convey to students. This is a sine qua non of a performance-oriented accountability system.

Appraisal Mechanisms. Of course this translates most readily to tests of academic achievement. Additionally, however, it involves collecting and reporting data regarding matters such as pupil attendance and behavior, dropout rates, Advanced Placement participation rates, scores on AP tests, extracurricular participation, and whatever else a state specifies as significant in its performance standards.

Timely and Accurate Feedback. Data regarding student performance must be available for individual teachers and principals in a manner that enables them to understand how well they are performing their instructional roles. These data must be timely. For example, receiving academic achievement data on students who have already graduated does little good in addressing deficient conditions.

Resources for Remediation. A performance-oriented system should provide teachers with multiple avenues through which they can remediate instructional deficiencies. The Houston Independent School District, for example, can offer a teacher a mix of district, state, university-based, and private sector tutoring and professional development activities shaped specifically to assist whatever subject-matter or pedagogical deficits are diagnosed in his or her teaching.

*Consequence*s. Without consequences, there is no performance accountability. In the absence of consequences, students, teachers, administrators and others are free to do as they like, regardless of expectations. To be effective, consequences must be known, fairly judged, and consistently applied.

Consequences can be both positive and negative. Positive consequences can consist of praise, public commendation, and financial remuneration. The latter seems to work most effectively in education when applied to the performance of an entire school, and least effectively when applied at the level of the individual teacher. Measurement instruments are presently too imprecise to undertake individual teacher performance appraisals with confidence. However, with the advent of ever more sophisticated “Value Added” testing schemes, individual appraisal may prove more effective in the future.

Negative sanction can range all the way from private admonition to collective criticism and shame to stringent actions such as state takeovers and wholesale reassignments of teachers and administrators. Usually, a state constructs a series of escalating sanctions. Failure by a school to perform well is initially treated as information that is fed back to the school. Typically the next step is for the state to provide targeted assistance. If improvement is inadequate, remedial efforts intensify. They can involve publication of lists of failing (and succeeding) schools, state demands for new strategies to be deployed by the school, and even state takeover of the school. The experience of most states has been that publicizing low performance is not an effective lever for improvement in many cases. This is the dimension on which most United States accountability system are deficient.

Much debate about negative consequences, especially state intervention, tends to focus on the prerogatives of adults rather than the fact that students are receiving an inadequate education. Opponents seem to presume that such action is imminent and would be widespread. Such a case is unlikely and has not been the experience of states with the power to intervene in local districts. It is more likely, however, that for many educators who would be unmoved by lesser sanctions, the threat of state intervention is a powerful motivator. In the words of Samuel Johnson, "When a man knows that he's to be hanged in a fortnight, it concentrates his mind wonderfully."

Student Consequences. Schools are not the only units that need to be appraised and rewarded. Students can also slip into a laissez-faire mode regarding achievement if they perceive no consequences for academic sloth or reward for extra effort.

TAILORING THE SYSTEM TO PROVIDE POLICY FEEDBACK

Once in place, a generic system can be tailored to provide feedback to policymakers regarding progress being made in achieving state-specified objectives. However, *for this to occur successfully, the state must be clear regarding its purposes.* Below are illustrative state education objectives for New Hampshire.

- Every student able to read at specified level by the end of second grade
- Fewer students scoring in the bottom two quartiles on state assessment (all students to be assessed)
- More students scoring in the top two quartiles on state assessment (all students to be assessed)
- More days of student attendance
- Reduced student attrition
- Fewer students receiving instruction outside of a regular classroom all or part of the day
- More programs aimed at early intervention
- Increased parent participation
- Greater integration of services paid for by Title 1, special education, and other categorical programs
- More students scoring 3 or above on AP examinations
- More students scoring above the 50th percentile on the SAT

For some of the above, the state may want to set benchmark standards as alternatives to growth, e.g., 75% of students scoring above 3 on AP or 5% annual growth.

Some state-specified objectives, such as the following three, must be viewed as a package. Otherwise they can encourage operating distortions, a topic to which we return below.

- Reduced referrals for special education evaluation
- Reduced number of special education due process hearings
- Greater percent of special education due process hearings decided in favor of school districts

We make no case for the above goals in particular. Goal-setting is an appropriate function of policymakers, not consultants. However, we do wish to stress that there is no accountability in the absence of goals. Moreover, it is impossible to design a useful evaluation system or data-gathering machinery without knowing what is important.

There is a remaining caveat: Ambiguous or poorly crafted goals can create perverse incentives. For example, there is more than one way for a school or district to elevate student test scores: limiting the students tested, cheating in test administration and correction, forcing low-performing students out of school, concentrating only on high-performing students, etc. Consequently, one has to specify goals carefully for fear that one will get what one asks for.

THE CURRENT NEW HAMPSHIRE ACCOUNTABILITY SYSTEM

The New Hampshire Educational Improvement and Assessment Program (NHEIAP) was established by the state legislature in 1993 to assist in elevating student achievement. The educational improvement plan has two main components: K-12 curriculum frameworks that define what students should know and be able to do at different grade levels, and assessment tools to measure student progress and improve achievement. Specifically, the plan has five steps:[7]

1. Define what students should know and be able to do at different grade levels.
2. Communicate these new standards to educators across the state.
3. Assist schools in developing a local improvement and assessment plan.
4. Develop assessment tools that accurately evaluate a student's ability to meet the new standards.
5. Assist schools in using assessment results to modify their local plan to improve student academic performance.

Several of these existing components can be built upon in a complete accountability plan. However, as New Hampshire's present arrangements now stand, they will not suffice to improve performance throughout the state.

[7] NHDOE Website, http://216.64.49.52/assessment/nheiap.htm

Supplanting, imprecise targeting, and district structure are very real impediments that may attenuate even the best-intended efforts to improve education in New Hampshire. These obstacles are discussed in the context of issues where they seem most relevant, elsewhere in the report. It is important, however, that policymakers not lose sight of their significance.

VIII. STUDENT DEMOGRAPHICS

Addressing the Needs of Low-Performing Students

Low student performance should be of some concern in New Hampshire. As can be seen in Table 2 (See Section III), the percent of students performing below the basic level varies from 18% to 61%, depending on grade level and subject area.

Low-performing students require additional assistance to achieve at levels consistent with state standards. Sometimes redirecting existing resources to better effect is sufficient to raise achievement. In fact, educators and policymakers should always look first at how existing resources are being deployed before adding more. Frequently, new resources fail to improve outcomes because they are deployed in a manner that is no more likely to improve student outcomes than the existing allocation. Purchasing more of an ineffective resource or deploying that resource in an ineffective activity is unlikely to produce intended results. However, even with an optimal allocation of existing resources, some students will require additional resources in order to achieve at the same levels as their more advantaged peers, especially when significant concentrations of disadvantaged students attend the same school.

The most recent and perhaps most comprehensive analysis of the cost-effectiveness of statewide interventions aimed at raising student achievement was conducted by RAND (Grissmer et al., 2000). Examining the effect various statewide initiatives appear to have on National Assessment of Educational Progress (NAEP) test scores, RAND concludes that, when comparing scores of similar students, NAEP scores were higher in states with:

- Higher per-pupil expenditures
- Lower pupil-teacher ratios in lower grades
- Higher public preschool participation
- Lower teacher turnover
- Higher levels of teacher-reported adequacy of resources for teaching

They further conclude that, "…additional resources have been effective for minority and disadvantaged students, but resources directed toward more-advantaged students—the majority of students—have had only small, if any, effects."[8]

These results provide clues as to interventions that will prove effective in New Hampshire, but should not be taken out of context. RAND found that among the states participating in NAEP,

[8] Grissmer (2000), p. xxviii.

Texas produced the greatest gains. Of course, the challenges and resources in Texas are quite different from those in New Hampshire.

What we do believe is useful for New Hampshire to take from the RAND study is the apparent cost-effectiveness of targeting resources to schools with high concentrations of low-income students; specifically to maintain lower pupil-teacher ratios in lower grades, increase participation of low-income students in preschool programs, and to ensure that teachers of low-income students have sufficient training and resources.

Poverty and Student Achievement

The federal government and many states address low student performance, at least in part, by targeting added resources on concentrations of students from low-income families.

Why is poverty a reasonable measure of need? Research has shown that children from lower socioeconomic status (SES) families tend to come to school less well prepared and tend to fall further behind their higher SES peers as they get older. As we will show, mothers' education level and parents' occupational status also tend to be measures of SES. Of the various measures of SES, family income is generally accepted as the most reliable and easiest to acquire. In schools, the most frequently used measure of family income is student eligibility for the federally subsidized lunch program, which is based on family income and is standardized, objectively measured, and audited by federal agencies. Since these data are already collected for another purpose, their use for estimating student need does not impose an additional administrative burden on school districts.

Hart and Risley (1995) spent two and a half years recording parent-child interactions of 42 children beginning at age 6 months. Thirteen children were from higher-SES professional families, 23 were from middle-to-lower-SES working-class families, and 6 were low-SES from welfare families. SES was in this study based on the highest occupational status of either parent. This measure correlates highly with mothers' years of education (0.73), with the combined education level of both parents (0.86) and with family income (0.69).

Hart and Risley (1995) provide a useful insight into different parenting behaviors among the three groups they studied. The advantage went to the higher-SES groups on several dimensions. For example, the highest SES parents spent significantly more time interacting with their child than the working-class parents, who in turn exceeded the time of the welfare parents. These researchers estimated that by the age of 4 the children of professional families would have an accumulated experience of 45 million words, the working-class children 26 million and the welfare children only 13 million.

These differences, and probably others, manifest themselves in very different performance later in life. By age three SES highly correlated with vocabulary growth (.65) and vocabulary use (.63) and IQ scores (.54). These differences persisted through third grade. Vocabulary at age three was highly predictive of performance on standardized tests with correlations of 0.57 to 0.74. IQ scores were similarly related to SES. The children of professional families had an

average IQ score of 117, compared to 75 for the children of working-class families and 79 for the children of welfare families.

Grissmer, et al. (2000) found that the cost-effectiveness of various interventions varies by the type of student population. Certain interventions are efficient only in low-SES states, while others appear to be efficient in high-SES states as well. Specifically, they claim that expanding prekindergarten, providing teachers more resources, and targeted pupil-teacher ratio reductions are most efficient for low-SES states, while providing teacher resources appears to be efficient for states at all SES levels.[9] Table 3 displays the Grissmer groups' estimates of how much it would cost per-pupil to raise statewide average achievement scores by 0.10 standard deviation through various types of resource allocations, for low-, middle-, and high-SES states.

One of the difficulties with attempting to compare the cost-effectiveness of different resource allocations is that the efficiency of each may depend on the current pattern of expenditures. For instance, the marginal returns on decreasing pupil-teacher ratio decline, and at some point it becomes inefficient to decrease pupil-teacher ratio further. But at what point does allocation of another resource become more efficient? Grissmer et al. examined this question more closely and found that reducing the pupil-teacher ratio was an efficient intervention for states with initially high pupil-teacher ratios, but that the efficiency declined for states that already had fairly low pupil-teacher ratios (see Table 3). Since the average New Hampshire pupil-teacher ratio is already below 17:1, it would cost over $1,000 per pupil to attain a 0.10 standard deviation average achievement gain through pupil-teacher ratio reductions; as can be seen from Table 3, such an achievement gain may be more efficiently be gained using a different intervention such as increased teacher resources.

Another implication of the Grissmer et al. study is that it is most efficient to target resources to students from low-SES families. While their research is based on between-state calculations, if within-state patterns are similar then they suggest that "every state could make achievement gains most efficiently by allocating resources to lower-SES schools" (p.92). They go on to state that:

> The results also imply—even using an extremely conservative interpretation—that very significant score gains could be obtained for minority and lower-SES students with additional expenditures of less than $1,000 per student if the resources are appropriately targeted. The results would also imply that resources spent in many high-SES states might be quite inefficient. (p.93)

Other studies similarly tend to find that targeting resources to students from low-income families is an efficient use of resources. For instance, the Tennessee study on class size reduction found that smaller classes were most effective in raising achievement among minorities and those eligible for free lunches. Research on the effectiveness of prekindergarten programs has likewise found it to be more important for low-SES students than for high-SES students. Finally, studies on small schools have found that small schools are positively associated with higher achievement, particularly for disadvantaged students. Thus from a state policy perspective, it

[9] Unfortunately, "teacher resources" is vaguely defined in the Grissmer study, based on teachers' response to the question, "How well are you provided with instructional materials and the resources you need to teach?" (p.193).

would make sense to target resources for these types of interventions to schools with high concentrations of low-SES students.

Table 3: Estimates of Additional Per-Pupil Expenditures to Raise Average Scores by 0.10 Standard Deviation, Overall and for States with Different SES

	Cost per Pupil ($)			
Type of Expenditure	**Overall**	**Low State SES**	**Medium State SES**	**High State SES**
Per-pupil expenditure	1,020-2,380			
Pupil-teacher (K-12)	750-1,030			
Pupil-teacher targeted (1-4)	230-320	150	450	>1,000
From initial PT ratio of 26		110	180	260
From initial PT ratio of 23		140	300	600
From initial PT ratio of 20		200	>1,000	>1,000
From initial PT ratio of 17		450	>1,000	>1,000
Teacher salary	>2,900			
Teacher resources—low to adequate	170-260	110	110	110
Teacher resources—medium to adequate	190-280	140	140	140
Prekindergarten	240-400	120	320	>1,000

Source: Adapted from Grissmer et al. (2000). Overall estimate ranges may differ from State SES estimates since they are from different regression models.

METHODS OF TARGETING RESOURCES TO LOW-PERFORMING STUDENTS

The New Hampshire adequacy aid formula currently contains an adjustment for the number of students from low-income families. The poverty adjustment is essentially a block grant to districts, to be used however they see fit. As discussed throughout this report, one effect of this adjustment can be local property tax relief, with no net increase in revenue for disadvantaged students.

An advantage of a block grant is that it allows schools maximum flexibility in designing programs to meet the needs of particular students. Schools are often best situated to determine how to meet their students' needs, assuming of course that funding is actually made available for educational programming. On the other hand, if the state wishes to exercise greater control over how funding is targeted and spent, there are other options it can consider, such as state-directed interventions, grant programs that would allow or require qualifying schools to choose from a menu of approved research-based reform models, categorical funding, or providing vouchers to parents.

In short, five types of funding mechanisms are presented here for consideration.

1. Continue a block grant approach that allocates funding to districts based on a measure of need, but restrict the expenditure of such funding to educational program purposes.
2. Introduce statewide targeted initiatives such as preschool, kindergarten, reduced pupil-teacher ratios, and professional development.
3. Allow or require qualifying schools to choose from a menu of state-approved, research-based reform models.
4. Convert the existing block grant into a categorical program that would require all state low-income funding to be spent on a specifically identified student population.
5. Provide the per-pupil low-income adjustment to parents of specifically identified eligible students in the form of a voucher that they could be spend for any state-approved activity that was aimed at improving their children's academic achievement.

None of these options contemplates additional state funding, but the first does imply that local spending on education would increase. The attractiveness of each option depends upon one's view of the role of state government in local education decision-making. The first option will appeal to those who believe that local decision makers are best positioned to design and implement programs for the unique student population in their schools. The next three assume that those decisions are better made at the state level. The final option assumes that parents are best positioned to decide which interventions will best meet the needs of their children. None of the five options is without strengths or weaknesses; but any of the five would target funding more effectively than New Hampshire's current finance mechanism.

Each of these options illustrates a particular approach to targeting. Implementation of any one will require decisions about criteria for determining which school districts would receive additional funding, the amount of funding provided, and, except for block grants, any restrictions on expenditures. These issues will be discussed later in this section of the report.

Finally, it is important for policymakers to keep in mind that not all low-income students are low-performing and not all low-performing students come from low-income families. These two populations significantly overlap, but we recommend that instructional assistance be based on demonstrated need. The instruction a student receives should be based on his or her specific need, rather that some demographic characteristic. Moreover, in most cases, the most powerful intervention will be to improve the school's capacity to identify and address the need of each student rather than create a separate intervention for arbitrarily identified populations of students. Block grants, schoolwide targeted initiatives and the "menu" option all hold much more promise for such capacity building than either the categorical or voucher option.

<u>Continue Block Grant Adjustment</u>

Based upon our understanding of research results and substantial practical experience in numerous states, large and small, we strongly favor a block grant approach. However, in New Hampshire we recommend that this be done in tandem with enactment of a maintenance of effort requirement, and implementation of a full performance accountability system.

Virtually any distribution formula change that still directly or indirectly[10] delivers revenues to towns will allow supplanting of local resources with state grants, regardless of the specified purpose of that grant. For that reason, we recommend that adjustments to the basic adequacy grant flow directly from the state to districts of attendance, and be conditioned on an enforceable requirement that added funds supplement existing spending and that recipient districts maintain expenditure effort of prior years.

For example, under this scenario, school districts operating one or more schools enrolling high concentrations of students from low-income households would receive a formula adjustment based on the number of such students. Hypothetically, envision a district with 1,000 students that is currently spending $6,000 per average daily membership (ADM) and that in one school of 300, half of the students qualify for the federal free- or reduced-price lunch program. Assume that the state adjustment for low-income students is $1,200 per eligible student. In this illustrative example, the adjustment yields to the district an additional $180 per ADM (district average). We would recommend that this district would first be required to maintain prior-year spending per ADM—$6,000—and then supplement that amount by the state adjustment, for a district average expenditure per ADM of $6,180.

Implementation of this option will require the state to specify the measure of prior years' expenditure levels. We recommend a multiyear rolling average of operating expenditures. Grants of limited duration should be excluded, but ongoing, predictable federal funding such as Title I should be included. We do not recommend that tax effort be used in this context as it tends to fluctuate with changes of assessed valuation. If assessed valuation were to grow faster than the cost of education, a static tax rate would yield excess revenue. Declining assessed valuation would have the opposite effect. If total tax revenues were held constant, it might be necessary to adjust the rate periodically.

The important advantages of this option are that it retains the flexibility of a block grant and ensures that state funding aimed at improving the achievement of low-income students is received by school districts that enroll significant concentrations of such students. It does require that total spending would increase in affected local districts. This may be perceived by some as a disadvantage.

State-Specified Intervention

In this alternative, one or more state-directed interventions would target schools with concentrations of low-income students in primary grades with programs such as preschool, lower pupil-teacher ratios, or full-day kindergarten. Ideally these programs would serve all children from low-income families who reside in districts with high concentrations of poverty, but the first priority should be schools with significant concentrations of low-income students. Simultaneously, the state should implement a more comprehensive accountability system to track student progress and measure program effectiveness (the specific components of such an accountability program are listed in Section VII). In the absence of such an accountability

[10] Under the current system it makes little difference whether state funds are sent directly to school districts or towns—the net effect is the same. Towns must approve school budgets. Unless there is some prohibition for supplanting, the towns are able to reduce their taxes by the amount of the state grant.

system, the state cannot be sure that any combination of these initiatives is having a desired effect.

These state-directed interventions can be financed within the revenue ranges now being distributed for special needs students. Moreover, not all changes need to be taken at once, and attempting to accomplish too much too quickly is likely to yield unintended consequences such as a facilities shortage in some locations or a shortage of teachers trained to teach young children. The state could begin by implementing full-day kindergarten programs, followed by preschool programs in subsequent years, or begin by reducing pupil-teacher ratios before installing kindergarten programs.

Menu of Whole-School Reforms

In a second alternative, schools not meeting specified performance targets could be encouraged or required to select and implement a whole-school reform model from a menu of approved options. The Memphis, Tennessee School District has implemented such a program and found it to be highly effective. After two years, schools that implemented one of the eight approved reforms had significantly higher student achievement gains than control schools (Ross, 1998).

In the next section of this report, we provide added details for each of the funding approaches mentioned above. We first assess the block grant poverty adjustment currently in use, and then describe what statewide initiatives are likely to be particularly effective if the Commission chooses this option. Finally, we describe how the state might go about creating a menu of reform options and what such a menu might include.

Categorical Programs

A third alternative would be to require that state funds generated by concentrations of low-income students be spent only on eligible students. This option would operate similar to several federal categorical programs that require school districts to track expenditures of special funding to specifically identified students. Under this option state policymakers could be fairly confident that they could determine how special funding was being spent. However, the disadvantages of this approach seem to outweigh any apparent advantages. After about 35 years, Title I, the multibillion-dollar federal categorical program for economically disadvantaged children, has failed to demonstrate significant achievement gains among the target population. For example, Minnesota's Office of the Legislative Auditor (1998) concluded that Title I programs in that state had produced only slight student progress and had done little to bridge the gap between disadvantaged and advantaged students. Most evaluations of categorical programs report only modest or mixed results (Danoff, Arias, Coles, 1977; Gartner, 1987; Hoff, 1997; Ramirez, Yuen, Ramey, 1991; Rossell and Baker, 1996).

Guthrie and Smith (1998) identified several criticisms of categorical programs: (1) The focus of most categorical programs is on procedural compliance rather than student outcomes. State and federal agencies tend to emphasize rules over results by holding local districts accountable for following specified procedures and filing plans and reports, rather than the academic achievement of students. (2) Funding formulas that are based on the number of low-performing

students offer disincentives to success. (3) Categorical funding may be based more on politics than student need. For example, Timar (1991) found that California urban districts received an additional $344 per student regardless of student need. (4) Categorical programs encourage program fragmentation and blur responsibility. When some students receive significant amounts of instruction and other services outside of the regular classroom it is difficult to affix responsibility for their performance. (5) Pupil identification is a flawed process. Eligibility for many categorical programs is based on subjective criteria. (See Appendix B of this report for a discussion of identification of learning-disabled students.) (6) There is little research supporting alternative instructional strategies for categorical students. In fact, researchers have found that instructional strategies varied little among categorical programs, regardless of the category, and between categorical and regular classrooms.

Vouchers

A fourth alternative would be to provide the state grants directly to parents of eligible students and allow parents to choose the instructional assistance that they believe will most effectively improve the academic performance of their children. The per-pupil amount of such a voucher would be equal to the per-pupil amount of the state low-income supplement the students' school district receives. Elsewhere we have recommended that the amount be approximately $1,157 for elementary schools.

If this option is chosen, the state first needs to determine in which schools it would be most appropriately implemented.[11] If policymakers believe that parents are, or could be, sufficiently informed of effective instructional interventions and are likely to make choices that substantially improve their children's academic performance, it may be appropriate to apply this option at all schools with significant concentrations of low-income students. Criteria for targeting the state grant to school districts are discussed later in this section. Alternatively, this option may be reserved for cases in which a school persistently fails to improve student performance. In this instance, it would be necessary for the state to establish criteria and procedures for identifying such schools. These criteria and procedures would be in place if the accountability system described above were operational.

Because vouchers are aimed at specific students, it is necessary for the state to decide which students are eligible to receive a voucher. If the state were to choose this option, eligibility should be based on individual student performance, rather than individual student family income. That is, parents of low-performing students in schools generating the state low-income grant would be eligible to receive a voucher. This, of course, implies that the state will define low performance.

Policymakers should decide what restrictions, if any, they would place on the expenditure of the voucher. Given the potential for abuse inherent in this option, we recommend that the state adopt a list of appropriate expenditures. The list could merely describe the types of eligible expenditures, such as other public schools, individual tutoring, or private reading instruction; or

[11] Eligibility for receiving the state low-income grant should be determined by the concentration of low-income students attending a specific school. However, funding should flow from the state to the school district. Thus schools are used to determine eligibility, but school districts receive the funds.

it could list specifically approved providers from which parents could individually or collectively purchase services. We recommend that approved providers include the school the student currently attends or individual teachers at that school. Leverage afforded by the parents controlling expenditure of the grant may be sufficient to encourage the school district to effect changes that dramatically improve the instruction these students receive. Allowing local school boards or administrators to determine which options are available or to interfere in any way with parental choice would be an apparent conflict of interest and is therefore not recommended.

A final caution about this option: It is incumbent upon state policymakers to establish provisions that ensure that high-quality instructional resources in the public and/or private sector are accessible to parents and that parents are provided sufficient information to make informed choices. If there are insufficient high-quality instructional resources accessible to parents at a particular school, the voucher would have little value to those parents and would have little effect on improving student outcomes. This may be the case in remote rural areas, but should not be in larger communities. Similarly, if parents do not know how to evaluate the potential effectiveness of available instructional resources, the potential value of the voucher is attenuated. It would therefore be important that procedures be implemented to ensure that parents be provided sufficient information and assistance with appropriate decision-making skills. A state-approved list of allowable expenditures coupled with periodic workshops conducted by the Department of Education should address both concerns. It is unlikely that this option would necessitate significant additional state-level resources.

Cost-Effective Targeting of Resources

To ensure that scarce resources are allocated in a manner calculated to cause the proper level of funding to be spent on the appropriate student populations, it is necessary to determine (1) how to measure poverty; (2) considerations of concentration levels; (3) levels of remedial funding; and (4) targeting procedures.

Measuring Poverty

Why not simply target funding to schools with low levels of achievement? A number of states do include a measure of student achievement in their funding formulas or supplementary funding programs in order to provide additional resources to struggling schools. The problem with this approach is that it financially rewards schools for low performance. Unless an effective accountability system is in place that provides strong incentives for schools to raise achievement for all students, schools have insufficient incentives to do so; in fact, their funding level will drop if their student test scores improve. Therefore, many states look for a proxy measure of student achievement upon which they can base funding without creating perverse incentives for schools.

One such measure is the percent of students eligible for free and reduced-price lunch. There are a number of reasons for its popularity. The first is practical: Since almost all schools participate in the federal free/reduced-price lunch program, data are readily available and relatively reliable. This may seem like a weak reason for employing a particular measure, but the accessibility of reliable and valid data is an important consideration.

Another reason that states use free/reduced lunch eligibility is that it is largely beyond district control. The only incentive it creates for districts is for them actively to recruit eligible youngsters to apply for the program. Finally and most importantly, research has shown that free/reduced lunch eligibility, particularly in significant concentrations of eligible students, is a satisfactory proxy for low achievement. Studies have consistently shown that students from low-income families tend to achieve at lower levels than their more affluent counterparts, and require additional resources to meet standards. In New Hampshire, the correlation between the percentage of students eligible for free/reduced lunch and elementary school student achievement is about -0.5,[12] meaning that as the percentage of eligible students goes up, test scores tend to decrease.

While not all economically disadvantaged students are low achievers, and not all low achievers are disadvantaged, the number of disadvantaged youth in a school is a relatively good indicator of the overall level of added resource need and can be used to determine a suitable level of additional funding. The school normally should not use this funding solely on free-lunch-eligible students; rather, it can use it to provide additional support for any students identified as at risk for failure. The number of free-lunch-eligible children is simply used as a means for estimating overall need at a school and an appropriate level of funding to address that need.

Other strong correlates of low achievement include mother's education level, minority status (at least in part because of its relationship to family income), and direct measures of household income. None of these measures is as effective as free/reduced lunch eligibility as a basis for funding. Mother's education level is statistically appealing but impractical; currently the sole data source for this measure is the national census, which occurs only once every ten years. Since populations can shift rapidly, these types of data become stale quickly. Imagine basing funding for the coming year on data from 1990; it would be highly unreliable. While the state could conceivably collect its own data on mothers' education level annually, such a task would be expensive, burdensome, and possibly viewed as intrusive. Schools would have to obtain data directly from parents, since children are not a reliable source for this kind of information, and parents might be reluctant to divulge personal information.

Given the difficulties with other correlates of student achievement, free/reduced lunch eligibility emerges as the prime candidate for funding adjustments. The next question is, how should such an adjustment be made?

Adjusting for Concentrations of Poverty

The current funding system already contains a mechanism for allocating additional funding to towns with higher proportions of students from low-income families, as follows:

- For towns with fewer than 12% of students in poverty, no adjustment is made.
- Towns with student poverty concentrations between 12% and 24% are allocated an additional 50% of the base adequacy amount (or $1,652 in additional funding) to each of their eligible

[12] $p<.000$. Correlations range from 0 to 1 (positive or negative), and express the degree of relationship between two variables. Within the social sciences, a correlation of 0.5 is considered high.

elementary students (eligibility is based on the rate of students receiving free/reduced lunch in grades 1-12).

- Towns with student poverty concentrations over 24% are allocated the full base adequacy amount ($3,304) as an additional resource per eligible elementary pupil.

The total state cost of the poverty adjustment is $57.7 million.[13] The New Hampshire adjustment is generous by national standards. It is unlikely that concentrations of low-income students as low as 12% indicates actual need for additional resources. Overall, 17% of New Hampshire students are eligible for free or reduced-price lunch.[14] The national average is approximately 45%.[15] Although this figure is relatively low, roughly one-third of schools have more than 25% of their student body eligible for free/reduced lunch. Research has shown that additional resources are required for low-performing students when they attend schools with high concentrations of other low-income students. If there are small numbers of economically disadvantaged students in a school, their needs can frequently be met within the general education program, as long as teachers are properly trained. It is only when saturating concentrations of economically-disadvantaged youth attend a school that additional funding is indicated. Because of this, it is appropriate for the legislature to target funding to school districts that contain schools with high concentrations of children from low-income families.

Concentrations of low-income students up to 25% should not present an inordinate challenge to a school with adequate numbers of qualified teachers. Also, as we will discuss below, the dollar amount of the current adjustment may exceed the cost of implementing cost-effective interventions to address the needs of low-income students. Of course, these observations are based on the premise that the state adjustment actually is converted to instructional services in schools with low-income students, which apparently may not always be the case.

Levels of Additional Funding

The actual costs of successful programs for disadvantaged youth are not well established, so it is difficult to determine a precise adjustment or weighting system. Other states that utilize weighting methods tend to apply weighting factors ranging from 11% to 25% above regular per-pupil funding (weights of 1.11 to 1.25). However, the weight range of 1.11 to 1.25 is based on average per-pupil expenditures, whereas New Hampshire's weights are based on foundation adequacy aid. Therefore, the weights are not directly comparable. In order to better compare with other states and more accurately reflect available resources, we recommend that the New Hampshire low-income grant be based on some multiple of actual statewide average expenditures. Using an appropriately larger weight based on the adequacy grant could, of course, produce similar results, but if the basic adequacy grant fails to keep pace with actual expenditures, it would be necessary to recalibrate the weight.

[13] As calculated for fiscal years 2002 and 2003. From NHDOE data file Final FY02&03.xls.
[14] NHDOE data file SchoolEnroll9900.xls, 1999-2000.
[15] The USDA reports that 26.3 million children received free lunches daily in 1996. According to NCES, there were 57.7 million school-age children (ages 3-17) in 1996. Therefore, based on these data about 46% were eligible for the free/reduced lunch program.

An alternative to weights is a flat grant approach. Several states rely on this method. Wyoming allocates $500 per identified student to schools where the number of students who qualify for free/reduced lunch exceeds 150% of the state average.[16] Converted to a weighting factor, this would be approximately 8% above the per-pupil base. At the other extreme, Illinois provides a graduated flat grant per low-income pupil based on the concentration levels of poverty in the district. For instance, districts with 20% to 35% of students designated low-income receive $800 for each identified student; districts with 35% to 50% low-income concentration receive $1,243 for each low-income student; districts with 50% to 60% receive $1,600; and districts with over 60% poverty receive $2,000 for each low-income student. Converted to a weighting factor, supplementary funding for disadvantaged youth ranges from 18% to 46% above the Illinois foundation level ($4,325 in FY 2000).

When considering the amount of the poverty adjustment, either in a weighting or flat grant system, one factor the Commission should consider is what the adjustment dollar amount would be able to buy the district. If a school is unable to produce acceptable outcomes for low-income students with available resources, is the problem the level of resources or the instructional program? One measure of adequacy would be to determine whether the school has available sufficient resources to implement a research-based program with a proven track record of success with similar student populations. For instance, "Success for All" is a whole-school reform model aimed at helping high-poverty schools get all their children reading at grade level by the end of third grade. There are a number of such whole-school reform models designed to help improve student achievement; "Success for All" is among the more costly, but also one of the most evaluated. Estimates suggest that the program costs roughly $1,000 per pupil (Odden and Picus, 2000).[17]

Schools need not choose to implement one of these programs, but we would argue that if the school has sufficient resources to implement such a program, but is not producing acceptable results, the problem is more likely an ineffective educational program than inadequate resources.

Poverty Adjustment Targeting Factors

When designing a funding formula poverty adjustment, lawmakers must consider four factors: what grade levels should be targeted; how eligibility should be measured; what concentration levels are appropriate; and where the funding should be sent. Each of these is explored below.

- *What grade levels should receive the adjustment?*

New Hampshire currently provides a poverty adjustment for elementary school students but not secondary students. This practice can easily be defended, and, given limited resources, probably should be continued. Research suggests that prevention is more cost-effective than remediation. For instance, students who are not reading at grade level by the end of third grade are at risk of never matching the academic performance of their peers. Intervention programs aimed at the early grades are thus a good use of resources.

[16] 150% of the state average in New Hampshire is approximately 25.5% (1.5 x 17=25.5).
[17] Costs for New Hampshire are likely to be lower, given the lower poverty rates and smaller school sizes.

In fairness to secondary schools, and regardless of the effectiveness of elementary-level programs, some students will still be struggling in secondary school and may benefit from additional resources. Results from New Hampshire's assessments reveal that more third-graders are meeting the standards than sixth- or tenth-graders. While a number of different factors may be responsible for this—not all of which may be directly affected by funding levels—it is not unreasonable to consider providing a poverty adjustment for secondary students as well as elementary students. However, if funding is limited, we contend that it should be concentrated initially on elementary school poverty students. The ultimate decision regarding the utility of providing added resources for at-risk secondary students is a question of priorities. The funding for this purpose might well be better used, as an example, for the provision of preschool or full-day kindergarten.

- *What measure should be used to determine which school districts should be eligible for additional funding?*

In the current formula, eligibility for the poverty adjustment is based on percent of students residing in a town in grades 1-12 qualifying for the federal free and reduced-price lunch program. There are two important considerations here. The first is the grade range used to determine eligibility. Elementary eligibility rates are generally a more accurate measure of poverty than grade 1-12 rates because secondary students tend to be reluctant to apply for the program. This trend holds true in New Hampshire: About 20% of elementary-level students across the state are eligible for free/reduced lunch, whereas the rate at the secondary level is only around 10%. It is unlikely that this discrepancy is due solely to a shift in demographics. Thus, using only elementary rates will help the state target funding more accurately, especially if the poverty adjustment is applied solely to elementary-level students.

If the poverty adjustment is applied to secondary students as well, an approximate rate can be extrapolated from the elementary rate. There are several ways such an extrapolation could be calculated. First, high school students who were eligible for the free/reduced lunch program in elementary school could continue to be considered eligible, whether or not their families actually reapplied for the program. Second, it is possible to determine the proportion of students in each high school who come from each elementary school, and weight the percent eligibility accordingly. Both these methods are reasonably accurate but would involve a greater administrative burden. A third, simpler approach that would not necessitate additional paperwork would be to apply the districtwide grade 1-8 eligibility level to each high school in the district. Though it's the least precise approach, as it would tend to undercount eligible secondary students, even this method would improve targeting over the application of districtwide grade 1-12 rates.

A second consideration is whether eligibility is based on the percent of students eligible for free and reduced-price lunch, or free lunch only. Students are eligible for free lunch if their family income is less than 130% of the federal poverty line ($21,710), and for reduced-price meals if their family income is less than 185% of the poverty line ($30,895).[18] Research has yet to provide a definitive answer as to what income threshold is appropriate when discussing poverty

[18] As of 2000, the federal poverty line was $17,050 for a family of four. Information on this and the free lunch program can be found at the U.S. Department of Agriculture Website: www/fns.usda.gov/cnd/Lunch/IEGchart.htm.

adjustments. However, in New Hampshire the percent of students eligible for reduced lunch is negatively correlated with achievement. In other words, achievement tends to be lower in schools with greater concentrations of students receiving reduced-price lunch. Given this, it appears appropriate to continue funding the poverty adjustment based on the percentage of students eligible for both free and reduced-price lunch.

- *What concentration levels are sufficient to warrant additional funding?*

Unfortunately, while the literature on this topic shows that additional resources are only indicated when hard-to-teach students enroll in large concentrations (Orland, 1990), it does not specify what threshold concentration level warrants additional resources. We only know that the greater the concentration, the greater the likely need. Researchers who specialize in this area generally believe that concentration levels above the 20% to 30% range necessitate additional resources. New Hampshire currently provides a basic adjustment when the concentration level in a town exceeds 12%, and a greater adjustment when the rate exceeds 24%. Thus, by comparison to practice in other states and considering available research, it appears that the current New Hampshire adjustment for low-income students provides resources in excess of those necessary to implement cost-effective programs for such students. In light of this national norm, lawmakers should consider modifying the formula to concentrate resources in districts with greater populations of students in poverty. Doing so might more precisely target state resources toward student need. We can find no compelling rationale for providing extra resources to schools with concentrations below 25%.

Setting any level of concentration as the threshold for receiving additional funding inevitably raises the question of a cliff effect. We argue that such an effect is appropriate, as it is *concentrations* of high-need students that necessitate additional resources. As we have argued elsewhere in this report, schools should be able to accommodate a reasonable number of such students without additional resources. We would not recommend grants for concentrations lower than 25%. Further, we find no compelling rationale for increasing the per-pupil amount as concentrations increase.

- *Upon what data should targeting decisions be based?*

Additional resources are indicated when there are large concentrations of students from low-income families at a particular school. However, the current New Hampshire funding system distributes funding based on the concentration levels in *towns,*[19] not on the concentration levels where students actually attend school. The result may be a mismatch between where the money is most needed and where it is spent.

For instance, a town may have a high percentage of students eligible for free/reduced lunch, say 20%, and receive additional funding through the current funding formula. However, students may actually be attending school in a larger neighboring district, where the overall poverty rate at any given school is under 10%. Logically, there is little reason to allocate additional funding to those students, since they are not attending schools with high concentrations of students in

[19] Except in the case of cooperative districts, where districtwide incidence is imputed to each town.

poverty. Conversely, incoming students may raise the overall poverty level in a district, so that a receiving town that did not meet the 12% cutoff point based on its students in residence may actually have over 25% of its students in attendance eligible for free/reduced lunch. The current system would not target supplementary funding to that receiving district, even though its schools have high concentrations of students in poverty.

In addition, the concentration of poverty may differ substantially between schools within a given district. One elementary school may have only 3% of its students eligible for free or reduced-price lunch, while the rate may be as high as 46% in another school in the same district, as is the case in Concord. The funding formula should take this into account, since additional funds are considered necessary only when students attend schools with high concentrations of poverty. Targeting precision could therefore be improved if funding were calculated at the school level.

Clearly, determining the appropriate formula for a poverty adjustment involves a number of policy decisions, depending on the goals of the lawmakers and the amount of funding available. Such policy decisions are best made through the deliberative process of the Commission and the Legislature.

Table 4 provides an array of options for lawmakers to consider. The table shows what the total cost to the state would be under different scenarios with varying eligibility thresholds, target grade levels, and per-pupil grant amounts. Results are shown both for options based on free-lunch-only eligibility criteria as well as free and reduced-price lunch criteria. Possible scenarios are endless. Though only a sampling is provided here, it is a simple matter to explore others. (MAP has provided an electronic spreadsheet to the Department of Education that allows staff to analyze the various options.)

Below we summarize MAP's findings and recommendations for the poverty adjustment.

Summary of Findings and Recommendations

1. Continue funding via a block grant to districts, but require that the entire low-income adjustment supplement existing funding. This can be accomplished by imposing a maintenance of effort provision that requires recipient school district expenditures per pupil to at least equal prior years' expenditures plus the amount of the state low-income adjustment.

2. If the state seeks alternatives to a block grant, four are offered: state-directed interventions, a menu-driven grant program, converting the block grant into a categorical program, or providing vouchers to parents of eligible students, all targeted at schools with high concentrations of low-income students.

3. Elementary schools, particularly primary grades, should remain the highest priority for receiving additional resources.

4. Eligibility for the federal free and reduced-price lunch program should be retained as the measure of poverty.

5. Only schools with significant concentrations of low-income students should be eligible for the state adjustment. We advise that the adjustment should be made available to schools with concentrations of students eligible for free and reduced-price lunch equal to or greater than 25%.

6. The amount of the low-income adjustment should more nearly approximate the likely cost of providing an adequate program for low-performing students. We advise reducing the eligible per-pupil weight to 1.2, but basing it on actual average per-pupil expenditures ($5,784 for elementary school students)[20] rather than on base adequacy cost ($3,304). Under this scenario, districts would receive an additional $1,157 per eligible pupil, rather than the existing $1,652 for districts with moderate poverty concentrations and $3,304 for higher-concentration districts.

7. Calculation of the low-income adjustment should be based on school-level concentrations of low-income students, rather than concentrations in towns or school districts.

[20] Calculated as a weighted average of elementary and middle/junior high current per-pupil expenditures (not including transportation). NHDOE 1999-2000 *Fingertip Facts*.

Table 4: Poverty Adjustment Options

DING OPTIONS	Cost to State for Grades K-8		Additional Cost of Including Grades 9-12		
	Eligibility Based on % Free Lunch	Eligibility Based on % Free/Red Lunch	Eligibility Based on Gr. 9-12 % Free Lunch	Eligibility Based on Gr. 9-12 % Free/Red Lunch	Eligibility Bas District Gr. 1- Free/Red Lu
bility for the poverty adjustment is based e town in grades 1-12 who are eligible for h. If the % eligible is:					
nent **2** per eligible pupil er eligible pupil	--	**$57,672,311**	--	--	$23,4
ient is calculated using the same poverty rs as above, but the adjustment is ol, using the % eligibile for free or reduced and then the school figures are aggregated t allocation. Note that % eligibility is rates only rather than on Gr. 1-12 rates. If of students in a given school is:					
nent **2** (half base aid) base aid)	$38,223,245	$66,054,488	$2,413,815	$6,357,244	$25,6
ent is again calculated at the school level istrict total. If the % eligible for free or chool is 25% or above, a flat grant per d. Grant amounts:					
% of $3304 base aid)	$3,812,165	$7,917,073	$10,407	$197,258	$3,0
% of $3304 base aid)	$5,082,886	$10,556,097	$13,876	$263,010	$4,0
% of $3304 base aid)	$6,353,608	$13,195,121	$17,346	$328,763	$5,0
5% of $5,784 average K-8 PPE)[b]	$6,673,596	$13,859,670	$18,219	$345,320	$5,2
(20% of $5,784 average K-8 PPE)	$8,898,128	$18,479,560	$24,292	$460,427	$7,0
(25% of $5,784 average K-8 PPE)	$11,122,660	$23,099,450	$30,365	$575,534	$8,8

[a] Ideally this would be based on Gr. 1-8 eligibility rates applied to high school enrollments.
[b] $5,784 is a weighted average of elementary and middle/jr current per pupil expenditures (not including transportation). NHDOE 1999-00 *Fingertip Facts.*
Table 4 Notes: Preschool children are not included in this analysis. All kindergarten students are counted as 1/2. In Nashua, 9th grade is elementary-level.
Data sources: All data are from NHDOE data files. Enrollment data are from "SchoolEnroll9900.xls." Free/Red eligibility rates are from "Final FY02&03.xls" or "Free and Reduce Lunch 1999-00.xls.

State-Directed Interventions

An alternative approach that can be effective in raising student achievement is for lawmakers to implement state-determined interventions that assist schools in building educational infrastructure. Three programs found to be particularly effective are highlighted here: preschools, full-day kindergarten, and class size reduction.

Ideally, we would describe how effective each of these interventions is in raising student achievement, detail the associated costs, and provide indications of the cost-effectiveness of each option. Unfortunately, sufficiently precise data do not exist to provide this level of information. It is exceptionally difficult to measure program effectiveness because so many variables affect student achievement, and since program implementation tends to vary considerably across sites. Likewise, costs vary with implementation levels and regional price differences, so measures of cost-effectiveness are doubly hard to produce reliably. That said, we have attempted to provide the Commission with the best available evidence of program effectiveness and general cost estimates. Where possible, we have tried to indicate which programs are most likely to raise achievement for the least cost, but such estimates must be treated cautiously.

Preschool Education

Early childhood education programs are increasingly common across the country. Nationally, almost 40% of 3-year-olds, 70% of 4-year-olds, and 90% of 5-year-olds attend a preschool or kindergarten program, and the numbers are growing (NCES, 2000). Thirty-seven states fund preschool programs or supplement the federal Head Start program (ECS, 1997). In New Hampshire only 37% of school districts offer preschool programs, most of which are only for special education students. A total of 1,711 children in the state attend public preschool programs (NHDOE, 1999).

The popularity of early childhood education has increased as educators have come to understand the importance of early intervention. Neuroscience research has shown that the first years of life are the most critical in developing future capacity to learn; that interactive environments can enhance brain development; and that early intervention can help reverse or prevent adverse effects for much less than it costs to provide special services later (ECS, 2000).

Research has shown both preschool and kindergarten programs to be beneficial and cost-effective. Studies on the long-term effects of preschool programs have found that children attending high-quality preschool programs score higher on performance tests through high school, spend less than half as many years in special education, have reduced absence rates, are more likely to graduate, exhibit improved attitudes and classroom behavior, and display improved attitudinal, emotional, and social development (Hoegl, 1985; Schweinhart and Weikhart, 1984; ECS, 2000). For instance, one study found that by age 14, the achievement scores of students who had attended preschool were 1.2 grade-equivalent units higher than those of a control group that had not attended preschool (Hoegl, 1985). Children from economically disadvantaged families have been found to benefit the most from early childhood education programs.

The effects of preschool appear to continue into adulthood. One longitudinal study found that at age 27, compared to the control group that did not attend preschool, the group that had attended preschool had half the number of arrests, four times as many earning over $24,000 per year, three times as many owning their own homes, one third more graduating from high school on time, one fourth fewer requiring welfare services as adults, and one third fewer out-of-wedlock births (Kendall, 1995). Schweinhart attempted to quantify these benefits, and estimated that every dollar invested in the preschool program resulted in a savings of $7.16 to the state. Hoegl (1985) came to a similar conclusion:

> A cost-benefit analysis of the Perry Preschool Program for socioeconomically disadvantaged children estimates economic benefits over the lifetime of the participants to have a present value of seven times the cost of one year of the program. Savings from reduced special education placements alone, calculated on a per child basis, paid for the cost of one year of the preschool program. (p.17)

Other studies have found the net savings from preschool programs to be $13,000 to $19,000 per pupil (Sawhill, 1999).

Not all researchers are so enthusiastic. Critics claim that the academic benefits decline over time, that successful programs are difficult to replicate, and that the research lauding the cost-effectiveness of preschool programs is methodologically flawed (Sawhill, 1999). While it is certainly true that program effects are difficult to prove conclusively, the preponderance of the evidence suggests that preschool appears to be a highly cost-effective way to not only increase student achievement, but also to improve lifetime productivity and emotional well-being of participants.

Early childhood education seems to be especially effective for special needs students. In 1986, the federal government passed legislation designed to assist states in developing comprehensive early childhood intervention programs as part of what later became known as the Individuals with Disabilities Education Act (IDEA). States report a substantial financial benefit from these programs (NDCPD, 1995):

- Massachusetts saved $2,705 per child in a single year after deducting the cost of early intervention services.
- Montana saved $2 for every $1 spent on early intervention by the time the child was age 7, and projects a savings of $4 for every $1 spent by age 18.
- Florida estimates a savings of $20,887 per child after 20 years.
- Texas found that 20% of children receiving services did not later require special education services.
- Montana found that 36% of children receiving services did not require special education services through at least 2nd grade, and that another 33% required only limited services.
- North Carolina reported that after 10 years, children receiving services were only half as likely to be referred for institutional or group-home services over time.

It must be emphasized that these types of benefits accrue only when programs are of high quality. Too often, preschool and daycare programs are overcrowded and staffed by minimum-wage workers who lack knowledge of early brain development and effective educational practices. Fortunately, New Hampshire has already aligned its early-childhood licensing requirements with the rigorous standards set by the National Association for the Education of Young Children (ECS, 2000).

It is difficult to obtain accurate estimates of preschool costs. One 1995 study (Kendall) estimates that the full cost of preschool center care services is $2.83 ($3.38 adjusted for inflation)[21] per child hour. If all 16,500 preschool age children in New Hampshire attended 5 hours per day for 180 days, the total cost would be about $50.2 million.

The New Hampshire adequacy aid formula allocates $3,304 per preschool ADM (capped at 0.5) for a total of $3 million.[22] There are 115 elementary schools with over 25% of enrollment eligible for free or reduced price lunch. If these schools are assumed to have grades 1 to 6,[23] and potential prekindergarten enrollment is assumed to equal 1/6 of elementary enrollment, then the total number of prekindergarten-aged children in high-poverty districts is 5,096. If these students attend 5 hours per day for 180 days at $3.38 per hour, total cost to the state would be approximately $15.5 million.

Kindergarten Programs

Kindergarten programs have been shown to be similarly effective. Studies consistently find that students who attend kindergarten have higher average achievement scores at least through third grade, are less likely to be retained a year, and have higher attendance rates. Students from low-income families and neighborhoods benefit the most. The greatest benefits were accrued by children who attended both preschool and kindergarten programs, although kindergarten alone was also effective (Howard, 1987; Offenberg and Holden, 1996). Forty states specify that districts must offer kindergarten programs, and 15 of those states require kindergarten attendance.

Stinard (1982) reviewed the literature on the effectiveness of full-day versus half-day kindergarten programs, and found strong evidence that full-day programs are more academically advantageous than half-day programs. Research could not be found on the cost-effectiveness of the full-day versus half-day programs.

In 1997, the New Hampshire General Court passed legislation designed to encourage districts to implement or expand kindergarten programs. The state provided $750 per kindergarten pupil and offered to fund 75% of construction costs for districts that did not already operate kindergarten programs. Since passage of the legislation, kindergarten enrollments have increased 12%,[24] and

[21] Inflated at 3% per year to equal $3.38 in FY 2002.
[22] Prekindergarten ADM was 908 as of 1998-99 (NHDOE data file ADM 9899.xls).
[23] An admittedly crude assumption necessitated by a lack of grade-by-grade enrollments in each school.
[24] *EdWeek* Quality Counts 1999.

28 more districts have implemented kindergarten programs.[25] As of 1999, 126 of the 154 districts operating elementary schools offered some form of public kindergarten (NHDOE, 2000). Only four districts offer full-day programs, however, and some districts offer kindergarten only to students with special needs.[26]

The former kindergarten aid program has been superceded by the new adequacy aid formula which includes funding for kindergarten: districts with kindergarten enrollment receive $3,304 per kindergarten ADM (kindergarten students are counted as 0.5 ADM since the state subsidizes only half-day kindergarten programs). Kindergarten ADM is currently 4,430,[27] so the state currently provides about $14.65 million in kindergarten funding through the adequacy aid formula.

If funding were provided for half-day programs for all the kindergarten-age children in the state using the current school finance system, the cost to the state is estimated to be about an additional $12 million in base costs alone.[28] This does not include the additional transportation reimbursement or funding for the poverty and special educational adjustments.

If full-day kindergarten were provided to children in schools with high concentrations of poverty, it would cost the state an additional $13.8 million in base costs alone.[29] Full-day programs for all kindergarten-aged students would cost in the neighborhood of an additional $39.5 million, using the $3,304 base adequacy grant as an estimate of costs.

Note that these figures also do not cover the cost of the new facilities that would likely be needed to accommodate kindergarten programs in many schools across the state.

Another way to estimate kindergarten costs is to examine teacher costs. Personnel costs generally account for 75% to 80% of a district's budget, and teacher salaries are the largest single component in personnel costs. Thus teacher costs provide a ballpark estimate of necessary funding. We estimate that it would cost roughly $50.2 million in teacher salary alone to offer full-day kindergarten to all children in the state.[30] This figure assumes a class size of 15; if class size were 20, teacher costs would drop to $37.7 million. For half-day kindergarten, the costs would be $25.1 million if class size were 15, or $18.8 million if class size were 20. These estimates do not include the costs of facilities, materials, special education, instructional support, etc.

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[25] Private correspondence with NHDOE staff, Augus This adjusts the $2.83 reported above by an estimated 3% annual inflation rate to equal $3.38 by FY 2002.t 30, 2000.

[26] NHDOE staff.

[27] NHDOE data file ADM 9899.xls.

[28] We estimate that there are about 16,500 kindergarten-aged students in the state, based on statewide second-grade enrollments found on the NHDOE Web page "State Totals—Fall Enrollments, 1999-00".

[29] The 115 high-poverty schools cited in the section above currently enroll 1,886 kindergarten students. If we assume that there are actually 5,109 kindergarten-age students in those districts (using the same assumptions as above), and that each received $3,304 in base adequacy for full-day kindergarten, it would cost the state approximately $16.9 million (an additional $13.8 million over what the state currently provides those districts for kindergarten).

[30] We calculated that there are about 16,500 kindergarten-age students in the state (based on second-grade enrollment provided on the NHDOE Web page "State Totals—Fall Enrollments, 1999-00"). Total teacher compensation was estimated at $45,658 (average teacher salary of $37,734 in the NHDOE 1999 *Fingertip Facts*,

Class Size Reduction

Class size reduction has become a popular reform in recent years, with around 20 states passing legislation that encourages or mandates lower class sizes in the primary grades. Smaller classes are popular with parents, teachers, many educators, and the general public: According to a March 1997 *Wall Street Journal* poll, 70% of adults believe that reducing class size will lead to significant improvements in public schools.

The literature on class size is extensive but inconclusive. While many argue that lower class size leads to higher student achievement, there is no professional consensus on the "right" class size or what grades should be affected. Much of the research to date has concentrated on the primary grades. An early study by Glass and Smith (1979) found that class size needs to be reduced to fewer than 20 students, preferably to 15, if strong impacts on student learning are to be seen. Odden (1990) also suggests that only dramatic class size reductions are worthwhile, and advocates 15 to 17 students per class. Ferguson and Ladd (1996) believe that class size should be in the vicinity of 23 to 25, and that lowering class size beyond that point will not lead to systematic improvement in student achievement.

One of the problems with this line of research has been the lack of a true experimental design. In fact, only one study with such a design has been undertaken. The Tennessee Student-Teacher Achievement Ratio experiment (STAR), which randomly assigned children to one of three groups: an experimental group that had an average class size of 15.1 students, and two control groups, one with 22.4 students per class and one with 22.8 students and a teacher's aide in each class . Under the study plan, each student was to stay in the original class size assignment until the third grade. Following third grade, the experiment was concluded and all students assigned to regular size classrooms. Standardized tests were given each school year to measure student achievement. While there are some methodological and data problems in any study of this magnitude, two respected researchers have argued that the Tennessee STAR project is the best-designed experimental study on this topic to date (Mosteller, 1995; Kruger, 1998). Kruger summarized the major findings of the Tennessee STAR project as follows:

- At the end of the first year of the study, the performance of students in the experimental classes exceeded that of the students in the two control groups by 5 to 8 percentile points.
- For students who started the program in kindergarten, the relative advantage of students assigned to small classes grew between kindergarten and first grade, but beyond that the difference was relatively small.
- For students who entered in the first or second grade, the advantage of being in a small class tended to grow in subsequent grades.
- There was little difference in the performance of students in the regular size classrooms compared to the performance of students in regular size classrooms with teacher aides.
- Minority students and students who qualify for free and reduced-price lunches tended to receive a larger benefit from being assigned to small classes.

plus 21% benefits, as estimated from the state MS-25 form). In practice the amount is likely to be lower because most new teachers will be hired at or near the bottom of the salary schedule.

- Students who were in small classes showed lasting achievement gains through the seventh grade.

The Tennessee STAR findings make a number of important policy suggestions. Smaller classes did apparently lead to improved student performance, and those performance gains were maintained at least through the seventh grade. However, alternative models that relied on the use of teacher aides to reduce the "effective class size" were found to be ineffective. The research also suggests that simply reducing class size without changing how teachers of smaller classes deliver instruction is unlikely to improve student performance. It is important that teachers take advantage of the smaller classes to offer material in new and challenging ways identified through research. Absent that effort and the training needed to accompany such a change, expenditures for class size reduction may be relatively ineffective.

As compelling as the STAR report is, it is important to not overgeneralize from one study. At the very most one can conclude that the class size employed in the experimental groups produced superior outcomes. It would not be appropriate to assume, based on this report alone, that a class size of 15 is optimal or that less than 15 would produce even better results. It would not be appropriate to conclude that class sizes 16 or 17 would produce inferior results, or that reducing class sizes in upper elementary or secondary grades would improve student performance. Hall (1998) conducted a study on class size in New Hampshire and found that contrary to expectations, lower class size in grade 3 did *not* appear to be related to higher student achievement on the state assessment. One possible explanation he gives for this finding is that many traditionally high-performing schools in the southern part of the state have recently experienced a surge in enrollment, and that these schools have not yet been able to construct the necessary additional facilities. Class size in these schools will remain higher than in the past until construction catches up with population growth. Since these areas are predominantly upper-middle-class neighborhoods, the children tend to score well despite the larger class sizes.

The general belief among most educators and policymakers is that smaller classes are effective in improving student performance. Even those who are not convinced that there is a strong supporting research base are willing to concede that smaller classes can lead to more individualized instruction, higher morale among teachers, and more opportunities for teachers to implement instructional programs that research shows work well. Therefore, it is a worthwhile initiative for policymakers to consider. However, it is important to keep in mind that this is a very high-cost reform, and that it may not be the most effective use of resources. For example, Darling-Hammond (1998) argues that dollar for dollar, professional development is a substantially more effective reform than class size reduction. While we are not able to report the relative cost-effectiveness of these two interventions, we do point out that reducing class size is among the most expensive of all interventions, and that teachers' skill and knowledge are probably the most important determinant of the value schooling adds to student outcomes.

How much would it cost to lower class size in New Hampshire? Unfortunately actual class size data were not available, so we used pupil-teacher ratio as a proxy in answering this question. Pupil-teacher ratio is different than class size: while class size is a measure of how many students on average are seated in a classroom, pupil-teacher ratio reflects how many credentialed professional educators are available at a school. Class size reflects how schools have chosen to

deploy those resources; pupil-teacher ratio is a more objective measure of resources available to school district decision makers. A school could have a low pupil-teacher ratio and a high class size if several of its teachers were deployed as specialists, were assigned to district-level activities, or if the school relied heavily on pullout programs to serve special needs students. We find such practices quite common in school districts nationwide. It is not our purpose here to second-guess school district decision makers. We merely point out that there are trade-offs among approaches and that large class sizes do not necessarily reflect inadequate levels of resources.

Currently, the average pupil-teacher ratio in New Hampshire is 15.3:1 in elementary schools and 13.5:1 in secondary schools. The range varies from a low of 6:1 at the secondary level to 30:1 at the elementary level (NHDOE 1999 *Fingertip Facts*). Nationally, the averages are 18.6:1 in elementary schools and 14.2:1 in secondary schools (NCES, 2000). New Hampshire ranked 20th nationally. These averages compare favorably to the class sizes reported for the STAR study experimental group, but they are averages. Clearly, the actual pupil-teacher ratios in some schools are considerably higher than average. Schools where there are 30 students for each teacher will almost certainly have a much harder time meeting state standards than their more advantaged peers. These differences in resources are particularly problematic when higher pupil-teacher ratios are associated with high concentrations of low-income or other hard-to-teach students. On the other hand, schoolwide averages may mask a lower pupil-teacher ratio in the primary grades, thereby mitigating in some cases the apparently unequal allocation of resources.

To reduce the pupil-teacher ratio in all elementary schools[31] to the state average of 15.3:1, a total of 348 additional teachers would be needed at an approximate cost of $15.9 million.[32] To reduce the ratio to this level only in schools where the concentration of poverty was greater than 25%,[33] 71 teachers would be needed at a cost of $3.2 million. If librarians and special education teachers were included in the existing teacher counts, the cost would be approximately $9.9 million for all schools and $1.7 million for high-poverty schools.

If the state chose to lower its pupil-teacher ratio further, it would cost an estimated $48 million to obtain a pupil-teacher ratio of 13:1 in every elementary school (1,060 additional teachers would be necessary). If pupil-teacher ratios were reduced to 13:1 in elementary schools with concentrations of poverty at 25%,[34] an additional 272 teachers would be needed at a cost of $12.4 million.

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[31] These scenarios use schools identified as elementary schools in the NHDOE file SchoolEnroll9900.xls. However, because the grade range in these schools can vary considerably—some are K-8, others only 1-3—these estimates may be somewhat misleading. A better approach would be to calculate the costs of class size reduction only for grades K-2 or K-3. We were unable to do so since school enrollments by grade level were unavailable to us. It should also be noted that for these scenarios we did not include kindergarten students, since districts have such varying policies regarding kindergarten programs.

[32] Teacher compensation was calculated as average salary ($37,734 in the NHDOE 1999-2000 *Fingertip Facts*) and benefits were calculated as an additional $7,924, based on an average benefit rate of 21% as reported on the 1998-99 state summary MS-25 forms. Therefore, for the purposes of these scenarios total teacher compensation is estimated at $45,658. In reality the total salary costs probably would be lower, as most new teachers would be hired at the low end of districts' salary schedules.

[33] As measured by the number of students eligible for federal free or reduced-price lunch program.

[34] Statewide, roughly 17% of students are eligible for the federal free or reduced-price lunch program. NHDOE data file Free & Reduce Lunch 1999-2000.xls.

It must be noted that these costs do not include any new facilities that may be needed. Another consideration is that a quick jump into a major class size reduction program may result in a possible shortage of qualified teachers, as happened recently in California.

Menu-Based Grant Programs

Another alternative to a block grant approach is instituting a grant program that allows or requires eligible districts to select from among a menu of effective interventions.

As mentioned earlier, this approach has been successful in Memphis, and is also similar to the federal Comprehensive School Reform Demonstration (CSRD) initiative, otherwise known as the Obey-Porter Program. The CSRD program provides grant money to schools that wish to implement a whole-school reform model. Whole-school models address the entire school structure—organization, instruction, professional development, evaluation, etc.— in a comprehensive, aligned fashion, instead of offering piecemeal approaches to reform. Whole-school reform models are increasingly popular across the country, and the number of research-based designs is growing. The Obey-Porter legislation mentions 17, although it does not limit eligibility to these, and another 64 are described in the Catalog of School Reform Models (NWREL, 1999).

Which schools are eligible to receive grants can be determined in a variety of ways. We recommend targeting this funding to schools with significant incidences of poverty (defined practically as 25% of students eligible for free/reduced-price lunch)[35] to implement a menu option. Alternatively, grants could be available only to low-performing schools with high concentrations of poverty, or to all low-performing schools.

The costs of implementing whole-school reform models varies widely. One researcher estimated first-year implementation costs to be roughly $180,000 for a school of around 750 students (Keltner, 1998). Since most New Hampshire schools are considerably smaller, costs could be expected to be proportionately lower. Costs also vary among programs. As noted earlier, the more expensive programs, such as Success for All, can cost roughly $1,000 per pupil (or over $300,000 per school). Many programs are considerably less expensive, however. Obey-Porter provides average grants of about $70,000 per school.[36] Many schools also receive federal Title I funds or grants from other sources to help them implement reform packages, and some programs and analysts claim that schools can afford them simply by reallocating existing resources.[37] The first years of implementation are typically the most costly, with expenses decreasing once materials and initial training have been provided. Tables 5a and 5b estimate the total cost to the state under several scenarios with different eligibility thresholds and funding levels. Table 5a shows the cost if the grant program were available to both elementary and secondary schools, while Table 5b shows the costs if eligibility were limited to elementary schools.

[35] Slightly less that 150% of the statewide average of 17%.
[36] CSRD: www.sedl.org/cgi-bin/mysql/csrd-summary.cgi
[37] See Odden, op. cit.

Table 5a: Cost to State of Menu-Based Grant Program Under Different Eligibility Thresholds and Funding Levels (in millions)[38]

Elementary Schools Only

Eligibility Criteria	Threshold Level	# of Schools	Grant Funding per School		
			$50,000	$70,000	$100,000
Poverty Concentration[39]	Over 20%	195	$9.6	$13.7	$19.5
	Over 25%	155	$7.8	$10.9	$15.5
	Over 30%	109	$5.5	$7.6	$10.9
Performance	Over 40% novice	150	$7.5	$10.5	$15.0
	Over 50% novice	98	$4.9	$6.9	$9.8
	Over 60% novice	49	$2.5	$3.4	$4.9
Poverty & Performance	Over 20% poverty and over 40% novice	90	$4.5	$6.3	$9.0
	Over 25% poverty and over 50% novice	51	$2.6	$3.6	$5.1
	Over 30% poverty and over 60% novice	21	$1.1	$1.5	$2.1

[38] Source: NHDOE datafiles for 1999-2000, including SchEnroll9900.xls, Free/Reduced Lunch 1999-00.xls, Ros399.xls, Ros699,xls, and Ros1099.xls.

[39] Percent eligible for the federal free/reduced-price lunch program.

Table 5b: Cost to State of Menu-Based Grant Program Under Different Eligibility Thresholds and Funding Levels (in millions)

All Schools[40]

Eligibility Criteria	Threshold Level	# of Schools	Grant Funding per School		
			$50,000	$70,000	$100,000
Poverty Concentration	Over 20%	208	$10.4	$14.6	$20.8
	Over 25%	161	$8.1	$11.3	$16.1
	Over 30%	110	$5.5	$7.7	$11.0
Performance	Over 40% novice	209	$10.5	$14.6	$20.9
	Over 50% novice	131	$6.6	$9.2	$13.1
	Over 60% novice	57	$2.9	$4.0	$5.7
Poverty & Performance	Over 20% poverty and over 40% novice	102	$5.1	$7.1	$10.2
	Over 25% poverty and over 50% novice	55	$2.8	$3.9	$5.5
	Over 30% poverty and over 60% novice	21	$1.1	$1.5	$2.1

As discussed earlier in this chapter, the five funding options presented here—block grants, state-directed interventions, menu-based grant programs, categorical programs, and vouchers—are not mutually exclusive. Lawmakers can choose the combination of approaches that best meets the priorities, available resource levels, or individual circumstances of specific school districts.

Each of the interventions discussed above, or some combination thereof, could be implemented within the current-level state expenditures under the poverty adjustment to the basic adequacy grant. The state is slated to spend a total of $57.7 million on the poverty adjustment in FY 2002. If the state adopted a revised adjustment system that allocates 20% of actual average funding to schools with poverty rates over 25% (Option B5 in Table 4), the cost would be only $18.5 million. The estimated cost of the other interventions is displayed in Table 6 below.

[40] This table presents total cost to the state of providing grants to all elementary and secondary schools meeting the specified eligibility criteria. As noted earlier, eligibility rates for free/reduced lunch are artificially low at the secondary level. If secondary-level eligibility rates were extrapolated from feeder elementary schools or from district elementary eligibility rates, targeting would be more precise, but the costs to the state would be substantially higher than those presented here.

Table 6: Summary of Cost Estimates for Statewide Reform Initiatives

Program	Estimated Cost *(in millions)*
Prekindergarten[41]	
Universal half-day	$27.1
Universal full-day	$47.2
High-poverty schools half-day	$9.3
High-poverty schools full-day	$15.5
Kindergarten[42]	
Universal half-day	$12.7
Universal full-day	$39.5
High-poverty schools full-day	$13.8
Reduce Elementary School Pupil-Teacher Ratios	
Ratio reduced to 15.3 in all schools	$15.9
Ratio reduced to 15.3 in high-poverty schools	$3.2
Ratio reduced to 13.0 in all schools	$48.0
Ratio reduced to 13.0 in high-poverty schools	$12.4
Whole-School Reform Grants[43]	$1 to $21

SPECIAL EDUCATION CONSIDERATIONS

Overall, 13.6% of New Hampshire students are identified as requiring special education services. This figure is higher than the national average of 12.3% (NCES Statistics in Brief, June 2000). Since special education rates often correlate highly with the number of poor and minority students, the identification rate in New Hampshire is surprisingly high. Compared to other states, New Hampshire ranks 17th in its percent of special education students. Nationally, identification rates range from just under 5% in Michigan to over 18% in New Mexico. Within New Hampshire, identification rates are similarly variable between districts, ranging from 3% in New Castle to 22% in Lisbon Regional.

Federal law requires schools to provide a free and appropriate education for students with disabilities. Students with disabilities must be educated to the full extent of their abilities in the

[41] Children are assumed to attend three hours per day (half-day) or five hours per day (full day) for 180 days at $3.38 per hour. For the purposes of this calculation, we assumed that the number of prekindergarten-aged children equals the number of second-grade students in the state (16,500; actual prekindergarten figures were not available). Since these figures are enrollment rather than ADM, actual costs can be assumed to be somewhat lower than the estimates shown here, since ADM figures will be lower than enrollment figures. High-poverty schools are defined here as those with over 25% of their students eligible for free/reduced lunch. Estimates are shown for the costs of providing prekindergarten to all appropriate-aged children in those schools. Note that the current adequacy aid formula provides $3 million for the 908 prekindergarten ADM; this amount has been subtracted from the two universal prekindergarten estimates, and may overlap with the two high-poverty school estimates.

[42] The state already spends roughly $14.6 million on kindergarten through its adequacy aid formula. The figures shown here are the additional amount that the state would need to spend to provide kindergarten to the specified population.

[43] Range depends on eligibility criteria and grant size. See Tables 4a and 4b for more detail.

least restrictive environment. However, few special education disabilities have objective diagnostic methods or standard approaches for instruction. Because of this, identification rates and treatment practices are highly susceptible to the incentives created intentionally or inadvertently by state funding systems. It is impossible to design a system free of incentives. States must ensure that special education funding mechanisms do not create perverse incentives for over- or underidentification of particular types of disabilities and high-cost placements, or encourage placement of students in segregated, restrictive environments.

Increasing special education costs emerged as a priority concern in a MAP-organized focus group of New Hampshire school district superintendents and school business administrators. Several participants mentioned that although percentages of special education students in their districts had not risen, costs of providing special education services had increased substantially in recent years. Participants attributed rising costs to two factors: Increasingly informed parents demanding more and more costly services for their children, and ever greater emphasis on least restrictive environment placements requiring additional costly support resources.

Based on our investigations, we have concluded that differences among districts in coding rates are primarily influenced by differences in how aggressively local educators seek to identify handicapped students, how aggressively parents seek services for their children, and the relative emphasis districts place on prevention versus identification. Some differences in identification rates are also explained by district size and grade levels of a district's schools. However, we were unable to find a satisfactory explanation for the higher-than-average overall identification rate.

Current Special Education Funding Formula

Funding for special education in New Hampshire is currently composed of two parts. The adequacy aid formula includes a special education component through its pupil weighting system, and a separate Catastrophic Aid program reimburses districts for low-incidence, high-cost special education students.

In the adequacy aid funding formula, an additional weight of 1.0 is given to students with disabilities, based on average daily membership (ADM) of special education students in each town. Because kindergarten, elementary, and secondary students are treated differently in the formula, the additional special education weight of 1.0 intentionally or unintentionally creates different de facto weightings for each group. Elementary special education students generate a total weight of 2.0, or 200% of the base cost funding of regular students. Secondary special education students generate 220% of base cost funding, which translates into 180% of regular secondary student funding. Prekindergarten and kindergarten students are capped at 0.5 ADM in the formula, so their total special education weight is 1.0 plus whatever their ADM is.

The state provides additional funding to districts educating high-cost special education students through its "Catastrophic Aid" program. When costs for a special education student are 3.5 to 10 times the statewide average per-pupil expenditure ($20,861 to $59,603 for FY 2000), the state reimburses the district for 80% of the amount above $20,861. If costs for a special education student exceed 10 times the statewide average, the district reimburses 100% of the costs

exceeding $59,603. Thus the maximum the district pays for a high-cost special education student is $28,609 (the first $20,861 plus 20% of the amount between $20,861 and $59,603).

The state allocated $79 million for special education through its adequacy aid formula in FY 2001,[44] and provided an additional $16 million through its Catastrophic Aid program (FY 2000), for a total $105 million. On the other hand, districts report spending over $219 million on special education in 1997-98, the latest year for which reliable data are available. Overall, it appears as if the state is compensating districts for less than half of their special education expenditures. However, districts do receive some federal aid for special education.

Nationally, expenditures on special education students are 2.3 times regular education expenditures (Odden & Picus, 2000).[45] On average, New Hampshire districts spend even more than this. Table 7 presents estimates for what typical New Hampshire special education expenditures would be if they were aligned with the national weight, compared to actual average special education expenditures. If districts spent the national average weight of 2.3 times regular education costs, typical special education expenditures would be $12,265 per pupil (as of 1997-98, the latest year for which reliable data are available). However, New Hampshire districts are actually spending an average of $14,213 per special education pupil, which is a weight of 2.7 over regular education expenditures of $5,332 per pupil.

Through its adequacy aid formula, the state is funding $6,402 per elementary special education pupil, and $7,042 per secondary pupil. This amounts to 45% to 50% of actual expenditures, and 52% to 57% of estimated national average costs.

[44] Adequacy aid formula special education costs will increase to $89 million for FY 2002, a result of a growing special education ADM and a higher base cost per pupil.

[45] Although the weight of 2.3 has become the standard measure, it must be noted that it is based on data from the 1980s and is likely out of date. However, it is the best available figure.

Table 7. Estimated Special Education Per-Pupil Actual Expenditures Compared to Adequacy Aid Grants (FY 1998)

Category	Cost
Estimated district cost for an average NH special education student based on national weight of 2.3 times regular education expenditures per pupil[46]	$12,265
Actual 1997-98 NH district average special education expenditure per pupil[47]	$14,213
Adequacy aid grant for an elementary special education student[48]	$6,402
Adequacy aid grant for a secondary special education student[49]	$7,042
Estimated regular education per-pupil actual average expenditures	$5,332
Actual weight of special education expenditures to regular education expenditures	2.7

Disadvantages of the Current System

The current funding formula seems to suffer from several deficiencies. First, there appears to be a disconnect between the state's apparent desire to target funding to school districts that experience higher costs as a result of educating disabled students and receipt of the extra funding at those school districts where such students attend. Any intended targeting is diluted by sending funding to towns rather than directly to the agency providing instruction, as there is no assurance that a funding adjustment will be passed through intact to a school district of attendance. There is no prohibition to any state funding being used to reduce local taxes.[50] On the other hand, a possible advantage of this arrangement appears to be that the incentive one normally associates with a direct connection between the number of students coded and the level of funding does not seem to be powerfully operating.

[46] Calculated as regular education per-pupil expenditure of $5,332 times 2.3 (national average special education weight). The regular education per-pupil expenditure of $5,332 is a rough estimate calculated as follows: current per-pupil cost of $5,781 (1997-98 state MS-25) times 1997-98 state total ADM of 195,445 (final FY01 adequacy spreadsheet) equals total cost of $1,129,803,048. From this total, subtract total special education expenditures of $219,250,927 (1997-98 MS-25), for a total of $910,552,121 in regular education expenditures. Divide by the total number of regular education students (170,757, Final FY01 adequacy spreadsheet), for the total regular per-pupil expenditure of $5,332. If this figure were inflated at 3% a year for two years, the result would be $5,657 for FY 2000.

[47] Marginal special education cost of $8,881 (total special education costs from the 1997-98 state MS-25, divided by total state special education ADM from the Final FY01 adequacy spreadsheet) plus regular per-pupil expenditure of $5,332.

[48] For grades 1-8. Does not include allotment for transportation or the poverty adjustment. Calculated as base cost of $3,201 times weight of 2.0.

[49] Does not include allotment for transportation or poverty adjustment. Calculated as base cost of $3,201 times high school weight of 1.2, plus an additional weight of 1.0 ($3,201).

[50] Even if state funding flows directly to school districts, the effect can be the same as if it went to towns. By restricting growth of the school district spending per pupil at or near the level the prior year, towns are still able to convert state funding into tax relief. If, under the current system, policymakers want to ensure that state funding for special education costs are used for that purpose, we recommend the maintenance of effort provision described in the discussion of funding for low-income students.

A second problem with the current funding system is that there may be an incentive operating in the catastrophic aid program to overserve some students. Districts have little incentive to control service costs when they approach thresholds of $20,861 or $59,603.

Third, New Hampshire's practice of counting special education kindergarten students and preschool children as 1/2 ADM regardless of the actual duration of each student's program may result in underfunding. Some special education kindergarten students attend full-day programs as part of individualized education plans and all preschool children currently served are identified as special education. As a consequence, the program provided for these students is not optional or a matter of local preference. Thus, attaching a full weight to such students would appear to be warranted.

Fourth, the current formula provides proportionately more funding to elementary special education students relative to their regular education peers than it does to secondary special education students. The base cost used in the funding formula is the *elementary* base cost; the high school base cost is calculated within the formula as 1.2 times the elementary base cost. Therefore, while the current special education adjustment does provide secondary students with a weight of 2.2 over elementary base costs, it only weights them 1.8 times high school base costs. Meanwhile, elementary special education students receive a weight of 2.0 times regular education elementary students.

Finally, even if the state-provided funding were to find its way to the appropriate school districts, the state may underfund special education costs in at least two ways. Compared to a national average per-pupil special education cost of 2.3 times *average expenditure* per non–special education student, the New Hampshire adjustment of roughly 2.0 times the *basic adequacy grant* may undercompensate districts for true costs they incur. There is some evidence that this is the case when one compares the state grant with what districts spend to educate disabled students. As noted above, total state expenditures on special education are $105 million, whereas districts report spending $219 million in 1997-98. If the state did provide 2.3[51] times average regular per-pupil district expenditure (estimated as $5,657),[52] the total cost to the state is roughly estimated to be in the neighborhood of $200 million.[53] If the weight of 2.3 were instead applied to base cost, the result would total $116 million. Finally, if the state wished to fully fund districts for their actual expenditures, it would need to use the weight of 1.7 determined above, raising costs to $152 million or $269 million, depending on which funding base is used.[54] These weighting options are summarized in Table 8. Note that the weights shown here are the additional weights added to the base weight of 1.0 for elementary students and 1.2 for secondary students. Thus, for an elementary student, an additional weight of 1.3 is a total weight of 2.3.

[51] An additional weight of 1.3 as opposed to the current additional weight of 1.0.
[52] See footnote 51.
[53] Calculated as 1.3 x 5,657 x 27,004 special education ADM (NHDOE data file Final FY02&03 Adequacy.xls).
[54] These figures are somewhat inflated as they do not take into consideration the federal special education funding received by districts.

Table 8. Total State Cost of Alternate Weights and Funding Bases for the Special Education Adjustment (FY 2002)

Additional Weight for Special Education ADM		Per-Pupil Funding Base	
		Adequacy Aid Base Cost of $3,304	Average Regular Ed. Expenditure of $5,657
1.0	*Cost*	$89,220,225[55]	$152,759,931
	Percent of Total[56]	10%	16%
1.3	*Cost*	$115,986,292	$198,587,910
	Percent of Total	13%	20%
1.7	*Cost*	$151,674,382	$259,691,883
	Percent of Total	16%	25%

Options for Modifying the Special Education Funding Formula

In light of the problems described above, lawmakers should consider modifying the state provisions for funding special education. We adapted the following 10 criteria from those described by Parrish (1995) to be used by policymakers to evaluate the effectiveness of any special education funding formula.

Understandable. The laws and regulations that govern funding should be easily understood by policymakers and implementers at the state and local levels. Complexity breeds ambiguity and a class of "high priests" who tend to derive power from their ability to interpret arcane statutes.

Equitable. Program quality should be comparable across districts, all districts should have available similar resources for comparable students, and the level of funding available to each district should be equitable regardless of local wealth.

Adequate. All districts should have available sufficient resources to provide appropriate programs for their students. This does not mean that every district should provide all services. State policy should encourage cooperation to minimize redundant services. Also, adequacy does not imply that funding should include any expenditure local decision makers might incur regardless of need or cost-effectiveness.

Predictable. Local decision makers should be able to reasonably plan local programs and the demand for state funds should be relatively stable and predictable. State and local agencies should be able to count on stable funding over time.

Flexible. Local educators should be given maximum latitude to use state funding to respond to local conditions. In return, the state should hold local districts accountable for

[55] This is the current system.
[56] Total here refers to the total amount generated by the adequacy aid formula.

specific outcomes. Changes to the funding system should be made in ways calculated to cause the minimum disruption to local programs.

Identification Neutral. The funding formula should not provide any incentives for local districts to label students, and it should not be necessary for students to be labeled in order to receive appropriate instruction.

Placement Neutral. District funding for special needs students should not be based on a particular type of educational placement or disability label. Sound educational decisions should drive expenditures, not vice versa.

Reasonable Reporting Burden. Only those data that are necessary to manage and monitor the system should be collected and reported. Only those data not available elsewhere should be collected from local school districts. State data gathering should be regularly scheduled, integrated, and designed to minimize disruption of local procedures. In some states, agencies collect data once or twice per year on predictable specific dates. The State Department of Education should allocate sufficient resources for the timely gathering and analysis of school district fiscal data.

Fiscal Accountability. Every school district should be required to follow standardized accounting procedures. The state should ensure that districts are accurately reporting expenditure through auditing and monitoring and by regularly training of local officials. Timely reporting is necessary to allow the state to intervene when a district's expenditures are inappropriate or excessive.

Cost-Based. The level of funding available to districts for special education should be based on the cost they face in providing those programs. District expenditures may be greater or less than the real cost of providing special education. Current or historical expenditures may not be an adequate measure of cost. For example, districts may employ more teachers (lower pupil-teacher ratio) than are necessary to provide adequate programs for disabled students, or their class sizes may be too large to adequately serve certain disabled children.

Cost Control. Patterns of special education identification, placements, and overall costs should be stabilized over time.

Outcome Accountability. The state should monitor school districts on the basis of student performance using multiple measures. Districts that consistently are able to produce state specified student outcomes, should be of permitted maximum flexibility in the use of funding from all sources. The state should adopt consequences for school districts that fail to meet the state's expectations.

Connection Between General Education and Special Education Funding. Any funding formula should facilitate the integration of special education personnel and services with those of regular education so that all students receive indicated services at the earliest appropriate time with the least disruption of their ongoing educational program.

Political Acceptability. Abrupt changes in state funding are likely to meet with resistance from various stakeholders, especially if the changes result in major losses of local revenues or disruption of existing services. Consultation with stakeholders while policy is being deliberated enhances the probability of local acceptance of change and reduces the likelihood of unintended consequences.

Types of Special Education Funding Formulas

There are four main types of special education funding formulas: pupil weights, flat grants, resource-based, and matching reimbursement.

Under a *pupil weighting system*, funding is allocated on a per-pupil basis premised on a given weight. For instance, if the weight is 2.0, special education students generate twice the funding allocated for general education students in that district. Weights are sometimes differentiated on the basis of student placement (e.g., pullout program, private residential), disability category, or a combination of the two. In Georgia, for instance, weights are determined by type of disability, varying from 2.27 for self-contained learning disabilities to 5.541 for the profoundly impaired. States using the pupil weighting method cite several strengths, including equity, predictability, reasonable reporting burden, and flexibility in resource use. However, states also noted that this approach can create incentives for misclassifying and overidentifying students.

Under a *flat grant system*, a fixed amount per pupil is allocated for each special education student. Some states limit the eligible counts of disabled students in a given district to a certain percent of total ADM, such as 12.5% in the case of North Carolina. Some advantages of the flat grant approach are that it does not encourage the overidentification of special education students, it allows early intervention and prevention, and it is easy to understand. On the other hand, flat grants can result in underfunding for some districts, given the variability in types of student conditions; they are not linked to student achievement; and they are not based on actual expenditures incurred by districts.

In *resource-based systems*, funding is allocated for specified types of resources, for example teachers or equipment. Rates for particular units are generally derived from prescribed student-staff ratios that vary by disability condition or placement. The advantages of this system are its relatively simple administration and freedom from overidentification or misclassification of students. Disadvantages include lack of flexibility in how resources are used and potentially inequitable distribution of resources.

The *matching reimbursement method* distributes special education funding to districts based on their actual expenditures. Districts may be fully or partially reimbursed for their program expenditures. There are usually criteria for determining which types of expenditures are eligible, and some states cap the total number of students in each district who can be claimed for funding. The major strengths of this approach are that it is based on actual expenditures and that as long as there is substantial district match, it is less likely to create an incentive for overidentification or particular types of student placement. The weaknesses are that it can be a substantial administrative burden, and unless cost ceilings are imposed it can cause difficulties in cost

control. Greater shares of expenditures reimbursed by the state tend to attenuate incentives for cost-effectiveness considerations.

As of 1994-95, roughly 40% of states used formulas primarily based on pupil weights, with the remainder evenly divided between the other three approaches. New Hampshire currently uses a combination of fixed dollar grants per pupil (in its adequacy aid formula) and percent reimbursement (in its catastrophic aid program). The former Foundation Aid program used a system of pupil weights.

In recent years the federal government and several states have implemented *census-based* funding, which is a variant of the flat grant. Under this method it is presumed that a predetermined portion of each school district's student population is handicapped, and no district's grant is based on the actual number of students identified. Districts with the same enrollment would receive identical special education grants. The statewide average cost of providing special education services is determined and each school district receives a grant equal to that amount multiplied by its enrollment and the predicted percent of disabled students. For example, a state spending $6,500 per pupil could determine that 12% of its students are disabled, and assuming that in that state the average per-pupil cost of special education is 2.3 times the regular education cost per pupil or $14,950, a school district with 3,000 students would receive a flat grant of $3,042,000 (.12 x 3,000 x ($14,950-$6,500)). A variant of census-based funding is to weight the grant by the number of low-income students attending the district.

Some of the advantages associated with census-based funding systems are that they tend not to provide incentives to overidentify or overserve, and thereby contain costs. Also, as long as the state does not specify how the grant is spent, census-based grants permit or even encourage school districts to engage in precoding interventions. Early intervention and prevention also offer opportunities to not only contain cost but to significantly improve the academic outcomes of at-risk students.[57] The potential disadvantage of census-based systems is that under certain conditions they can present incentives to not identify truly eligible students and may underfund or overfund districts where the incidence of handicapped youngsters is significantly more or less than the predicted rate. Federal law and a well-crafted state accountability system are both powerful antidotes for such concerns. The Alabama Supreme Court struck down that state's census-based formula primarily because of the perceived disadvantages described above.

Among states that have adopted census-based special education funding are Vermont, Massachusetts, Montana, and California. This funding method seems to hold great promise for disabled and potentially disabled students, while removing many of the perverse incentives

[57] Slavin (1995) begins a paper on the prevention of learning disabilities with this parable: "Once upon a time, there was a town that had in it a playground located at the edge of the cliff. Every so often a child would fall off of the cliff and would be seriously injured. At last the town council decided that something should be done. After much discussion, however, the council was deadlocked. Some council members wanted to put a fence at the top of the cliff, but others wanted to put an ambulance at the bottom." Is the latter solution so different from waiting until a child is 9 or 10 before providing intensive intervention for a problem that could have been effectively addressed three or four years earlier? Does it make sense to base instructional decisions on legal definitions and funding source restrictions? Stanovich (1987) concluded after a review of related research that achievement gap between children who get an early start reading and those who do not tends to widen over time. Stanovich advises that it is necessary to "Identify early, remedy early, and focus on phonological awareness." (p. 394)

associated with other methods. One notable example of the efficacy of this approach can be found in Elk Grove Unified, a large suburban school district in Northern California. Elk Grove obtained a waiver from the State Board of Education to obtain its special education funding as a block grant based on the assumption that 10% of its students were handicapped. The district focused available resources on prevention and coordinating services to students. They report that over the past five years the number of students coded dropped 7%; over the past four years approximately 7,300 students who would have been identified handicapped were not so identified; and over the past three years initial psychological assessments have declined 41%. District performance on state student assessments has improved significantly, and there have been no parent requests for administrative hearings since implementation.[58]

Unfortunately, in New Hampshire the proliferation of very small school districts, the mismatch between student need and resources available to meet those needs, and the lack of flexibility to shift resources among schools consistent with changing needs would seem to eliminate census-based funding from consideration at this time. A basic premises of census-based grants are that on average the proportion of the student population that is handicapped is predictable and that on average the costs incurred to serve that population is similarly predictable. These assumptions do not hold for very small districts, where small changes in the number of handicapped students could substantially change the proportion of their handicapped enrollment. Also, the mix of disabilities could shift significantly from year to year, thereby making costs unpredictable. For a census-based formula to work in New Hampshire, it would be necessary for school districts and SAUs to consolidate or form regional consortia to provide special education services.

Findings and Recommendations

Under the current funding methodology, it is unlikely that state funding policies have great influence on district decisions on how to code students because of the current disjuncture between state distribution targets and operating district practices. If, however, the state were to decide to actually target additional funding to compensate districts for the extra costs of providing services to disabled students, it would almost certainly become necessary to subvent special education funding directly to districts of attendance. Once funding is directly connected to number of students coded (as would be the case under the current funding method), at some point even the shortfall between state funding and local expenditures may be an inadequate disincentive to overcode students. The perverse incentives described above will be exacerbated if state funding covers a greater portion of districts' special education expenditures. For the next few years, there appears to be little risk to leaving the current formula alone. It does not, however, seem likely that the current funding formula will remain static for a long period. We therefore strongly recommend that the state anticipate possible changes and begin the arduous task of rethinking how it funds programs for students with disabilities.

No funding formula is value-free. All provide incentives and disincentives for local educators to behave in particular ways. For example, as we have discussed elsewhere, formulas that base funding on number of students identified, or that reimburse actual expenditures, tend to encourage decisions at the margin to identify more students or to spend more for services. Thus,

[58] See district Web page www.egusd.k12.ca.us. Also, conversations with William Tollestrup, Director of Special Education/Neverstreaming.

it is incumbent upon the Legislature to make explicit its policy priorities before making changes to the special education funding formula.

Special education is unique among education programs because of a set of specific rights that accrue to identified children and their families. It is complex, charged with emotion, and closely monitored by powerful interest groups. As a consequence, it would be folly to approach the task of modifying the current formula without a thoughtful, systematic process that involves all stakeholders. Such a process is complicated and often fraught with more heat than light, but as we have asserted elsewhere, the Legislature is uniquely qualified to manage such a process and craft a reasonable outcome. First, however, the Commission or other appropriate legislative entity should set the stage.

What are the problems to be solved? Do districts fail to serve some disabled children? Are too many students being labeled as disabled? Do districts tend to provide higher-cost services than are warranted by the nature of their student population? Is the number of students identified in a particular category of disability growing at a rate that causes concern? Do districts tend to delay intervention until a significant discrepancy between ability and performance can be demonstrated for some students? Does the current program produce acceptable student outcomes? How will the answers change if the state funding formula is modified in specific ways?

The problem statement process may initially be impeded by a shortage of reliable data. In order to facilitate the collection of sufficiently detailed reliable data on special education incidence and cost, the state should consider participating in the Special Education Expenditure Project (SEEP), operated the Center for Special Education Finance (CSEF) at the American Institutes for Research. SEEP is a national inquiry into special education revenues and expenditures, allocation patterns, and modes of service delivery. While all 50 states are included in the sample, not enough information is collected from any one state to provide a representative sample. CSEF has helped nine states[59] conduct parallel state-level examinations of their special education revenues and expenditures and service programs, and has extended a similar offer to the remaining 41 states.[60]

Taking advantage of this opportunity would allow New Hampshire to obtain reliable, detailed information on state and local special education expenditures. Participating states cite other benefits as well: The study has helped them provide a basis for comparison to the national database, assess changes in funding policies, provide cost breakdowns by category, analyze special education versus general education spending, build capacity for long-term data collection, begin to relate special education spending to student outcomes, and provide sufficient information for informed policymaking. Since the development costs of the national SEEP have already been covered through a federal grant, the cost to the state for an expanded study is reduced by about one-half.[61]

[59] Alabama, Delaware, Indiana, Kansas, Missouri, New Jersey, New York, Ohio, and Rhode Island.
[60] See the Summer 2000 issue of *The CSEF Resource*, newsletter of the Center for Special Education Finance.
[61] Total cost would depend on the level of effort required by the contract with CSEF. Current contracts in nine states vary in size from about $70,000 to $350,000. Actual cost to New Hampshire would largely depend on how many districts the state decided to include in the sample and how much subsequent analysis it required. For $212,000, the

Comprehensive, reliable data are necessary to design a sound funding system and to evaluate its effectiveness in future years. The New Hampshire Department of Education has had difficulty collecting and auditing special education data in a uniform manner, and does not currently gather information on the costs of different disability categories. Because the SEEP studies are already underway, participating in an expanded state-level assessment would provide a cost-effective way of implementing new, proven data collection methods, and would provide sufficient information for district-level and state-level comparisons upon which policy can be based.

It is unlikely that any formula will maximize all priorities, but a well-crafted formula will send clear signals that shape local decision-making in the directions most desired by the Legislature and away from those that are inconsistent with state priorities. The Legislature should test suggested changes in the special education funding formula against each of the targeting criteria described above and consciously decide which criteria should receive the maximum weight. To successfully modify the special education program to meet the greatest number of criteria is likely to require conforming changes in complementary programs, accountability standards, Department of Education infrastructure, and elsewhere.

Finally, if the Commission wishes to consider more innovative but untried approaches to special education funding, one is offered here for consideration.

A Proposal for a Needs-Based External Assessment Funding System

The Adequate Education Commission specifically asked MAP to "think outside the box" and to propose creative solutions for education funding in New Hampshire. In that vein, we offer for consideration a novel approach to special education funding. Please keep in mind that this is designed to be a preliminary proposal that ventures into untested waters. However, it may provide some new ways of thinking about special education funding possibilities.

Parrish (1996), a national expert in special education finance, highlights the need for needs-based special education funding that is determined outside district control.

> In the face of increased demands and dwindling resources in public education, it is essential that ways be found to channel funds where they are most needed. This suggests a needs-based funding system, which would vary with differences in true measures of student *need* rather than the number of students identified or the quantity and types of services being provided. Externally determined measures, *beyond district control*, are needed to link funding to student service needs without creating incentives for local providers to necessarily label more students or to provide one type of service over another. Unfortunately, such external measures are not currently available…. The development of objective, needs-based funding systems and appropriate, relevant, and agreed-upon results-based accountability systems will pose considerable challenges for future special education research and policy development. (p.29, emphasis added)

Rhode Island contract includes all school districts (the only state to do this) plus a policy analysis project. (Correspondence with Tom Parrish of CSEF.)

One way for New Hampshire to take up this challenge is as follows. The state could determine the total state appropriation for special education funding using the census-based method, perhaps something in the neighborhood of $203 million.[62] However, this funding would not be allocated directly to districts. Instead, the state would either contract with an external special education assessment firm, or create a division within the Department of Education for this purpose. Either way, the Assessment Agency would set up several regional offices across the state, each responsible for allocating a portion of the total special education funding. When districts had pupils they felt might require special education services, these pupils would be assessed by the regional Assessment Agency staff, rather than by district employees. Agency staff would determine whether the student warranted special education services, and if so, allocate the appropriate funds for those services to the district. Districts would not be obligated to provide the exact services recommended by the Assessment Agency or to use the funding specifically on the child who generated it, so local control and local service provision would be maintained. Under this system, special education identification and funding could be applied consistently and equitably across the state. Since district funding would not be based on the number of students with IEPs, districts would not have an incentive to overidentify special education students in order to receive more state funding. Nor would they have an incentive to underidentify such students. In addition, districts would be responsible for the full costs of the assessment if the Assessment Agency found that no special services were needed, but would not be required to pay (or would be responsible for only a small percent of costs) if services were indicated. This policy would dissuade districts from frivolously sending students to be assessed. If a district felt that the outside assessor was in error, it could appeal under the provisions of current federal law, or it could fund services for that child through local funds.

This proposed system would replace both the special education adjustment in the adequacy aid formula and the Catastrophic Aid program. As with all funding plans, the devil is in the details. Clearly, the details and implementation of such a plan would need to be developed carefully and reviewed by stakeholders.

PROVISIONS FOR LIMITED-ENGLISH PROFICIENT (LEP) STUDENTS

Similar to special education students, limited-English proficient (LEP) students enjoy federal protection. Consistent with the United States Supreme Court 1974 decision in Lau v. Nichols, the instructional program offered to LEP students must take into account their ability to access the school's curriculum. More explicitly, in its 1981 decision in Castaneda v. Pickard, the Fifth Circuit Court of Appeals set forth three criteria for evaluating programs for LEP students: (1) the program must be based on "sound educational theory," (2) it must be "implemented effectively," with adequate resources and personnel, and (3) it must be evaluated and shown to be effective in both teaching of English and providing access to the full curriculum. Neither court required that LEP students be provided bilingual education or any other specific instructional program.

New Hampshire is not a major point of destination for new residents of the United States. As a consequence, the proportion of the school population that does not speak English fully is quite

[62] Calculated as the national average weight of 2.3 times the average NH regular education per-pupil expenditure of $5,657, times 12.3% of NH student enrollment. Alternatively, the state could fund a higher percent of students, or provide a different weighting and base cost.

small. District administrators with whom we met described many of their LEP students as coming from relatively advantaged backgrounds and possessing solid academic skills, which tend to mitigate the need for additional resources. There does not appear to be a statewide LEP issue in New Hampshire, or at least no problem of a magnitude justifying inclusion of this category of added costs as a statewide distribution formula component.

Statewide, only 1% of New Hampshire students are classified as LEP. Only 30% of New Hampshire's 457 schools have any LEP children. Most schools that do have LEP students have only a handful (1-5 LEP students). The highest percent at any school is 29% (172 students). Only 9 schools in the state have LEP concentrations over 10%, and these schools are clustered in just two districts (Manchester and Nashua).[63]

Only 36% of New Hampshire's 163 school-operating districts have any LEP children. The highest percent in any district is 6.5% (Manchester). Nashua, Littleton, and Hanover each have approximately 3%. In most of the remaining districts with any LEP students, they comprise less than 1% of total district enrollment.

Most schools should be able to accommodate the unique instructional needs of English learners when they are enrolled in small concentrations, as is apparently the norm in New Hampshire. This is especially the case when LEP students are not clustered in a particular grade level or single classroom. Manchester may well have a challenge greater than other New Hampshire districts. A more thorough examination of the nature and distribution of LEP students in that district, and of the marginal costs of services provided them, may reveal that Manchester incurs extraordinary costs because of its unique student population. Under such circumstances, MAP recommends a grant to Manchester in which added state funds are allocated to the district based upon an approved plan for serving LEP students.

The cost of providing services to LEP students depends on the nature of instruction they receive, which should in turn depend on the enrollment concentrations of such students, their background characteristics, and, at least in the short run, the skills and knowledge of available teachers. There are several instruction strategies applied to LEP students that vary in intensity and cost. Chambers and Parrish (1992) estimate the average marginal per-pupil cost of services to LEP students at $361, although some instructional strategies cost over $1,200.

PROVISIONS FOR GIFTED AND TALENTED STUDENTS

Special programs for students that are identified as gifted or talented tend to be controversial. Guthrie and Smith (1998) concluded after a review of research that there is presently no generally accepted objective definition of what constitutes talent or giftedness, and that definitions tend to shift from place to place and over time. Moreover, probably because identification is ambiguous, there are no generally accepted instructional strategies or curriculum for gifted or talented students. Consequently, it is not possible to reasonably estimate the marginal cost of providing programs to these students, if in fact such programs do or should cost more than programs for students who are not identified as gifted or talented.

[63] All data are for the 1999-2000 school year. NHDOE data file MAPLEP.xls revised July 18, 2000 after conversation with staff.

New Hampshire currently does not specifically fund programs for gifted and talented students and we find no compelling reason for adding an adjustment to the state grant for these students.

PROGRAMS FOR ALL STUDENT POPULATIONS

Much is made of identifying students at risk for failure and targeting funding through categorical programs aimed at serving only those children. However, these students are often best served within the general education program instead of via pullout programs, and a number of interventions can be effective in raising scores overall. Across most grade levels and subject areas, the majority of New Hampshire students are performing at a "basic level." Programs designed to help raise achievement for these students substantially overlap with services for at-risk students.

The most effective reform may be schoolwide programs that help all students based on their individual needs rather than limited services to identified children. In fact, setting high and rigorous standards for all students, holding school districts accountable for providing programs that allow students to meet the state standards, and providing school districts with adequate resources may be the most effective approaches to improving outcomes for all students. This relatively simple approach drives education reform in most states.

Reading Initiatives

The root cause of underachievement for most children is related to poor reading skills. The academic performance of students who have not mastered reading by the second or third grade tends to fall further behind their peers each subsequent year. Reading Recovery, an extensively evaluated program designed to ensure that low-performing students learn to read in the earliest grades, targets the 10% to 20% lowest-achieving students in primary schools and provides them with focused, individualized attention to ensure that they learn how to read. The amount of individual attention makes it a staff-intensive and therefore costly program. However, several studies have found that Reading Recovery is actually quite cost-effective, since it can dramatically reduce subsequent need for special education and remedial services.

Reading Recovery alone would rarely address all of the needs of the typical school with high concentrations of low-income students, and because it is so labor-intensive, it may not be cost-effective in those schools. It does hold promise for most other schools, however. All schools have some early-grade students who struggle with mastery of reading skills. Implementing Reading Recovery statewide is likely a cost-effective way to generally raise academic achievement.

Maine began a program to implement Reading Recovery in schools across the state in 1991. The program now serves almost 2,200 students in 215 schools. An independent researcher hired by the Maine Department of Education to evaluate the program found that most of the Reading Recovery students did make the accelerated progress necessary to reach the achievement level of their peers. Of the children who successfully completed Reading Recovery in first grade, 92% to 100% met or exceeded the average state achievement level, and continued to keep pace with their peers once they returned to their regular classroom. At the start of first grade Reading

Recovery students were in the bottom quartile of their class, but by the end of the year almost 35% were in the upper half of all first-graders.[64]

New Hampshire already provides some support for Reading Recovery. In 1997, legislation passed that helped fund Reading Recovery training for first-grade teachers. In 1998-99, local districts reported spending a total of $3.3 million on Reading Recovery, and the state contributed approximately $307,000 towards teacher training. A total of 1,072 children participated in the program, and 75% of students who received the full program caught up with their classmates. Teachers and administrators are generally very positive about the program, and it appears to successfully reduce special education placement and retention rates (NHDOE, 1999).

It is sensible to support Reading Recovery at the state level. While costs may be prohibitive at the school level for small schools, larger areas can capture economies of scale that substantially reduce costs to individual school districts.

Cost estimates for Reading Recovery vary widely. Estimates place the cost of the program at anywhere from $2,500 to $10,000 per pupil. A reasonable estimate would be that costs start out somewhere in the $4,000 range (primarily because of extensive teacher training requirements), decreasing to about $2,600 over a five-year period. In its ninth year of implementation, New Hampshire expenditures on Reading Recovery were approximately $3,400 per pupil, in part because the program is continuing to expand to new schools and regions of the state.

Increasing the Number of Students Performing at the Advanced Level on Statewide Tests

The number of students performing at the advanced level on New Hampshire state tests is low. Across the state, the percent of students scoring in the top performance category varies from under 1% to 12%, depending on grade level and subject area (see Table 2). As noted above, this may be a result of the test itself, the criteria by which tests are scored, or the level of the standards. Whatever the cause, educators should be concerned with increasing the number of high-performing students.

One way to increase the number of students achieving at higher levels is for schools to offer more advanced courses such as Advanced Placement (AP) and International Baccalaureate (IB) programs, and to encourage more students to participate.

The AP program is sponsored by the College Board and designed to allow students to take college-level courses while still in high school. AP courses are offered in 19 subject areas. Many colleges and universities award college credit to students who receive a specified grade (usually 3) on an AP examination. Costs of AP programs are modest, involving primarily training of teachers, much of which is subsidized by the College Board. Examinations cost $77; for low-income students the fee is reduced to $22. Twenty-six states provide some sort of incentive and financial assistance to encourage greater participation in this program. In 2000-01 the federal government is providing $15 million in grants to states for low-income student examination fee waivers.[65]

[64] www.ume.maine.edu/~cel/aboutrr.htm
[65] College Board Web page: www.collegeboard.org/ap/stateinit/

The IB program grew out of efforts of international schools to develop rigorous common curriculum and assessments that would be recognized by universities around the world. It is composed of the "Diploma Programme" for students in the final two years of secondary school, "Middle Years Programme" for students aged 11 to 16, and "Primary Years Programme" for students aged 3 to 12. The International Baccalaureate Organization, a nonprofit foundation based in Switzerland, develops curriculum and assessments and provides teacher training and information seminars for over 1,000 participating schools in 100 countries.[66] Costs of this program vary depending on the number of participating students, but IBO staff estimate start-up costs of about $50,000, primarily for teacher training, spread over the first three or four years. Ongoing annual costs are about $10,000.[67]

Perhaps the most powerful mechanism for increasing the number of students participating in AP, IB, and other advanced courses, and for increasing higher-level performance generally, is to implement a state accountability system that provides adequate incentives for higher performance of all student groups. If state policymakers decide that increasing the number of students in the advanced performance category is a major priority, this goal can be built into the accountability measures, and school districts would be held accountable for enrolling greater numbers of students in advanced classes and for improved performance of larger numbers of students in those courses. For instance, a baseline year of data can be used to determine the percent of students at the advanced level, and then annual performance targets can be set for individual schools. Nearly a decade ago, California achieved a dramatic increase in the number of students taking AP examinations by requiring school districts to report the number of students earning a score of 3 or higher on an AP examination.

Systematic Professional Development

Professional development is a term educators use to describe a wide range of activities aimed at objectives such as:

- Providing teachers with up-to-date knowledge of curriculum content
- Enhancing their range of teaching methods to better meet the needs of all students
- Providing teachers with the skills to diagnose student learning and evaluate student progress
- Motivating teachers' commitment to and enthusiasm for teaching
- Training teachers to evaluate the strengths and weaknesses of their own teaching (Little, et al. 1987)

No school's instructional program can be better than the skills and knowledge of its teachers; but few states or school districts invest the time and money necessary to actually affect what teachers teach and how they teach it. The ubiquitous one-shot workshops accomplish little beyond conveying information, and are rarely worth the time and effort they consume. Even university courses and other "skills training" seem to have minimal demonstrable effect on teachers' ability

[66] IBO maintains a regional office in New York. IBO Web page: www.ibo.org/ibo/english/
[67] Correspondence with IBO staff.

to translate new ideas into classroom practice.[68] If the state expects teachers to possess the skills and knowledge to deliver an instructional program that allows all children to achieve at their maximum potential, it must invest leadership and resources to ensure that all teachers enter the profession with high-level skills and content knowledge, and have access to and incentives for engaging in high-quality professional development throughout their careers.

Determining the most effective state role in professional development depends in part on the priority a state places on improving public education and in part on the traditional relationships between the state and its local school districts. At least two states have made the improvement of teachers' skills and knowledge a high priority and addressed this goal comprehensively and systemically. North Carolina and Connecticut both have invested heavily in teachers by increasing salaries, strengthening licensing requirements and renewal systems, instituting compensation structures based on knowledge and skills, raising entry standards, establishing school-university partnerships, mentoring beginning teachers, funding professional development tied to standards, requiring teacher education programs to be accredited, encouraging peer review, and providing support and incentives for teachers to become certified by the National Board for Professional Teaching Standards (Darling Hammond, 1997).

In 1999, New Hampshire instituted new rules regarding the recertification of teachers that require each district to appoint a local professional development committee to develop and monitor a five-year master plan that is submitted to the state. The plan must incorporate student assessments, the State Board of Education curriculum frameworks, ongoing evaluation, provisions for individual educator growth and school program improvements, a statement of how data will be utilized, a statement of how accountability for student performance will be demonstrated, and a description of professional development activities. In addition, each certified educator must develop a three-year individual plan that is linked to the master plan and focused on increasing student performance in order to satisfy recertification requirements.
Under the new plan, educators must have a minimum of 75 hours of approved professional development activity every three years. Forty-five of those hours must be dedicated to meeting district needs, school goals, or school improvement plans; and 30 hours must be in the subject area of specialization.

The new program incorporates many of the characteristics of high-quality professional development consistent with current research. Among these are that it is to be job-imbedded, focused on the application of knowledge, evaluated on effectiveness rather than participant satisfaction, and that it is to be aligned with state curriculum frameworks. We do have some concerns about the State Department of Education's role in this program, however.

[68] Little, et al.(1987) Summarize the research underlying this point: **"**…Bruce Joyce and Beverly Showers published a critique of skill-based staff development, estimating a "transfer rate" of less than 20 percent in the absence of classroombased "coaching" (Joyce and Showers, 1981). The most sophisticated of the skill training studies trace the effect of training into classroom practice. From these studies, one learns (1) the more complex the ideas and methods, the greater the requirement for incremental, long-term support (Joyce and Showers, 1981); (2) teachers' acceptance of an idea and their commitment to its use in the classroom, are more powerful than their knowledge or skill in predicting actual classroom use (Molman, Coladarci, and Gage, 1981); (3) the greater the difference between current classroom practice and the (new) content of staff development, the greater the time and effort required (Showers, 1982; McLaughlin and Marsh, 1979); but (4) modest staff development investments stretch very far indeed when teachers are well organized at the school level to provide support for one another ."

The first concern is the apparent lack of state leadership in determining content and modes of delivery. The state has adopted curriculum standards and tests to measure student performance that are based on those standards. Like it or not, the state does specify a significant portion of local curriculum. Acknowledging this reality, the current professional development program requires that locally determined professional development plans address the state curriculum standards. But as we understand the current program, each district is left to its own devices to develop its program. Each district will invent its own program, and predictably some programs will be excellent and others a waste of teachers' time and district money. This is particularly problematic for small districts—most New Hampshire districts—which typically do not have sufficient resources to develop or deliver high-quality professional development.

We recommend that the State Department of Education create scale economies and enhance quality control by organizing local educators to develop and deliver professional development programs.

Our second concern is the requirement that the State Department of Education review and approve local plans. From our experience state review and approval for local plans is not a cost-effective enterprise. In the first place, skill at writing plans frequently does not imply skill at program implementation. Secondly, most written plans don't accurately convey the actual quality of a program as implemented. Finally, despite the best intentions, these processes tend to become a bureaucratic exercise that wastes time and state resources that could be engaged in providing assistance to school districts. We recommend that the state rethink the requirement that the Department of Education review and approve local professional development plans.

Costs of high-quality professional development are not well documented, but from our experience an annual expenditure of $1,500 to $3,000 per teacher, on average, is necessary to bring about significant change in classroom performance. Darling Hammond (1997) argues that professional development is more cost-effective than other popular interventions. Her research in this area is controversial, and the specific ratios she reports should be viewed in that light. From our experience, however, high-quality professional development is essential to substantive educational reform, and should be an integral part of any statewide strategy to improve education.

IX. TEACHER FACTORS

A career-level New Hampshire teacher, even one who leaves the classroom for a school or district administrative post, is employed in education for more than 25 years. Thus, each professional hire represents an approximate $1 million lifetime commitment by the state's taxpayers.

Investments of this magnitude should yield returns. This section is devoted to a discussion and a set of recommendations suggesting means by which New Hampshire can better ensure returns from such investments in the form of added academic achievement.

New Hampshire employs 14,012 individuals as full-time teachers in its local public school districts. Their statewide mean salary is $37,734. Fringe benefits add an additional $7,924 to each teacher's annual cost. An average teacher costs the public more than $45,000 each year.[69] Thus, for 1999-2000, we estimate that New Hampshire's taxpayers spent approximately $640 million on aggregate teacher salaries.

Keep in mind that the above-specified individual annual payment (salary and fringe benefits) is what a teacher receives for working a nine- or ten-month academic year. If we assume the conventional teacher work year in New Hampshire to be 185 days, this remuneration equals approximately $247 per day or more than $59,000 when extrapolated to a conventional 240-day work year.[70]

Many teachers earn something in addition to their annual instructional salary by assuming added responsibilities such as sponsoring after-school activities and coaching. Figures for such supplemental compensation are not available statewide.

THREE FACTORS AFFECTING TEACHER SALARIES

Teachers' annual salaries have three major components. The first is a base yearly payment related to a candidate's possession of a Bachelor's degree and a state certificate or license. It is for individuals qualified at this level that issues of supply and demand most prominently come into play in determining salaries. The other two major teacher salary components are less connected with labor market dynamics.

A second salary component is an annual dollar increment commensurate with length of employment, or seniority pay. Nationwide, school district salary schedules typically recognize at least 15 years of service by teachers and often go as high as 25 or more years of annual service increments.

The third remuneration component for teachers consists of salary schedule payments for college course credits in excess of a bachelor's degree. This is "Professional or Academic Credit Pay." Below we examine each of these components individually.

Market Dynamics

As noted earlier, the size of the base adequacy grant is based on actual expenditures in a subset of New Hampshire school districts. For the adequacy grant accurately to reflect education costs, salaries of teachers and administrators in the districts included in the calculation must be

[69] Average teacher salary is from the NHDOE 1999 *Fingertip Facts*. Benefits are estimated at 21% based on data from the statewide MS-25 form.

[70] This analysis assumes that a modal New Hampshire teacher spends the same number of workday hours as the conventional yearlong worker with whom we are comparing her. If she works fewer than 185 days, or fewer than 7.5 hours a day, then she is even better compensated on an annual basis than we are suggesting above. However, if she works more than 185 days or longer than 7.5 hours a day, she may be less well compensated on an annualized basis.

sufficient for those districts to attract and retain competent professionals. This section presents data related to this topic.

While we did find that salaries in New Hampshire tend to lag behind salaries in the region, we did not undertake a thorough analysis of the market for teaching professionals in New Hampshire. For example, given varying tax structures from state to state, we are unable to specify the net income differences of beginning teachers between New Hampshire and various higher-taxing New England states with which New Hampshire competes for professional labor. Certainly Massachusetts is higher-taxing than New Hampshire—might this narrow the net entry-level salary difference? Factors such as this must be considered before arriving at a conclusion regarding competitive status. Therefore, we cannot be certain that the lower salaries depicted in this section are contributing to any disadvantage for New Hampshire or constituent school districts; however, the data presented below do suggest that current salaries, especially in some districts, may not be sufficiently competitive to ensure a high-quality teaching force.

National experts disagree on the extent to which the alleged teacher shortage is real. However, it is perceived as real by selected New Hampshire school district superintendents, who reported to MAP that they are experiencing increasing recruitment difficulties. We encounter similar perceptions throughout the nation. Growing enrollments are rendering teacher labor markets tighter. This is particularly true for critical fields such as mathematics, physical science, foreign languages, and special education. Nevertheless, whereas we do not doubt the veracity of the superintendents with whom we spoke, we still were not able to verify the magnitude of their hardship. Do they merely have to work harder to keep positions filled with qualified teachers, or are they forced to choose between leaving positions vacant or hiring teachers who are unqualified? Before concluding that New Hampshire's salaries are insufficiently competitive, one would want to know the number of qualified applicants for vacant positions and whether an inordinate number of teachers were leaving to teach elsewhere.

If New Hampshire teacher salaries are insufficient, the problem would likely be most evident at the entry level, where districts must compete most intensely for talent. If there is a regional teacher shortage, and if New Hampshire entry-level salaries are noncompetitive, then the state will suffer at the hands of the labor market, by being faced with hiring, on average, fewer teachers or more underqualified teachers.

As can be seen in Table 9, New Hampshire's average teacher salaries are low for both the nation and New England. They are competitive, on average, with Maine and Vermont. Perhaps more important, however, New Hampshire's *beginning* teacher salary levels are below those of the nation and all other New England states. We will have more to say about this topic later in this section.

Table 9: Beginning and Average 1998-99 Teacher Salary, New England Region

State	Average Salary	Beginning Salary	National Rank
NEW ENGLAND			
Connecticut	$50,277	$31,391	2
Rhode Island	$46,286	$26,237	9
Massachusetts	$44,051	$28,055	11
New Hampshire	$37,405	$24,406	25
Vermont	$36,697	$25,435	27
Maine	$34,906	$24,962	33
U.S. AVERAGE	$40,574	$26,639	—

Source: American Federation of Teachers, annual survey of state departments of education, www.aft.org/research/survey99/tables/table1-2.html

Statewide averages do not clearly depict the circumstances for individual districts, however. A total of 105 of the 154 New Hampshire districts for which this type of salary information is available have BA minimum salaries below the state average. Those districts employ about half of all New Hampshire teachers. The mean entry-level salary for these districts is $23,321, or more than $1,000 less than the mean for the average for all New Hampshire districts. More importantly, it is $2,000 below Vermont's entry-level statewide salary average, and $1,500 below Maine's statewide entry-level salary average.

Within New Hampshire, BA minimum salaries range from $19,160 in Northwood to $29,236 in Hanover. The average BA minimum is $23,926. MA maximum teacher salaries range from $25,350 in Stewartstown to $53,210 in Hanover. The statewide average MA maximum is $42,100. The overall New Hampshire teacher maximum salary ranges from $25,350 in Stewartstown to $61,980 in Hanover. The statewide average maximum teacher salary is $44,582.[71] Even if, on average, New Hampshire salaries were sufficient to attract and retain a high-quality teaching force, it is clear that Northwood, Stewartstown, and similarly situated districts are handicapped as they compete for teachers.[72]

The average weighted BA minimum salary for teachers in the subgroup of school districts used by the state to calculate basic adequacy aid is $24,166. The average weighted BA minimum salary for all the districts in New Hampshire is slightly higher, $24,497. This relatively modest difference may be attributable to differences in teacher seniority and could be addressed by implementing an adjustment for teacher seniority, which is discussed below.

[71] NEA-New Hampshire, "New Hampshire School Districts Salary Schedules, 1999-2000."

[72] Nominal differences in salaries may be misleading if the low-salary districts are located in areas where the cost of living is appreciably lower or if those districts are able to offer employees access to unique amenities such as recreation or spectacular scenery.

Without a more comprehensive analysis, it is not possible to conclude that New Hampshire school districts are unable to attract and retain qualified teachers. The available evidence does suggest, however, that in many New Hampshire districts the salaries offered are unlikely to attract the same-quality teachers hired by higher paying districts. Only with more in-depth study is it possible to determine the effect on student outcomes of teacher salaries statewide, and especially in the currently low-paying districts. Given the importance of teacher quality in the educational enterprise, it seems New Hampshire citizens would be well served by such a study.

In the two sections that follow we argue that the traditional methods of setting teacher salaries bear little relationship to teachers' productivity. This should not be construed to mean that we conclude that teachers are overpaid. In fact, that is a separable issue, as we have discussed above. When accepting employment, teachers likely evaluate not only the starting salary, but a probable future stream of income. If school districts were to merely truncate current salary schedules at seven to ten years and eliminate payment for extra education, the effect would be to significantly reduce the potential salary a teacher could earn over her career. Under such a scenario it would be safe to predict that prospective teachers would opt for employment elsewhere, or New Hampshire school districts would be forced to hire from a lower-quality labor pool. Thus any adjustment for teacher salaries in the state's basic adequacy grant should be in the context of the labor market in which New Hampshire competes.

Teacher Seniority

Education is one of only a few occupations granting virtually automatic salary increases for each added year of employment. This practice continues and is widespread throughout the nation, even in the face of scant evidence that a teacher's instructional performance is enhanced by classroom experience in excess of seven years.[73] It is simply a convention of public education.

It is unlikely that New Hampshire can, by itself, counter this seniority pay convention. The state should therefore take into account an extra cost condition that can occur because of seniority dynamics.

The average salary increment for an additional year of New Hampshire seniority in 1999-2000 was $1,146 for teachers with a BA and $1,250 for teachers with an MA.[74] Roughly 60% of teachers in New Hampshire are at the BA level. Weighting the BA-level increment at 60% and the MA-level increment at 40%, we can roughly estimate the average cost for each additional year of teacher seniority in New Hampshire as $1,188. This amounts to almost $16.5 million per year, statewide, for each added year of aggregated teacher seniority.

Put another way, a hypothetical teacher, having been employed in a New Hampshire district for fifteen years, is likely to have almost $18,000 of her annual salary result from longevity alone.

[73] Analyses of 1966 Equality of Educational Opportunity data revealed a modest positive correlation between teacher seniority and student achievement for the first seven years of teacher experience. Guthrie, James W.; Levin, Henry M.; Kleindorfer, Benjamin W.; and Stout, Robert S. *Schools and Inequality*, Cambridge: MIT Press, 1970. No dependable subsequent analyses have discovered a significantly different relationship.

[74] NEA-New Hampshire (1999). "New Hampshire School Districts Salary Schedules 1999-2000." Tables 3 and 7.

A school district can accrue a disproportionate number of highly experienced (and thus highly paid) teachers for reasons partially beyond its control. If a district experiences an enrollment boom and employs added teachers to cope with the enrollment expansion, it is under a substantial obligation to retain those teachers for the balance of their careers. If enrollments remain fairly constant in subsequent years, few new teachers will be hired, and average seniority will increase until retiring teachers are replaced with beginning teachers. At that time, average seniority will decline.

The base adequacy aid grant represents the average cost per pupil to produce an adequate education program. The grant is based on the expenditures of a subset of New Hampshire school districts. Teacher salaries tend to be the largest single component of school district expenditures. If the teachers in those districts used in the calculation of the adequacy aid grants are more senior than the state average, the adequacy grants may overstate actual costs; if they are less senior than the state average, the grants may understate actual costs.

We have assumed that the districts used in the calculation of the adequacy grants are approximately representative of all New Hampshire school districts on all important dimensions, including teacher seniority (although we have not independently verified this assumption). If this is the case, for school districts with more senior teachers than average the adequacy aid grant will represent less than their actual cost. School districts with fewer senior teachers than average will realize a windfall. Thus we recommend that the state implement a seniority adjustment to account for these differences in cost.

Wyoming and Oregon both include such an adjustment in their school finance formula, but address it somewhat differently. Wyoming bases its seniority adjustment on the actual number of years the faculty has taught in each district. The adjustment is calculated by multiplying a standard cost per year of seniority by the number of years each district's faculty has taught. As the faculty in a district gains seniority, the adjustment increases accordingly. When senior faculty are replaced by beginning teachers, the adjustment decreases accordingly.

Oregon annually computes statewide mean teacher experience. The school finance formula adjusts each district's grant by $25 per pupil for each year of average teacher experience above or below the state mean. For example, if the statewide mean teacher experience were 13 years, a school district whose teachers averaged 14 years of experience would receive an additional $25 per pupil, and a district whose faculty averaged 12 years experience would have its state grant reduced by $25 per pupil.

Professional (Academic) Credit Pay

Teacher pay also reflects another education convention: salary increments for college course credits in excess of a bachelor's degree. This too is a practice for which there is little or no research support.

Our analyses suggest that 4% ($26.5 million) of total statewide teacher costs is a result of districts paying teachers for college credits taken beyond having earned a bachelor's degree. This is a conventional pattern in the United States. The supposition is that a teacher is somehow more

effective for having taken these additional college credits, regardless of the course nature, subject matter, institutional caliber, instructional rigor, or relationship to an individual teacher's school or classroom assignment. There is little objective research to support this supposition.

Some, maybe many, of these additional courses may be quite relevant to a teacher's assignment and may indeed contribute to his instructional effectiveness. However, under current arrangements, there is no way of knowing. In effect, New Hampshire presently spends more than $26 million per year for an activity over which it has little control, and even less knowledge regarding its utility.

We are *not* recommending that teachers be deprived of previously and duly earned post-bachelor's salary increments. Such would be unfair and would contribute to unnecessary conflict. Rather, what we suggest is the development of a statewide value-added pupil assessment system that offers an opportunity for far more finely tuned analyses of individual teachers' performance. Thereafter, a more accurate prescription could be constructed for the kinds of staff development from which his or her classroom instruction would benefit.

Because teacher salaries are determined locally, New Hampshire probably cannot directly affect how teachers are paid without dramatically upsetting the existing state-local relationship. The state is not, however, without leverage in this area. The Legislature could mandate that local boards construct salary schedules that reward only those factors that the boards can reasonably demonstrate will lead to improved student performance. The Legislature could provide incentives for school districts to more closely tie pay to productivity, similar to incentives they have provided for school districts to join cooperatives or to offer kindergarten. The State Board of Education could adopt guidelines for professional development activities that would qualify for salary increments, and state leaders could use the "bully pulpit" to encourage local parties to negotiate more rational compensation systems.

OBTAINING FEEDBACK ON TEACHER PERFORMANCE AND DETERMINING STAFF DEVELOPMENT NEEDS

In sections VI and XIV of this report, we refer more fully to the fundamental components of a "value-added" accountability system. One of the features of such an arrangement is an ability to obtain detailed information regarding the performance of every student for which a teacher has instructional responsibility. In the course of a semester or academic year, these examination results can be aggregated for each teacher and for an entire school. If the subject is mathematics, for example, a value-added testing system can determine both individual student performance and aggregate student performance, teacher by teacher. Under this arrangement, if Ms. Jones is deficient in instructing in five of the district's 15 fourth-grade mathematics objectives, then the principal might be able to say to Ms. Jones:

> "Here are the data from your last semester's class, which are similar to the instructional results of the last three years as well. A pattern emerges: You are not doing well in conveying fractions, long division, etc. Together we need to agree upon a course of action that will provide you with the necessary knowledge and skills for you to better meet the needs of your students. Here is a menu of state,

> university, district, and private-sector professional development opportunities from which you could gain a deeper understanding in teaching these topics. Or, if you want, we can arrange to have a tutor or mentor for you. If you succeed in the future in overcoming this deficiency, we will increase your salary."

The above is not a fevered academic fantasy. In fact, such conversations occur regularly in the Houston Independent School District. That district's "Profiler" testing and reporting system specifies for an elementary school principal the performance, classroom by classroom, of every student in a school, subject matter by subject matter. Thus, the aggregated effects of a single teacher can be obtained. Of course, any individual teacher can appraise her own performance, without the assistance of a principal. In a sense, Houston's system renders teachers far more professional than is generally possible, by empowering them to improve and diagnose their own performance without outside intervention.

What is important for this discussion, however, is that there are practical means, of which Houston is but one example, for linking teachers' performance to professional development. New Hampshire should move in this direction. The following is a more immediate example.

In addition to the shaping of teachers' instructional proficiency through targeting of professional development, there are more macro in-service education issues to consider. In 1994, for example, when New Hampshire developed curriculum standards around which the state examination system for grades 3, 6, and 10 was constructed, teachers surely would have benefited from a better understanding of how to teach the newly enacted state policy and procedures. This would have been an opportune time for a statewide staff development initiative. Making changes in instruction as dramatic as those implied by new state curriculum standards almost always requires a substantial commitment of time and resources to ensure that teachers know and are able to teach the new content. At a minimum, if actual classroom instruction is to change, teachers should be provided two weeks full-time instruction, in-class coaching, and periodic follow-up training for approximately two years. This may appear expensive, but without a comparable investment, standards, assessment, and accountability systems will not have maximum effect.

Similarly, if the Commission should determine that secondary-level academic performance is insufficient, staff development activities for high school teachers regarding implementation of more Advanced Placement courses would seem appropriate. If reading for disadvantaged students is judged by the Commission to be a statewide problem, a state reading instruction initiative would be in order.

There are assuredly many additional opportunities for teachers to be provided with better techniques to cope with instructional situations. We are not suggesting particular statewide professional development activities here. What we are suggesting is that consideration be given by the New Hampshire State Education Department to those dimensions that lend themselves productively to such statewide training initiatives.

TEACHER-RELATED FINDINGS AND RECOMMENDATIONS

The state, as a regular part of its systematic appraisal of the basic adequacy grant level, should determine the seniority representativeness of its sample of districts. Assuming that they are, we recommend that the basic adequacy grants be adjusted to compensate for districts where teacher seniority is greater or less than average.

The Legislature should encourage local school boards to more closely tie teacher compensation to improved productivity. The Legislature could mandate that local boards construct salary schedules that reward only those factors that the boards can reasonably demonstrate will lead to improved student performance. The Legislature could provide incentives for school districts to more closely tie pay to productivity, similar to incentives they have provided for school districts to join cooperatives or to offer kindergarten. The State Board of Education could adopt guidelines for professional development activities that would qualify for salary increments, and state leaders could use the "bully pulpit" to encourage local parties to negotiate more rational compensation systems.

Finally, the state should construct a "Value Added" assessment system, linking pupil performance with classroom teachers in order to shape professional development needs more finely.

X. SCHOOL AND DISTRICT SIZE FACTORS

For most of the 20th century, educators and policymakers have sought to consolidate small schools and small districts into ever larger units. Between 1940 and 1990 the number of public schools declined from approximately 200,000 to a little over 80,000, while the nation's population increased about 70%.[75] Similarly, the number of school districts in the nation dropped from around 120,000 to about 15,000 over the same timespan.[76]

WHY IS SIZE AN ISSUE IN EDUCATION FUNDING?

Cost per pupil tends to be a function of school size. Small schools and districts face higher per-pupil costs because of diseconomies of scale. All schools require some level of administration, student support, maintenance, and facilities. When these costs are divided among a smaller number of students, the per-pupil amount is higher. Very large schools and districts also face diseconomies of scale, since especially large enrollments are unwieldy and can create additional administrative burdens. Therefore, expenditures per pupil graphed by school size tend to form a U-shaped curve, decreasing as enrollments increase up to a point and then eventually reversing

[75] Cotton, Kathleen (1996). "School size, school climate, and student performance." Close-up #20. Portland, OR: Northwest Regional Educational Laboratory, also see AASA Online www.aasa.org/issues/Rural
[76] NCES Digest of Education Statistics, 1999. Table 90.

direction and increasing again as enrollments rise above a manageable level (Fox, 1980[77]; McKenzie, 1983.[78])

WHAT ARE THE PERFORMANCE CHARACTERISTICS OF SMALL SCHOOLS?

Based largely on an analogy with manufacturing in the private sector, there have been widely held beliefs that larger school units were more efficient and more cost-effective, that they enjoyed economies of scale in administration and curricular offerings, and that these factors combined to prove that bigger was better. Over 30 years of research has failed to substantiate those beliefs. Any relative cost advantages of larger schools seem to be outweighed by small schools' superior educational performance.

Summarizing over 100 research reports on school size, Kathleen Cotton (1996) concluded that there is considerable evidence that elementary schools of 300 to 400 students and secondary schools of 400 to 800 students are the most effective.[79] Compared to larger schools, she found that small schools produced:

- Equal or superior academic achievement
- More positive student attitudes toward school and toward particular subjects
- More positive student behavior
- Higher levels of participation in extracurricular activities
- Better student attendance
- Lower dropout rates
- More positive personal relationships among students, teachers, and administrators
- More positive teacher attitudes toward their work and their administrators

School size research that finds superior outcomes in smaller schools also frequently concludes that low-income students and those of ethnic minorities especially benefit from attending small schools.

Although the research tends to find that smaller schools are associated with higher student performance, it is clear that optimal school size is situational and depends on a variety of factors. Analyzing nationwide data from 10,000 high schools, Lee and Smith (1997) found that students, particularly minority students, learned more in high schools of 600 to 900 students.[80] Gregory (1992) argues that high schools of 250 or smaller can offer cost-effective programs.[81] Anecdotally, MAP researchers have observed several rural high schools in Nevada and

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[77] Fox, W. (1980). *Relationships Between Size of Schools and School Districts and the Cost of Education.* Washington, D.C.: Economics, Statistics, and Cooperative Services, U. S. Department of Agriculture. (ERIC Document Reproduction Services No. ED 187 029).

[78] McKenzie, P. *The Distribution of School Size: Some Cost Implications.* Paper presented at the Annual Meeting of the American Education Research Association, Montreal, Quebec, Canada, April 1983 (ED 232 256).

[79] Cotton, Kathleen (1996), op. cit.

[80] Lee, Valerie E. and Julia B. Smith, (1997) "High school size: Which works best, and for whom?" *Educational Evaluation and Policy Analysis,* 19 (3), 205-227.

[81] Gregory, T. "Small Is Too Big: Achieving a Critical Anti-Mass in the High School," *Source Book on School and District Size, Cost, and Quality*. Minneapolis, MN: Minnesota University, Hubert H. Humphrey Institute of Public Affairs; Oak Brook, IL: North Central Regional Educational Laboratory, 1992, 1-31.

Wyoming with fewer than 250 students that appear to be academically successful by almost every measure. There is almost certainly no single best school size, although large schools do appear to especially disadvantage poor and minority students. Rather, each school district should decide on school size based on a variety of factors, such as the program needs of its students, proximity to other schools and resources, and need and availability of transportation.

Less is known about the effects of district size on performance and cost, since little research has been conducted in this area. While it is generally believed that small districts face diseconomies of scale, the relationship between district size and student performance is insufficiently documented.

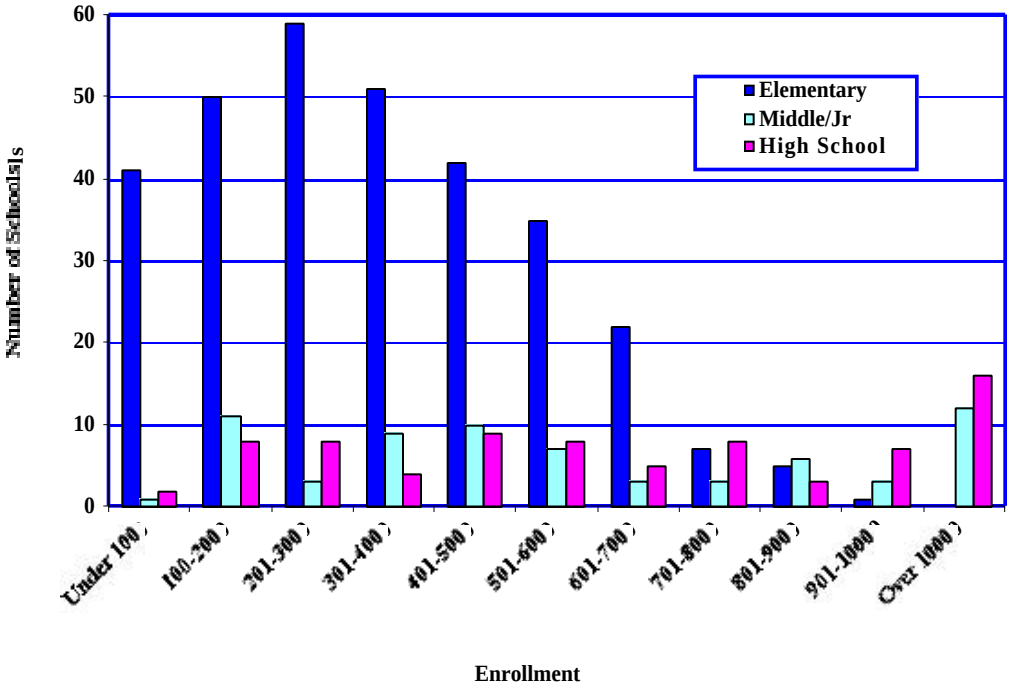
WHAT SIZE SCHOOLS AND DISTRICTS ARE TYPICAL IN NEW HAMPSHIRE?

Table 10 displays average New Hampshire school and district size. The accompanying Figure 1 displays the size distribution graphically. By and large, schools and districts in the state tend to be small. Average elementary, middle, and high school size is within the “effective” range cited by Cotton (1996).

Table 10: New Hampshire Schools and District Size: 1999 Fall Enrollment

Level	Average	Median	Standard Deviation	Smallest	Largest
Elementary[82]	336	315	200	14	910
Middle/Jr.	601	505	368	96	1,368
High School	750	567	617	62	2,975
District	1,269	619	2,032	18	17,213

Figure 1: Distribution of School Size in New Hampshire



[82] Includes kindergarten enrollment but not preschool students.

In New Hampshire's unusual school district structure, each town is responsible for providing its children with an education. Towns operate their own schools (essentially forming single-town districts), join with another town in a cooperative schooling arrangement (cooperative districts), or pay to have their children attend schools in a neighboring town (nonoperating districts). Some towns combine these approaches, operating their own elementary school but sending secondary students to a neighboring district or taking part in a high school cooperative. Additionally, there are 24 Authorized Regional Enrollment Areas (AREAs) approved by the State Board of Education, where a sending district agrees to tuition all its students to the receiving district and the receiving district agrees to ensure that there will be space for them.

There are 132 single-town districts, 31 cooperative school districts, and another 14 districts that do not operate schools, for a total of 177 districts in the state. These districts are further organized into 77 School Administrative Units (SAUs), whereby several smaller districts join to hire one superintendent and share administrative costs.[83] However, within a SAU, each district maintains its own school board and its own education policies, and allocates its own resources. A superintendent cannot reallocate resources among districts regardless of relative student need.

The current organizational structure of districts in New Hampshire likely impedes the most efficient allocation of resources. Districts and even SAUs tend to be relatively small. The median SAU has approximately 2,130 students, but SAUs range in size from 94 enrollees to over 17,000 students. Fifteen SAUs enroll fewer than 1,000 pupils, and only three enroll more than 6,000. However, if SAUs were school districts in the more traditional sense, all but the 10 to 15 smallest would likely be of sufficient size to operate cost-effective educational programs**.**

In 1987 there were 56 SAUs, compared to the current 77. According to sources in the Department of Education and some local educators, the effect of recent reorganizations has been for larger, wealthier districts to separate from smaller, poorer districts. If this is accurate, it would seem to create more high-need, low-resource entities forced to bear an ever greater cost of administration. If these smaller, property-poorer SAUs also enroll significant numbers of low-income students, such reorganizations would seem to run counter to the state's interest in ensuring appropriate resource flows to high-need students.

Another concern is the lack of flexibility within SAUs to allocate resources consistent with the changing level of student need. Especially in small schools, the portion of the student population with special needs can fluctuate dramatically from year to year. This tends to be less of a problem when those small schools are part of a larger entity where increases in one location can be offset by decreases elsewhere in the system. In SAUs, however, the potential for such resource reallocation is not realized, as each constituent district is autonomous. Constituent school districts may jointly support certain centralized services, but do not actually pool resources for allocation consistent with student need or other priorities. For example, a SAU may be comprised of one or more high-wealth school districts enrolling predominantly low-need students and one or more low-wealth school districts enrolling predominantly high-need students. Within that SAU it is likely that the least resources will be devoted to the education of

[83] NHDOE *Fingertip Facts*, 1999.

the students with the greatest need. There would be no mechanism for the SAU to provide a higher level of services to the high-need students.

Since the Education Reform Act of 1919, which organized the state into 64 Supervisory Unions, there have been numerous studies of school district organization in New Hampshire. We will not revisit these various reports, nor will we propose any particular reorganization strategy. Nationally, the history of forced consolidation is mixed at best. The anticipated benefits of consolidation frequently are offset by increased transportation or other costs when constituent districts are geographically dispersed. Moreover, the emotional and cultural costs of closing the only school in a remote community may exceed any anticipated financial gain. These concerns may not be germane when districts are in close proximity.

Some states have addressed small-district problems by structuring overarching cooperative arrangements to provide high-cost specialized services such as special education and vocational education. While these arrangements are crafted to meet the unique needs of each state, the underlying principle is the pooling of resources to provide higher-quality, more cost-effective services than individual districts could provide on their own. New York state, with its Boards of Cooperative Educational Services (BOCES) is a good example. Not only can local districts cooperate through these entities to gain economies of scale in the provision of services such as special education, BOCES can, under limited conditions, have taxing authority for particular programs the state chooses to promote. Professional development is an example of such a specialized program for which the cost might be prohibitive to a small district but affordable when economies of scale are captured over multiple districts.

We are insufficiently optimistic about the ultimate outcome of such an effort to recommend ways to overcome inefficiencies inherent in the way New Hampshire school districts are organized. We understand the current organizational pattern is a result of historical and cultural traditions about local control, rigidified by differences in property wealth and socioeconomic status. However, it is our hope that a genuine desire to improve educational outcomes for special needs students will motivate a greater willingness for districts to enter cooperative arrangements for sharing the cost of services to such students.

IS A SMALL-SCHOOL ADJUSTMENT APPROPRIATE IN NEW HAMPSHIRE?

About a dozen states provide a cost adjustment in their school finance formulas to compensate for the extra costs associated with operating small schools and/or districts.[84] States use a variety of eligibility criteria to determine which schools qualify for the adjustment, and allocate different levels of compensation. Some states base their adjustment solely on school enrollments: all schools below a given cutoff level qualify for the adjustment. Other states also take into account factors such as population density, degree of isolation, and distance. Several states provide adjustments only to schools deemed "remote and necessary."

[84] Gold, Steven D., David M. Smith, and Stephen B. Lawton (1995). *Public School Finance Programs of the United States and Canada: 1993-94.* New York: American Education Finance Association of Center for the Study of the States, The Nelson A. Rockefeller Institute of Government.

New Hampshire law currently includes a provision permitting supplemental state grants to eligible necessary small high schools.[85] However, this provision has not been funded for at least 15 years.[86] The adequacy aid funding formula does not presently contain an adjustment for small schools or small districts. Is such an adjustment warranted?

If one accepts for New Hampshire the consensus on optimal school size described above, the state has approximately 150 elementary, 24 middle schools, and 22 high schools that reasonably meet a definition of small. Schools thus identified probably experience diseconomies—higher costs per pupil that increase as enrollment decreases. Their costs are likely on the downward slope of the U curve described above.

Data available to MAP do not allow us to determine which of these schools are necessarily small because of geography and population sparsity, and which are small because of local preference. It is likely that many are small because of a local preference or because local districts in close proximity choose to operate separate schools. Just as important, the Department of Education does not currently collect expenditure data at the school level. It is therefore impossible to estimate the extent of diseconomies in the smaller schools or the shape of the cost curve as enrollments change.

While there is compelling evidence that smaller schools tend to produce superior outcomes for students, it does not necessarily follow that small schools are the most cost-effective way to produce high outcomes. Inevitably there is a limit on public funds available for schooling, and policymakers should set priorities for how those funds can be utilized. Other expenditures that can produce improved student outcomes include favorable pupil-teacher ratios, professional development, longer school day and year, preschool, and full-day kindergarten, to name a few. Evidence also suggests that state standards, high-quality student assessment tied to those standards, and a rigorous accountability system produce superior outcomes. Rarely would any state enjoy sufficient resources to implement all of these interventions, and while some may produce synergy applied in combination, some may be incompatible.

Before lawmakers decide whether to adjust for the costs associated with small schools, we recommend that they determine the following:

- Which schools are small of necessity, and which are small as a result of local preference
- Expenditure patterns of schools of various sizes
- The degree to which local wealth differences explain school expenditure variance
- Which small schools are located in districts large enough to enjoy offsetting economies

This information would provide a foundation for decisions about whether a small school adjustment is warranted, how much such an adjustment would be, which schools warranted such an adjustment, and the priority a small-school adjustment should receive relative to other interventions.

[85] Chapter 195 A:11 “Special Aid to Small AREA High Schools.”
[86] Conversation with NHDOE staff, August 29, 2000.

IS A SMALL-DISTRICT ADJUSTMENT APPROPRIATE IN NEW HAMPSHIRE?

Although insufficient data about school size are available to make a determination about a small school adjustment, the state does collect information on school district expenditure patterns. Recall that in New Hampshire, the base adequacy level is calculated from actual per-pupil expenditures of districts meeting certain performance criteria (see Appendix A for details). Given the low variability in district enrollment, if the sizes of the selected districts are reasonably reflective of the state as a whole, it is likely that an adjustment for district size is unnecessary since size is already taken into consideration when calculating base adequacy funding.

Of the 163 districts in the state that operate schools, 32 were used to calculate base adequacy. Do these districts differ substantially from their peers in terms of enrollment size? The answer is yes. On average, districts in the adequacy group are larger than other districts (2,324 students compared to 1,010).[87] This finding suggests that small district size may not be adequately compensated for in base adequacy funding. In order to explore this further, we examined performance and expenditures by district size. The results are less than straightforward.

Most of the small districts[88] that were in the 40% to 60% performance range were eliminated from the base cost calculation. This could be expected: Only the lowest-spending districts in the 40% to 60% performance range were included in the calculation, and because small districts face diseconomies of scale, their per-pupil expenditures tend to be higher than those of other districts. However, among the small districts that remained in the calculation, per-pupil expenditures were actually *lower* on average than for the larger districts that remained in the calculation. We are unable to explain why this is the case, and suggest that it warrants further analysis.

Despite this anomalous finding, small districts spend about 13% more per pupil than do larger districts. This is true at every performance level, although the percent difference varies. Among lower-performing districts (under 40% of students performing at or above basic), small districts outspend larger districts by about 21%, but this figure is only around 6% among the higher-performing districts (over 60% of students scoring at or above basic).

The only conclusion that can currently be drawn from this analysis is that the base funding level does not adequately capture the diseconomies of scale faced by small districts. However, before advocating for a small district adjustment, policymakers must again assess whether most of these small districts are small through choice or through necessity, and if through choice, whether the state wishes to subsidize this local preference.

XI. TRANSPORTATION

The current funding formula reimburses towns for 70% of transportation expenditures. For the most part, transportation costs are governed by factors that are largely outside district control, such as distance, population density, and road conditions. The state reimbursement rate of 70%

[87] These findings hold true even when Manchester (an outlier district with over 17,000 students) is eliminated from the analysis.

[88] For the purpose of this analysis, small districts were defined as those enrolling under 500 students.

covers most of those costs, but leaves districts a share that may be sufficiently high to encourage cost control. It has been our experience working in other states that some districts' transportation expenditures are inflated by local practices, regardless of the state's share of such expenditures.

If the state does wish to trim transportation costs further, it should consider conducting a study of transportation expenditures across districts. Maine recently reviewed district transportation cost profiles and found that expenditures varied considerably across the state, with some districts paying twice as much as others to transport the same number of students the same distance (Maine State Board of Education, 1998). At the very least, the state should adopt very specific standards for which expenditures will be reimbursed and periodically audit local programs to ensure the validity of locally reported expenditures.

Members of the Commission have asked whether student transportation is a necessary component of an adequate education. Ultimately this would seem to be more of a legal constitutional question than an educational question, and therefore beyond the scope of this report. We know of no research that speaks to this question. Some would argue that providing transportation is a logical extension of compulsory attendance requirements. Others could argue that it is the responsibility of parents to transport their children to school. New Hampshire law (Title 15 Chapter 189:6) presently requires school districts to furnish transportation under certain conditions, but the Legislature could repeal that law unless prohibited from changing it by some provision of the New Hampshire Constitution.

Federal law requires school districts to provide transportation for handicapped students if transportation is necessary for them to receive a free and appropriate education.

XII. REGIONAL COST

The cost of providing educational programs varies among districts in the same way that cost of living varies by city. Ideally, a state's education financing systems account for the different costs that districts face in providing the same level of services. Unfortunately, accurately determining and adjusting for cost differences is difficult. States rarely have accurate consumer price information at the district level, and experts disagree on the appropriate measure of such costs. Hence regional cost adjustments are relatively rare in education funding formulas, despite the belief that they are theoretically important. Currently, only Colorado, Florida, Ohio, Texas, and Wyoming adjust for regional cost differences.

Regional cost differences can be estimated with a mathematical model that regresses all national data on teacher salaries and other costs, from relationships derived from New Hampshire's statewide employment data, or from a statewide survey of consumer prices. Colorado, Wyoming, and Florida base their distributions on consumer price surveys, Ohio bases its distribution on wage levels derived from employment data, and Texas utilizes a statewide regression model of education expenditures.

Existing methodology is not adequate to achieve absolute precision in the adjustment of education spending for regional cost differences. Some districts affected by a regionally adjusted distribution will always feel that there are additional cost factors not accounted for by any methodology. Implementing such an adjustment isn't cheap, and greater precision is almost never achieved without substantially higher cost.

Under most circumstances MAP would recommend that the state adopt an adjustment to account for differences in regional costs. Clearly there are differences of expenditures per pupil among New Hampshire school districts, some of which could be explained by differences in regional costs. However, it is more likely that differences in district wealth, size related economies, and student demographics account for a greater portion of New Hampshire expenditure variance. Also, the cost of developing and maintaining a sophisticated regional cost index may exceed the value of any enhanced equity in the current context. It is therefore our recommendation that any consideration of a regional cost be postponed until other, higher-priority modifications are made to the school finance formula.

XIII. INFLATION

It appears unnecessary to consider inflation as an extra cost component. New Hampshire's base cost is adjusted every two years, and is based on actual district expenditures. This procedure should adequately capture inflation.

XIV. CAPITAL CONSTRUCTION

According to the 1993-94 *Public School Finance Programs of the United States* (Gold, Smith et al., 1995), 13 states provide no capital outlay funding, though several of these states do provide some monies for debt service or offer low-interest loans. Seven states provide capital outlay through their basic support program, and 30 states contribute some state funding for capital projects by means other than their basic support programs. Amounts, mechanisms, and percent of funding from the state varies hugely.

A more recent congressional Government Accounting Office (GAO, 1995) study reported that 40 states have ongoing assistance programs, ranging from $6 to $2,000 per student. Thirteen of these states have established comprehensive facilities programs. The GAO report found that overall, most states do not play a major role in addressing facilities funding, and that state philosophy on the issue varies considerably. Many states report that school facilities are primarily a matter of local responsibility.

New Hampshire subsidizes local school districts for new construction and certain major capital renovations. These subsidies are limited to 30% to 55% of principal, depending upon the type of district involved. Cooperative districts receive the higher-level subsidy, apparently as an incentive for districts to form cooperatives.

These state construction subsidies do not appear to be conditioned in any way on district enrollments or the property wealth of recipient districts. It seems likely that some districts will be too small to raise sufficient revenue to construct new buildings or perform major maintenance. Similarly, low-wealth districts, presumably ones that must tax themselves more intensely than higher-wealth districts to raise any given amount of capital outlay revenue, likely will find it more difficult than their wealthier peers to build new schools or renovate obsolete schools.

There is another capital construction finance component of more immediate concern. The process by which New Hampshire determines basic education adequacy aid does not provide for local district debt service payments. To the extent that districts make unreimbursed expenditures for this purpose, the adequacy aid grant fails to reflect actual costs.

XV. EVALUATION

MAP proposes a two-pronged evaluation strategy.

The long-term need is for a statewide, performance-based, comprehensive accountability system. The design of this endeavor should follow a set of guidelines such as those described in the accountability section included previously in this report. Success in a venture such as this requires good planning, able leadership, and adequate resources. In the absence of such an accountability system, the Commission and other state policymakers will never be able fully to determine the consequences of their decisions and the benefits of their resource allocations.

A fully developed statewide performance accountability system would routinely provide state policymakers with factually based answers to policy related queries such as:

- What proportion of New Hampshire students in each grade achieve at various academic performance levels?

- How does academic achievement differ for students in the lowest and highest quartiles of performance assessment?

- How do student academic performance results differ over time?

- How do academic performance results differ by subject matter field; by students' gender, socioeconomic status, and race; by school district geographic region; by school district; by school; by classroom; and by school per-pupil spending level?

- What is the distribution of other school outcome measures such as dropout rate, college matriculation and graduation, and Advanced Placement enrollment and performance?

- What school patterns of spending, class size, school enrollment size, and teacher qualifications are associated with varying levels of pupil performance?

- What are the operating costs of schools relative to their enrollment size?

Short-Run Solutions: Added and More Effective Data Collection

In the short run, there is a set of data collection and evaluation improvements that, with the proper direction and resources, can be undertaken by the New Hampshire State Education Department. These data topics and suggestions are provided below.

- Measure academic achievement in terms of performance on NHEIAP; enrollments in secondary advanced academic subjects; performance on SAT, AP, etc.

- Track seniority status of all teachers to monitor disproportionate salary burdens.

- Measure school-level operating costs relative to enrollment size and "necessary" small schools.

- Participate in the national Special Education Expenditure Project (SEEP) to collect data on special education expenditures, allocation patterns, and costs so as to be able to design an effective reimbursement system.

- Streamline state data collection so that different State Department of Education divisions and other state agencies are not collecting similar information multiple times.

- Implement quality control procedures at the State Department of Education to ensure that reported data are accurate.

- Ensure an explicit and valid state purpose for every major data item requested of local school districts and schools.

- Calculate data request burdens on local agencies before implementing.

- Ensure (where appropriate) that collected and compiled data are fed back to districts and schools so that they too may benefit from it and from the comparisons that might flow from it.

- Audit district-reported data more carefully to ensure accuracy.

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Appendix A: New Hampshire's Current Funding System

New Hampshire's general education adequacy aid formula allocates funding to districts based on the average daily membership of students in residence (ADM-R). The ADM-R is weighted by grade level, the number of students with disabilities, and the number of students eligible for free and reduced-price lunch. The total weighted ADM-R is then multiplied by a base cost per pupil to determine the level of adequate funding for each town. That amount is further adjusted for transportation costs. The weighting system is explained in greater detail below.

Grade Level Weights
Elementary students (preschool through grade 8) receive a weight of 1.0, with the exception of kindergarten students who are capped at 0.5 ADM to account for half-day kindergarten programs. High school students receive a weight of 1.2, to reflect the higher cost of providing a secondary education.

Special Education Weights
An additional weight of 1.0 is applied to students with disabilities.

Free/Reduced-Price Lunch Eligibility Weights
The weight for students from low-income families is based on the number of students in grades 1-12 who are eligible for the federal free and reduced-price lunch program. If less than 12% of students are eligible, then no additional weight is applied. If 12% to 24% of students in the town are eligible, then each eligible elementary student receives an additional weight of 0.5. If over 24% of students are eligible, then each eligible elementary student receives an additional weight of 1.0. For cooperative districts, the eligibility rate for the district as a whole is applied to each town.

Transportation Adjustment
Towns are reimbursed for 70% of their transportation expenses.

Base Cost
The base cost is calculated every two years, and is based on the average per-pupil expenditures in districts that have achieved a specified level of performance. Districts where 40% to 60% of elementary students score at the basic or above levels on the NHEIAP tests are ranked by base cost. The lowest-spending districts that account for half of the pupils are selected, and their base costs per pupil are averaged. That average is reduced by about 10% to account for the fact that not all district expenditures include services that are essential for an adequate education.

For fiscal years 2002 and 2003, the base cost is set at $3,304. Once the pupil weights and adjustments described above are included, the average per-pupil amount distributed via state adequacy aid is $4,426. Towns tend to supplement this amount by way of additional local property taxes; the actual average per-pupil expenditure across the state was $6,293 for the 1998-99 school year.

APPENDIX B: IDENTIFICATION OF LEARNING DISABLED STUDENTS

Learning Disabled (LD) is the fastest growing segment of the special education population. Given the prevalence of LD students and the costs associated with serving them, it is not surprising that this population has received considerable attention from researchers and policymakers. It also may not come as a surprise that there is significant disagreement about the nature of this disability and the appropriate educational interventions for addressing it. Identification of a learning disability normally requires the documentation of a significant discrepancy between a student's academic performance and his ability to learn.[89] That is to say that low academic performance is not explained by low IQ. Terman et al. argue, "Although the existence of learning disabilities is beyond dispute, the process of identifying students with these disabilities is fraught with complications. Definitions are vague and broad, and manifestations of the disorder vary greatly."[90]

They suggest that the increase in identification of learning disabled students results from incentives inherent in state funding formulas, ongoing pressures for schools to raise academic standards, parents and schools increasing awareness of the important long-term impacts of "less apparent" disabilities and schools of education inadequately preparing teachers to deal with students with special needs.[91] They concede however, that, "there are no universally accepted, validated tests of diagnostic criteria to determine the presence or absence of learning disabilities."[92]

Lyon (1996) suggests other explanations:

> The simplest explanation for the increasing numbers of children identified with learning disabilities and for the difficulty in understanding and defining LD is that "LD" is not a distinct disability but an invented category created for social purposes. Some argue that the majority of students identified as having learning disabilities are not intrinsically disabled but have learning problems because of poor teaching, lack of educational opportunity, or limited educational resources. In addition, because the label of LD is not a stigmatizing one, parents and teachers may be more comfortable with a diagnosis of LD than with labels such as slow learner, minimal brain dysfunction, or perceptual handicap. A diagnosis of LD does not imply low intelligence, emotional or behavioral difficulties, sensory handicaps, or cultural disadvantage.[93]

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[89] LD is not a single disability. It is defined in Federal regulations as follows: "'Specific learning disability' means a disorder in one or more basic psychological processes involved in understanding or in using language, spoken or written, that may manifest itself in an imperfect ability to listen, speak, read, write, spell or do mathematical calculations. The term includes such conditions as perceptual disabilities, brain injury, minimal brain dysfunction, dyslexia, and developmental aphasia. The term does not apply to children who have learning problems that are primarily the result of visual, hearing, or motor disabilities, of mental retardation, of emotional disturbance, or of environmental, cultural, or economic disadvantage." Code of Federal Regulations. Title 34, Subtitle B, Chapter III, Section 300.7(b)(10), reported in Lyon p. 56.

[90] Terman, et al., op. cit., p. 5.

[91] Terman, et al., op. cit. pp. 6 and 19.

[92] Terman p. 8.

[93] Lyon p. 60.

Other researchers argue that many students receiving special education services are inappropriately identified as LD. Shepard, Smith, and Vojir (1983) report that:

> At least half of the learning disabled population could be more accurately described as slow learners, as children with second-language backgrounds, as children who are naughty in class, as those who are absent more often or move from school to school, or as average learners in above-average systems.[94]

The National Association of State Boards of Education (1992) report research conducted at the University of Minnesota that suggests that up to 80% of all students could be identified as learning disabled using the various identification procedures in practice in the 1980s.[95]

Gerald Coles (1987) argues,

> A very small portion of the children identified as learning disabled do have some degree of neurological dysfunction that may interfere with learning and academic achievement. Research shows, however, that the actual extent of the problem is quite small compared to the millions of children who have been diagnosed as learning disabled. Most of the differences in brain activity found between normal and disabled learners are just that—differences. They are not neurological abnormalities; they are simply biological distinctions that might be found between any two groups of people with different abilities.[96]

Spear-Swerling and Sternberg (1998) contend:

> Current educational guidelines for identifying children with LDs, with an ability/achievement discrepancy at their core, not only lack scientific validity but also are poor educational policy. All low achievers, not just those who meet some arbitrary and illogical discrepancy cutoff, need educational help. The precise nature of this help may certainly need to differ depending on the individual child, but the essential point for policymakers is that there is no scientific basis for singling out only one group of low achievers for educational services.[97]

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[94] Sheppard, L.A., Smith, L.A. & Vojir, C.P. (1983). Characteristics of pupils identified as learning disabled. *Journal of Special Education*, 16, 73-85.

[95] National Association of State Boards of Education (1992). *Winners all: A call for inclusive schools*. Alexandria, VA.

[96] Coles, Gerald, 1987. *The Learning Mystique*. New York: Pantheon, pp. xvii-xviii.

[97] Spear-Swerling, Louise, and Robert J. Sternberg, 1998. "Curing Our 'Epidemic" of Learning Disabilities." *Phi Delta Kappan*, January, 397-401.

Reading: The Primary Deficiency

The primary deficit of as many as 80% of children with learning disabilities is in basic reading skills. This disability is primarily manifested as a deficit of phonological awareness.[98] Also, research evidence suggests that the longer a child's reading disability is not properly addressed, the more difficult the task and the less likely that remediation will be successful.[99] Lyon (1996) reports a longitudinal study that found that 74% of children whose reading disability was identified when they were nine or older continued to read in the lowest quintile throughout middle and high school.[100]

Even though inexpensive, reliable instruments for identifying reading disorders in kindergartners are available, most children are not identified and thus do not become eligible for services until the second or third grade.

> For the individual child, use of the discrepancy standard clearly promotes a wait-to-fail policy because a significant discrepancy between IQ and achievement generally cannot be detected until about age eight or nine. In fact, most school districts do not identify children with learning disabilities until a child is reading well below grade level, generally in third or fourth grade. By this time the child has already experienced at least a few years of school failure and probably has experienced the common attendant problems of low self-esteem, diminished motivation, and inadequate acquisition of the academic material covered by his classmates during the previous few years.[101]

Reading disability is a condition LD students share with other populations in public schools. In particular, the primary focus of Title 1 programs for low-achieving, low-income students is improving reading skill. Research suggests that even though programs for LD and Title 1 students are separately identified, and normally separately taught, the services the two populations receive are indistinguishable. If LD were an objectively identifiable condition one could reasonably expect to see in the schools relatively unique instructional programs aimed at meeting the needs of this population. In fact, this tends to not be the case. For example, Pugach (1995), researching Title 1 (formerly Chapter 1) programs for underachieving, low-income children and special education programs for the mildly handicapped, observed,

> Despite the general tendency to think of these programs as exclusive of one another, the similarity between special education for children with mild disabilities and Chapter 1 in terms of instruction, curriculum, and demographics is unmistakable.[102]

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[98] Lyon, p. 63.
[99] Lyon, p. 54.
[100] Lyon, p. 59.
[101] Lyon, G. Reid (1996), "Learning Disabilities" in Richard E. Behrman, ed. *The Future of Children. Special Education for Students with Disabilities*. Los Altos, CA: Center for the Future of Children. p. 59.
[102] Pugach, M.C. (1995). Twice Victims: The Struggle to Educate Children in Urban Schools and the Reform of Special Education and Chapter 1. In M.C. Wang and M.C. Reynolds (eds.). *Making A Difference for Students at Risk: Trends and Alternatives*. Thousand Oaks, CA: Corwin Press, Inc. p. 33.

Learning disabilities occur on a continuum from mild to severe and few would argue against identifying (coding) and serving students who are severely disabled. Given the imprecision associated with identification of most mildly disabled LD students, given the considerable costs associated with identification, and given the likelihood that their primary disability is related to reading, the case for identifying these students as special education is dubious. This is especially true if there are interventions that might preclude the need for special education services.