NATIONAL CENTER FOR POLICY ANALYSIS

# THE FAILURE OF OUR PUBLIC SCHOOLS: THE CAUSES AND A SOLUTION

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# THE FAILURE OF OUR PUBLIC SCHOOLS: THE CAUSES AND A SOLUTION

## Executive Summary

"The educational foundations of our society are presently being eroded by a rising tide of mediocrity that threatens our very future as a Nation and a people." This was the startling conclusion of the recent report by the National Commission on Excellence in Education. The evidence supporting this conclusion is overwhelming. The "tide of mediocrity" is affirmed by virtually every indicator of academic achievement among students today.

The report identified the central reasons behind the decline, including the fact that the schools are demanding much less from students than they should be. High school curricula, the report concluded, have become "homogenized, diluted and diffused to the point that they no longer have a central purpose."

One thing missing from the report is any explanation of why this situation has developed. To our knowledge, this study is the first to explain systematically the disturbing facts that the Commission described.

Our principal findings are:

- Since World War II, an increasing share of public school revenue has been awarded to school districts on the basis of student attendance. Most districts receive no financial reward for academic achievement.

- In many ways, there is a fundamental conflict between the goal of higher attendance and the goal of higher academic achievement.

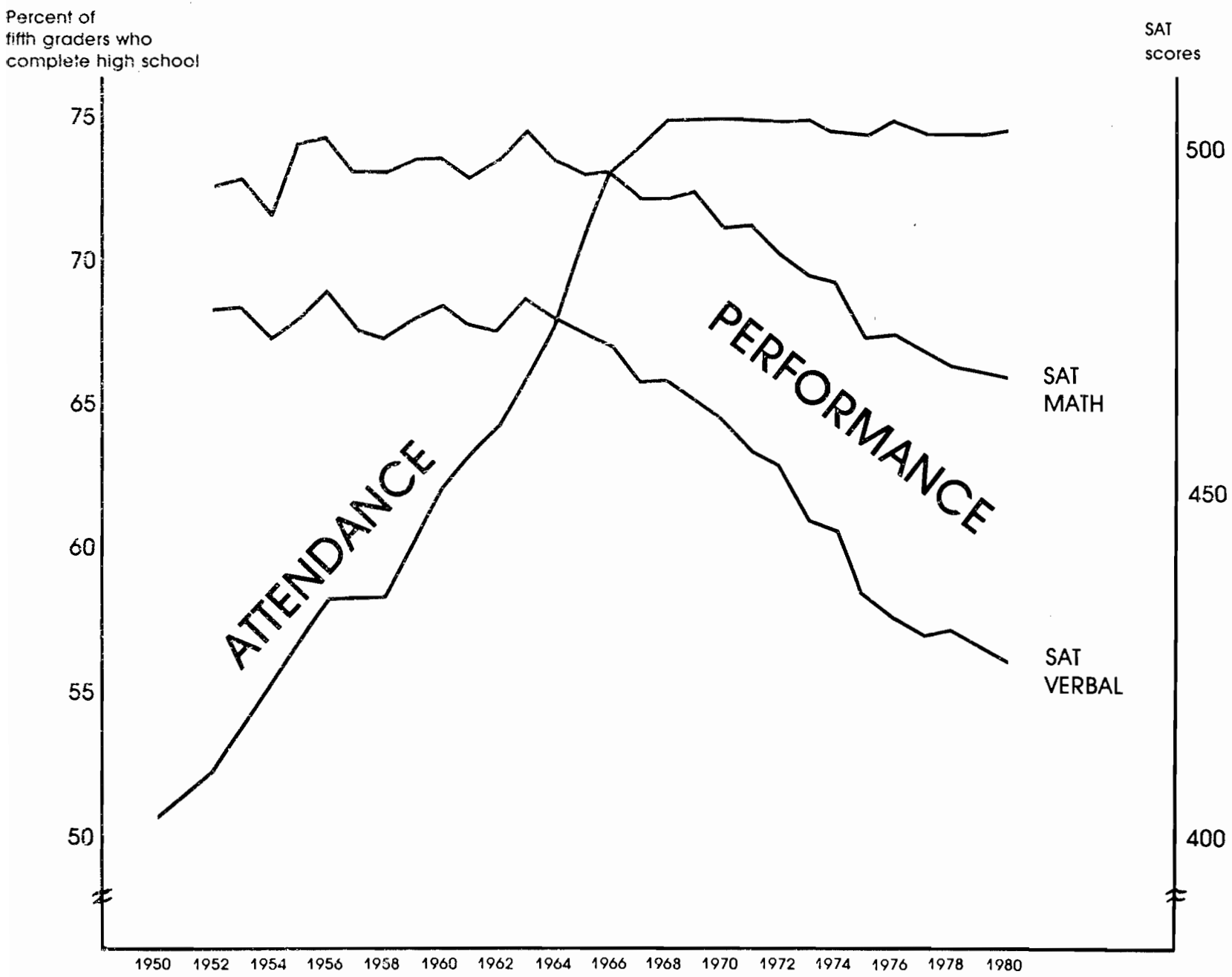
- In response to the financial incentives they face, school districts have resolved this conflict by sacrificing learning goals in order to reach attendance goals.

- In addition, because there is no financial penalty attached to low academic achievement, school districts also have sacrificed learning goals to other, peripheral goals selected by principals, teachers and students.

If we are to fundamentally improve the quality of education in our public schools, it is necessary to change the financial incentives which school districts face. To this end, we propose the Reading, Writing and Arithmetic Development (REWARD) System for educational funding.

The REWARD System rewards school districts for their academic achievement as well as for student attendance. Under the REWARD System, school districts for the first time will have a financial incentive to strive for excellence in education.

# RESPONSE TO INCENTIVES:
# ATTENDANCE VS. PERFORMANCE




SOURCE: NATIONAL CENTER FOR POLICY ANALYSIS
COLLEGE ENTRANCE EXAMINATION BOARD

## INTRODUCTION

The notion that our public schools are failing is not quite correct. It is true they are failing to reach the goal of higher academic achievement, but they are not failing to reach the goal of higher attendance. Unfortunately, these two goals often conflict.

- Over the last three decades, the percentage of fifth graders who completed high school increased 47 percent.[1]

- Over the same period of time, SAT math scores fell by 28 points, and SAT verbal scores fell by 52 points.[2]

To understand why the schools are succeeding at attendance and failing at achievement, it is important first to understand how schools are financed.

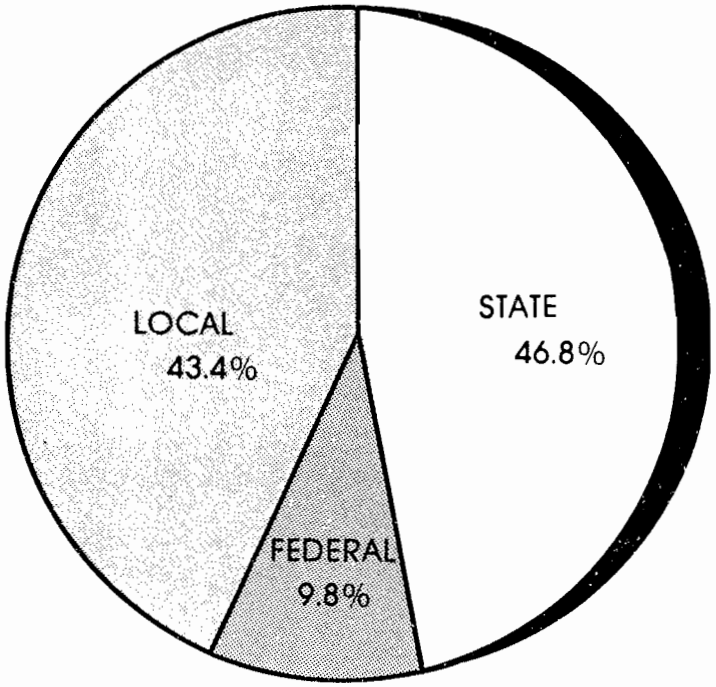
Public schools are funded by all three levels of government: federal, state and local. The amount contributed by the federal government is relatively small throughout the 50 states, but there is considerable variation in the amount contributed by the state governments. In New Hampshire, for example, only nine percent of educational funds come from the state. By contrast, in Hawaii state funds account for 81 percent of all spending for public schools.[3]

In every state there has been a persistent trend toward shifting more and more of public school financing to the state level. For the nation as a whole, the share of funds supplied by state governments was about 30 percent in 1940. Today that share is approaching 50 percent.

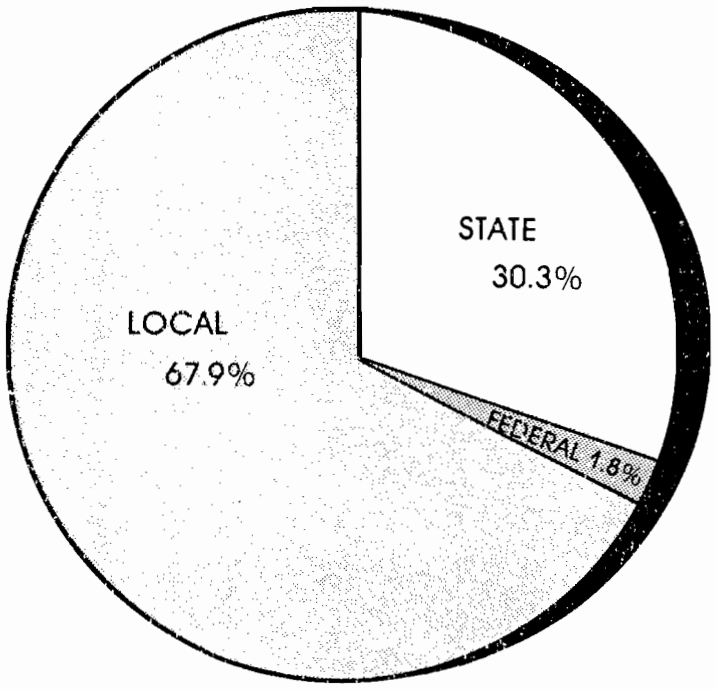
The increase in the percentage of funds coming from state governments has had a dramatic effect on the incentives faced by schools. In general, the amount of funds provided by local governments is independent of average daily attendance. The amount provided by state governments also is probably independent of average daily attendance. However, each district's share of state funds is determined largely by its average daily attendance. This means that school districts compete with each other for a larger share of the educational financing pie. And the way they compete is by boosting attendance.

1. Data obtained from the National Center for Education Statistics.
2. Data obtained from the College Entrance Examination Board.
3. Data obtained from the National Center for Education Statistics.

# TOTAL REVENUE OF PUBLIC SCHOOLS BY SOURCE




1980




1940

SOURCE: NATIONAL CENTER FOR POLICY ANALYSIS

The financial incentives to increase attendance are strong. Consider what would happen if students did not come to school:

- If every student in Dallas took a one-day vacation, the public schools would lose $570,774.

- If every student in Houston took a one-day vacation, it would cost the schools there $867,920. It would cost Los Angeles $5.3 million. And it would cost New York City $5.7 million.

- If every student in the nation took a one-day vacation, the nation's public schools as a whole would lose about $150 million.

## ATTENDANCE VS. PERFORMANCE

In response to these incentives, school districts have acted in a manner that is both predictable and understandable. They have devoted more and more time, money and energy to finding ways of raising attendance.

A recent technological innovation--the computer "tattletale"--illustrates how school districts are so determined to raise attendance that they are employing every device that the silicon revolution can produce to achieve this goal.

The tattletale automatically telephones parents at home in the evening and relays a tape-recorded message informing them that their child was not in school that day. The manufacturers are finding a receptive market in school districts across the country. School officials in Houston, for example, are considering a $500,000 investment in the devices, which make good sense from a school district's point of view. As one Chicago truant officer explained, "If we can raise a district's attendance by nine students a day, we can pay for the machine in less than a year."[4]

But what appears to be sound business judgment from a school district's point of view is not necessarily rational from the point of view of voters and taxpayers. One-half of a million dollars spent on tattletales is one-half of a million dollars not available for teacher salaries, textbooks, equipment and computers which teach basic skills. The school districts buying these devices are responding to financial incentives. Were school districts not rewarded on the basis of average daily attendance, the bottom might fall out of the tattletale market.

4. Time, March 7, 1983.

This is only one instance in which school administrators are deciding to allocate scarce resources toward the goal of raising attendance instead of academic achievement. There also are other ways in which learning and attendance goals come into conflict.

Consider the policy of social promotions, for example. One way to encourage attendance is to promote students to a higher grade even though they have not mastered the material in the previous grade. Failure embarrasses the student before his teachers and peers, and therefore discourages attendance. Clearly, then, social promotions are consistent with the practice of giving attendance top priority. The practice of failing a student who has not mastered the course content may encourage learning, but it does little to enhance a school district's revenue.

During the 1970s, a series of scandalous revelations occurred in several states regarding the practice of social promotions. It appeared that large numbers of students were being graduated from public high schools without achieving minimum levels of literacy. In response, 37 states passed minimum competency requirements mandating that students demonstrate a mastery of certain basic skills before being graduated.

It is important to note that the minimum competency requirements were not adopted by the school districts voluntarily; rather, they were forced on the school districts by the state legislatures. In addition, the National Commission's report described how the school districts responded to these requirements. The report noted that, "The 'minimum' tends to become the 'maximum,' thus lowering the educational standards for all."[5]

Finally, the most general way of encouraging attendance at the expense of academic achievement is to make the classroom experience less rigorous and less demanding. The practice of assigning less homework, of adopting less rigorous textbooks, of lowering standards on exams, of allowing students to elect out of courses which teach basic skills, and even the practice of keeping so-called disciplinary problems in school--all of these are consistent with giving attendance a higher priority than academic achievement.

5. The National Commission on Excellence in Education, A Nation at Risk: The Imperative for Education Reform, p. 20.

Indeed, aside from the fact that schools are paid for attracting students, what other reasons could explain why:

- Twenty-five percent of the credits earned by "general track" high school students are in physical and health education, work experience outside the school, remedial English and mathematics, and personal development courses such as training for adulthood and marriage.[6]

- In many schools, the time spent learning how to cook and drive counts as much toward a high school diploma as the time spent studying mathematics, English, chemistry, U.S. history, or biology.[7]

- Two-thirds of high school students spend less than one hour a night on homework.[8]

- Students are able to master 80 percent of material in some of their subject-matter texts before they even open the books.[9]

One way to gauge the importance placed on attendance relative to performance is to read the professional literature written for high school principals. The most widely read publication is the National Association of Secondary School Principals Bulletin. A review of the NASSP Bulletin reveals:

- Of the last 63 issues published between 1973 and 1979, there were 30 articles on attendance, or about one every other issue on the average. By contrast there were only 18 articles on basic skills.

- In a rather incredible twist of focus, the authors of one of the articles reported that teaching students study skills improves attendance. The authors did not bother to measure whether improved study skills lead to improved academic performance.[10]

6. A Nation at Risk, p. 19.
7. A Nation at Risk, p. 22.
8. A Nation at Risk, p. 19.
9. A Nation at Risk, p. 21.
10. W. L. Christen and Stephen M. Brown, "High School Study Skills: Can They Effect Attendance?" National Association of Secondary School Principals (NASSP) Bulletin, 66, October, 1982, pp. 123-124.

Several articles in the NASSP Bulletin discuss the practice of denying credit to students who miss a certain number of classes, regardless of the students' academic performance in the course. Apparently this policy is not unusual. Describing the attitude of a school district which adopted it, one author wrote, "No longer was it a responsibility for students to attend school; rather it was the school system's obligation to utilize the bureaucratic pressures at its disposal to persuade and cajole youngsters to comply with legal requirements that were enacted in their best interest."[11]

In Texas, a survey of 48 schools found that on the average students were allowed to miss only 10 days of school per quarter and still receive credit. In two of the schools, only five absences were allowed. Exceptions to the rules were granted in the case of hospitalization or death in the immediate family. In no case was an exception made by reason of a student having mastered the material in his courses.[12]

The conflict between attendance goals and learning goals also is evident among U.S. colleges. The National Commission report, which failed to note this conflict at the primary and secondary school level, did note that "in some colleges maintaining enrollments is of greater day-to-day concern than maintaining rigorous academic standards."[13]

An important distinction needs to be made between colleges and the primary/secondary schools, however. In their pursuit of larger enrollments colleges compete with each other by the quality of education they offer. On the other hand, the public schools, enjoying a virtual monopoly in their given geographic area, face little or no rivalry in terms of the quality of education offered. They compete only against the extracurricular interests of the students they hope to attract.

11. R. Bryne, "Capturing the Elusive Student...," NASSP Bulletin, 65, May, 1981, p. 30. See also, Perry A. Zirkel and Ivan B. Gluckman, "A Legal Brief: Academic Penalties for Absences," NASSP Bulletin, 66, January, 1982, pp. 101-104.

12. "Texas Association of Secondary Schools Principals Survey--Limit on Absences," Texas Study of Secondary Education Research Journal, No. 25, Fall, 1979-80, p.1.

13. A Nation at Risk, p. 14.

## OTHER GOALS VS. PERFORMANCE

It might be assumed that if academic achievement is not the top priority of the nation's public schools, then it is at least number two. This assumption isn't necessarily correct. Once students are in school, there is no particular reason why academic achievement should be second on the list of priorities.

Since there is no financial reward for academic achievement, there is no financial cost for assigning a higher priority to other goals.

As in the case of attendance, other goals clash with learning goals through the struggle over financial resources. For example, money spent on textbooks, equipment and instructional materials that improve learning is money which is not available to pay teacher salaries. Not surprisingly, then, how education dollars are spent is a political decision subject to political pressures. And because teachers are organized, they are more successful at getting a larger share of the budget pie.

In a similar vein, teachers and administrators traditionally have won the battle to resist new educational technology. They have maintained their resistance even though technological change often promotes learning. When new technologies are adopted, teachers must learn new ways of doing things, while principals and other administrators must learn new managerial skills. It is little wonder that these changes are not readily embraced.

These facts may help explain the inertia that runs throughout our public education system. One hundred years ago the standard technique for teaching was as follows: The students sat in chairs facing a teacher and a blackboard. The teacher wrote on the blackboard while the students copied. Today the standard technique for teaching is no different: Students sit in chairs facing a teacher and a blackboard. The teacher writes on the blackboard while the students copy. In no other industry in U.S. history has there been so little technological change as in the field of public school education.

Few people stop to realize that a large part of educational activity in this country, maybe more than half, takes place outside the public schools--in schools for mechanics, for wordprocessor operators, for computer programmers, and for hundreds of other trades, as well as through on-the-job training that takes place in every business enterprise. Moreover, most of this educational activity is conducted by profit-making firms for whom the financial pressure to produce results is strong. In these educational activities technological change is rampant.

A few examples help illustrate the resistance to technology in public education. In the 1960s a number of electronics firms such as SRA, D.C. Heath, and RCA-Random House designed and developed learning systems for the public schools. The potential of these systems was never realized, however, because the schools had no financial incentive to purchase them or to develop the managerial capabilities necessary to implement them.[14] A similar fate befell new technologies developed by the Department of Defense, the Job Corps and other agencies, despite the fact that these technologies were shown to be effective in developing basic skills in math and reading.[15]

In an effort to overcome local resistance to technological advances in education (many of which were subsidized with federal dollars), the Office of Economic Opportunity in the early 70s sponsored several pilot projects in which private contractors, operating outside of the education bureaucracy, were paid a fee to raise substantially the achievement levels of underachieving students. The preliminary results from 20 of these projects is instructive:[16]

- The private contractors succeeded in doubling the rates of student achievement for a cost that was only slightly more than the costs incurred by public schools.
- The private contractors spent about 10 percent less on teacher salaries and considerably more on instructional equipment than did the public schools.
- In the case of audio-visual equipment, the private contractors spent between 10 and 15 times more than the public schools.

More than anything else, what these results show is that when there are financial rewards for academic achievement spending priorities change radically.

This conclusion should not be taken to suggest that teachers are paid too much. Rather, it is an argument that spending priorities are being distorted because financial incentives to produce academic results are nonexistent in the public schools. Further evidence of this fact comes from the National Commission's report:[17]

14. Charles Blaschke, "Performance Contracting: Who Profits Most?" Phi Delta Kappa Educational Foundation, 1972, p. 10.
15. Blaschke, "Performance Contracting," p. 29.
16. Blaschke, "Performance Contracting," pp. 31-39.
17. A Nation at Risk, p. 21.

- Expenditures for textbooks and other instructional materials declined by 50 percent over the last 17 years.

- While many educators recommend a level of spending on texts which is between five and ten percent of a school's operating costs, the budgets for basic texts and related materials have been declining steadily during the last 15 years, to only .7 percent today.

Other goals which interfere with the goal of academic achievement include "medieval guild-type" goals, e.g., the practice of structuring teacher pay scales on seniority or the number of educational degrees instead of on teacher performance, and the policy of granting tenure. In addition, there is the goal of integration, e.g., lowering standards to promote racial balance; the goal of creating a "democratic environment," e.g., no tracking or grouping of students according to ability; and the goal of "social adjustment," e.g., lessened emphasis on competition and achievement. While some of these goals may be desirable, the priority given to each is being determined arbitrarily. These priorities are not being assigned in a way that reflects the clear preferences of voters, taxpayers and parents.

## ARE THE TEACHERS AT FAULT?

The recent debate over the issue of merit pay has drawn much-needed attention to the role of teachers and the financial incentives they face. We agree that the current system of compensating teachers is unsatisfactory. However, we have no reason to believe that changing the financial incentives they face without making other changes at the same time will improve the quality of education.

In fact, we find that teacher attitudes on the whole are far more consistent with the goal of raising academic achievement than that of the administrators above them. A 1978 poll in Maine asked teachers and administrators to rank a number of educational goals:[18]

18. D.L. Silvernail, "How do Administrators, Teachers Rank Educational Goals," NASSP Bulletin, 64, December, 1980, pp. 101-108.

- Among teachers the most important goal was to develop the ability to read printed material on the level of a daily newspaper. The second most important goal was to develop the ability to perform minimum daily living transactions (e.g. completing job applications, etc.).

- The administrators ranked "reading printed material" seventh and "daily transactions" ninth.

- The administrators ranked "developing a positive self-image" as the most important goal. The teachers ranked it fourth.

Further evidence of teacher attitudes comes from a poll reported in Today's Education, the magazine published by the National Education Association.[19]

- More than 90 percent of the teachers polled favored an increased emphasis on basic curriculum, higher standards for student performance, and maintaining stricter discipline.

- About 75 percent wanted more tracking (grouping of students according to ability), more restructuring of schools into traditional formats, and more retention of students in their present grade or class until their performance is satisfactory.

- About 75 percent of the teachers polled favored a requirement that students pass achievement tests before promotion or graduation.

In addition, many of the teachers expressed dissatisfaction with what their schools were doing about these goals.

It is evident that the reasons why the public schools are exhibiting the characteristics described in the National Commission's report are not due to the fact that teachers want the schools to be that way.

19. "Back to Basics," Today's Education, Vol. 70, No. 1, February-March, 1981, p. 84.

## WHO ARE THE VICTIMS?

There is mounting evidence that the nation's public schools are focusing their attention on the so-called average student and ignoring the special needs of gifted students and students who are slow learners. The real victims of falling educational standards are precisely those students who are not "average."[20]

- Between 1976 and 1982, SAT scores for students in the top 10 percent of their class fell by 13 points. Among the second 10 percent, SAT scores fell by six points.
- Among students in the next four tenths, however, there was virtually no change at all in SAT scores.

The performance of the public schools with respect to students who are underachievers is even more disturbing. Some evidence suggests that the public schools have no idea how to teach students with learning problems. For example, a special summer school session was established in Dallas in 1982 to instruct 1,369 students who had failed to master minimum skills in reading, language and mathematics in their regular courses. At the end of the session, only 10.5 percent of the students had mastered the minimum skills. The cost: $900,000 for the program -- $6,250 per successful student.

## ANATOMY OF FAILURE: ATTEMPTS TO INCREASE PERFORMANCE WITHOUT REWARD

A central premise of the REWARD System is that educational systems work best when people who make the decisions reap the benefits of their good decisions and bear the costs of their bad ones.

A major problem under the current system is that the school districts which make decisions that ultimately raise academic achievement receive no benefit. Conversely, school districts which make decisions that lower academic achievement bear no cost. This is the structural flaw that needs to be changed.

20. Data taken from the College Entrance Examination Board.

Unfortunately, most of the current proposals to change public education are designed to alter behavior without addressing the underlying incentives that decision-makers face. Although many of these proposals are aimed in the right direction, we are convinced that the gains, if any, will be modest as long as the current financial incentives remain intact.

The following is a brief summary of current proposals and programs and their inherent weaknesses:

**Competency Based Education.** The practice of requiring students to pass a minimum competency exam before graduation began in Oregon in the 1970s. Since then 37 states have adopted the requirement. The program gives incentives to students, but it does not change the financial incentives faced by the education bureaucracy.

**Performance Contracting.** The practice of contracting with private companies to provide education services gives incentives to the entrepreneurs, and these incentives can be expected to produce results. However, this practice also does not change the financial incentives of the public school bureaucracy, which has successfully resisted performance contracting in most localities.

**Teacher Certification and Teacher Competency Exams.** Since the end of World War II there has been a growing tendency to raise the educational qualifications which must be met in order for teachers to work in public schools. In addition, 20 states now require prospective teachers to pass minimum competency exams. Ironically, the increasing stringency of teacher certification requirements may be doing more harm than good. A Ph.D. in chemistry, history, literature or economics, for example, cannot teach in the public schools in most states unless he or she has had the requisite number of education courses. By contrast, many teachers who have been certified have only limited knowledge about the subjects they teach. Teacher certification requirements may be keeping the best potential teachers out of the public schools. As the National Commission's report noted:[21]

- The teacher preparation curriculum in most states is weighted heavily with courses in "education methods" at the expense of courses in subjects to be taught.

- Half of the newly-employed mathematics, science and English teachers are not qualified to teach these subjects.

- Too many teachers are being drawn from the bottom quarter of graduating high school and college classes.

21. A Nation at Risk, pp. 22-23.

The performance of prospective teachers on minimum competency exams (38 percent recently failed a new test in California) may simply be disclosing to the public what most people have long suspected: that the best potential teachers are not entering the teaching profession.

**Merit Pay for Teachers.** The practice of rewarding teachers based on their performance theoretically provides teachers with incentives to do a better job. But teacher groups are correct when they question whether merit pay schemes will be fairly and objectively administered. Merit pay for teachers without merit pay for principals and other administrators is comparable to introducing incentives on an assembly line without also giving upper management incentives to perform. In order for merit pay schemes to work, the people who operate them must have a personal stake in the decisions they make.

**Increased Spending.** One of the remarkable things about the U.S. educational system is that the more money that is put into it the worse it seems to perform.[22]

- Over the last two decades, real spending per student per day has increased 130 percent.
- Over the last two decades, real salaries for teachers have increased 23 percent.
- And during the same period of time the average pupil-teacher ratio has decreased 23 percent.

Over time there appears to be a negative relationship between the number of educational dollars spent and the degree of academic performance. Moreover, throughout the 50 states we are unable to find any statistical relationship between spending per student and performance on SAT exams.

In conclusion, we believe it is unlikely there will be any substantial gains in public school performance unless there is a fundamental change in the way the school districts are funded. It is a change in financial incentives that must come from the top down.

22. Data taken from the National Center for Education Statistics.

## THE REWARD SYSTEM

In order to change the incentives faced by the nation's school districts, we propose that state funding of education be radically redesigned. Under the REWARD formula, a certain portion (say 80 percent) of state funds spent on education would continue to be based on attendance and other factors. The other portion of funds (20 percent) would be allocated on the basis of academic achievement in order to encourage learning goals. School districts would be compensated for the academic achievement of each student within the district. Achievement would be measured by student performance on standardized basic skills tests. For each student, the most recent score on the tests would be compared to his or her scores in previous years. Improvement over the most recent year would be rewarded more heavily than improvement over longer periods of time. Table I illustrates how the REWARD formula might be applied.

The REWARD formula has the following properties:

- School districts do not lose funds because of a failure to improve achievement. They can only gain funds as a result of improvement.
- A school district can never gain by intentionally lowering its achievement scores during one period in order to register a larger gain during a later period.
- At the time the program is initiated, schools are "experience rated." Based on this rating, the REWARD formula is structured so that the school districts which have brighter students do not have an advantage over other school districts.
- School districts with the greatest number of slow learners have the most to gain under the formula. This is because they have the greatest potential to raise their level of performance.
- Adjustments can be made for special cases, e.g. changes in student population, problems created by busing, an influx of immigrant students, etc. These adjustments can be made without changing the school districts' incentives to improve performance.
- The total amount spent on education under the plan is fixed, rather than open-ended. State governments do not have to increase spending on education in order to implement the plan.

TABLE I

A Simulated Example of the Formula
Based on National Averages in 1982

| Compensation per Student | Amount | Percent |
|---|---|---|
| Compensation from local government: | $1,089.62 | 44.72% |
| Compensation from federal government: | 205.20 | 8.42 |
| Compensation from state government: | | |
| Attendance and other factors | 913.02 | 37.48 |
| Improvement on test scores: | | |
| One-year improvement | 91.30 | 3.75 |
| Two-year improvement | 68.48 | 2.81 |
| Three-year improvement | 34.24 | 1.41 |
| Four-year improvement | 22.83 | 0.94 |
| Five-year improvement | 11.41 | 0.47 |
| TOTAL | $2,436.10 | 100% |

## INCENTIVES UNDER THE REWARD SYSTEM

As Table I shows, the funds which school districts receive from the state based on their achievement amount to less than 10 percent of their budgets. However, this revenue represents marginal funding--additional money which may be used to increase teacher salaries, purchase equipment, etc. And in order to receive this additional revenue the school district must perform.

In structuring school finance this way, the REWARD formula establishes a price for each one-point improvement in standardized test scores. It is inevitable that school districts will compare the price paid for a one-point improvement with the cost of achieving that improvement. On the other hand, should a school district lower academic achievement by pursuing other goals, the district will bear a cost for each one-point reduction in test scores. The cost is the pricetag that the state has placed on that achievement.

Thus, the REWARD formula creates a radically different set of incentives under which school districts operate:

### 1. Incentives and the Choice of Goals

- For the first time, school districts will have an incentive to weigh attendance goals against learning goals. The potential revenue gain from higher attendance must be compared with the potential revenue loss if higher attendance is bought at the cost of lower academic achievement.

- As a result, school districts will be more reluctant to keep students who are discipline problems in the classroom, to make courses more entertaining and less substantive, to practice social promotion, to lower homework requirements, and to allow students to elect out of courses which teach basic skills.

- To the extent that school districts pursue other goals (promoting integration, develping well-rounded personalities, etc.) which conflict with learning goals, they will be motivated to weigh the cost of these goals against the perceived benefits.

## 2. Incentives and Benefits for Individual Students

- For the first time, school districts will have a financial incentive to investigate and evaluate teaching techniques--to adopt techniques that work and discard those that do not.

- Because each student's performance affects school district revenue just as much as any other student, school districts will have an incentive not to ignore the students who are not "average."

- School districts will have an incentive to separate fast learners from slow learners and to develop techniques which maximize the achievement of both groups.

- Because the largest potential revenue gains can be had by improving the scores of slow learners, school districts will have an incentive to devote special attention to this group.

## 3. Incentives, Equipment and Personnel

- For the first time, school districts will have an incentive to weigh specific expenditures of money against the gain in academic achievement which those expenditures produce.

- School districts will have an incentive to make capital expenditures based on educational effects. A "more pleasant learning environment" becomes desirable only if it really improves learning.

- School districts will have an incentive to attract and retain superior teachers, superior principals and superior administrators.

## 4. Incentives and Accountability

- For the first time, school districts will have a financial incentive to investigate carefully whether their personnel are contributing to or detracting from academic achievement.

- Since the actions of individual administrators, principals and teachers affect academic achievement, and since academic achievement affects revenues, school districts will have an incentive to hold individuals accountable for their behavior--to reward superior performance and to discourage inferior performance.

- Since incentives are applied from the top down, the greatest pressure for performance is on administrators and principals, rather than on individual teachers. In addition, school districts will have strong incentives to develop fair and accurate systems for evaluating teacher performance.

## POSSIBLE OBJECTIONS TO THE REWARD SYSTEM

There is considerable and understandable skepticism about standardized testing these days. Questions have been raised about the culture-neutrality and the validity of IQ tests, the Scholastic Aptitude Test (SAT), and other achievement tests such as those marketed by the Educational Testing Service.[23] In general, these questions surround a concern as to whether or not test scores are a reliable measurement of a student's knowledge and skills.

Under the REWARD System, a legitimate worry might be that teachers might focus all of their attention on preparing students for a test to the exclusion of other worthwhile goals, and that this will lead to a rigid uniformity of curriculum and goals. While these are potential problems, they are not inevitable.

**Test Validity need not be a problem.** The central question for test validity is: Does the test tell us what we want to know? Tests for basic skills need to be developed to meet certain standards:

1. The test should not focus on isolated bits of information which can be temporarily memorized then forgotten after the test. Rather, it should require that students use information skillfully, i.e., use a skill and not just recall a fact.

2. Because they involve language, tests do have a cultural aspect. But then so do the basic skills themselves. The problem of cultural bias should be dealt with by removing irrelevant cultural items from tests, not by making tests non-cultural (which is impossible).

   Our concern with basic skills is that students are graduating without being able to read, write and calculate well enough to effectively participate in society. Tests can and should legitimately incorporate cultural items that are necessary for this participation. Some will argue that this puts certain students at a disadvantage on the test which is true. But these students already are at a disadvantage in society. The purpose of the test is not to penalize these students, but to identify problems and correct them so the students will not be penalized in society for the rest of their lives.

23. See Banesh Hoffman, The Tyranny of Testing (New York: Crowell-Collier Press) 1962; See also Clinton I. Chase, "Psychometric Problems in Performance Contracting," The Elementary School Journal, 76, March, 1976, pp. 381-385; and Robert L. Ebel, "Content Standard Test Scores," Educational and Psychological Measurement, 22, Spring, 1962, pp. 15-25.

3. It will be crucial to insure that test scores reflect student ability to use basic skills in real life settings, not just in school. It will be important to monitor test items carefully and to make sure that test performance is a good predictor of the ability to use the skills after graduation.

4. Most of the objections and problems related to the test scores of individual students cease to become relevant when considering the scores of large groups of students. This is due to the "law of large numbers." We can make far more reliable inferences from the average test score of 10,000 students than we can from the test score of a single student. Errors of measurement for specific individuals tend to cancel out in the aggregate. And because the REWARD formula focuses on school districts in their entirety, errors-of-measurement problems are much less worrisome.

Finally, it should be noted that while there always will be problems with tests, these problems in principle are no different than the problems facing any teacher who must construct a test for the day-to-day classroom experience.

**"Teaching to the Test" can be discouraged.** "Teaching to the Test" is a problem which arises when teachers focus all of their attention on getting students through the test by having them memorize answers. If teachers do not know the specific items on the test, and if the test requires more than memorization, there will be no pay-off for this kind of teaching. Still, teachers should know what kinds of skills are needed in order to do well, and should teach those. By doing so the teacher will not be able to teach students how to pass a basic skills test without at the same time teaching them the basic skills.[24]

**Incentives to reach other goals.** The REWARD System seeks to give administrators and teachers incentives to achieve universally desirable learning goals. Ninety percent of funding is not touched by this program, however, and there is no reason why some of the 90 percent cannot be used to encourage other goals. Indeed, it would be possible to provide incentives for a teacher to achieve a specific goal (e.g., superior creative writing) if a school district wishes to do so. If teachers are focusing entirely on basic skills, it would only show that they are not being held responsible for any other goals.

**Curriculum Need Not Be Uniform.** We are recommending that school districts be encouraged to pursue widely accepted learning goals. We are not recommending methods. Both school districts and teachers should be free to develop the procedures which work best for them in their own settings. Thus, the REWARD System encourages individual creativity, not procedural uniformity.

24. See Robert L. Ebel, "The Role of Testing in Basic Education," NASSP Bulletin, 63, October, 1979, pp. 89-93.

## FACILITATING THE REWARD SYSTEM

Indeed, one of the most important features of the REWARD System is its emphasis on results, not methods. Many educational reforms specify the methods to be used, involve a lengthy and expensive process of developing standardized curricula, and entangle teachers in miles of red tape. Under these circumstances, teachers find themselves feeling frustrated and overworked. They end up paying more attention to paper than to pupils, using methods which do not suit their styles and talents, and annoyed at not being allowed to develop their own techniques. The result is stifled creativity, wasted money and little significant improvement.

The REWARD System provides incentives for results only. The teachers' task is to find methods which work for them and their students. Creativity in methods is encouraged. Uniformity is discouraged. Paperwork will be reduced because there is no need to show what one does, only what the results are.

All too often, the typical attempts to achieve procedural uniformity consume time and money and rob teachers of their major source of job satisfaction: the opportunity to exercise imagination while developing effective teaching methods. Most teachers are good at this when given the opportunity and the incentive. The REWARD System would do precisely that.

Note: Nothing written here is to be construed as necessarily reflecting the views of the National Center for Policy Analysis or as an attempt to aid or hinder passage of any bill before Congress or before any state legislature.

# APPENDIX

## THE "REWARD" FORMULA

### Structure of the Formula

The amount of funds given to a school district for any student j in the current time period t, is:

$$(1) \quad R_j = A_{jt} + a_t (X_{jt} - X_{jt-1}) + a_{t-1}(X_{jt} - X_{jt-2}) + \ldots\ldots\ldots + a_{t-k-1} (X_{jt} - X_{jt-k})$$

or

$$(2) \quad R_j = A_{jt} + \sum_{i=1}^{k} a_{t-i-1}(X_{jt} - X_{jt-i})$$

Where,

$R_j$ = total amount

$A_{jt}$ = amount based on average daily attendance and other factors in the most recent time period

$X_{jt}$ = score made by the student in the most recent time period

$X_{jt-i}$ = score made by the student in time period t-i

$a_t$'s = weights attached for time periods

k = number of time periods

$X_{jt}-X_{jt-i}$ = improvement in score between time period t-i and time period t

The amount spent on a student can thus be divided into two parts: An amount $A_{jt}$, based on attendance and other factors, and an incentive payment, based on performance on standardized tests. Incentive pay is essentially based on the difference between a student's score in the current period and his score in prior periods. In order to avoid perverse incentives, improvement over the previous year must be rewarded more heavily than improvement over past years. Thus

$$(3) \quad a_t > a_{t-1} > a_{t-2} > \cdots > a_{t-k-1}$$

The following is an example of how such a compensation scheme might work, based on scores over a five-year period:

$$R_j = \underbrace{A_{jt}}_{\substack{80\% \\ \text{attendance}}} + \underbrace{a_t (X_{jt} - X_{jt-1})}_{\substack{8\% \\ \text{one year} \\ \text{improvement}}}$$

$$+ \underbrace{a_{t-1} (X_{jt} - X_{jt-2})}_{\substack{6\% \\ \text{two year} \\ \text{improvement}}} + \underbrace{a_{t-2} (X_{jt} - X_{jt-3})}_{\substack{3\% \\ \text{three year} \\ \text{improvement}}}$$

$$+ \underbrace{a_{t-3} (X_{jt} - X_{jt-4})}_{\substack{2\% \\ \text{four year} \\ \text{improvement}}} + \underbrace{a_{t-4} (X_{jt} - X_{jt-5})}_{\substack{1\% \\ \text{five year} \\ \text{improvement}}}$$

Thus, the district receives 80% of its revenues for attendance, 8% for improvement over the most recent year, etc.

One way of looking at the formula is to see that incentive payment for a student is actually based on the difference between his current score and a weighted average of his scores in all previous years, with more recent years receiving a higher weight than more distant years.

Thus,

$$(4) \quad \text{Incentive Payment} = X_{jt} \left(\sum a_{t-i-1}\right) - \sum_{i=1}^{k} a_{t-i-1} X_{jt-i}$$

## TOTAL SPENDING UNDER THE FORMULA

The total amount spent by the state is the average amount spent per pupil, $\bar{R}$, times the total number of students, n. The average amount per pupil is:

$$(5) \quad \bar{R} = \sum_{j=1}^{n} \frac{R_j}{n}$$

or

$$(6) \quad \bar{R} = \bar{A} = + \sum_{j=1}^{n} \sum_{i=1}^{k} \frac{a_{t-i-1}}{n} (X_{jt} - X_{jt-i})$$

where $\bar{A}$ is the amount spent per pupil based on attendance.

A different way of expressing (6) is to put it in terms of average test scores. Thus,

$$(7) \quad \bar{R} = \bar{A} + \sum_{i=1}^{k} a_{t-i-1} (\bar{X}_t - \bar{X}_{t-i})$$

where the $\bar{X}$'s are the average scores of all students in a particular year.

## SUGGESTED WEIGHTS

It is recommended that at least 20 percent of all funds allocated represent "incentive" spending. This means that 80 percent of spending would be allocated on the basis of attendance and other factors. Accordingly, we can rewrite (7),

$$(8) \quad \bar{R} = .8\bar{R} + \sum_{i=1}^{k} \frac{a_{t-i-1}}{n} (\bar{X}_t - \bar{X}_{t-i})$$

or

$$(9) \quad \bar{R} = \sum_{i-1}^{k} \frac{a_{t-i-1}}{.2n} (\bar{X}_t - \bar{X}_{t-i})$$

This, in turn, means that we can always express the amount spent per pupil as a weighted average of the average scores in each period:

$$(10) \quad \bar{R} = b_1\bar{X}_t + b_2\bar{X}_{t-1} + \ldots + b_k\bar{X}_{t-k}$$

where, $b_1 = \sum \frac{a_{t-i-1}}{.2n}$ $\quad b2 = \frac{-a_t}{.2n}$, $\quad b3 = \frac{-a_{t-1}}{.2n}$, $\quad$ etc.

For planning purposes, it would seem desirable to set the total level of spending at some fixed amount, independent of how students perform on standardized tests. For the coming year's educational budget, we know what the average scores have been in all past years and we can fix a number for $\bar{R}$. Once the scores during the coming year have been tabulated, we can always choose the weights $b_i$ to insure that equation (10) is satisfied.

## THE NATURE OF INCENTIVES

A school district has control over only two of the variables which determine its income in the current period: attendance and scores on current exams. With respect to exam scores, a one-point improvement in the score of any student j will generate an additional income to the district equal to:

$$\frac{\Delta R_j}{\Delta X_{tj}} = \sum_i a_{t-i-1} = y_t$$

Thus, $y_t$ is the "price" that the state pays in return for each one point increment in student scores on standardized exams. This means that the school district has an incentive to allocate its funds so that, at the margin, the "cost" to the school district of "producing" a one-point increment in each student's score is approximately $y_t$ dollars. Furthermore, a school district has an incentive to allocate its resources among students so that it invests more effort in those students who promise the greatest return. School districts which do not respond to these incentives will have lower revenues than those which do respond.

It is important to note that the formula proposed here is a linear one. Under such a formula, all students are treated equally and any improvement in test scores is treated equally. Suppose that the standardized exam is graded on a scale of zero to 100, and that in the previous year one student scored 98, while another scores only 50. A question the school district must face, in attempting to maximize its revenue, is whether, for the same resources spent, it would be easier to raise the former student from a 98 to a 99 or whether it would be easier to raise the latter student from a 50 to a 51.

Little is known about the answers to such questions. It seems probable, however, that the same investment of resources will produce a larger increase in the score of the latter student than the former. If this is true, then the formula encourages schools to pay more attention to those students who are falling behind in achievement. Should this assumption prove to be false, it may be desirable to alter the formula in order to create even greater rewards for districts which show improvement with students who are low achievers.

## THE INITIAL STARTING POINT

The central motivation behind the REWARD System is that school districts which improve their performance should be rewarded for doing so. It follows that we want to structure the REWARD formula to insure that school districts do not gain simply by continuing to do in the future whatever they have been doing in the past.

Suppose, for example, that over the past five years, the following is true for the average student in each of two school districts:

$$\text{for district 1: } \sum_{i=1}^{k} a_{t-i-1} (X_{jt} - X_{jt-i}) = 100$$

$$\text{for district 2: } \sum_{i=1}^{k} a_{t-i-1} (X_{jt} - X_{jt-i}) = 50$$

Then on the date on which the REWARD System is started we may want to adjust the compensation to the two districts for attendance, so that

$$A_t \text{ for district 2} = A_t \text{ for district 1} + 50$$

In this way, both districts will receive the same total compensation in the future if both continue doing in the future what they have been doing in the past. Through this type of "experience rating," a school district which has "fast learners" will have no advantage over a district which has "slow learners."