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The Federal Role in Education Reform

Abstract
[Excerpt] The analysis of the causes of the American apathy regarding teaching and learning has important implications for the curriculum. Many of the weaknesses of math and science curricula--the constant review and repetition of old material, the slow pace and minimal expectations--are adaptations to the low level of effort most students are willing to devote to these subjects. When considering proposed revisions of the curriculum, one must remember that motivating students to take tough courses and to study hard must be a central concern.

Keywords
CAHRS, ILR, center, human resource, job, worker, advanced, labor market, satisfaction, employee, work, manage, management, training, federal role, employ, education reform, student, education, American economy, secondary education, graduation requirement

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THE FEDERAL ROLE IN EDUCATION REFORM

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THE FEDERAL ROLE IN EDUCATION REFORM

93% of 17 year olds do not have "the capacity to apply mathematical operations in a variety of problem settings." (National Assessment of Educational Progress, 1988b p. 42).

25% of the Canadian 18 year olds studying chemistry know as much chemistry as the top 1% of American high school graduates (International Association for the Evaluation of Educational Achievement, 1988).

In October of 1985, 1986, 1987 and 1988, 28 percent of the previous June’s noncollege-bound white high school graduates had no job. 55 percent of the black graduates had no job (Bureau of Labor Statistics 1989).

The high school graduates of 1980 knew about 1.25 grade level equivalents less math, science, history and English than the graduates of 1967. This decline in the academic achievement lowered the nation’s productivity by $86 billion in 1987 and will lower it by more than $200 billion annually in the year 2010 (Bishop 1989).

The rapid gains in academic achievement overseas and declining achievement here spell trouble for the American economy (Bishop 1989). The problem is so serious and so longstanding that nothing short of radical reform will help. Most of the reforms now underway are desirable, but by themselves they are insufficient.

Proposed reforms of secondary education include stricter graduation requirements, more homework, increases in the amount and difficulty of course material, greater emphasis on the basics (English, math, science, social science, computer science), and improvements in the quality of teaching through higher salaries, career ladders, and competency tests for teachers. Although important, these reforms are limited in that they emphasize changes in the content and quality of what is offered by the school and require the student to work harder. They have given insufficient attention to how to motivate students to work harder. Learning is not a passive act; it requires the time and active involvement of the learner. In a classroom with 1 teacher and 18 students, there are 18 learning hours spent to every 1 hour of teaching time. Student time is, therefore, very important, and how intensely that time is used affects learning significantly. Clearly, then, attention needs to be given to how much time and energy students devote to learning.
The key to motivating students to learn is recognizing and rewarding learning effort and achievement. Some students are attracted to serious study of a subject by an intrinsic fascination with the subject. They must pay, however, a heavy price in the scorn of their peers and lost free time. Society offers them little reward for their effort. Most students are not motivated to study by a love of the subject. Most "don’t like to do any more school work than [they] have to." As a result, far too few high school students put serious time and energy into learning and society suffers. If this situation is to be turned around, the peer pressure against studying must be eliminated and the rewards for learning must be increased. The full diversity of types and levels of accomplishment need to be signaled so that everyone—no matter how advanced or far behind—faces a reward for greater time and energy devoted to learning. Learning accomplishments need to be described on an absolute scale so that improvements in the quality and rigor of the teaching and greater effort by all students makes everybody better off.

Increasing numbers of employers need workers who are competent in mathematics, science, technology and communication. If these employers know who is well educated in these fields, they will provide the rewards needed to motivate study. Ninety-two percent of 10th graders say they "often think about what type of job I will be doing after I finish school"(LSAY, Q. AA13C). If the labor market were to begin rewarding learning in school, high school students would respond by studying harder and local voters would be willing to pay higher taxes so as to have better local schools. Colleges need to be induced to select students on the basis of externally validated achievements, not by "aptitude" test scores or rank in class.

Some might respond to this strategy for achieving excellence by stating a preference for intrinsic over extrinsic motivation of learning. This, however, is a false dichotomy. Nowhere else in our society do we expect people to devote thousands of hours to a difficult task while receiving only intrinsic rewards. Public recognition of achievement and the symbolic and material rewards received by achievers are important generators of intrinsic motivation. They are, in fact, one of the central ways a culture symbolically transmits and promotes its values.
Recommendations for policy initiatives by the federal government have been grouped into seven categories:

* Introducing a more rigorous curriculum,
* Better signals of learning accomplishment,
* Setting an example in federal hiring,
* Greater use of improved employment tests,
* Creating new opportunities for learning in schools,
* Generating additional recognition and rewards for learning,
* Creating new learning opportunities outside of school

1. Introducing a More Rigorous Curriculum

The analysis of the causes of the American apathy regarding teaching and learning has important implications for the curriculum. Many of the weaknesses of math and science curricula—the constant review and repetition of old material, the slow pace and minimal expectations—are adaptations to the low level of effort most students are willing to devote to these subjects. When considering proposed revisions of the curriculum, one must remember that motivating students to take tough courses and to study hard must be a central concern.

A second constraint that must be dealt with is the great diversity of the learning goals and capabilities of high school students. On the NAEP mathematics scale 15 percent of 13 year olds have better mathematics skills than the average 17 year old student and 7 percent of 13 year olds score below the average 9 year old (NAEP 1988b). It is neither feasible nor desireable for all high school students to pursue the same science, mathematics and technology curriculum. Some students will want to pursue natural science in greater depth and rigor than others. Some students will want to concentrate on technology not pure science. Some courses will be easier than others and students will inevitably be able to choose less demanding courses.

State requirements that students take more math and science courses to graduate will have little effect on learning if students meet the requirement by taking undemanding courses. Holding background characteristics and the rigor of the math and science courses constant, an additional three courses in math and science during high school increases the
gain in math competency between 10th and 12th grade by only .19 of a grade level equivalent and reduces science gains by .09 of a grade level equivalent and English and social studies gains by .17-.18 of a grade level equivalent. Holding background characteristics and the number of courses constant, taking five college preparatory math and science courses--chemistry, physics, algebra II, trigonometry and calculus--increased the gain on math and science tests by .75 of a grade level equivalent and increased the gain in English and social studies by .34-.44 of a grade level equivalent.¹ These data clearly imply that learning rates are determined by the rigor not the number of courses taken in a subject.

Another strategy that is bound to fail is setting minimum standards for graduation. Some students arrive in high school so far behind and the consequences of not getting a diploma are so severe, minimum competency standards are never set very high (and cannot in good conscience be set too high given the constraints on the system). Once they satisfy the minimum, many students stop putting effort into their courses.

How then do we convince students to study hard? How do we induce them to select courses that require a lot of work just to be an average achiever in the class? The answer is by (1) developing rigorous courses that teach students concepts and material that they will use after leaving high school, (2) convincing students that the material being taught is useful by presenting it as solutions to practical real world problems, (3) defining accomplishment in a way that students who work hard will perceive themselves as successful, and then (4) recognizing and rewarding accomplishment.

Usefulness is an absolutely central criterion for selecting the topics to be included in a curriculum for three reasons. First, the social benefits of learning derive from the use of the knowledge and skills not from the fact they are in someone’s repertoire. Secondly, skills and knowledge that are not used deteriorate very rapidly. In one set of studies, students tested 2 years after taking a course had forgotten 1/2 of the college psychology and zoology, 1/3 of the high school chemistry, and 3/4 of the college botany that had been learned (Pressey and Robinson, 1944). Skills and knowledge that are used are remembered. Consequently, if learning is to produce long term benefits, the competencies developed must continue to be used after the final exam (either in college, the labor market or somewhere else). Finally, usefulness is essential because students are not going to put
energy into learning things they perceive to be useless. Furthermore, the labor market is not in the long run going to reward skills and competencies that have no use. Indeed, selecting workers on the basis of competencies that are not useful in the company’s jobs is in most circumstances a violation of Title VII of the Civil Rights Act.

Differentiating the Curriculum

By 10th grade most students have a pretty good idea what kinds of jobs they want after finishing their education. Ninety-seven percent can select a particular occupation they expect to be doing at age 40 and 77 percent agree with the statement: "I am quite certain about what kinds of jobs I would enjoy doing when I am older" (LSAY, Q. AA13C & AA22A). Students who are planning scientific careers need to be able to take college preparatory biology, chemistry and physics courses that prepare them for the core courses they will face in college. The students not planning on scientific careers, however, quite often fail to see how these courses will be useful to them. When asked to rate "How useful do you think the [science course you are now taking] will be to you in your career?" on a five point scale, 23 percent of the high school sophomores selected the "No Use" extreme end of the scale and only 28 percent selected the other "Very Useful" end of the scale (LSAY, Q. AASCII1F).

One approach to this problem, of course, is to point out to students how the material in standard college prep courses is useful in non-scientific jobs and everyday life. Presumably, teachers already try to do this. Another approach is to modify the standard curriculum. That is the approach of the new math and science curriculums proposed by the National Council of Teachers of Mathematics (1989) and the American Association for the Advancement of Science (1989). This makes sense in the first 9 years of schooling. There is, however, no standard curriculum in 10th, 11th and 12th grade and it is not realistic to propose that everyone take the same courses. At these grade levels the most effective way to motivate students to take demanding courses and to study hard is to tailor courses to the student’s career interest.
Teaching Science and Math by Infusing it into Technology Courses

The analyses of labor market success of young men and of job performance in the military indicate that young people who expect to have jobs in which they use or maintain complicated pieces of equipment should receive a thorough technology education (Bishop 1988b; Hunter Crossen and Friedman 1985; Maier and Grafton 1981). Computer classes are one example of the kinds of courses needed. High school sophomores described their computer classes as "Very Useful" for their career 53 percent of the time and as of "No Use" only 6 percent of the time (LSAY, Q. AACOMF).

The Principles of Technology (PT) course developed by a consortium of vocational education agencies in 47 states and Canadian provinces in association with the Agency for Instructional Technology and the Center for Occupational Research and Development is another example of a course that meets this need very well. This 2 year applied physics course is both academically rigorous and practical. Each six day subunit deals with the unit's major technical principle (eg. resistance) as it applies to one of the four energy systems--mechanical (both rotational and linear), fluid, electrical and thermal. A subunit usually consists of two days of lectures/discussion, a math skills lab, two days of hands-on physics application labs, and a subunit review. This approach appears to be quite effective at teaching basic physics. When students enrolled in regular physics and Principles of Technology courses were tested on basic physics concepts at the beginning and end of their junior and senior year in high school, the PT students started out behind the regular physics students but obtained an average score of 81 at completion as compared to an average of 66 for those completing a physics course(Perry, 1989). Another study by John Roper (1989) obtained similar results.

Expand Advanced Placement Courses

The Advanced Placement program is a cooperative educational endeavor which offers course descriptions, examinations and sets of curricular materials in 28 different academic subjects. Students who take these courses and pass the examinations receive college credit for high school work. Unlike the SAT, the ACT and all other standardized aptitude/achievement tests which employ multiple-choice answer format exclusively, these exams require students to write long essays and to work out complicated science and
mathematics problems. Hence they are similar in format to the French Baccalaureate, the English A Level and other exams taken by European students completing secondary school. They are also of roughly comparable difficulty. Consequently, the number of students taking and passing these exams is a good way of monitoring progress toward the goal of closing performance gaps in mathematics and science.

The students of Jaimie Escalante’s Advanced Placement calculus classes have demonstrated how young people from disadvantaged backgrounds can use the AP program as an upward mobility escalator. The James A. Garfield High School student body is predominantly disadvantaged minorities; yet it accounts for 17 percent of all Mexican Americans taking the AP calculus exam and 32 percent of all Mexican Americans who pass the more difficult BC form of the test (Berlin and Sum 1988). There is no secret about how they did it; they worked extremely hard. Students signed a contract committing themselves to extra homework and extra time at school and they lived up to the commitment. What this experience establishes is that minority youngsters from disadvantaged backgrounds can be persuaded to study just as hard as academic track students in Japan, Finland and England and that if they do, they will achieve at the same level. Escalante cast aside the zero sum competition of grades and rank in class and set for his students a very difficult externally defined goal. He persuaded them that they could succeed and that there was great honor in taking on the challenge. The success at Garfield High is replicable.

Expanding the AP program should be a center piece of any effort to promote excellence in American high schools. It clearly meets a felt need for it is growing rapidly. The numbers of students taking AP exams more than doubled between 1983 and 1988. Nevertheless, only 8022 of the 22,902 US high schools participate in the Advanced Placement Program and only 52 AP exams are taken on average in each participating high school. In the Class of 1988 only 4.3 percent took an AP English Literature and Composition exam, 3.1 percent took the American History exam, 2.5 percent took the AP calculus exam, .7 percent took the AP computer science exam, 1.1 percent took AP biology, .7 percent took AP chemistry and .6 percent took AP physics. (The College Board 1988). The nation should set a goal of doubling these percentages every two years for the next decade. New AP exams should be established in principles of technology,
electronics, algebra, geometry and trigonometry, probability and statistics, psychology and business mathematics so that larger numbers of 10th and 11th graders and students planning to attend 2 year technical colleges may participate in the AP program. Acting in concert, the college presidents of a large group of selective 2 year and 4 year colleges should send a letter to every high school principal in the country (with copy to the school board and local newspaper) urging them to establish AP courses in science, mathematics and technology. They should also announce that starting in 1993, students seeking admission to their school should have taken and passed at least one AP course in junior year and be taking more than one AP course their senior year.

The federal government can facilitate the growth of the AP program by underwriting the development of AP exams for new subjects, by financing summer institutes for the teachers of AP courses, by subsidizing the fees charged for taking the exam and by offering AP Excellence Awards to students who achieve passing scores on the exam. To insure that attending a summer institute is considered a plum, compensation should be generous. In 1988 approximately 42,000 teachers taught AP courses. Rapid expansion of the program will require a yearly increase of 20,000 in the stock of teachers teaching AP courses and if 30 percent of the increment to the stock were to experience summer institute training for 6 weeks, the cost would be about 42 million dollars.

The amount of the scholarship award should depend both on the level of student’s pass and the eligibility of the student for BEOG grants. If the award schedule for those not eligible for BEOG grants was $300. for a 1 (the top score), $200. for a 2 and $100 for a 3. and twice that for students eligible for BEOG grants, the average award would probably be $250. In 1988 286,009 students would have been eligible for an AP excellence award, so the scholarship program would have cost 71 million dollars. If a good deal of publicity were attached to these awards, they would induce a major expansion of the program.

A National Network of Science, Math, History, Literature and Technology Clubs.

At present only 3.2 percent of high school sophomores are members of a science club, only 2.5 percent are members of a math club and only 1.6 percent are members of a computer club (LSAY, Q. BA10K-BA10M). Memberships in these clubs should be increased and the clubs should be stitched together into a national network. The national
student organizations would sponsor interschool competitions, visits to science museums and science and technology project competitions that would feed into national competitions like the Westinghouse Science projects awards. The national organizations would function in much the same way as the national offices of Boy Scouts, Future Farmers of America and VICA. They would provide training to teachers and student leaders and develop program activity packets to help local science and math teachers devise activities for their club. The federal government can help stimulate the formation of national club networks in academic fields by offering to pay travel costs for the first few national conventions and by contributing to national programing costs. The national club organizations could also be a conduit for reimbursing local schools for some of the expenses of local club activities.

2. Better Signals of Learning Accomplishment

Develop Better Assessment Mechanisms

As student recognition and rewards come increasingly to depend on the results of school assessments of competency, it becomes more and more important that we improve our methods of assessing math, science and technological achievement. Linking assessment to curriculum also implies a need for a greater diversity of assessment mechanisms. States should not be prevented from having their own unique curriculum simply because examinations keyed to this curriculum are not available. However, the need for multiple versions and for fairness to minorities make test development very expensive. The federal government should underwrite state consortia and other organizations that seek to develop alternatives to currently available tests and assessment mechanisms. Priority needs to go to developing methods of assessing higher order thinking skills and hands on performance through simulations, judged portfolios and demonstrations of skills conducted in front of judges. High cost has been the primary barrier to the use of these richer forms of assessment. Consequently, consideration should be given to subsidizing these more costly assessment mechanisms.

Instituting Statewide Achievement Examinations

States should adopt statewide tests/assessments of competency and knowledge that are specific to the curriculum being taught (e.g. New York State’s Regents Examinations
and California's Golden State Exams) and then give students a competency profile/portfolio certifying performance on these exams which could be used as an aid in searching for jobs. Admission to state universities and merit based scholarships should be based on these achievement exams and on AP exams not an aptitude tests like the SAT. In addition to their incentive effects, these examinations/assessments would:

- Better inform students and parents about how well the student is doing and thus help parents work with teachers to improve their children's performance.
- Make the relationship between teachers and students more cooperative, with the teacher and students working jointly to prepare the students for the exam.
- Create a database that school boards and parents could use to evaluate the quality of education being provided by their local school.
- Enable employers to use scores on these examinations to help improve their selection of new employees. If the uncertainties involved in hiring are reduced, expanding employment will become more profitable, total employment will increase, and recent high school graduates will be better able to compete with more experienced workers for top quality jobs.

Induce either a complete transformation of SAT and ACT Tests or a substitution of AP and state sponsored achievement exams for purposes of awarding state scholarships and selection for competitive colleges.

While national tests are necessary, the Scholastic Aptitude Test (SAT) is not the kind of test that is helpful. The SAT suffers from two very serious limitations: the limited range of the achievements that are evaluated and its multiple choice format. The test was designed to be curriculum free. To the extent that it evaluates the students' understanding of material taught in schools, the material it covers is vocabulary and elementary and junior high mathematics. Most of the college preparatory subjects studied in high school--science, social studies, technology, art, music, computers, trigonometry and statistics--are completely absent from the test. As a result, it fails to generate incentives to take the more demanding courses or to study hard. The new version of the ACT test is somewhat better for it tests science and social science knowledge and attempts to measure problem solving in science. Both tests suffer from the common problems that arise from their multiple choice format. National and provincial exams in Europe are predominantly essay and extended answer examinations. The absence of essays on the SAT and ACT
tests contribute to the poor writing skills of American students. The test advertises itself as an ability test but is in fact an achievement test measuring a very limited range of achievements (Jencks and Crouse 1982). Jencks and Crouse have recommended that either the SAT evaluate a much broader range of achievements or be dropped in favor of AP examinations. Knowledge and understanding of literature, history, technology and science and higher order thinking skills should all be assessed. These exams should not be limited to a multiple choice format and essays should be required where appropriate. Foreign language exams, for example, should test conversational skills as well as reading and writing. Students taking science courses should be expected to conduct experiments and demonstrate the use of lab equipment. It is not clear if there is a federal role in engineering necessary changes in the selection methods of colleges and universities. Major revisions of tests like the SAT and ACT are quite expensive. Possibly the federal government could induce the testing organizations to undertake the effort by dangling a large development contracts in front of them.

Certifying Competencies

Schools should provide graduates with certificates or diplomas that certify the students’ knowledge and competencies, rather than just their attendance. Competency should be defined by an absolute standard in the way Scout merit badges are. Different types and levels of competency need to be certified. Minimum competency tests for receiving a high school diploma do not satisfy the need for better signals of achievement in high school. Some students arrive in high school so far behind, and the consequences of not getting a diploma are so severe, we have not been willing to set the minimum competency standard very high. Once they satisfy the minimum, many students stop putting effort into their academic courses. What is needed is a more informative credential which signals the full range of student achievements (e.g. statewide achievement exam scores, competency check lists).

Releasing Student Records

One of the saddest consequences of the lack of signals of achievement in high school is that employers with good jobs offering training and job security are unwilling to
take the risk of hiring a recent high school graduate. They prefer to hire workers with many years of work experience. One important reason for this policy is that the applicant’s work record serves as a signal of competence and reliability that help the employer identify who is most qualified. In the US recent high school graduates have no such record and information on the student’s high school performance is not available, so the entire graduating class appears to employers as one undifferentiated mass of unskilled and undisciplined workers. Their view of 18 year olds was expressed by a supervisor at New York Life Insurance who commented on television "When kids come out of high school, they think the world owes them a living" (PBS, March 27, 1989). Surely this generalization does not apply to every graduate, but the students who are disciplined and academically well prepared currently have no way of signaling this fact to employers.

Employers believe that school performance is a good predictor of job performance. When they have grade point average information, it has a major effect on the ratings they assign to job applicants in policy capturing experiments (Hollenbeck and Smith, 1984). However, they have great difficulty getting information on school performance. If a student or graduate has given written permission for a transcript to be sent to an employer, the Buckley amendment obliges the school to respond. Many high schools are not, however, responding to such requests. In Columbus Ohio, for example, Nationwide Insurance sent over 1,200 requests for transcripts signed by job applicants to high schools in 1982 and received only 93 responses.

The school can help students get good jobs by developing an equitable and efficient policy for releasing student records. School officials have the dual responsibility of protecting the student’s right to privacy and helping them find good, suitable jobs. The student and his or her parents should receive copies (encased in plastic) of transcripts and other records that might be released so that they may make them available to anyone they choose. Schools might also develop a sheet explaining to parents and students their rights, as well as the pros and cons of disclosing information.

According to the Federal Education Rights and Privacy Act, all that a student/graduate must do to have school records sent to a prospective employer is sign a form specifying the purpose of disclosure, which records are to be released, and who is to receive the records. The waiver and record request forms used by employers contain this
information, so when such a request is received, the school is obliged to respond. Requiring that graduates fill out a school devised form—as one high school I visited did—results in the employer not getting the transcript requested and the graduate not getting the job. There are probably millions of high school graduates who do not realize that they failed to get a job they were hoping for because their high school did not send the transcript that was requested. Schools can best serve students by handling all inquiries expeditiously and without charge.

Credential Data Bank and Employee Locator Service

It may, however, be unrealistic to expect 22,902 high schools to develop efficient systems of maintaining student records and responding quickly to requests for transcripts. An alternative approach would be to centralize the record keeping and dissemination function in a trusted third party organization. This organization would be easy to regulate and thus everyone could be assured that privacy mandates are being observed. The student would determine which competencies to have assessed and what types of information to include in his/her competency portfolio. Competency assessments would be offered for a variety of scientific, mathematical and technological subjects, languages, writing, business and economics and occupational skills. Tests with many alternate forms (or administered by computer based on a large test item bank) would be used so that students could retake the test a month later if desired. Only the highest score would remain in the system. Students would be encouraged to include descriptions of their extracurricular activities, their jobs and any other accomplishments they feel are relevant and to submit samples of their work such as a research paper, art work or pictures of a project made in metal shop. Files could be updated after leaving high school.

Students would have three different ways of transmitting their competency profile to potential employers. First, they would receive certified copies of their portfolio which they could carry to job interviews or mail to employers. Second, they would be able to call an 800 number and request that their portfolio be sent to specific employers. Thirdly, they could ask to put themselves in an employee locator data bank similar to the student locator services operated by the Educational Testing Service and American College Testing. A student seeking a summer or post graduation job would specify type of work sought and
dates of availability. Employers seeking workers could ask for a print out of the portfolios of all the individuals living near a particular establishment who have expressed interest in that type of job and who pass the employer's competency screens. Student locator services have been heavily used by colleges seeking to recruit minority students and an employee locator service would almost certainly be used in the same way. This will significantly increase the rewards for hard study because the employee locator service is likely to result in a bidding war for the qualified minority students whose portfolios are in the system.

The National Alliance of Business, the American Business Conference, Educational Testing Service and California Department of Education are currently cooperating in the development of the system just described. I do not believe that a federally sponsored credential data bank would have the credibility with business that is essential for success. With respect to credential data bank, the best role for the federal government is simply to help create a facilitating environment. Federal funding of the research and development necessary to develop the high quality examinations/assessments that might be used by this system would be desirable. A federally sponsored system of subject matter exams taken at the end of high school would speed the development of a credential data bank and would be desirable for other reasons. Current plans, however, envision constructing the credential data bank, state by state and city by city.

3. Setting an Example in Federal Hiring Decisions

The Federal Government Should give Greater Weight to Academic Achievement in its Own Hiring

The federal government is the largest employer in the nation. It should set an example for the private sector by announcing that hence forth it is giving greater weight to academic achievement in high school and college than it has in the past.

The military currently admits recruits into the military on the basis of AFQT scores and the high school diploma. The current AFQT is an average of scores on the verbal, arithmetic reasoning and mathematical knowledge subtests of the Armed Services Vocational Aptitude Battery, ASVAB. By adding the general science, electronics knowledge, mechanical comprehension and the auto/shop knowledge tests to the composite
which defines the AFQT, the military would simultaneously increase the validity of their selection and improve incentives to study science and technical subjects in high school.

The Office of Personnel Management is designing a biodata form to be used for selecting professional and managerial personnel for the federal government. The current draft of the form asks applicants a number of questions about the grades in high school and college and about class rank. It does not ask about the difficulty level of the courses taken (Office of Personnel Management, 1987). Current plans are to request that transcripts be sent only for a sample of the applicants and to use this data only for checking the accuracy of the information provided. If discrepancies are discovered for people who were hired, the cases will be referred to investigators. The questions are worded in such a way, however, that only the most outrageous of distortions can be proved to be a lie and therefore are grounds for dismissal. The following changes in civil service hiring procedures are recommended:

- All candidates for civil service jobs (including clerical jobs) should be required to send their high school and college transcripts.
- After a preliminary screening on the basis of the biodata key, course grades and difficulty level indicators should be coded for the most recent school attended.
- Final rankings should be based on a combination of the transcript information, biodata, scores on job relevant tests and other relevant information.

This change will increase hiring costs but the benefits of greater validity and improved incentives outweigh these costs by a large margin.

4. Greater Use of Improved Employment Tests

Add Subtests Measuring Technical, Scientific and Advanced Mathematical Competency to the General Aptitude Test Battery

The Employment Service’s program of validity research for the GATB has made this test one of the few employment tests whose validity (as a predictor of job performance) has been generalized for a great variety of jobs. The content of the GATB was set in the 1940’s and there has been little change in the content of the academic subtests since then. The nature of jobs has changed substantially and it is time to rethink the content of the GATB. Research conducted by the military into the validity of the
ASVAB indicates that the validity of the GATB would be substantially increased by adding subtests measuring technical, scientific and advanced mathematical knowledge and skills. The Department of Labor should immediately add subtests similar to the technical, mathematical knowledge and science subtests of the ASVAB to the GATB and include these subtests in the composites that are used for recommending clients to civilian jobs that are similar to the jobs studied in the military. The employment service should also undertake a major study of the validity of the new GATB in the full spectrum of civilian jobs.

The fear of litigation has significantly inhibited testing research outside of government. Companies no longer share the results of their validity studies or allow them to be published (even when the company’s name is withheld) for fear of revealing their defense strategy to a potential litigant. As a result, research on tests other than the GATB has been inhibited. The government needs to step into the vacuum it has created and sponsor a major increase in research into the development and validation of improved employment tests.

EEOC Regulations Should Encourage the Use of Broad Spectrum Achievement Test Batteries rather than IQ Tests and the Current GATB

EEOC regulations that evolved out of the Supreme Court’s 1971 Griggs vs Duke Power decision misinterpreted Congressional intent in Title VII of the Civil Rights Act. (Gold 1985). These regulations made the use of employment selection tests measuring competence in reading and mathematics prohibitively expensive. Before such a test could be used, the firm had to conduct a very expensive validity study of the proposed test and alternative tests at their own work sites. Separate studies had to be done for men and women, blacks, hispanics and whites. Most firms did not have enough workers in each category to do a reliable study (Friedman and Williams 1982). The result has been to greatly diminish the use of tests for employee selection. A 1987 survey of small and medium size firms found that only 3 percent of new hires in the previous year had taken employment aptitude tests as part of the selection process. This has substantially reduced the rewards for learning.

The Supreme Court’s decision in the Wards Cove Packing Case has shifted the burden of proof in adverse impact cases on to the plaintiff and has therefore opened the
door for increased use of employment tests. It appears that employers will be able to justify the use of employment tests without having to undertake costly validity studies in their own firm by citing validity research done for similar jobs in other firms. Since civilian research on test validity has used the GATB almost exclusively, there is a very real danger that most firms will choose to use reading, vocabulary, and arithmetic reasoning tests that are demonstrably similar to their GATB counterparts. Unfortunately, the verbal and mathematical subtests of the GATB are considerably less valid than tests measuring a broader range of competencies and do not generate incentives for students to study history, algebra, trigonometry, and science.

Courts have in the past required that employers demonstrate that each question on an employment test has a specific application in each job for which it is a proposed selection device. To avoid having to redesign tests for each job, test developers are likely to dumb the test down and include only simple questions covering mathematical, scientific and technical principles that are learned in grade school. Litigation costs and the potential liability are enormous so companies have become extremely cautious about testing. When selecting a test, defensibility in court has become a much more important criterion than maximum validity. Given the uncertainty of whether ASVAB research will be accepted as evidence on the validity of similar tests for civilian jobs, broad spectrum achievement test batteries will probably be judged too risky. A well designed validity study can protect a firm using an unconventional test battery but in most cases the potential benefit of finding a more valid selection method will not outweigh the costs of the study and the greater risks of litigation. If things are left as they are, it will be at minimum a decade before tests measuring competence in algebra, science and the technical arena can be used as general selection devices for craft and other blue collar jobs. Firms need to be given a signal by the EEOC that broad spectrum achievement tests are acceptable selection devices and in fact preferred over the low level basic skills test that serves as the 'g' aptitude of the GATB.

For employment tests to generate incentives to learn, students, parents and teachers must be aware that local employers are using tests for selection and what kind of material is included on these tests. Unfortunately, the fear of litigation has caused many employers to give only limited publicity to their use of tests. This is another reason why
employers need to be told by people in authority that they are acting in the national interest when they seek out and reward those who have high level academic skills.

5. Creating New Opportunities for Learning in School

Increase the School Year from 180 to 200 Days

Longitudinal studies of learning have found that students appear to forget during the summer a portion (up to 1 to 2 months worth) of the mathematics they learned during the previous school year. Reading ability either declines or improves at very low rates during the summer months. The learning loss is particularly large for disadvantaged students and for minority students (Heyns 1987). As a result, much of September is devoted to review and practice of the material taught the previous year. The authors of The Underachieving Curriculum, the report which presented and analyzed the reasons for poor American performance in the Second International Mathematics Study, severely criticize this practice of allocating so much time to review of old topics rather than to the presentation of new material. These findings clearly imply that school attendance is essential if math and reading skills are to improve and that a longer school year would not only increase learning time but also reduce forgetting time. Adding a month to the school year could very well produce a more than proportionate increase in learning.

Studies of the effect of summer school that use random assignment to define treatment groups confirm the educational impact of additional instruction time. A experimental evaluation of Summer Training and Employment Program, STEP, a program for disadvantaged youth that combines a part time summer job with about 90 hours of remedial instruction, found that adding the instruction to the summer job raised academic achievement by .5 grade level equivalents above that of youth receiving only a part time job. (Corporation for Public Private Ventures 1988). The documented success of the STEP intervention has resulted in its replication (with federal support) in 33 different school systems.

This evidence indicates that extending the school year would not only raise educational standards generally, it would also help children from educationally and economically disadvantaged backgrounds keep up with their more advantaged peers.

Accelerating the Pace of Instruction
Increasing the time devoted to learning by one-ninth has major implications for the curriculum. The learning objectives specified for each year would need to be changed. In subjects which follow a sequence such as mathematics, reading and spelling, material taught at the beginning of third grade might be moved to the end of second grade, eight grade topics might be taught in seventh grade, etc. In mathematics, for example, Algebra might now begin in 7th grade, geometry in 8th or 9th and probability and statistics (which is necessary for implementing statistical process control) might become a regular part of the high school curriculum. For students headed for college, the final two years would be given over to AP courses. College freshman would arrive much better prepared than they are now. A decision would have to be made whether (a) the bachelors degree should become a three year degree, (b) the number of credits for graduation should be increased, or (c) college courses made more rigorous with a corresponding reduction in the number of credits that students can carry per semester.

The Federal Government Role in Instigating a Lengthening of the School Year

A major increase in the length of the school year is unlikely to evolve without federal leadership and funding support. If one state were to try to do it alone, it would confront all sorts of difficulties. Standard textbooks would not fit the new curriculum and the per-pupil costs of curriculum revision would be very high. Graduates would be more productive workers but one doubts that employers would pay graduates from that state a higher wage. While local public colleges could be expected to adapt, problems would arise when students attend college out-of-state.

The most significant barrier to this reform, however, is the cost. If teachers are to spend 11 percent more time teaching, yearly salaries must be increased by a comparable percentage. Since about $100 billion of salaries were paid to K-12 public school teachers in 1988, the taxpayer cost would be $11 billion. This is not really as big a number as one might think. For comparison, between 1985 and 1988 total compensation of employees rose $73 billion in state and local government as a whole and rose $50 billion in the health care industry. Since more than half of the mothers of school children work, the savings in day care costs would be substantial. If one-fifth of the 45 million school children attending school an extra 20 days would have required day care costing $3.00 an hour for 6 hours a day, the savings would be $3.24 billion. Since most teachers and
students do not work in the summer, the increase in learning time would come primarily out of leisure not work time. GNP would immediately increase because the rise in teacher pay and labor released by the reduced demand for child care would be larger than the induced decline in summer job earnings of teachers and students. If GNP rises taxes will rise as well, so the change would be partially self financing.

The long term benefits would be very large. Because a longer school year reduces summer forgetting as well as increasing learning time, it is quite possible that a more than proportionate learning response (on a grade level equivalent scale) would result. Let us, however, make the conservative assumption that the 11 percent increase in learning time increases 12th grade achievement scaled in grade level equivalents by 11 percent or 1.3 grade levels. Since a one population standard deviation increase in test scores raises an adult’s wage rate by 21 percent (Bishop 1989, derived by taking the antilog of .19) and population standard deviation is equivalent to about 5 grade level equivalents, student cohorts experiencing the longer school year for 12 years would have their wages increased by 4.9 percent or about $980. a year (the mean yearly compensation of adults 18 to 65 years old is about $20,000 when the nonemployed are included in the denominator). I have argued elsewhere (Bishop 1989) that productivity effects of test score increases are larger than wage rate effects, so the 4.9 percent is a lower bound estimate of the productivity consequences lengthening the school year by 20 days. Since a one year age cohort contains 4 million people, the benefit is about $3.92 billion dollars per year. The yearly rate of return is 35.6 percent on the taxpayer contribution to the additional learning investment. Only investments in R&D have social rates of return this high. If the real rate of social discount is 5 percent, the ratio of present discounted benefits to costs is roughly 6 to 1. Even if the additional month of school produces only a third or a half a month of learning gains, the investment has a higher payoff than other uses of taxpayer dollars.

**Voluntary Summer School**

A variety of remedial, enrichment and special interest short courses should be offered during the rest of the summer. While many of the teachers would be regular school staff, an education degree and state certification would not be required. Private
teachers of music, art, athletics and academic subjects could also offer their own courses at the school. Where appropriate, academic credit would be given for the summer school courses. The school district would provide transportation.

**Turn Schools into All-Day Learning Centers**

The length of the school day should be extended from 6 to 7 hours. A full range of remedial and enrichment programs and extracurricular activities and intramural sports should be offered during the extra hour. Students making normal progress might choose whatever alternative they desire. Many students do not have a quiet place to study at home, so the library, the computer lab and a number of classrooms should remain open and supervised during this period. Extra help would be available for students having difficulty with the core curriculum. Volunteers to provide tutoring and to offer special interest courses could be recruited from the community. Private teachers of music, art and other subjects might also be allowed to use school facilities during these hours. The benefit of this reform is that (1) the regular school day would be freed up for more intensive study of the core curriculum, (2) more homework could be assigned and all students would have a quiet place to study, (3) slower students would be given the extra instruction they need, (4) enrichment programs could be expanded, and (5) the phenomenon of the latch key child would be significantly reduced or eliminated.

**6. Generating Additional Recognition and Rewards for Learning**

**A Massive Dose of Mastery Learning**

Students who are not learning at the desired rate should be expected to commit additional time to the task after school and during the summer. At the beginning of the school year school personnel would meet with the student and his or her parents to set goals. Students who are not performing at grade level in core subjects and who do not make normal progress during the school year should be kept after school for tutoring and remedial instruction and required to attend summer school. Assessments of progress should be made at appropriate points during the school year to inform students of their progress and to enable those who are participating in remedial programs after school to demonstrate
they are now progressing satisfactorily. Course grades and teacher evaluations would be a central part of the assessment process, but there should be an external yardstick as well. The external yardstick might be a competency check list, a mastery test keyed to the textbook, or an exam specified by the state, the school or collectively by the teachers in the that grade level or department. The assessment tools would be established at the beginning of the school year. The reason for the external yardstick is that it helps insure that students perceive the standard to be absolute rather than relative to others in the class, and it helps create a communality of interest between teacher and student. Teachers need to be perceived as helping the student achieve the student's goals not as judges meting out punishment. Final decisions regarding who would be required to attend summer school could be made by committees of teachers possibly with some administrative representation. Since students will want to avoid being required to get remedial instruction after school and during the summer, this will be a powerful incentive for them to devote themselves to their studies.

**Acting as a Source of Informal Contacts**

School personnel can be a reference and a source of job contacts for their students. Some students may feel that they do not have and cannot develop good employment contacts. School personnel can help out by building and maintaining trusting relationships with local employers and then helping to match employer and student needs. Students from disadvantaged backgrounds have special need for this kind of help, because their relatives and neighbors typically lack the employment contacts of middle-class families.

Many schools provide job placement and referral services for their students and graduates. Three and a half million people found their current job through a referral by a teacher, school or college (Rosenfeld 1975). This function of schools is a lot more important than is generally thought.

Whenever possible, there should be a one-on-one relationship between a specific teacher or administrator and an employer. A study by McKinney et al. (1982) found that when schools formalize this relationship by creating a placement office, the number of jobs
found for vocational students tended to decrease. The best example of an informal contact system is the one that exists for many vocational students. Vocational teachers often know local employers in related fields; they also know their students well enough to recommend them. This kind of informal system could be expanded to include all students not planning to attend college.

Developing a Job Search Portfolio

Schools should consider providing students with a job search portfolio or competency profile that records all their accomplishments in one place. Students attempting to market themselves to employers will have greater success if all their school achievements are summarized in one compact, standardized document. Compactness and standardization make it easier for employers to use information in their hiring decisions and this facilitates information flow.

The coverage and format of the document are probably best worked out cooperatively by a committee that includes school administrators, employers, and other interested parties. Developing and using such a document might be a part of a campaign to enlist commitments from major local employers to hire the school’s graduates. Developing the information system cooperatively is a good way to ensure that the finished form will be beneficial to schools, employers, and students.

Students have many talents and skills that can be highlighted in such a document. The job search portfolio should emphasize accomplishments and performance indicators that are most useful in identifying a good match between a job and a youth. Students and parents should receive copies of it, and students should be encouraged to bring copies with them when they apply for jobs. Employers should be encouraged to ask to see the portfolio and keep a copy when a job application is filed.

7. Creating New Learning Opportunities Outside of School

Greatly Expand Educational Programming on T.V.

American youngsters spend an average of 23 hours a week watching television. This is more time than they spend engaged in school sponsored learning activities and more time than the students in any other nation. Austrian students watch 68 percent less TV, Swiss students watch 60 percent less and Canadian students watch 44 percent less.
(OECD, Table 18.1, 1986) Higher standards, longer school days and the expansion of nursery schools will reduce the U.S. figure (college students, for example, watch less TV than high school students) but time spent in front of a TV set is probably going to remain high.

This can, however, be viewed as an opportunity, for television has a vast potential as a positive educational force. Programs like Sesame Street, 3-2-1 Contact, Square One, NOVA and National Geographic are examples of what is possible. But these excellent programs account for a very small share of broadcast time. Transformers, GI Joe, Sheera, Bugs Bunny and MTV are cheaper to produce and are more effective advertising vehicles so they dominate the airwaves during the afternoon. Only a society that places little value on the transmission of its cultural heritage to the next generation would allow such a powerful medium for instructing the young to be guided solely by what sells toys, cereals and popular records.

If TV is to begin to achieve its educational potential we need: (1) more and above all better funded educational channels, (2) increased federal funding of the production of educational programs, (3) to establish better mechanisms for obtaining high school or college credit and employer recognition for the learning that results from distance learning, (4) a requirement that every channel devote at least X percent of its air time (including specified percentages of late afternoon and prime time) to educational fare.3

One of the concerns that is sometimes expressed about federal funding of educational TV programs is it might give a single decision maker too much power. This danger can be avoided by maintaining the current dispersal of funding authority among many different governmental agencies. NSF, NIMH, NASA, National Endowment for the Humanities, and the Department of Education have all funded programs in the past and additional agencies should be recruited. Another safeguard that could be instituted would be to require that contracts be signed with production companies or educational institutions and not directly with networks or commercial stations. This would mean that the federal authority to fund educational programs would give it no leverage over the news departments of commercial stations and networks.
Appendix on the Summer Drop Off in Student Performance

In the Sustaining Effects Study, the beginning of the year test was administered during the third week of school and the end of year test was administered five weeks before the end of the term. Consequently, the school year testing period was only 7 months long and the 5 month "summer gap" between spring and fall testing contained 2 whole months of school learning time. As one can see in Figure 1, gains in reading slow considerably during the 5 month summer gap period and math competence hardly rises at all (Klibanoff et al.). If children were learning during the 2 months of classes included in the summer gap period at anything like the rate they learn during the rest of the school year, their reading and math skills must have declined during the summer months. In most classrooms the first few weeks are spent reviewing and practicing skills taught in previous years. Old material can probably be relearned at a more rapid rate than new material is learned, so this is likely to be a period of particularly rapid rise in test scores. The most reasonable assumption is that learning rates during school time are constant. Figures 2 and 3 (taken from Hemenway et al. 1978) present the results of calculating learning trajectories and the 3 month summer drop off under the assumption of constant learning rates during the school year. The sustaining effects study is only one of many studies finding a summer drop off in math competence. Heyns (1987) reviews a number of these studies. In a very recent study by Entwisle and Alexander of 1st and 2nd graders in Baltimore found no gain in math test scores between the test administration in spring of first grade and the fall of 2nd grade and a very slight decline between 2nd and 3rd grade (Entwisle and Alexander 1989, table 1).
Figure 1

Reading and Math CTBS Scores for Five Cohorts Over Three Test Administrations
Figure 2. Vertical Scale Scores as a Function of Grade Level by Quartiles for the Debiased CTBS Reading Test

Note: The spring-to-fall differences are always associated with cross-sectional changes in samples and are frequently also associated with differences in test levels. Negative 'growth', when it occurs, may be attributed to sample differences and test-level differences. When raw scores are compared for the same test levels, the differences are either positive or small when negative. Therefore, the zig-zag nature of the curves above should not be carelessly attributed to 'summer drop-off'.

Source: Hemenway et al. (1978), Figure 1-1, p. 29.
Figure 3. Vertical Scale Scores as a Function of Grade Level by Quartiles for the Debiased CTBS Math Test

Note: The spring-to-fall differences are always associated with cross-sectional changes in samples and frequently also associated with differences in test levels. Negative 'growth', when it occurs, may be attributed to sample differences and test-level differences. When raw scores are compared for the test levels, the differences are either positive or small when negative. Therefore, the zig-zag nature of the curves above should not be carelessly attributed to 'summer drop-off'.

Source: Hemenway et al. (1978), Figure 1-2, p. 30.
ENDNOTES

1. A study was conducted of the cohort of High School and Beyond students projected to graduate in 1982. The dependent variables were the change between sophomore and senior years in test scores and grades. The model included extensive controls for variables that may influence both curriculum and the outcomes. Holding the total number of academic courses and their distribution across fields constant, taking the 5 college preparatory math and science courses—chemistry, physics, algebra II, trigonometry and calculus raised math and science performance by 75 percent of a grade equivalent, verbal test scores by 33 percent of a grade equivalent, and civics test scores by 44 percent of a grade equivalent but significantly lowered the student’s grade point average (Bishop 1985).

2. This proposal sounds radical but, in fact, is only a modest change from current practice at these selective colleges. A survey of college placement officials conducted by USA Today and interviews of officials at Cornell and SUNY Binghamton conducted for this report found that students were expected to take AP courses if they are offered and grade point averages were adjusted for the difficulty level of the courses taken. High school students and parents are generally unaware of this policy, however, and many have not factored it into their high school course selections. The announcement, therefore, has two effects: it informs students and parents of existing admissions policies and warns that come 1993 those seeking admission to selective colleges will not necessarily be held harmless if a local high school does not offer AP courses. This announcement will generate strong political pressure on principals and school boards to expand their AP program and allow additional students to take AP courses. Students at schools not offering AP might be offered other ways of demonstrating college level proficiency such as an AP independent study option, taking courses during the summer at a local college or high scores on the afternoon subject matter SAT exams or New York State Regents exams. Exceptions would have to be made for students from under represented minorities, foreign students and in other individual cases but exceptions should not become the rule.

3. The survey was of a stratified random sample of the NFIB membership. Larger firms had a significantly higher probability of being selected for the study. The response rate to the mail survey was 20 percent and the number of usable responses was 2014.

4. Our estimate of the productivity benefit of a 1.3 grade level equivalent increase in achievement is very conservative. College graduation raises wages of males by 60 percent or by 15 percent per year of college. If one were to assume, instead that 13 months of additional time in elementary school is equivalent to a year in college, the estimated productivity benefit triples to 15 percent. In addition the social costs of adding 20 days to the school calendar are probably
smaller than $11 billion, for child care costs will be substantially reduced. Yes, 16-18 year olds will be earning less during the summer but this effect is substantially smaller than the savings in child care costs. It should be noted that student leisure time is significantly reduced and that except for the lost work time of teenagers this is not counted as a cost. This is standard operating procedure when doing benefit cost studies of educational interventions.

5. In order for a program to be considered educational it would have to be under the creative control of a subject matter expert (e.g., Jacob Bronowski, Carl Sagan), an educational institution or a committee of educators and subject matter experts. Each network and independent station would have its own educational advisory committee but the decision making power would remain with the network/station. To minimize the politics, appointments to these committees would be for a fixed non-renewable term and the power to appoint would be dispersed among a variety of elected officials and educational organizations. For example, in states which elect a state educational commissioner, the official might make one appointment to the advisory committees for each station located in the state. The board of education for the largest city included in a station's viewing area might also be asked to appoint one member. The teachers association representing most of the teachers in the viewing area might be allowed to elect still another.
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