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# Signaling the Competencies of High School Students to Employers

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# Signaling the Competencies of High School Students to Employers

## **Abstract**

[Excerpt] The fundamental cause of the low effort level of American students, parents, and voters in school elections is the absence of good signals of effort and accomplishment and the consequent lack of rewards for learning. In most other advanced countries mastery of the curriculum is assessed by examinations that are set and graded at the national or regional level. Grades on these exams signal the student's achievement to employers and colleges and influence the jobs that graduates get and the universities and programs to which they are admitted. Exam results also influence school reputations and in some countries the number of students applying for admission to the school. In the United States, by contrast, students take aptitude tests that are not intended to assess the learning that has occurred in most of the classes taken in high school. The primary signals of academic achievement are diplomas awarded for time spent in school and grades and rank in class—criteria that assess achievement relative to other students in the school or classroom, not relative to an external standard.

## **Keywords**

employ, vocational, education, work, job, training, occupation, college, high school, student, labor, market

## **Disciplines**

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## **Comments**

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# Signaling the Competencies of High School Students to Employers

John H. Bishop

Working Paper 94-18



## **Signaling the Competencies of High School Students to Employers**

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Working Paper 94-18

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This paper has not undergone formal review or approval of the faculty of the ILR School. It is intended to make results of Center research available to others interested in preliminary form to encourage discussion and suggestions.

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The low level of academic achievement in American secondary schools has been a disaster for our youth and our economy. High school diplomas no longer signify functional literacy. Most schools do not help their graduates obtain employment and many do not even send transcripts to employers when their graduates sign the necessary waivers while applying for a job. In consequence, *26 percent of noncollege-bound white high school graduates and 56 percent of the black graduates have not had a job four months after graduating from high school during the last seven years* (National Center of Education Statistics 1993, p. 82). *Between 1971 and 1988, inflation adjusted wages fell 17.3 percent for young male high school graduates and 10 percent for young female graduates* (Katz and Murphy 1990). The decline in the academic achievement of high school seniors between 1967 and 1980 lowered the nation's productivity by \$120 billion in 1990 (Bishop 1989c).

Profound changes are needed:

Teachers must assign more homework and the assignments must be completed. Yet in some schools "Students were given class time to read The Scarlet Letter, The Red Badge of Courage, Huckleberry Finn, and The Great Gatsby because many would not read the books if they were assigned as homework. Parents had complained that such homework was excessive (Powell, Farrar and Cohen 1985, p.81)."

Parents must tell children: "Turn off the TV and do your homework." Currently, American students spend 19.6 hrs/wk watching TV while students spend only 6.3 hrs/wk in Austria, 9.0 hrs/wk in Finland, 5.9 hrs/wk in Norway and 10.9 hrs/wk in Canada (OECD 1986).

Students must be engaged in learning—Yet, Frederick, Walberg and Rasher (1979) estimated 46.5 percent of the potential learning time was lost due to absence, lateness, and inattention. After spending hundreds of hours observing in high school classrooms, Theodore Sizer (1984) characterized students as, "*As all too often docile, compliant and without initiative* (p. 54)."

Students must choose rigorous math and science courses. Yet of those graduating in 1990, only 50 percent had taken chemistry, only 22 percent had taken physics. Only 13.5 percent had taken pre-calculus and only 6.6 percent had taken calculus (NCES 1973 pp. 68, 72). In Canada 25 percent of all 18 year olds are studying science at a level of difficulty that is comparable to AP level courses taken by only about 3 percent of U.S. students (IAEEA 1988).

School Boards must be willing to raise local taxes so they can offer better salaries to attract better teachers to their community. Relative to other workers, experienced American upper secondary teachers are currently paid at least 20 percent less than their counterparts in Canada, Finland, France, Germany, Japan, the Netherlands, Norway and the United Kingdom (Nelson and O'Brien 1993, pp. 73-74, 9091).

Parents must demand higher standards at their local school. Yet despite the fact that their 5th graders were far behind their Taiwanese and Japanese counterparts in mathematics, 91% of American mothers rate their local school "good" or "excellent." Only 42 percent of Taiwanese and 39 percent of Japanese parents are equally positive (Stevenson, Lee and Stigler 1986).

**Why haven't these changes already been made?** Before reforms can be proposed, we must understand the nature of the problem. The next section of the paper provides such an analysis. Improvements in the signaling of high school achievement to colleges and employers are an essential part of any reform strategy. The options are discussed in Section 2 and a package of proposals is offered and discussed in section 3 and 4. The paper concludes with a discussion of the effect of improved signaling of high school achievement on minority youth.

## **I. THE ABSENCE OF REWARDS FOR EXCELLENCE: THE ROOT CAUSE OF THE LEARNING DEFICIT**

The fundamental cause of the low effort level of American students, parents, and voters in school elections is the absence of good signals of effort and accomplishment and the consequent lack of rewards for learning. In most other advanced countries mastery of the curriculum is assessed by examinations that are set and graded at the national or regional level. Grades on these exams signal the student's achievement to employers and colleges and influence the jobs that graduates get and the universities and programs to which they are admitted. Exam results also influence school reputations and in some countries the number of students applying for admission to the school. In the United States, by contrast, students take aptitude tests that are not intended to assess the learning that has occurred in most of the classes taken in high school. The primary signals of academic achievement are diplomas awarded for time spent in school and grades and rank in class—criteria that assess achievement relative to other students in the school or classroom, not relative to an external standard.

Consequently, the students who do not aspire to attend highly selective colleges benefit very little from working hard in high school. Parents have little incentive to push for higher standards at their local school or to vote the tax increases necessary to upgrade the academic quality of local schools. The absence of external assessment of academic achievement in specific fields of study influences incentives in five different ways.

### **1.1 Easy and Entertaining Courses Drive Out Rigorous Courses.**

American high schools offer a large variety of courses that are taught at very different levels of rigor. Those taking rigorous courses learn a good deal more but their grade point average suffers as a result (Bishop 1985, Gamoran and Barends 1987). However, titles often fail to signal a course's rigor. As a result, employers and many colleges do not take course

rigor into account when hiring workers or admitting freshman. The students who do not aspire to attend the selective colleges that pay attention to course rigor, consequently, quite rationally avoid rigorous courses and demanding teachers.

Most parents are uninformed about course options and their consequences and do not influence the choices made. In Ithaca, New York, for example, less than one-fifth of the parents attend the meeting in 8th grade at which the student and guidance counselor plan the student's 9th through 12th grade course sequence. Most students choose courses that have the reputation of being fun and not requiring much work to get a good grade. Teachers know this and adjust their style of teaching, their homework assignments and their grading standards with an eye to maintaining enrollment levels. Attempts to induce students to take tough courses seldom succeed:

*An angry math teacher (remembering) the elimination of a carefully planned program in technical mathematics for vocational students simply because not enough signed up for it, said, "It's easy to see who really makes decisions about what schools teach: 'the kids do.'" (Powell, Farrar and Cohen 1985, p. 9)*

Minimum competency exams do not solve the problem because minimums are set low and most students pass early in their high school career.

### **1.2 Peer Group Norms Oppose Academic Learning**

In the United States, the peer group actively discourages academic effort. No adolescent wants to be considered a nerd, brain geek, or grade grubber or to be acting White, yet that is what happens to students who study hard. A major reason for peer pressure against studying is that pursuing academic success forces students into a zero-sum competition with their classmates. In contrast to Scout merit badges, for example, where recognition is given for achieving a fixed standard of competence, the school's measures of achievement assess performance relative to fellow students through grades and class rank. Students who study hard for exams make it more difficult for close friends (other members of the class) to get an A. Since devoting time to studying for an exam is costly, the welfare of the entire class is enhanced if no one studies for exams that are graded on a curve. Students know who has broken the 'minimize studying' code and they reward those who conform and punish those who do not. For most students the benefits of studying hard are less important than the very certain costs of being considered a 'brain geek', 'grade grubber' or 'acting White,' so most students



abide by the 'minimize studying' norm.<sup>1</sup> The peer norms that result are: *It is OK to be smart. You cannot help that. But, it is not OK to study hard to get a good grade.*

Peer pressure not to study does not derive from a general desire to take it easy. In jobs after school and at football practice, young people work very hard. In these environments they are part of a team where individual efforts are visible and appreciated by teammates. Competition and rivalry are not absent. but they are offset by shared goals, shared successes and external measures of achievement (i.e., satisfied customers or winning the game). On the sports field, there is no greater sin than giving up, even when one's team is hopelessly behind. On the job, tasks not done by one worker will generally have to be completed by another. For too many students in too many high schools, when it comes to academics, there is no greater sin than trying hard.

### ***1.3 Teachers Become High Stakes Judges of their Students and this Prevents the Development of Mentoring Relationships***

Despite a need for emotional support from teachers, few students develop strong personal ties with any teacher. This is an important reason why drop out rates are high despite minimal graduation standards. When a mentoring relationship develops it is usually with a coach, a band conductor, a dramatics teacher, debate team sponsor, yearbook advisor, vocational teacher or an advanced placement teacher. These intensive multi-year interactions with small stable groups of students foster mentoring relationships. Even more important to mentoring is the coaching relationship. The coach is helping the student prepare for a "performance" (a play, concert or AP exam) or a competition with students from another school (basketball game, debate or VICA contest). These teachers are not the high stakes judges of the student's performance and achievement. They give guidance and feedback while the student prepares for the game or exhibition, but summative evaluations are made by others. As a result, the mentor/coach can set high standards without losing the crucial role of advocate, confidant and friend.

Thus, external assessments foster mentoring relationships between teachers and students. Without them, the effort to become friends with one's students and their parents often deteriorates into extravagant praise for mediocre accomplishment. Other times the choice of high standards means that close supportive relationships are sacrificed.

The teachers in Europe who have the responsibility of preparing students for external assessments do not find it limits their professionalism. When changes in Ireland's system of

external assessments were proposed, the Association of Secondary Teachers of Ireland (1990) wrote:

*"The introduction of school-based assessment by the pupil's own teacher for certification purposes would undermine . . .*

*-the pastoral contribution of teachers in relation to pupils*

*-the perception of teachers as an advocate in terms of nationally certified examinations rather than as judge . . .*

*This would automatically result in a distancing between the teacher, the pupil and the parent. It also opens the door to possible distortion of results in response to either parental pressure or pressure emanating from competition among local schools for pupils."*

#### **1.4 Schools Find it Difficult to Signal Upgraded Standards to Colleges and Employers**

Now let us examine the incentives that principals, school superintendents, school boards and communities face. When there is no external assessment of academic achievement, students (and their parents) benefit little from a school administration decision to establish higher standards, to hire more qualified teachers or to raise pay to attract better teachers. The immediate consequences of such decisions—higher taxes, more homework, lower GPA's, less time for fun courses, a greater risk of being denied a diploma—are all negative.

The positive effects of choosing rigor are negligible and postponed. Since admission decisions are based on class rank, GPA and aptitude tests, not on externally assessed achievement in high school courses, upgraded standards do not improve the college admission prospects of graduates. They will be more successful in college, but that benefit is uncertain and postponed. Maybe over time the reputation of the high school (and the admission prospects of future graduates) will improve because the current graduates are more successful in college, but that is even more uncertain and postponed.

Higher standards will not help work-bound students either because hiring decisions are seldom influenced by high school reputations or student achievement (Hollenbeck and Smith 1984). The employers who do consider academic achievement use indicators of relative performance such as GPA and class rank. Consequently, higher standards do not benefit either group of students, so parents as a group have little incentive to lobby strongly for higher teacher salaries, higher standards and higher school taxes.

### **1.5 The Labor Market Does Not Reward Achievement in High School**

Signals of learning such as years of schooling which are visible to all are handsomely rewarded. Actual competencies developed in high school are not well signaled and are, consequently, not well rewarded.

Students who plan to look for a job immediately after high school generally see little connection between their academic studies and their future success in the labor market. When 10th graders were asked which math and science courses they needed "to take to qualify for their first choice of job," only 20-23 percent checked physics, chemistry, biology and geometry and 29 percent checked algebra (Longitudinal Survey of American Youth 1988, Question #BA24B-BA25D)). Statistical studies of the youth labor market confirm their skepticism about the monetary benefits of taking the more difficult courses and studying hard:

- During high school, grades and test scores have no effect on unemployment rates or the wage rates of part-time jobs (Hotchkiss, Bishop and Gardner 1982).
- During the first decade after leaving high school, young men received no rewards from the labor market for developing competence in science, language arts and mathematical reasoning. Figures 1 and 2 present estimates of the impact of a five grade level equivalent (one population standard deviation) increase in various academic and technical skills derived from analysis of the Youth Cohort of the National Longitudinal Survey (Bishop, 1989b, 1994). The only competencies that were rewarded were speed in doing simple computations (something that calculators do better than (people) and technical competence (knowledge of mechanical principles, electronics, automobiles and shop tools). For the non-college bound female, there were both wage rate and earnings benefits to learning advanced mathematics but no benefits to developing competence in science or the technical arena. Competence in language arts did not raise wage rates much, but it did reduce the incidence of unemployment among young women.
- Indicators of good work habits in high school—low absenteeism, no problems with the law, good study habits—are also not positively related to labor market outcomes immediately after high school (Hotchkiss 1984, Rosenbaum 1990).

Figure 1.

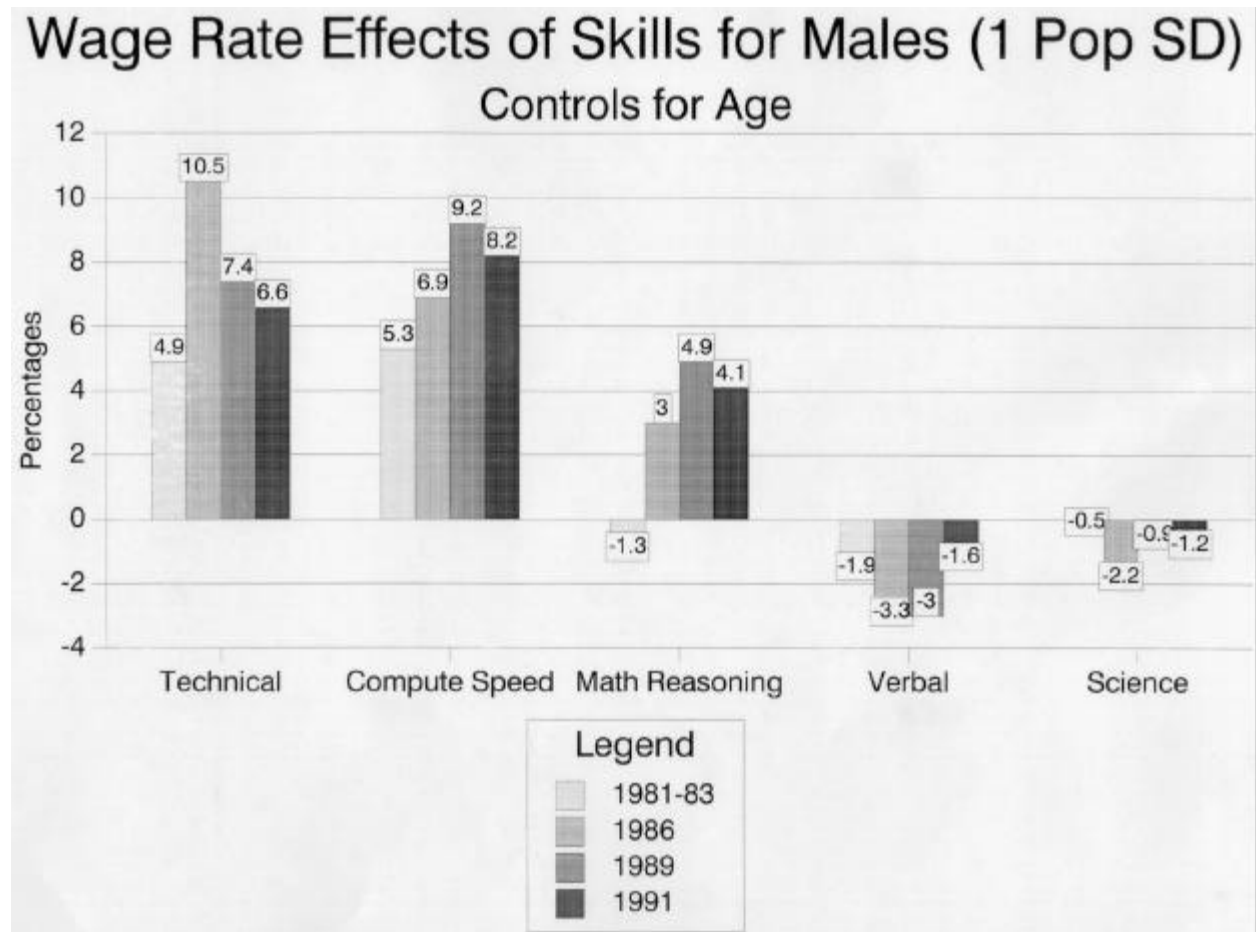
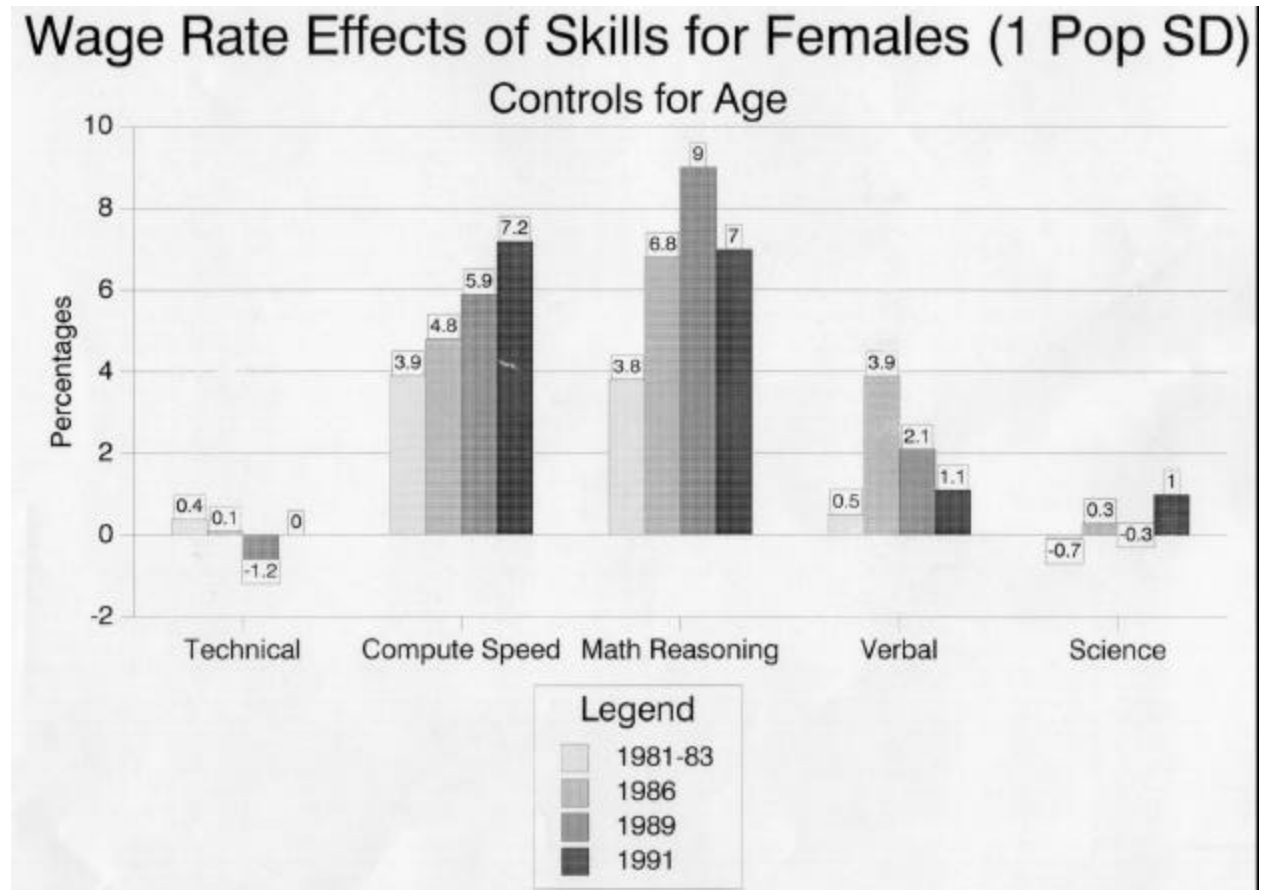


Figure 2.



Does the lack of wage rewards for cognitive and non-cognitive achievement in high school imply that society does not benefit from such achievements? **NO, it does not!** When one compares workers in the same job, those with higher levels of mathematical, verbal and problem solving ability are more productive (Ghiselli 1973; Hunter 1983; Hunter, Crosson and Friedman 1985). Holding years of schooling and the job constant, a one grade level equivalent improvement in mathematical, verbal and technical skills generates increases in productivity that have a present discounted value at age 18 of \$15,000 to \$29,700 in 1994 dollars (Bishop 1994). Similarly good work habits in high school are strong predictors of job performance, even while they have no impact on the wages of young adults. A study of performance during the first year on the job of 100 Lockheed Corporation employees found that days absent at school correlated .30 with days absent at work and .20 with tardiness at work. Three year GPA had a correlation of .37 with the supervisor's conduct rating and .34 with the production rating (Brenner 1968). When information on high school grades is available, employers give preference to job applicants with high grade point averages (Hollenbeck and Smith 1984).

If employers believe correctly that success in high school predicts success on the job, why don't they not compete for the best students and reward them with higher wages? The anomaly is caused by the difficulty of getting information on school performance. If a student or graduate has given written permission for a transcript to be sent to an employer, the Federal Education Rights and Privacy Act obligates 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 transcript information signed by job applicants to high schools in 1982 and received only 93 responses.

A 1987 survey of a stratified random sample of small and medium sized employers who were members of the National Federation of Independent Business (NFIB) found that transcripts had been obtained for only 14.2 percent of the high school graduates hired. When high school graduates were hired, the new hire had been referred or recommended by vocational teachers only 5.2 percent of the time. Referrals by someone else at the school accounted for only 2.7 percent of the new hires. Tests assessing competence in English and mathematics had been given in only 2.9 percent of the hiring decisions studied. As a result, the matching of young workers to jobs is little influenced by accomplishment (cognitive or noncognitive) in high school.

In most entry-level jobs, one's wage rate reflects the job's position in the hierarchy, not one's productivity in the job. Thus, the employer immediately benefits from a worker's greater

productivity. Good work habits and strong basic skills make promotion more likely, but it takes many years for the imperfect matching process to assign a particularly competent worker a job that fully uses that greater competence - - and pays accordingly.

*One of the saddest consequences of the lack of signals of school achievement is that employers 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 helps identify who is most qualified. 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.*

## 2. SOLUTION--INDUCING THE LABOR MARKET TO REWARD LEARNING

The key to motivating students to learn is to recognize and reward learning. Some students are attracted to serious study 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 by a love of the subject. Sixty-two percent of 10th graders agree with the statement "I don't like to do any more school work than I have to" (LSAY Q.AA37N). As a result, far too few high school students put serious time and energy into learning science, math and technology and the society suffers.

If this situation is to be turned around, 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 increases in student effort make 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, most high school students would respond by studying harder and voters would be more willing to raise taxes to improve their schools.

Some might respond 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 one of the central ways a culture symbolically transmits and promotes its values.

Another possible argument against policies designed to induce employers to reward high school students who study is that bad students will not be considered if an employer learns of this fact. Quite likely. But providing no information to employers about school achievements results in no recent graduate (whether a good or poor student) getting a job that pays well and provides training and opportunities for promotion. There is nothing unfair about letting high school GPAs or the results of a battery of school examinations influence the allocation of young people to the best jobs. The grade point average, for example, reflects performance on hundreds of tests and the evaluations of over 25 teachers.

Most employers have at least ten applicants for every job opening. Selection decisions must be made somehow. If measures of school performance are unavailable, hiring selections will be decided by the chemistry of job interviews and idiosyncratic recommendations of a single previous employer. Since many employers will not request the information, providing information on student performance would not prevent poorer students from getting a job; it would only influence the quality of the job obtained.

If improved signals of the skills and competencies of high school graduates are developed and large numbers of employers use them, productivity will increase because more valid selection procedures improve the match between workers and jobs and reduce turnover and the unemployment that results from turnover (Bishop 1991). In addition, the supply of workers with the talents measured by the school examinations will grow in response to the increase in labor market rewards for the talents.

The better jobs will go to those who studied hard in school. Since selection criteria on which many women excel—school grades and test results—would be displacing criteria that work to their disadvantage such as stereotypes about what jobs are appropriate for women,



women would gain more access to high paying occupations (Bishop 1991). If affirmative action were abandoned simultaneously, the representation of Blacks and Hispanics in occupations where the payoff to cognitive skills is high such as craft worker and technician would decline.<sup>2</sup> If, however, affirmative action continues and is strengthened- blacks and Hispanics will not suffer any adverse impact. Consequently, impacts on minority groups should not be the primary basis for deciding how to assess and signal school accomplishment. Other instruments are available for achieving employer and societal goals regarding integration on the job and the representativeness of a firm's workforce. When it comes to generating incentives to develop the skills needed for work and efficiently matching workers to jobs, there is no other selection device that does as good a job as measures of work habits, teamwork and verbal, mathematical and technical competencies. These are the two criteria—incentives and matching efficiency—by which alternative employee selection policies should be evaluated. That is the task undertaken in the next section of the paper. The effects of better signaling of high school accomplishment on minority groups is discussed in the final section of the paper.

### 3. SIGNALLING ACHIEVEMENT TO THE LABOR MARKET PROS AND CONS OF VARIOUS ALTERNATIVES

Student incentives to learn, teacher incentives to set high standards, and parental incentives to demand a quality education are maximized when the following is true:

- (1) **Significant economic rewards depend directly and visible on academic accomplishments,**
- (2) **The accomplishment is defined relative to an externally imposed standard of achievement and not relative to one's classmates.**
- (3) **The reward is received very soon after the learning occurs,**
- (4) **Everyone, including those who begin high school with serious academic deficiencies, has an achievable goal that will generate significant rewards,**
- (5) **There is a good deal of overlap between the indicators used by employers for selection and the indicators used by colleges for admission decisions.** [This is desirable because most students aspire to college and the programmatic needs of these students get priority in most schools. In the United States, a system of examinations and exhibitions in which college bound students do not participate would inevitably become stigmatized.]
- (6) **Assessments evaluate all of the types of learning the society feels are important.** [Since it is anticipated that students will attempt to prepare for the assessments and

that teaching will be influenced by them, it is essential that the assessments be "authentic"—i.e., measure the capabilities that society wants is young people to develop. Some of these capabilities may have little value in the labor market.]

- (7) **Particular assessments are studied for in specific courses.** [It is important that teachers feel individually responsible for how their students do on the assessment and that responsibility not be diffused over the entire faculty of the school.]
- (8) **Progress toward the goal can be monitored by the student, parents and teacher.**

None of these goals will be achieved if most colleges and employers fail to use these signals to help them make admission and selection decisions. For this to happen the assessment/signaling system must:

- \* **Provide information that improves predictions of job performance and that meets the job relatedness requirements of the Civil Rights Act of 1991 [Signals used for selection must be valid predictors of job performance. Otherwise, employers will not want to use them and be risking civil rights law suits if they do.]**
- \* **Be convenient and cheap for employers and colleges to use,**
- \* **Include the great majority of recent high school graduates.**

Improved matching of workers to jobs can substantially improve productivity (Bishop 1991, Jovanovic and Moffitt 1990; Nord and Schmitz 1989). The objective of the matching system should be to encourage workers to stay in (and/or enter) occupations in which they have a comparative advantage. Matching efficiency is maximized when the indicators used in selection for particular occupations measure abilities that have a uniquely high productivity payoff in that occupation (e.g., mechanical and technical knowledge for maintenance and repair occupation). Assessments of cognitive competencies used in the job are appropriate selection criteria, but they should supplement not displace consideration of other factors such as personality, physical strength and occupationally relevant training and experience.

It is not easy to design a system of signaling and certifying high school achievements that satisfies all of these requirements. Consequently, it will generally be desirable to use more than one signal of high school achievement and to use different signals and weight them differentially when selecting for different jobs and for different colleges.

Let us examine the pros and cons of the primary alternatives:

- \* **Diplomas**
- \* **Certificates of Mastery**
- \* **Grades in High School**
- \* **Job Tryout, Dismissals and Promotions Based on Performance**

- \* **Competency Profiles**
- \* **Work Samples and Job Knowledge Tests**
- \* **Employment Aptitude Tests--e.g., GATB**
- \* **Broad Spectrum Achievement Test Batteries administered by employers**
- \* **School Sponsored Achievement Exams**

### **Diplomas:**

High school diplomas and college degrees are effective devices for generating incentives to enroll in school. The standard high school diploma does not, however, generate incentives to attend regularly or to study hard and thus it fails requirement #1, the most critical requirement of all. Establishing a minimum competency level for receiving a high school diploma improves incentives only modestly because the minimum is set low and most students pass their competency exam long before graduating. If a diploma (backstopped by a minimum competency exam) were the only signal of academic accomplishment, most students would stop putting effort into their academic courses once the minimum had been satisfied. High school graduates have lower turnover and absenteeism (Weiss 1985). Studies have found that high school graduates make better soldiers than drop outs and holders of high school equivalency degrees, even when direct measures of academic achievement are controlled. The labor market pays high school graduates considerably more than holders of high school equivalency certificates (Cameron and Hechman 1993). Consequently, from a matching efficiency point of view, the high school diploma belongs on the list of credentials considered by employers even when good assessments of verbal, mathematical and technical competencies are available.

### **Certificate of Initial Mastery**

Elsewhere in this volume, Mark Tucker proposes establishing a single year Certificate of Initial Mastery (CIM) representing a **"truly world class standard" that "everyone is expected to meet."** The CIM is not a new set of elective courses. It would be part of the core required curriculum and all students would prepare for it. He argues that everyone could be brought up to this high standard by varying "the amount of instructional time in the day, week and year so that students who need more time to reach the standard have that time along the way, not just at the end of their career as a student." Schools would have to arrange for poorly prepared students to take additional classes in core subjects before or after school, during study halls, on Saturday and during the summer. Most would attain this certificate at age 16 or earlier. Some would take longer.

If as desired by Mark Tucker only one standard of achievement is signaled to the labor market and almost everyone achieves it, a CIM system would not significantly improve matching—i.e., the fit between worker abilities and job requirements. Its real purpose is improving achievement. The incentive effects of such a scheme will depend on its design and the size of the rewards for completing the certificate. To be effective the standard should be quite high and assessment should be largely external. Teachers from other schools, not the student's own teacher, should evaluate the portfolios. Committees of teachers organized by the State Department of Education or some national testing organization should select the exam questions and define the grading standards. If such a system were in place, non-college bound graduates with a CIM would get better jobs than graduates without a CIM—earning possibly as much as 10 to 15 percent extra.<sup>3</sup> One could make the rewards greater by requiring school attendance until the certificate is obtained and/or by making it a requirement for a diploma, for entry into colleges and universities or for preferred apprenticeships. This would, however, create political pressures to dilute the world class standard of the certificate.

Whatever the final design of the CIM, it should not be the only signal of high school accomplishment used by employers and colleges. If it were the only signal, there would be no reason to study once the CIM had been obtained. The CIM described by Tucker does not offer students who want to pursue special interests the opportunity to signal those accomplishments to employers and colleges. Consequently, if a CIM system were set up, there would still be a need for external assessment of accomplishments at the end of high school and the different types and levels of accomplishment would need to be signaled.

### **Hiring Based on Grades in High School.**

Using grades to select new hires results in a very visible dependence of labor market outcomes on an indicator of academic accomplishment. For skills such as work habits and teamwork and for courses lacking external exams, teacher assessments are the only possible indicators of student performance. Grading on a curve, however, results in zero-sum competition between classmates and consequently contributes to peer pressure against studying and parental apathy about the quality of teaching and the rigor of the curriculum. It also induces students to select easy courses and discourages mentoring. These problems are mitigated by weighting grades by the rigor of the course and by including grades on external exams on school transcripts. Thus, although grades should be an important determinant of hiring decisions, other indicators of high school accomplishment need to get equal attention.

**Job Tryout and Promotions Based on Performance:**

From the point of view of motivating students to study, the problem with job tryout and performance reward systems is that the dependence of labor market outcomes on academic achievements is both invisible and considerably delayed.

From the matching efficiency point of view, the disadvantages of job tryout are the costs of training workers who are fired, its unpopularity with workers who will spend months unemployed if they are fired, and its potential for generating grievances. Supervisory ratings are not very reliable, and workers are reluctant to take jobs in which next year's pay is highly contingent on one supervisor's opinion. Pay that is highly contingent on performance can also weaken cooperation and induce workers to sabotage others. Most workers and employers choose compensation schemes in which differentials in relative productivity generate relatively small wage differentials (Bishop 1987). Thus, while all new hires are on probation during the first months on a job, it would be inefficient for firms to use job tryouts as their primary mode of selecting new hires.

**Competency Profiles:**

Competency profiles (or Training Achievement Records in the Job Corps) are check-lists of competencies that a student has developed through study and practice. The ratings of competency that appear on a competency profile are relative to an absolute standard, not relative to other students in the class or to other apprentices at the company. By evaluating students against an absolute standard, the competency profile prevents one student's effort from negatively affecting the grades received by other students. It encourages students to share their knowledge and teach each other.

A second advantage of the competency profile approach to evaluation is that students can see their progress as new skills are learned and checked off. The skills not yet checked off are the learning goals for the future.

With a competency profile system, goals can be tailored to the student's interests and capabilities, and progress toward these goals can be monitored and rewarded. Students who have difficulty in their required academic subjects can, nevertheless, take pride in the occupational competencies that they are developing. Upon graduation, the competency profile serves as a credential certifying occupational competencies.

Many occupational training programs currently use competency profiles both to structure instruction and as a system for articulating with the labor market and further training. Unfortunately, however, most schools do not view mailing out profiles to prospective employers

as part of their responsibility. Harder to correct is the problem of geographic variation in the format of these documents, the skills and competencies that are assessed and the competency standards used. These problems make it more difficult for employers to use these profiles and reduce their ability to aid a student's job search. Some thought needs to be given to how to how some standardization can be achieved and accessibility improved.

**Work Samples and Job Knowledge Tests:**

In Europe, work sample and job knowledge tests are the primary form of assessment at the end of apprenticeships and school based occupational training programs. From the point of view of matching efficiency, job performance assessments and job knowledge tests have much to recommend them for they maximize classification efficiency—the assignment of job seekers to jobs that make use of already acquired skills. They are generally immune to EEO challenges. They are particularly appropriate if applicants vary in their knowledge and background in the occupation and training costs are substantial. Job knowledge tests are less useful when training costs are low or applicants have no experience in the field.

From the point of view of learning incentives, the disadvantage of assessing job performance and job knowledge is that they generate no incentives to study history and literature. They generate incentives to study math and science only occasionally (i.e., when the student expects to seek a technical job and the job knowledge tests for the job contains math and science questions relevant to the job). If occupation specific skills were the only selection criteria of most employers, students might be induced to over specialize. This is not a real danger, however, because indicators of competence in mathematics and communication can easily be used together with job knowledge tests and performance assessments.

**General Aptitude Test Battery (GATB)-as constituted in 1994:**

The cognitive subtests of the current GATB measure only a few very basic skills—vocabulary, reading and arithmetic. There are no subtests measuring achievement in most of the subjects in the standard high school curriculum—science, history, social science, algebra, high school geometry or computers. Heavy use of the GATB would strengthen incentives to learn arithmetic and English. It would not, however, strengthen incentives to study other high school subjects and it might cause instruction in mathematics and English to focus on the types of multiple-choice problems that appear on the GATB. Consequently, hiring based on the GATB fails to satisfy requirement #1 and #6.

On the other hand, a large body of research suggests that greater use of the GATB in selection decisions would probably yield substantial matching efficiency gains (Hunter 1983;

Hartigan and Wigdor 1989; Bishop 1991). This is, however, not a persuasive argument in its favor. Other selection methods—achievement tests assessing a broader range of competencies and externally set examinations assessing achievement in high school subjects—can achieve at least as efficient matching outcomes as the GATB and simultaneously generate better incentive effects.

**Achievement Tests Batteries:**

Broad spectrum achievement test batteries covering science, computers, mechanic, principles, economics, business practices and technology as well as mathematics, reading and vocabulary would be an improvement over the GATB. Assessment batteries that cover the full spectrum of knowledge and skills taught in high school are more valid predictors of job performance than tests that assess math and verbal skills only. Evidence for this statement comes from examining the relative contributions of various subtests to the total validity of the ASVAB battery (Bishop 1991; Maier and Grafton 1981). Tests measuring electronics, mechanical, automotive and shop knowledge—material that is generally studied only in vocational courses—are valid predictors of performance in most blue collar jobs. In Maier and Grafton's data, adding general science, electronics information, mechanical comprehension and mathematics knowledge tests to a basic skills battery raised the proportion of true job performance explained from .306 to .372 (Hunter, Crosson and Friedman 1985, Table 19).

The incentive effects would also be better than the GATB's. If the battery included material covered in courses such as algebra, statistics, chemistry, physics and computers, the use of such tests for selection might generate parental pressure for an upgraded curriculum and encourage students to take more rigorous courses. However, since employers conventionally administer these batteries and do so many years after the worker has left school, the connection between study in school and the reward of a better job would not be as visible as it should be. Broad spectrum achievement tests administered by employers, therefore, fail requirements #1, #3 and #6 through #8. A better approach would be to administer batteries of achievement tests while the student is in school and incorporate the results in the student's transcript. We turn now to a closer examination of this alternative.

**Performance on Achievement Exams Taken toward the End of Secondary School:**

In Japan and most European countries, the educational system administers achievement tests (e.g., the GCSE in England and Wales and the Baccalaureate in France) which are closely tied to the curriculum. While the Japanese use a multiple choice exam, other nations use extended answer examinations in which students write essays and show their

work for mathematics problems. Generally, regional or national boards set the exam. These are not minimum competency exams. In some subjects students may choose to take the exams at two different levels of difficulty. Excellence is recognized as well as competence. In France, for example, students who pass the Baccalaureate may receive a "Tres Bien," a "Bien," an "Assez Bien" or just a plain pass. These exams generate credentials that signal academic achievement to all employers and not just the employers who choose to give employment tests. The connection between the teacher's competence, the student's effort in school and performance on these exams is clearly visible to all. Consequently, school sponsored achievement exams like those used in Europe will have stronger incentive effects than employer administered broad spectrum achievement tests.

This approach to signaling academic achievement has several advantages. Students would take each subject exam at most only a few times. There would be no need for recent high school graduates to take cognitive tests at each firm where they file a job application. School sponsored assessments are, consequently, more comprehensive and higher in quality. More time is available for administering and grading the exam, so it becomes feasible to use "authentic" forms of assessment that are considerably more costly to carry out. It is easier to keep the exams secure. By retaining control of exam content, educators and the public influence the kinds of academic achievement rewarded by the labor market. Societal decisions that students should read Shakespeare and understand the Constitution are reinforced by employer hiring decisions. Tests developed solely for employee selection purposes do not cover Shakespeare and the Constitution.

There is, however, a danger that the examination system will be designed primarily around the needs of post-secondary education, ignoring work place competencies and applied technology. If so, students who need to develop skills valued in the labor market might be forced to spend their time on purely aesthetic subjects. This has been a serious problem in Great Britain and in many developing nations. During the 19th and early 20th century, the heavy weight given to the knowledge of Greek and Latin in the civil service exams of the time helped cause an overemphasis on classical studies in British education. This overemphasis on the classics and the corresponding neglect of science and technology was an important reason for the relative decline of British industry (Barnett 1972). Indeed the problem was accurately forecasted by Herbert Spencer in 1861:

That which our school courses leave almost entirely out, we thus find to be that which most nearly concerns the business of life. Our industries would cease, were it not for



the information which men begin to acquire, as best they may, after their education is said to be finished (Spencer, p. 25).

The job relatedness requirement of the Civil Rights Act will tend to discourage this from happening in the United States. Nevertheless, this is a danger that needs to be guarded against.

For young workers, a system like the new French Baccalaureate (which offers Bac exams in a host of applied technology fields as well the standard academic subjects) is the preferred alternative. When many employers use school administered achievement tests to select new employees, everyone who wants a good job faces a strong incentive to study, and those not planning to go to college will find the incentive especially strong. The best paying firms will find they can ask for higher levels of school performance than low paying firms, so the reward for learning will become continuous. Whether one begins 9th grade way behind or way ahead, there will be a benefit on the margin to studying hard for it will improve one's job prospects.

By 7th grade there are already wide achievement differential among students.<sup>4</sup> When this is the case, incentives for effort are stronger for most students if rewards grow with the final achievement level than if a single large reward is attached to exceeding some absolute standard. Under the single cutoff reward system, many students pass the standard without exertion and are, therefore, not stimulated to greater effort by the incentive. Many of the least well prepared students will judge the effort required to achieve the standard to be too great and the benefits of achieving too small to warrant the effort. They give up on the idea of meeting the standard. Only a few students will find the reward for exceeding the single absolute cutoff an incentive for greater effort (Kang 1985).

Students will be able to choose some of the courses and exams they take. Grades for each subject will be reported so employers will be able to focus on the exams that have special relevance to their jobs. School administered exams are more reliable measures of achievement in specific fields because they sample a larger portion of the student's knowledge of the field. The ASVAB General Science subtest, by contrast, allows the student 11 minutes to do 24 items.<sup>5</sup> Thus, although some subjects tested will not be job related, an optimally weighted average of exam results is probably a better predictor of performance than most employment tests.

#### 4. SIGNALLING ACHIEVEMENT TO THE LABOR MARKET: A PROPOSAL

*Develop a "medium stakes" student incentive and accountability system that is based in part on individual assessment results at the secondary level and that involves universities and employers rewarding effort and achievement in high school (Education Subcouncil of the Competitiveness Policy Council 1993, p. 5).*

##### ***Instituting Statewide Achievement Examinations***

Statewide assessments of competency and knowledge that are keyed to the state's core curriculum should be made a graduation requirement. All students would be assessed in core subjects such as English, mathematics, history and social science, science and computers but students should also be able to select additional subjects—e.g. foreign languages, geography, art, economics, psychology, business management, auto repair, electronics, computer programming—for assessment. The assessments should not all be bunched up during the final month of 12th grade. For many subjects the final externally graded assessment would occur during 11th grade or in January of senior year. Students would take these exams over again if they are dissatisfied with their performance. Results of these assessments should replace SAT and ACT test scores in the college admission process and in the award of merit based scholarships. Students should be given a credential certifying performance on these exams and employers should be encouraged to factor examination results into their hiring decisions. State Departments of Education are logical sponsors of such a testing and certification program. Testing organizations (e.g., the Educational Testing Service) or a new joint educator/employer organization could also sponsor and administer such a program.

##### ***Develop Better Assessment Mechanisms***

If student recognition and rewards depend on the results of assessments of competency made by the education system, it is essential that all the competencies that we believe students should be developing be assessed. Since curriculum objectives differ, assessment systems are likely to vary between states. Priority needs to go to developing methods of assessing higher order thinking skills and hands on performance through simulations, portfolios of the student's work, and demonstrations of skills conducted in front of judges. Written exams might include some multiple choice items but other types of questions—essays, short explanations, showing your work in multi-step math problems—should become more common.

### **Externally Assessed Achievement Should Influence College Admissions**

Externally assessed achievement should become the primary basis for deciding whom is admitted to particular colleges, to particular programs and into degree credit programs generally. Entering students who did not meet these requirements could fulfill them at community colleges, but the remedial courses would not generate degree credits.

This is not really a radical proposal because most colleges already offer non-credit remedial courses which students with deficiencies in their background must take. The proposal is simply to raise what students are expected to be able to do **before** they begin a bachelors or associates degree program, and, thus, to require poorly prepared students to spend additional time getting a degree.

Colleges and universities are already stratified and the prestige and the economic rewards for graduating from the finest colleges are substantial (Solomon 1975; Mueller 1988; James, Alsalam, Conaty and To, 1989). Graduates with scientific and technical training are paid much more than graduates with humanities and social science degrees. This means that strong incentives to compete for admission to the best colleges and the high wage majors already exist. The primary problem is not a lack of competition for admission to preferred colleges and majors, but the basis of that competition—teacher assessments of achievement relative to others in your high school and aptitude tests that do not assess what has been learned in most high school courses. If college admissions decisions were based on external assessments of achievement in the subjects studied in high school, student incentives to study in high school and parental incentives to press for higher standards would improve.

If, however, external assessments of achievement are to be used in the college admissions decision, the results of these assessments need to become available in time to affect these decisions. This means conducting the assessments through out the last few years of secondary school and postponing admissions announcements until late spring of senior year. Where that is impossible, admissions offers might be made contingent on end of year exam results as in Britain.

### **Certifying Competencies and Releasing Student Records**

*Schools should develop easily understood transcripts that at the request of students, are readily available to employers. These transcripts should contain documentable measures of achievement in a variety of fields as well as attendance records. State governments should provide assistance to facilitate the standardization of transcripts so that they will be more easily understood. (Secretary of Labor's Commission on Workforce Quality and Labor Market Efficiency 1989, p. 12)*

Schools should provide graduates with certificates or diploma 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.

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 of transcripts and other records that might be released so that they may make them available to anyone they choose.

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. Employer waiver and record request forms contain this information, so schools are 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. The student would decide which competencies are assessed and what types of information are included in his/her competency portfolio.<sup>6</sup> Students would include descriptions of their extracurricular activities, their jobs and any other accomplishments they feel are relevant. They might also 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 receive certified copies of their portfolio that they could carry to job interviews or mail to employers. They could request that copies be sent to specific employers. They could also place their portfolio 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 the 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 pass the employer's competency screens. Many colleges use student locator services to recruit minority students and employers would use an employee locator service 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. Pilot programs are underway in Hillsborough County, Florida, New Jersey and several other locations. A sample profile is included as Exhibit 1.

## **5. THE ROLE OF OCCUPATIONAL COMPETENCY MEASUREMENT IN THE NEW SIGNALLING SYSTEM**

In most jobs, productivity derives directly from social abilities (such as good work habits and people skills) and cognitive skills that are specific to the job, the occupation and the occupational cluster: not from reading, writing and mathematics skills. When asked about the traits they seek in new employees, employers cite work habits and occupational skills much more frequently than reading and mathematics skills. Applicants' knowledge of history, geography and literature is seldom evaluated.

A recent study of employees at small and medium size companies found that employer's ratings of the worker's occupational skills, learning ability, work habits and people skills significantly influence global performance ratings. Ratings of the worker's academic skills ("reading, writing math and reasoning ability") and leadership did not (Bishop 1993). When paper and pencil tests of occupational knowledge appropriate for the job compete with reading and mathematics tests to predict supervisor ratings of job performance, the job knowledge tests carry all of the explanatory power, the reading and mathematics tests none. When they compete in the prediction of judged performance on a sample of critical job tasks, the effect of job knowledge is two to four times larger than the combined effect of the reading and mathematics tests (Vineberg and Joyner 1982; Hunter 1983b). Thus, basic academic skills make little direct contribution to a worker's productivity. Their contribution is to help the individual learn the occupation and job specific skills that are directly productive. Since large improvements in job knowledge and occupational skills are easier to achieve than equivalent (in proportions of a standard deviation) improvements in verbal and mathematical skills,

occupationally specific training is highly desirable if the student is likely to use the knowledge to use by working in the occupation or a closely related one.

Occupational knowledge is cumulative and hierarchical. Everyone must start at the bottom of the ladder of occupational knowledge and work their way up. The spread of information technology and of high performance work systems is forcing workers to learn new skills, but the new skills are generally additions to, not replacements for, old skills. While learning a new skill is easier when the worker has good basic skills, a foundation of job knowledge and occupational skills is generally even more essential. At some point every individual must start building his/her foundation of occupational skills. At the start, the period that might occur in high school, the foundation building process involves learning skills relevant in a broad cluster of occupations (e.g. office and management, construction occupations). The foundation building should begin two or more years before the individual plans to complete schooling.

Applied technology courses significantly increase the wages and earnings of graduates who do not go to college. Tests assessing technical competence are powerful predictors of wage rates and earnings of young males and highly valid predictors of training success and job performance in technical, craft and industrial occupations. A one population standard deviation increase in technical competence raises the average earnings of young men by \$2000. per year in 1994 dollars. Averaging over the six non-clerical noncombat occupations, and assuming that the standard deviation of true productivity is 30 percent of the wage, a one population standard deviation increase in all four of the technical subtests raises productivity by about 11.5 percent of the wage or about \$4313. per year in 1994 dollars. With a working life of 40 years and a real discount rate of 5 percent, the present discounted value of such a learning gain is about \$75,000 (Bishop 1994). These results imply that broad technical literacy is essential for workers who use and/or maintain equipment that is similar in complexity to that employed in the military.

The skills taught in typical trade and technical programs raise productivity and yield substantial labor market benefits if jobs are found in a related field. Though only half the graduates of these programs get jobs in the field, the higher earnings of those who do get related jobs are sufficient by themselves to justify the vocational program (Altonji 1988; Bishop 1989a). Occupationally specific training in high schools is much more effective than similar training in second/third chance programs funded by the Job Training Partnership Act. The recent random

assignment evaluation of JTPA occupational training programs concluded that they lower the earnings of young (under 21) trainees (Bloom, Orr, Cave, Bell and Doolittle, 1992).

The Nation at Risk report recommendation that all students take a course in computers recognized the need for including applied technology in the curriculum. Somehow, however, geography, a subject that is not taught in most American universities and that no one argues is important in most jobs, has displaced computers on the National Governors Association's approved list of five core subjects. Art and music have also been added to the list. Computer studies has not. Although the education reform movement marches under a banner of economic renewal, it is in danger of being captured by advocates for traditional subjects like geography, art and music that have little role in improving the nation's productivity or preparing young people for work. The SCANS's proposal to teach budgeting, scheduling, computers and technology in school was not well received in much of the educational establishment. There is a danger that the emerging system of national assessments in a limited number of academic and aesthetic subjects may discourage students from studying subjects such as computers, business, electronics and construction that enhance productivity on a job and encourage students to focus instead on aesthetic subjects that do not. The forgotten half would lose again. After studying hard in high school, they would still not have developed the skills necessary to gain high paying jobs.

To avoid this, students must be able to study occupation and industry specific skills (in apprenticeships or the classroom) during the final two years of high school. Their accomplishments in these courses need to be assessed and signaled to the labor market. What about the generic SCANS competencies like scheduling and budgeting? To me, it makes little sense to offer courses that specialize in teaching competencies like scheduling or budgeting or skills like problem solving. There is no room in the curriculum for new courses. Most of these competencies should be taught as part of existing courses such as business management, mathematics, science, economics, construction technology or auto mechanics. Students specializing in construction would learn about budgeting and scheduling by applying it to the construction industry. The obvious relevance of the topic to the student's planned career should improve motivation to learn the material. In each course in which a student had been exposed to budgeting, the student would also be assessed. Assessment should occur in the same subject matter context as the teaching because we have no assurance that teaching budgeting in one context will easily transfer to another. The result would be a series of context specific assessments of competencies that may or may not be generic and transferable. When

a student sought a job in construction, the "budgeting" grade for the construction industry application would receive the most attention not the budgeting grade in the economics course or the computer course. If, however, this student sought a clerical job in government, the budgeting grade used in the selection process might be an unweighted average of the budgeting grades in each of the three courses where the subject was covered.

This approach to assessing SCANS competencies has face validity and is likely to meet the job relatedness test of the 1991 Civil Rights Act. Before generic tests of many SCANS competencies could be employed in selection, extensive predictive validity research would be necessary to assure that job relatedness standards are met.

The third reason for preferring an industry or occupational cluster approach to signaling is that it involves incremental evolutionary change rather than a revolution in the way schools are organized and students are taught. Educational programs for non-college bound students have industries and occupations as their organizing focus. Students who complete these programs do much better in the labor market than the non-college bound students who took academic courses only (Bishop 1989a). Increasingly these programs are using validated assessments of occupational competency to evaluate the effectiveness of their programs, to improve curricula and to signal student competencies to potential employers. The best strategy is to infuse the teaching of SCANS competencies into existing courses, broaden their focus to occupational clusters rather than narrowly defined jobs and improve instruction and assessment of occupational competencies.

Since 1987 the state of Pennsylvania has been awarding **Pennsylvania Skills Certificates** to high school vocational students who display mastery of their craft by passing an occupational competency assessment that includes a practical hands-on component. As in the Gerran apprenticeship exams, local employers employing workers in the craft were recruited to serve as judges for the hands-on performance portion of the exam. In the first year of testing, students did poorly on the competency tests for clerical occupations. The problem was not the test but the curriculum. It was poorly aligned with current employer needs. The result was a revision of the office education curriculum.

The federal government has invested heavily in the development of a system of occupational competency assessment for military jobs. It has invested almost nothing in developing occupational competency assessment instruments for civilian jobs. As a result, most occupational competency assessment instruments have been developed on a shoe-string using predominantly volunteer labor. Where public authorities have been involved it has



often been at the state level and the result has been fragmentation of effort and incompatible standards that are barriers to geographic mobility. As the role of occupational competency assessment in program accountability and competency certification of trainees grows, it is important for the Department of Labor to shoulder responsibility for rationalizing and improving the system.

## **6. THE IMPACT OF PROPOSED REFORMS ON UNDER-REPRESENTED MINORITIES**

The two blue ribbon commissions that have recommended improvements in the signaling of academic achievement to colleges and employers included substantial representation from the minority community.<sup>7</sup> Nevertheless, the reader may be wondering about the likely impacts of the reform proposals just described on the labor market chances of minority youth. Since minority students receive lower scores on achievement tests, it might appear at first glance that greater emphasis on academic achievement will inevitably reduce their access to good colleges and to good jobs. This is not so, however, for four reasons.

When accomplishment in high school becomes a more important basis for selecting students and workers, something else becomes less important. The consequences for minorities of greater emphasis on academic achievement depend on what becomes deemphasized. Substituting academic achievement tests for aptitude tests in college admissions **improves minority access**. Minority-majority differentials are smaller (in standard deviation units) on achievement tests (e.g., the NAEP reading and math tests) than on aptitude tests (e.g., the SAT).<sup>8</sup>

Greater emphasis on academic achievement will not reduce minority access to jobs, if it substitutes for other criteria that also place minority youth at a serious disadvantage. The current system with its very imperfect signaling of high school achievements has not generated jobs for minority youth. One reason minority youth do poorly in the labor market is that most of the criteria now used to make selections—previous work experience, recommendations from previous employers, having family friends or relatives at the firm, performance in interviews, and prejudices and stereotypes—work against them. These criteria will diminish in importance as academic achievement becomes more important. There is no way of knowing whether the net result of these shifts will help or hinder minority youth seeking employment. In some models of the labor market the relative position of minority workers improves when academic achievement is better signaled.

Secondly, improved signaling of school achievements will give recent high school graduates, both black and white, the first real chance to compete for high-wage jobs that offer substantial training. Now, primary labor market employers seldom consider applicants who lack considerable work experience. A black personnel director interviewed for a CBS special on the educational reform proudly stated, "We don't hire high school graduates any more, we need **skilled workers**" (CBS, September 6, 1990). This generalization does not apply to every recent graduate. State exams, competency portfolios and informative graduation credentials would change this unfair situation and give students a way of proving that the stereotype does not apply to them. Minority youth must overcome even more virulent stereotypes and often they lack a network of adult contacts who can provide job leads and references. By helping them overcome these barriers to employment, improved signaling in of particular help to minority youth.

The third way in which these proposals will help minority students is by encouraging more firms to undertake affirmative action recruitment. The creation of a competency portfolio data bank that can be used by employers seeking qualified minority job candidates would greatly reduce the costs and increase the effectiveness of affirmative action programs. Affirmative action has significantly improved minority representation in managerial and professional occupations and contributed to a substantial increase in the payoff to schooling for blacks (Freeman 1981). Affirmative action has been particularly effective in this labor market in part because college reputations, transcripts and placement offices provide brokering and prescreening services to employers. These services significantly lower the costs of recruiting minority job candidates. The competency portfolio data bank would extend low cost brokering and pre-screening services to the labor market for high school graduates. Establishing such a data bank would generate a great deal of competition for the more qualified minority youth in the portfolio bank.

The most important way these reforms will benefit minority youth is by bringing about improvements in academic achievement and productivity on the job. Learning will improve and the gap between minority and majority achievement will diminish. Society has been making considerable progress in closing achievement gaps between minority and majority students. In the early National Assessment of Educational Progress (NAEP) assessments, black high school seniors born between 1952 and 1957 were 6.7 grade level equivalents behind their white counterparts in science proficiency, 4 grade level equivalents behind in mathematics, and 5.3 grade level equivalents behind in reading. The most recent National Assessment data

for 1986 reveal that for blacks born in 1969, the gap has been cut to 5.6 grade level equivalents in science, 2.9 grade level equivalents in math, and 2.6 grade level equivalents in reading (NAEP 1989, NCES 1993). Hispanic students are also closing the achievement gap. These positive trends suggest that despite their limited funding, Head Start, Title I, and other compensatory interventions have had an impact. The schools attended by most minority students are still clearly inferior to those attended by white students, so further reductions in the school quality differentials can be expected to produce further reductions in academic achievement differentials.

The students of James A. Garfield's Advanced Placement calculus classes have shown what minority students from economically disadvantaged backgrounds can accomplish. The students were mainly disadvantaged minorities; yet in 1987 only three high schools in the nation (Alhambra High School in California and Bronx Science and Stuyvesant High School in New York City) had more students taking the AP calculus exam. This high school and its two very talented calculus teachers, Jaime Escalante and Ben Jimenez, are responsible 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 (Matthews, 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 in school and they lived up to the commitment. What this success establishes is that minority youngsters can be persuaded to study just as hard as the academic track students in Europe and that if they do they can achieve at world class levels. The success at Garfield High can be replicated.

## Bibliography

- Altonji, Joseph. "The Effects of High School Curriculum on Education and Labor Market Outcomes." Chapter 3 of a report to the Department of Education from the National Center on Education and Employment, Department of Economics, Northwestern University, December 1988.
- Association of Secondary Teachers of Ireland (1990) Flyer mailed to membership.
- Barnett, Correlli. The Collapse of British Power. Gloucester, U.K., Alan Sutton, 1972.
- Bishop, John. Preparing Youth for Employment, Columbus: The National Center for Research in Vocational Education, The Ohio State University, 1985.
- Bishop, John. "The Recognition and Reward of Employee Performance." Journal of Labor Economics, Vol. 5, No. 4, pt 2, October 1987a, pp. S36-S56.
- Bishop, John H. "Occupational Training in High School: How can it be Improved?" Economics of Education Review, 1989a.
- Bishop, John "The Productivity Consequences of What is Learned in High School." Journal of Curriculum Studies, 1989b.
- Bishop, John. "Is the Test Score Decline Responsible for the Productivity Growth Decline." American Economic Review, Vol. 79, no. 1, March 1989.
- Bishop, John. (1991) Department of Labor Testing. Ithaca, New York. Cornell University. Center for Advanced Human Resource Studies Working Paper 91-14. p. 1-134.
- Bishop, John. The Economic Consequences of Schooling and Learning. forthcoming in 1994, Washington, D.C.: Economic Policy Institute.
- Bloom, Howard S.; Orr, Larry; Cave, George; Bell, Stephen; Doolittle, Fred. The National JTPA Study: Title II A Impacts on Earnings and Employment at 18 Months. Executive Summary. Bethesda, Md.: Abt Associates, May 1992.
- Brenner, Marshall H. (1968) "Use of High School Data to Predict Work Performance." Journal of Applied Psychology, Vol. 52, No. 1, 29-30.
- Cameron, Stephen and Heckman, James. "The Determinants and Outcomes of Post-Secondary Training: A Comparison of High School Graduates, Dropouts, and High School Equivalents." in Private Sector and Skill Formation: International Comparisons, edited by Lisa Lynch, National Bureau of Economic Research, Chicago: Univ. of Chicago Press, 1993.
- Commission on Workforce Quality and Labor Market Efficiency, Investing in People: A Strategy to Address America's Workforce Crisis. Wash, DC: Department of Labor, 1989.

- Commission on the Skills of the American Workforce. America's Choice: High Skills or Low Wages! National Center on Education and the Economy, Rochester, New York, Jane 1990.
- Education Subcouncil of the Competitiveness Policy Council. Building a Standards Driven System. Washington, D.C.: Competitiveness Policy Council, 1993.
- Frederick, W.; Walberg, H.; and Rasher, S. "Time, Teacher Comments, and Achievement in Urban High Schools." Journal of Educational Research 73, no. 2 (November-December 1979): 63-65.
- Freeman, Richard. "Black Economic Progress after 1964: Who has Gained and Why." Studies in Labor Markets. edited by Sherwin Rosen, Chicago, Ill: University of Chicago Press, 1981.
- Gamoran, A and Barends, M. (1987) "The Effects of Stratification in Secondary Schools: Synthesis of Survey and Ethnographic Research." Review of Education Research. Vol. 57, 415-435.
- Ghiselli, Edwin E. "The Validity of Aptitude Tests in Personnel Selection." Personnel Psychology. 1973: 26, 461-477.
- Hartigan, John A. & Wigdor, Alexandra K. Fairness in Employment Testing, National Academy Press, 1989.
- Hollenbeck, K., and Smith B. The Influence of Applicants' Education and Skills on Employability Assessments by Employers. Columbus: The National Center for Research in Vocational Education, The Ohio State University, 1984.
- Hotchkiss, Lawrence. Effects of Schooling on Cognitive, Attitudinal and Behavioral Outcomes. Columbus: The National Center for Research in Vocational Education, The Ohio State University, 1984.
- Hotchkiss, Lawrence; Bishop, John H. and Gardner, John. Effects of Individual and School Characteristics on Part-time Work of High School Seniors. Columbus: The National Center for Research in Vocational Education, The Ohio State University, 1982.
- Hunter, John. Test Validation for 12,000 Jobs: An Application of Job Classification and Validity Generalization Analysis to the General Aptitude Test Battery. Washington, DC: US Employment Service, Department of Labor, 1983a.
- Hunter, J.E. "Causal Analysis, Cognitive Ability, Job Knowledge, Job Performance, and Supervisor Ratings." In Performance Measure and Theory, edited by S. Lundy, F. Zedeck, and S. Cleveland. Hillsdale, NJ: Lawrence Erlbaum, 1983b.
- Hunter, John E.; Crosson, James J. and Friedman, David H. "The Validity of the Armed Services Vocational Aptitude Battery (ASVAB) For Civilian and Military Job Performance," Department of Defense, Washington, D.C., August, 1985.

International Association for the Evaluation of Educational Achievement (IAEEA) Science Achievement in Seventeen Nations, New York, Pergamon Press, 1988.

James, Estelle; Alsalam, Nabeel; Conaty, Joseph C. and To, Duc-le. "College Quality and Future Earnings: Where Should You Send Your Child to College?" American Economic Review, Vol. 79, No. 2, May 1989, 247-252.

Jovanovic, Boyan and Moffitt, Robert. 1990. "An Estimate of a Sectoral Model of Labor Mobility" Journal of Political Economy, vol. 98, (no. 4), 827-852.

Kang, Suk. "A Formal Model of School Reward Systems." in Incentives, Learning and Employability, edited by John Bishop, Columbus Ohio: National Center for Research in Vocational Education, 1985.

Katz, Lawrence & Murphy, Kevin, (1990). "Changes in Relative Wages, 1963-1987: Supply and Demand factors." Quarterly Journal of Economics.

Lapointe, Archie; Mead, Nancy and Askew, Janice. Learning Mathematics, International Assessment of Educational Progress, Princeton, N.J.: Educational Testing Service, 1992.

Longitudinal Survey of American Youth. "Data File User's Manual" Dekalb, III: Public Opinion Laboratory, 1988.

Maier, Milton H. and Grafton, Frances C. Aptitude Composites for AOVAB 8, 9 and 10. Research Report 1308. U.S. Army Research Institute for Behavioral and Social Sciences, Alexandria, VA, May 1981.

Matthews, Jay. Escalante: The Best Teacher in America. New York, NY: Henry Holt, 1988.

Mueller, R. O. "The Impact of College Selectivity on Income for Men and Women." Research in Higher Education, Vol 29, 1988, 175-191.

National Assessment of Educational Progress. Crossroads in American Education. Princeton, New Jersey: Educational Testing Service, 1989.

National Center for Educational Statistics. Trends in Academic Progress. Wash. D.C.: US Department of Education, 1991.

National Center for Educational Statistics. The Condition of Education: 1993. Wash. D.C.: US Department of Education, 1993.

National Federation of Independent Business. [Survey of NFIB membership using a questionnaire designed by John Bishop], 1987.

Nelson, Howard and O'Brien, Timothy. How U.S. Teachers Measure Up Internationally: A Comparative Study of Teacher Pay, Training, and Conditions of Service. Washington, D.C.: American federation of Teachers, 1993.

- Nord, Roy D. and Schmitz, Edward. (1989) "Estimating Performance and Utility Effects of Alternative Selection and Classification Policies." edited by Zeidner, Joseph and Johnson, Cecil. The Economic Benefits of Predicting Job Performance. IDA Paper P-2241. Alexandria, Virginia: Institute for Defense Analysis, p. 3.1-3.56.
- Organization of Economic Cooperation and Development. "Living Conditions in OECD Countries: A Compendium of Social Indicators." Social Policy Studies No. 3. Paris, France: Organization for Economic Co-Operation and Development, 1986.
- Powell, Arthur; Farrar, Eleanor and Cohen, David. The Shopping Mall High School. New York, New York: Houghton Mifflin, 1985
- Public Broadcasting System, "Learning in America," March 27, 1989.
- Rosenbaum, James. "Do School Achievements Affect the Early Jobs of High School Graduates? Results from the High School and Beyond Surveys in the US and Japan." Northwestern University, Evanston, Illinois, 1990.
- Sizer, Theodore R. Horace's Compromise: The Dilemma of the American High School. Boston: Houghton Mifflin, 1984.
- Slavin, Robert (1990) "Achievement Effects of Ability Grouping in Secondary Schools: A Best-Evidence Synthesis". Review of Educational Research. Vol 60, No. 3, 471-499.
- Solmon, Lewis. "The Definition and Impact of College Quality." in Does College Matter, edited by Lewis Solmon and Paul Taubman, New York, New York: Academic Press, 1973, 77-102.
- Spencer, Herbert. Education: Intellectual, Moral and Physical. London: William and Norgate, 1861)
- Stevenson, Harold; Lee, Shin-Ying and Stigler, James W. "Mathematics Achievement of Chinese, Japanese & American Children." Science, Vol. 231, February 1986, pp. 693-699.
- Vineberg, Robert and Joyner, John N. Prediction of Job Performance: Review of Military Studies. Alexandria, VA: Human Resources Organization, 1982.
- Weiss, Andrew. "High School Graduates: Performance and Wages" Bell Communications Research, Inc. Economics Discussion Paper #3, 1985.

## Endnotes

1. The costs and benefits of studying vary across students because interest in the subject varies, ability varies and parental pressure and rewards vary. This heterogeneity means that some students choose to break the "minimize studying" norm. When they are a small minority, they cannot avoid feeling denigrated by classmates. In the top track and at schools where many students aspire to attend competitive colleges, the numbers of such students may be sufficient to create a subculture of its own with norms that value good grades and denigrate those who disrupt classroom instruction. This is the structural basis of the "brains" and "preppie" cliques found in many high schools. Most high school students, however, are in cliques that denigrate studying.
2. This adverse impact results not because tests are unfair but because academic achievement contributes to worker productivity and because there are, unfortunately, real differences in mean levels of academic achievement between groups (Hartigan and Wigdor 1989). The tests are giving us the unhappy news that educational opportunities and achievement have not been equalized.
3. For 25-34 year olds, those who did not complete high school earn 35 to 40 percent less than high school graduates and those with some years of college earn 12 to 30 percent more. Effects are smaller if one focuses on full time workers only--an 20-29 percent penalty for dropping out and an 18 percent premium for completing some college. Holding years of schooling constant the effect of a CIM will probably be smaller, hence the guess of a 10 to 15 percent effect.
4. On the criterion referenced NAEP mathematics scale, 15-16.5 percent of 13 year olds have better mathematics and reading skills than the average 17 year old student, and 7-9 percent of 13 year olds score below the average 9 year old (NAEP 1986, 1988b). The variance of achievement at age 13 is roughly comparable abroad (Lapointe, Mead and Askew 1992). Consequently, it is neither feasible nor desirable for all senior high school students to pursue the same curriculum. While many nations have a common curriculum with no tracking in elementary school and lower secondary schools, no country requires all senior secondary students to take the same courses. Some students will want to pursue subjects like mathematics and 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 between more demanding and less demanding courses. Tracking is not the cause of the low American achievement levels. Slavin's (1988) review of the literature on tracking in secondary school found no effects on mean achievement levels. The Asian and European systems that get most of their students to achieve at very high levels have more pervasive tracking systems than the U.S. What is distinctive about American schools is the lack of clarity about which track/program you are in and the consequent lack of rewards for pursuing a more demanding educational program.
5. Reliability is important because it is anticipated that career choices (classification outcomes) will be influenced by exam results. School exams may also be more valid because they are not limited to the multiple-choice format that prevails in employment tests.
6. Competency assessments might 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 using a large test item bank) might be used so that students could retake the test a few months later if desired.

7. The Commission on Workforce Quality and Labor Market Efficiency included in its membership Constance E. Clayton, Superintendent of Schools of Philadelphia, Jose I. Lozano, Publisher of *La Opinión*, William J. Wilson, author of *The Truly Disadvantaged*. The Commission on the Skills of the American Workforce included in its membership Eleanor Holmes Norton, former Chairwoman of the Equal Employment Opportunity Commission, John E. Jacob, President of the National Urban League, Badi Foster, President of AETna Institute for Corporate Education, Thomas Gonzales, Chancellor of Seattle Community College District VI, Anthony J. Trujillo, Superintendent of Sweetwater Union High School District.

8. SAT tests have standard deviations of slightly above 100 points. In 1991-92 the Black-White differential was 90 points on the Verbal SAT and 106 on the Math SAT (NCES 1994 p. 54). By contrast, for NAEP 17 year olds in 1990, the Black-White differential was .675 standard deviations in mathematics and .71 standard deviations in reading (NCES 1991, pp. 287, 333).