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The History of Performance Decline

Concerns about student performance are widespread. For two decades, the average high school students have had such mediocre scores on the Scholastic Aptitude Test (SAT) that their performance has made front-page news. Local test results are also regularly reported in many metropolitan areas. The scores make headlines usually because they are disappointing.

The basic facts make depressing reading:

- Student performance, as measured by a wide variety of standardized tests, fell across the board during the 1970s.

- During the 1980s some measures of student performance began to improve (from the depressed levels of the 1970s), but others showed only maintenance of a dismal status quo.

- The average minority student consistently performs less well than the typical white student, even though a modest narrowing of the gap has occurred during the past decade and a half.

- Students from the United States perform worse than those from many other countries. Although some variation occurs across tests, there is little evidence of significantly narrowing international performance gaps.

Assembling a complete, detailed picture from scattered and often uncertain data is fraught with inevitable problems, but the brow-beating headlines do seem to have accurately captured the general tenor of American student performance. National SAT scores fell from the mid-1960s through the end of the 1970s before beginning to recover, but the recovery has been neither consistent nor sufficient to return performance to its previous highs. The average test-taker in 1979 (the trough) was performing at the thirty-ninth percentile in math and thirty-third percentile in reading of the test-takers in 1963 (the peak). Although the college admission tests (SAT and ACT, or American College Testing score) showed some of the largest declines in test scores, other tests also showed very significant falls.

Results from the National Assessment of Educational Progress (NAEP) are particularly significant because these are the only tests that provide data for a sampling of students who are statistically representative of the overall student population. These tests cover reading, mathematics, and science for a random selection of students of given ages.
Although there are some differences between different tests in the series, these data suggest that the overall performance of the average seventeen-year-old student changed little between the early 1970s and 1990. Reading performance showed no improvement, and science performance slipped. The performance gap between black and white students generally narrowed during this period, but it still remains unacceptably large.

International comparisons provide a different perspective on student performance. The most telling of the testing projects that have been undertaken during the past three decades is the International Assessment of Educational Progress (IAEP). The IAEP measures performance in science and mathematics, subjects less affected by possible language and cultural differences. It also uses the general tests developed for U.S. students, so any differences in curricular objectives or instructional approaches work in favor of U.S. students. Tables 3 and 4 show the performance of thirteen-year-olds from several countries and school systems on a battery of mathematics and science tests administered in 1989.

### Table 3

**Comparative Performance of Thirteen-Year-Olds in Mathematics, as Measured by the International Assessment of Educational Progress, 1989**

<table>
<thead>
<tr>
<th>Country/region</th>
<th>Percentage performing at or above each level of competency (scale score)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Add and subtract (300)</td>
</tr>
<tr>
<td>Korea</td>
<td>100</td>
</tr>
<tr>
<td>Quebec (French)</td>
<td>100</td>
</tr>
<tr>
<td>British Columbia</td>
<td>100</td>
</tr>
<tr>
<td>Quebec (English)</td>
<td>100</td>
</tr>
<tr>
<td>New Brunswick (English)</td>
<td>100</td>
</tr>
<tr>
<td>Ontario (English)</td>
<td>99</td>
</tr>
<tr>
<td>New Brunswick (French)</td>
<td>100</td>
</tr>
<tr>
<td>Spain</td>
<td>99</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>98</td>
</tr>
<tr>
<td>Ireland</td>
<td>98</td>
</tr>
<tr>
<td>Ontario (French)</td>
<td>99</td>
</tr>
<tr>
<td>United States</td>
<td>97</td>
</tr>
</tbody>
</table>

Table 4  
Comparative Performance of Thirteen-Year-Olds in Science,  
as Measured by the International Assessment of Educational Progress, 1989

<table>
<thead>
<tr>
<th>Country/region</th>
<th>Know everyday facts (300)</th>
<th>Apply simple principles (400)</th>
<th>Analyze experiments (500)</th>
<th>Apply intermediate principles (600)</th>
<th>Integrate experimental evidence (700)</th>
</tr>
</thead>
<tbody>
<tr>
<td>British Columbia</td>
<td>100</td>
<td>95</td>
<td>72</td>
<td>31</td>
<td>4</td>
</tr>
<tr>
<td>Korea</td>
<td>100</td>
<td>93</td>
<td>73</td>
<td>33</td>
<td>2</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>98</td>
<td>89</td>
<td>59</td>
<td>21</td>
<td>2</td>
</tr>
<tr>
<td>Quebec (English)</td>
<td>99</td>
<td>92</td>
<td>57</td>
<td>15</td>
<td>1</td>
</tr>
<tr>
<td>Ontario (English)</td>
<td>99</td>
<td>91</td>
<td>56</td>
<td>17</td>
<td>2</td>
</tr>
<tr>
<td>Quebec (French)</td>
<td>100</td>
<td>91</td>
<td>56</td>
<td>15</td>
<td>1</td>
</tr>
<tr>
<td>New Brunswick (English)</td>
<td>99</td>
<td>90</td>
<td>55</td>
<td>15</td>
<td>1</td>
</tr>
<tr>
<td>Spain</td>
<td>99</td>
<td>88</td>
<td>33</td>
<td>12</td>
<td>1</td>
</tr>
<tr>
<td>United States</td>
<td>96</td>
<td>78</td>
<td>42</td>
<td>12</td>
<td>1</td>
</tr>
<tr>
<td>Ireland</td>
<td>96</td>
<td>76</td>
<td>37</td>
<td>9</td>
<td>1</td>
</tr>
<tr>
<td>Ontario (French)</td>
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<td>6</td>
<td>&lt;1</td>
</tr>
<tr>
<td>New Brunswick (French)</td>
<td>98</td>
<td>78</td>
<td>35</td>
<td>7</td>
<td>&lt;1</td>
</tr>
</tbody>
</table>


American students are far from the top, and the gap is particularly large on more complex tasks. Moreover, as the report on the first IAEP mathematics results noted, the U.S. students seemed unworried by their performance: "Despite their poor overall performance, about two-thirds of the United States' thirteen-year-olds feel that they are 'good at mathematics.' Only 23 percent of their Korean counterparts, the best achievers, share the same attitude."

A smaller and different group of countries participated in a follow-up to the IAEP in 1991. On this collection of tests, nine-year-old students from the United States scored in the middle of the range on the science examination and at the bottom on the mathematics examination. Thirteen-year-old U.S. students scored at the bottom in both examinations.
Other tests confirm the IAEP's general findings. For example, the International Association for the Evaluation of Educational Achievement (IEA) compared international results on mathematics examinations given in both the mid-1960s and the early 1980s. These show American students generally falling behind students from both developed and underdeveloped countries.

The one examination showing a somewhat different result is the 1991 Reading Literacy Study. Fourteen-year-old Americans placed seventh out of nineteen international testing groups. Unfortunately, no historical data exist on reading performance, so no conclusions about changes in performance can be drawn. Reading is also a very difficult subject to test and to compare internationally.

A related issue concerns the performance of the very top students. Many analyses of labor markets and the macroeconomy indicate that the very highly skilled — for example, scientists and engineers — play a particularly important role in determining the viability of the economy and its future growth. Thus, a fall in the performance of the highest performing students, particularly a disproportionate fall, might have especially adverse effects. Existing data and testing methodology make it difficult to ascertain whether the performance of top students has declined, as some measures have suggested. No evidence, however, indicates that their performance has improved.

Sources of Uncertainty About Performance

The paucity of any consistent and accepted national measures of student performance frustrates any detailed analysis. The SAT is the only examination to provide nationwide data on student performance over an extended period of time. Only those students who wish to go on to certain colleges or universities take that test, however. The possibility that the mix of students who take the SAT has changed over the years raises doubts as to whether average scores on this test reflect changes in the performance of the student population as a whole.

The proportion of high school graduates taking the test held constant or fell throughout the 1970s but increased noticeably during the mid- to late 1980s. If increasing numbers of poorer-prepared students take the test, changes in scores over time could result more from the composition of the test-taking population than from what students are learning. Similarly, the test itself can change over time, so that changes in the average scores may not fully reflect differences in performance. Extensive analysis of each of these possibilities, both for the SAT and for other tests, such as Iowa achievement tests, suggests
that the tests do not reflect the performance of the whole population of students with unflagging accuracy. Nonetheless, these analyses do discern a general pattern of decline.

Nor are the data able to elucidate fully the composition of performance change. Specifically, some analyses have suggested that the character of performance has changed significantly. The decline in scores appears, by some tests, to have come more from higher-level skills than from basic, or lower-level, skills. The recovery may have come from improvement in basic skills and less from higher-level skills. One cannot have full confidence in these generalizations, but they do suggest a greater decline in the most important dimensions of schools than the overall scores indicate.

Although the details of student performance remain vague, the broad-brush conclusions are very consistent. Nobody would argue that student performance has improved during the past three decades. At best, it has remained relatively flat. At worst, it has fallen every bit as dramatically as the SAT scores indicate.

The Sources of Change in Performance

Schools are not solely responsible for the scholastic performance of their students. Parents and others outside of schools have a very large influence. This fact is not particularly surprising, given that students spend only five or six hours a day for 180 days out of the year in school, but it raises questions about how much schools can improve student performance on their own.

Some aspects of family life and the socioeconomic environment surrounding schools have undoubtedly worsened in recent decades. The composition of families has changed dramatically, with more children living in single-parent families. The incidence of poverty among children, after falling in the 1970s, has returned to the levels of the early 1960s. Persistent welfare support has increased. Schools now compete for students' time and attention with video games, fifty or more television channels, and other attractions. Moreover, increased immigration has put new pressures on schools, especially in a handful of areas with large immigrant populations. These immigrants bring generally lower incomes, different languages, and a variety of cultural adjustment problems to the schools.

Not all changes have been for the worse. The adult population has higher levels of schooling than at any point in the past. Families are generally smaller, allowing for more attention to each child. And a variety of governmental programs — including expanded health care for the poor, food and nutrition programs, and pre-school programs — have been developed to ameliorate the difficulties that disadvantaged families face.
Good or bad, none of those outside factors is a convincing explanation, either individually or jointly, for the uncomfortable fact that improvements in academic performance have not accompanied the tremendous increases in school spending. School districts commonly labeled “good” — districts with adequate resources, serving relatively advantaged student populations, and free of the pressures of immigrants — have had the same sorts of performance problems as the nation as a whole. Although such districts have generally increased spending at least as fast as the national average, they have been unable to convert more resources into higher performance.

Poor performance in education presents difficult policy problems. Clearly, overall student performance would improve if more parents motivated their children to do better in school and if more parents took an active interest in their children’s schooling. Direct comparisons of schools in the United States with those of Japan, for example, dramatically illustrate the effects of differences in parental attitudes. Parents in Japan demand, and support, higher academic achievement; American parents appear ambivalent about achievement. This lack of family support may, in fact, offer a severe constraint on the possibilities. At the same time, the policy options for changing parents’ behaviors appear fairly limited, particularly in the short run. Exhorting parents to do a better job has not proved very effective, and nobody has yet articulated effective policies for developing more educationally active parents. Thus, for the most part, policymakers who want to improve student performance can concentrate only on schools.

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PART 3

Economic Principles: A Guide for Improvement

Education's status quo is not sustainable. America will not, indeed cannot, continue to spend more and more on education to achieve flat or falling performance. The rapidly increasing costs of the education system are already bumping against limited resources.

Despite the nation's overall healthy economic growth, the living standards of America's middle class are, by some measures, stagnating. At the same time Americans are demanding that the government spend more on health care, social security, the environment, and other government programs. Legitimate public and private desires compete with schools for limited resources. One way or another, the United States must choose where to put its resources, and the nation's future well-being will depend on the wisdom of these choices. The question is how to best choose.

As economists, we believe that economic principles are a crucial part of any reasonable procedure for making decisions about the allocation of economic resources. At best such principles have been inconsistently ignored. We believe that the unhappy state of public education is largely the result of inattention to three decision-making principles designed to ensure that schools' resources are productively employed.

1. Efficient use of resources is paramount.

Perhaps the most fundamental economic principle is that resources should be used in the most efficient manner possible. In simplest terms, this means that any funds devoted to schools should be put to their best possible use. When a choice is made between two programs, put the funds into the program that achieves the best results for the money spent. If a program or activity does not contribute to students' performance, do not put funds into...
Much of the resistance seems to come from a fundamental misunderstanding of the idea of efficiency as it is applied to education. Many people immediately assume that efficiency is either very narrow or very mechanical. Efficiency does not mean minimizing costs without regard to the results, nor does it mean creating a rigid structure for schools, in which only approved “efficient” education techniques can be employed. What efficiency does mean is simply that costs and benefits should continually be compared and that costly programs with few benefits should be abandoned.

Although some argue that education is too important to be managed by concerns about costs and efficiency, we argue that education is too important not to be managed by those concerns. The United States must do everything possible to ensure that it reaps the largest possible gain from the resources available. So long as benefits exceed costs, decision-making based on efficiency calculations will ensure that funds are made available even for expensive projects. A productive education project is more likely to go unfunded when efficiency is not considered, because narrow political considerations are then more likely to sway decisions.

Evidence indicates clearly that schools often use their resources inefficiently. Inefficiency drains off funds and thwarts achieving superior performance for all students. To put it more positively, if schools were made more efficient, funds would be released for new and innovative programs that could help students improve their performance.

2. Appropriate performance incentives are the surest way to improve student performance and to ensure the efficient use of resources.

Using resources efficiently is difficult, especially when the object of concern is something as complicated as education and schools. It is particularly difficult if the participants — the students, teachers, and principals — have limited interest in increased performance or the conservation of resources. This lack of interest characterizes the current schooling system. Improved academic performance is rarely rewarded; indeed, it is sometimes punished. Instead of rewarding good results, as the economist would favor, the current system concentrates much more on taking away individual initiative and incentives and replacing these with central direction.
Concentrating on performance incentives is the approach most likely to lead to improved schools. There are two basic approaches to decision-making in education: regulation and incentives. Regulation is a centralized command and control system based on punishment. Central management creates a system of rules; those under its control are punished if they do not obey. Incentives are a decentralized system based on rewards. Central management specifies a set of desired outcomes and rewards those school personnel (and students and parents) who achieve them. Typically incentives specify the goal and leave it to the agent to decide how to achieve it; regulatory regimes attempt to specify both the goal and the way it is to be reached.

Schools today rely far more heavily on regulation than on incentive. The appeal of regulation is that allows central authorities at the state or school district level to control the processes and the activities of individual schools, ensuring that no locality or school strays too far from acceptable, general goals.

But regulation-based systems of management have drawbacks when used in education. Systems of regulations implicitly assume a single, well-defined, "best" way of educating. At best, regulatory systems ignore local differences, such as those arising from varying local objectives, differing student needs, or local initiatives in teaching approach. Worse, regulatory schemes can promote inefficiency by preventing local schools from adopting useful local variations. Regulatory systems are often costly and complicated to manage, because of the cost and difficulty of monitoring the actual performance of agents to ensure they are obeying the rules. So even when central decisionmakers seek desirable outcomes, they may be thwarted by an inability to determine who is behaving properly and who is not. Most important for education, regulations are likely to be too blunt and imprecise for use in a field that depends so much upon individual actions.

Schools, like all other organizations, develop a series of implicit and explicit incentives for the people in them. People respond to incentives — be they financial, emotional, or some other form of reward. When rewarded for taking a specific action, people tend to take it. Students, teachers, and other school personnel respond just the same as other people.
Unfortunately, few of the existing incentives within schools relate directly to student performance. Few pay, promotion, or assignment decisions rest on a teacher's accomplishment in the classroom. Yet a variety of programmatic and classroom decisions have a direct bearing on teachers' workload and other school activities, regardless of their effect on student achievement. Poorly defined and often conflicting incentives simply do not push strongly for better outcomes in schools.

At the same time it is insufficient simply to direct schools to use performance incentives. The problem with applying performance incentives to the management of education is defining what sort of incentives will work most effectively without also having undesirable side effects. Nobody knows what incentives work effectively in the varied settings of the nation's schools. Several conceptually appealing incentive frameworks exist. But, limited experience with direct performance incentives suggests that extensive experimentation will be required to determine which incentives will work best in the nation's schools.

3. Sustained improvement requires learning from experience.

Today's schools frequently adopt new programs and pursue altered activities in the name of improved performance. We too are calling for changes in school programs, albeit ones differing in focus from those commonly introduced. We want schools to adopt a stronger performance objective and to reflect the importance of high performance in much more explicit incentive structures. Both traditional school reforms and those proposed here have one thing in common: Their ultimate success depends crucially on the ability to identify and separate good change from bad. Schools must learn from their experiences.

Today, America's schools only teach. They themselves have little motivation to learn. Working and workable programs are difficult to find because schools all too often fail to monitor systematically the success or failure of programs now in place.

Working and workable reform programs are difficult to find because schools all too often fail to monitor systematically the success or failure of programs now in place.

Today almost all formal evaluation of new education schemes ceases before the plan actually goes into operation. One reason for this is a frequent lack of clarity, and sometimes actual disagreement, about the desired outcomes. Another reason is that many outcomes are difficult to measure. And a final, more damning, reason is that few people in education have any reason to measure outcomes because few are rewarded on the basis of their ability to achieve specified outcomes.

Learning is difficult. It requires more than a simple statement about what does and does not work; it requires a wealth of information to disentangle the key factors in the
success or failure of any venture from the environment in which they succeeded or failed. Milwaukee, for example, now runs a voucher scheme that enables parents to choose the school — public or private — their children will attend. Because so few localities have experimented with voucher schemes, it is tempting to generalize from Milwaukee's experience to all voucher schemes. But it would be wrong to do so. The Milwaukee choice program is one specific and highly constrained use of vouchers, and it is embedded in a particular urban setting with an existing set of public and private schools. Disentangling the causes of any successes or failures of the Milwaukee program will be extraordinarily difficult; transferring such a program to other localities will necessarily be fraught with uncertainty.

And herein lies the real difficulty with the poverty of experimentation in education. Lack of learning breeds lack of learning. Schools not only lack good answers to the problems that beset them, but they are not generating answers that will help in the future. There is no systematic approach to learning from existing or proposed programs, so, although the Milwaukee choice program has had ongoing evaluation, there is little information from any other voucher program to compare with these results. In fact many of the most celebrated intervention programs in place today have no regular or systematic evaluation attached to them.

In the private sector productive and profitable enterprises are always learning. They are constantly modifying their approach and trying to better their performance. They have two advantages over schools. First, they generally find it easier to agree on performance measures and the definition of desirable outcomes. Standard information on profitability and return on investment gives immediate information on outcomes. Second, competition forces an external discipline. Those that do not learn, that do not adapt to changed conditions and improved technologies, find their profits slipping and may even cease to exist. But schools, faced with less clear direct measures of performance and seldom facing bankruptcy, have not felt the same pressure to learn from their own experiences and from the experiences of others.

For example, the Rochester, New York, City School District embarked in 1986 on a nationally acclaimed reform. The multi-million dollar restructuring included salary increases in excess of 40 percent for the typical teacher over the first three contract years, along with commitments to evaluate teacher performance. Although remnants of the plan — as well as its costs — remain today, the hoped-for change died in subsequent contract negotiations concerning performance evaluation. At no time from 1986 to the present has serious evaluation of the effectiveness of the plan been undertaken. And little has been learned from it.

Much is to be learned about the rewards and punishments that will promote improved student achievement in the various conditions with which America's schools must
cope. Harnessing change and experimentation requires a plan for systematic evaluation or results. Such evaluation requires a clear delineation of what is to be produced along with suitable measures of that performance. Beyond that, however, achieving a high rate of progress demands a consistent strategy for trying out new approaches and for integrating the results of different experiences.

The fundamental point remains, however, that general school improvement is quite unlikely unless the future is built on a strong foundation of knowledge about what has and has not worked in the past. The culture of today’s schools does not value learning from experience. Moreover, the states and the federal government provide limited guidance, resources, and direction in developing information about success and failure, even though these bodies are the logical centers of such learning. If the nation is to progress toward a better performing school system, experimentation and evaluation cannot be viewed as a pro forma but largely superfluous activity. It must be considered integral to the structure of change and improvement.

** * * * *

These decision rules for selecting what works and eliminating what does not do not remove the need for creative and competent leaders. They provide a framework for deciding on alternatives and for developing an improvement plan. They do not provide the plan. Nor do the rules substitute for teachers and school personnel of high quality. Quite to the contrary, we envision them as a way to ensure that those people control the schools.

These rules, concentrating on the efficient and effective use of resources, also do not eliminate the need for careful consideration of equitable outcomes. The United States is committed to equity, and its people and their political leaders have a continuing responsibility for ensuring that the schools fulfill the needs of disadvantaged and minority students. Those needs are easiest to meet when existing resources are employed as productively as possible.
Conclusion

If a single, glaring lesson is to be learned from past attempts at school reform, it is that the ability to improve academic performance using standard, uniformly applied policy is limited. State and federal authorities have instituted numerous regulations, spending programs, and general policy goals— all to little avail.

If there is no single policy cure for the ills of individual schools, then policymakers have little choice but to undertake the daunting task of managing diversity, giving local decisionmakers the freedom to devise educational programs appropriate to their situation and the discipline to ensure their effectiveness.

The strength of performance incentives as a reform proposal is their ability to deal with complexity. By rewarding participants in the educational process when they do well and penalizing them when they do poorly, schools can harness the energy, ability, and inventiveness of individuals. The rewards to teachers, for example, may be explicit monetary rewards, or they may be a wide variety of intrinsic rewards, such as special recognition, more latitude in classroom and activity assignment, or expanded travel and training opportunities. Effective teaching is positively reinforced, and defective teaching discouraged. Performance incentives also reward effective support structures but not constraining structures.

No matter what their field of endeavor, people respond to incentives. Because the incentives in schools bear little relationship to student performance, it is not surprising that schools have not yet improved student performance, despite constant reform pressures. Several programs are available that would connect incentives to performance—either by linking teachers’ and administrators’ pay directly to some objective measure of the results they achieve with their students, or by letting parents and students themselves decide which schools best meet their needs and therefore most deserve their support.

We currently lack the information needed to choose among the options with precision. But there is probably not one, single approach that is best in all circumstances. And we can be confident that performance incentives as a whole are far superior to the current system, which pays little attention to student performance.

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