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Chapter 1  
Introduction

AN ATMOSPHERE OF REFORM

Rapid technological change in the workplace, coupled with intense international competition, have focused national attention once again on the role of the schools in preparing youth for productive employment. The ominous news seems relentless: declining test scores, growing numbers of high school students unable to perform simple arithmetic, poor showings of American youth in international comparisons of academic ability, a national dropout rate of roughly 25 percent, and forecasts of relatively high demand for workers with technical skills. There are many reasons to wish for better educational opportunities for American school children. But economic considerations — the productivity growth slowdown and America's struggle to remain competitive in the global economy — have provided the main impetus for reform. And while it is erroneous to pin the blame for America's economic difficulties entirely on the education system, many people believe that basic features of the school system — who is taught which subjects? when? how? — need to be redesigned to fit the realities of the post-industrial world.<sup>1</sup>

Things are changing. As OTA pointed out in a recent report on educational technologies, American schoolrooms today still resemble their ancestors of 50 years ago more closely than do business organizations, manufacturing plants, hospitals, or university research facilities.<sup>2</sup> But there is an extraordinary consensus in the country

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1. It is important for school reformers to avoid mistaking the coincidence of test score decline and economic downturn for cause and effect. See Richard Murnane, "Education and the Productivity of the Work Force: Looking Ahead," *American Living Standards*, Robert E. Litan et al., (eds.) (Washington, DC: Brookings Institution, 1988), p. 215; and John Bishop, "Why the Apathy in American High Schools?" *Educational Researcher*, vol. 18, No. 1, January-February 1989, pp. 6-10.

2. U.S. Congress, Office of Technology Assessment, *Power On! New Tools for*

today that technological innovation at the workplace, changing demographic composition of the school population, modern understanding of multiple learning styles, and the advent of new learning technologies need to be reflected in the way schools are organized and in the way instruction is designed. At least since 1983, when the Department of Education declared this was a “Nation at Risk,”<sup>3</sup> nearly all the States have begun implementing reforms: increased graduation requirements, more standardized testing, lengthening the school day and the school year, imposing sanctions for poor performance, and designing new teacher certification processes are the most common strategies.<sup>4</sup>

While there is much variation in the way the States have approached the design and management of change, overall “accountability” has become a guiding principle. Schools are expected to act like businesses, and account for their successes and failures; and though it has never been very easy to apply quantitative measures to complex educational processes and outcomes, more and more school systems have been doing just that. In many places, performance measurement has become a basis for incentives or sanctions directed at various levels of the educational system. For example, merit pay for teachers is an attempt to reward teachers for superior performance, while so-called “bankruptcy” laws penalize school districts for poor performance by transferring their assets and liabilities.<sup>5</sup>

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Teaching *and Learning*, OTA-SET-379 (Washington, DC: U.S. Government Printing Office, September 1988).

3. U.S. Department of Education, *A Nation at Risk: The Imperative for Educational Reform* (Washington, DC: U.S. Government Printing Office, April 1983).

4. For different views on the potential for education reform, see Thomas B. Timar and David L. Kirp, “State Efforts to Reform Schools: Treading Between a Regulatory Swamp and an English Garden,” *Educational Evaluation and Policy Analysis*, vol. 10, No. 2, summer 1988, pp. 75-88; John Chubb, “Why the Current Wave of School Reform Will Fail,” *The Public Interest*, No. 90, winter 1988, pp. 28-49; and Chester Finn, “Questioning Cliches of Education Reform,” *Education Week*, Jan. 25, 1989, p. 40.

5. For a review of incentive and sanction programs instituted in various places in the United States, see David Stern, University of California, Berkeley, “Performance Incentives for Secondary Vocational Education,” OTA contractor report, December 1989.

## THE ROLE OF VOCATIONAL EDUCATION

Most high school performance measures of the past decade have emphasized academic test scores and performance in college. Occupationally-specific learning has received less attention, and the vocational education system has remained at the fringes of the major reform debates. Because of the perception that effective job training at the secondary level is an important element of economic resurgence, the education and business communities now agree that the time has come to position the future role and structure of vocational education squarely in the broader education policy debate.

Vocational education is a complex system. With its origins dating to early 20th century demand for skilled workers, vocational education has been traditionally viewed as the principal training ground for noncollege-bound youth entering technical trades. But recent data indicate that enrollment in high school vocational education is nearly universal: 97 percent of the high school graduates from the class of 1982 enrolled in at least one vocational course, one-half of all students took at least four vocational courses, and most students who took one vocational course followed through with a second or later course in a sequence leading to specific occupational proficiencies.<sup>6</sup>

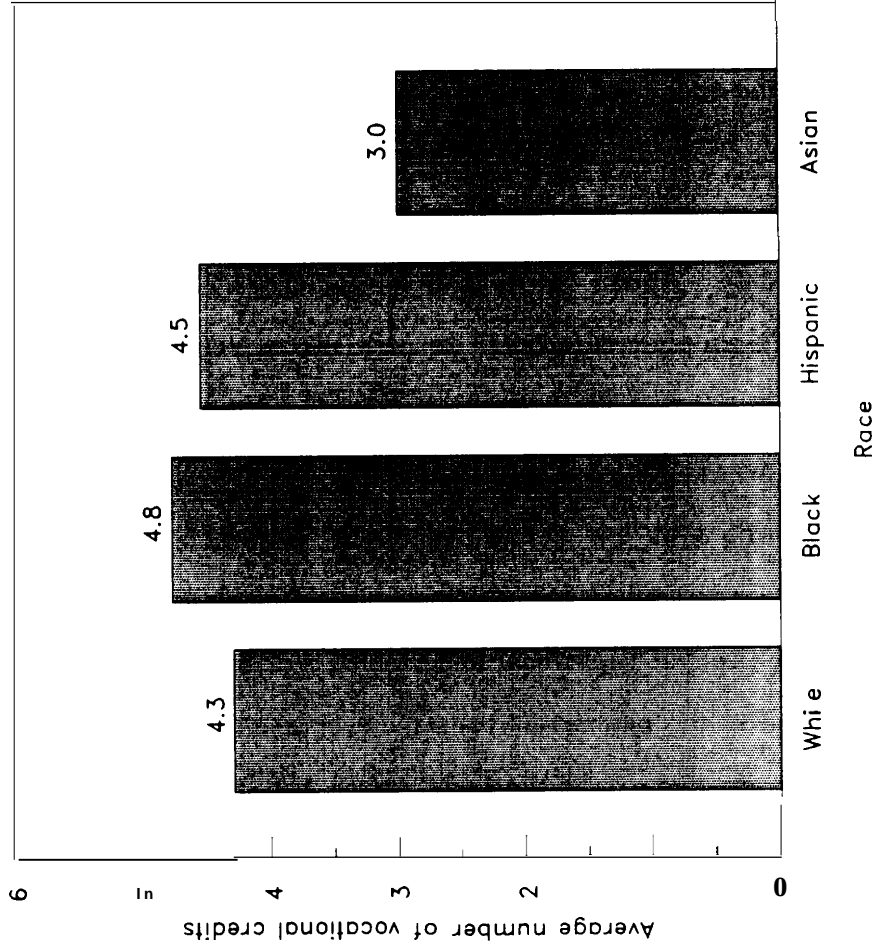
Most stereotypes about vocational education are inaccurate. For example, there is almost no difference in the number of vocational course credits taken by white, Black, Hispanic, and Asian students. As shown in figure 1-1, the range is from about three credits, on average, for Asian students to slightly over four credits among Blacks. Perhaps more striking are the data illustrated in figure 1-2: the percentage of students taking two vocational course credits is roughly the same whether or not they plan to attend college; and roughly 10 percent of students planning to go on to graduate or

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6. U.S. Department of Education, *First Interim Report From the National Assessment of Vocational Education* (Washington, DC: January 1988), p. 1-5.

Figure - 1

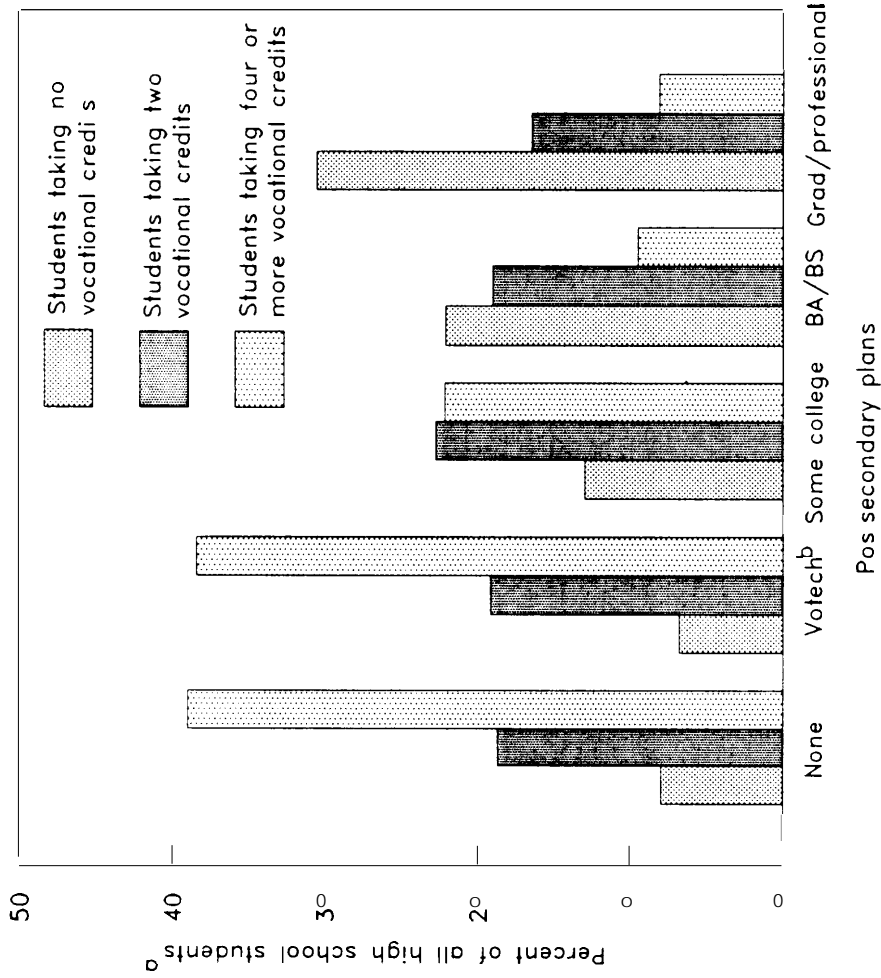
Vocational Education Credits Taken in High School,  
by Race of Students



SOURCE: Office of Technology Assessment, based on the National Assessment of Education, First Interim Report (Washington DC: U.S. Department of Education, January 1988).

Figure 1-2

Completion of Vocational Course Credits in  
Primary Subjects, by Students' Postsecondary Plans



<sup>a</sup> Does not include percentages of students taking one vocational course credit or three vocational course credits. Columns do not total 100 percent.

<sup>b</sup> Vocational/Technical colleges.

SOURCE: Office of Technology Assessment, based on the National Assessment of Vocational Education, First Interim Report (Washington DC: U.S. Department of Education, January 1988).

professional school take four or more credits in vocational courses. In addition, almost one-half of all vocational credits are taken by college-bound students.<sup>7</sup>

Figure 1-3 shows that ability of vocational students, as measured by verbal and mathematics achievement tests, is also a poor predictor of participation in vocational courses. Students ranking in the middle two ability quartiles took an average of just under five credits and accounted for more than 50 percent of vocational enrollment. Only in the highest ability quartile did participation decline significantly. Socioeconomic status had much the same effect, as illustrated in figure 1-4.

#### Outcome Measures for Secondary Vocational Education

The Carl D. Perkins Vocational Education Act reflects traditional congressional concern with equity in access to public education. For example, it mandates procedures to be used by the States in allocating portions of set-aside grants for handicapped and economically or educationally disadvantaged students. But the Perkins Act also recognizes the potential role of outcome measurement in vocational programs: the act requires States to establish boards to review vocational curricula and their relevance to labor market needs, and specifies that the boards must be composed of business and education leaders in the community according to Federal guidelines. However, these outcome requirements do not include methodological guidelines, and they are not rigorously enforced.

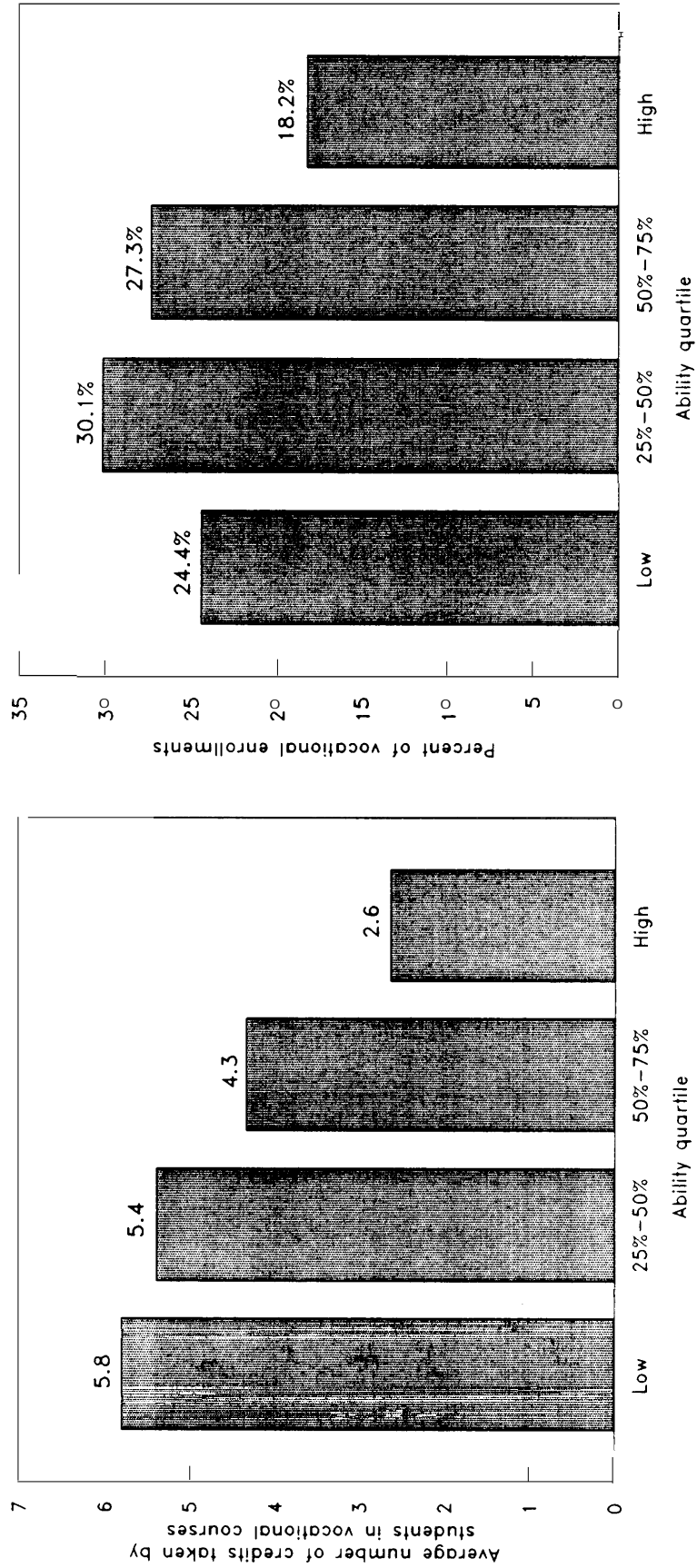
The reauthorization of the Perkins Act comes at a time when performance incentives and quality indicators are very much in vogue, in the schools as well as in job training programs outside the schools (see box 1, page 21). Many people are urging Congress to apply similar measures for secondary vocational education. As one prominent researcher explained:

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7. See John G. Wirt, "National Assessment of Vocational Education," testimony before the House Committee on Education and Labor, Subcommittee on Elementary, Secondary, and Vocational Education, Mar. 7, 1989, p. 6.

Figure -3

Student Ability<sup>a</sup> and Enrollment  
in Vocational Education



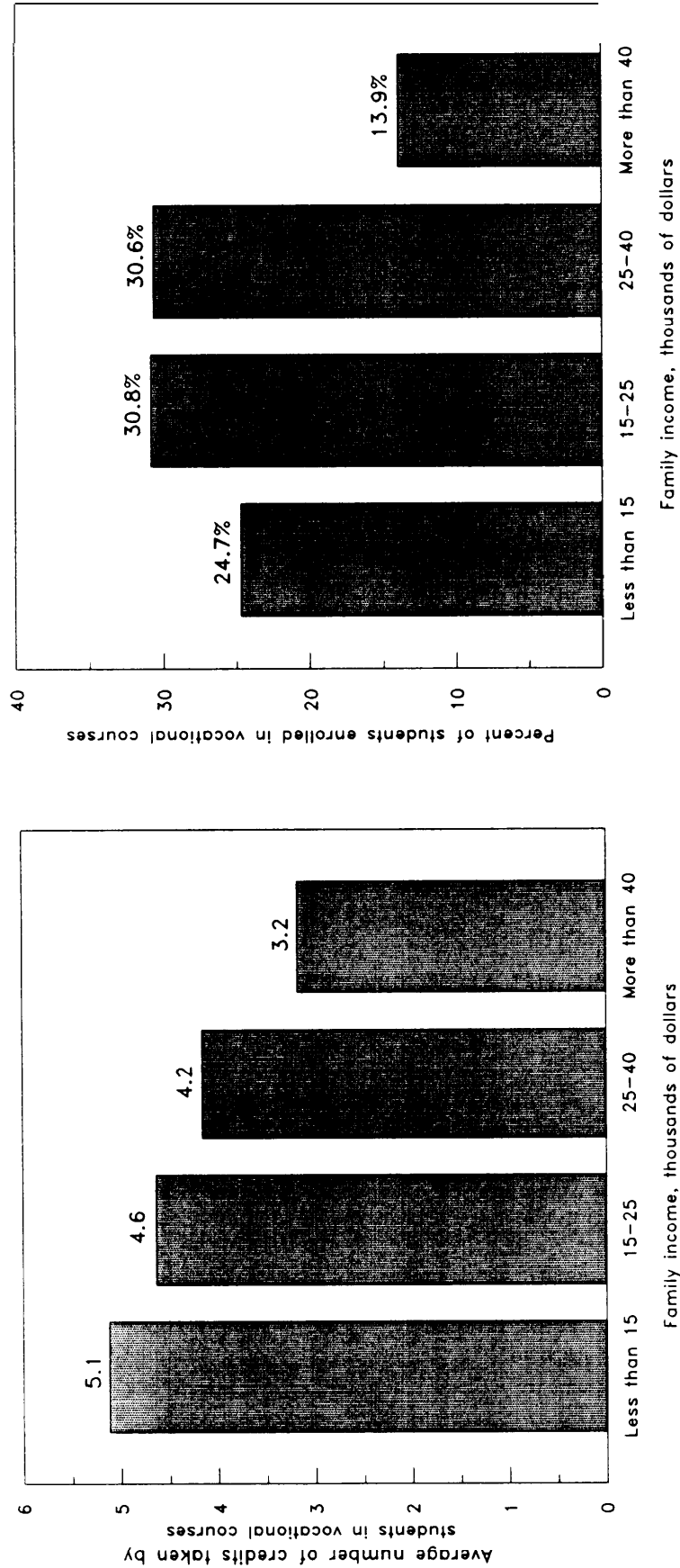
<sup>a</sup> As measured by verbal and mathematics achievement tests administered by the U.S. Department of Education High School and Beyond survey.

SOURCE: Office of Technology Assessment, based on the National Assessment of Vocational Education, First Interim Report (Washington DC: U.S. Department of Education, January 1988).



Figure 1-4

Students' Family Income and Participation in Vocational Education



SOURCE: Office of Technology Assessment, based on the National Assessment of Vocational Education, First Interim Report (Washington DC: U.S. Department of Education, January 1988).

“Vocational education is a good candidate for performance-based . . . policies for several reasons. First, [it] has a long though somewhat ill-defined tradition of defining accountability in terms of outcomes. For many years Federal vocational education policy has urged that the effectiveness of vocational programs be measured in terms of such labor market outcomes as placement in jobs related to training and employer satisfaction. . . . Second, vocational education has made extensive use of competency-based curricula and competency testing, which lend themselves to establishing more performance-oriented public policies. . . . Third, experience with performance standards and other outcome-based features of the Job Training Partnership Act . . . suggests that vocational education might successfully adapt them to its operations. . . . Fourth, the existence of Federal policy and Federal funding for vocational education offers the opportunity for crafting a stronger performance orientation [through] policies [that] would not require a new Federal initiative and new funding. . . .<sup>8</sup>

The principal objective of this Background Paper is to examine the possibility of instituting more stringent requirements for outcome-based performance measurement than are currently featured in the Perkins Act. While there can be many types of outcome measures for vocational education, OTA concentrated on two that are most frequently mentioned. The first is based on labor market outcomes, which are intuitively appealing because they link important objectives of vocational training to the subsequent work experiences of program participants and graduates. Productive and gainful employment ranks high among the objectives of American secondary schools, and is the traditional *raison d’etre* for vocational education and training. Job placement, **earnings**, unemployment, productivity, and employer satisfaction are all assumed to be affected, to some degree, by the quality of an educational program.

The second type of measure OTA examined is based on estimates of learning by students. Regardless of their labor market experience after school, how much students learn, and in which subjects, are important indicators of an educational program’s

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8. E. Gareth Hoachlander, “Performance Based Policies in Vocational Education, ” paper prepared for the Research Conference of the Association for Public Policy and Management, Seattle, WA, October 1988.

quality. In fact, many people believe that testing of competencies is the single most important component of performance measurement.

Job-related competencies and subsequent labor market success are not the only accepted objectives of vocational education. There are a number of other measures that could be included in a comprehensive approach to performance evaluation. For example, some research has examined noneconomic effects of vocational education, such as job satisfaction and family stability.<sup>9</sup> Reduction of the dropout rate and participation in postsecondary education are two other outcomes often cited by experts.<sup>10</sup>

## SCOPE AND OBJECTIVES OF THIS BACKGROUND PAPER

The House Committee on Education and Labor asked OTA to examine the relative merits of alternative performance measures for secondary vocational education. In particular, the Committee was concerned with two key issues: the technical feasibility of such measures, i.e., questions of data availability, accessibility, and commensurability; and the appropriateness of various measures, i.e., the extent to which they could provide valid information without distorting the goals of vocational programs or the behavior of program participants and personnel.

The central question addressed in this Background Paper is this: if Congress wanted to mandate performance measurement, for the purpose of diagnosing problems in specific vocational programs and/or as criteria for Federal funding, what would be the strengths and weaknesses of the two most frequently-mentioned strategies?

Chapter 2 addresses the use of economic indicators to measure secondary vocational program performance. OTA explored the available data that demonstrate the

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9. See, for example, Lawrence Hotchkiss, National Center for Research Into Vocational Education, *Noneconomic Effects of Vocational Education* (Columbus, OH: Ohio State University, 1987).

10. See Stern, op. cit., footnote 5.

relationship between vocational education and subsequent labor market performance, and then considered the possible uses of State-collected wage records data as a basis for outcome measurement. To gain some preliminary insight into the technical problems associated with using the wage records, OTA applied the method in a Midwestern school district. In addition, this section reports on State efforts at data collection and analysis, based on responses to an OTA telephone survey conducted in December 1988.

Chapter 3 looks at occupational competency testing. OTA's analysis concentrates on two key questions: Do tests of occupational aptitude and competency predict future labor market performance? Do these tests provide reliable indications of program performance? The role of the States in measuring competency is highlighted in this chapter.

While OTA did not examine formal methods of measuring other plausible outcomes of vocational education, these do warrant further attention. Chapter 4 of the report outlines some of the basic issues surrounding these measures.

Box 1

Mandating Performance Standards in Federal Programs:  
The Job Training Partnership Act (JTPA)

During the 1980s, the philosophy of job training for the unemployed changed. From 1973 to 1982, the Comprehensive Employment and Training Act (CETA) was the Federal Government's vehicle for "manpower" training. Though CETA was a consolidation of numerous pieces of legislation enacted in the 1960s, it had no more stability than its predecessors. In its brief history, CETA was amended 8 times, had 12 different titles, and went through 26 separate appropriations. The instability of the program's design and funding resulted from the diversity of its objectives: at one time or another CETA attempted to remedy the adverse effects of automation, retrain experienced workers, create jobs, reduce juvenile delinquency, encourage high school completion, and conserve natural resources.<sup>11</sup>

With the legacy of CETA's problems, and with the cost-cutting consciousness of the "New Federalism" at hand, JTPA took shape during the recession of 1981. Championed by Senators Edward Kennedy and J. Danforth Quayle, JTPA was intended to be a more efficient job training system for the poor, designed to operate on less than one-half the funds of CETA, with control given to private business and State governments. Through a partnership between local

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11. Robert Guttman, "Job Training Partnership Act: "w Help for the Unemployed," *Monthly Labor Review*, vol. 106, March 1983, p. 3.

(continued)

government and business, represented by private industry councils (PICS), JTPA puts the design and administration of training programs at the local level, known as service delivery areas (SDAs). Where CETA relied on an army of auditors to monitor compliance with a multitude of method and access requirements, JTPA uses standards based on the labor market outcomes of participants. The Federal role is limited primarily to prescribing effective and enforceable performance goals.

According to the JTPA legislation, the Secretary of Labor is to prescribe performance standards to measure the increase in employment and earnings and the reduction in welfare dependency resulting from participation in the program. The Secretary must also prescribe standards relating to gross program expenditures. This is combined with a hierarchical management system where all levels of JTPA play a role in determining whom the system serves. The Department of Labor has developed adjustment models that are intended to hold SDAs “harmless” for serving individuals with characteristics that make them hard to serve or difficult to place. States play a major role by adding other standards, granting incentive awards to SDAs for exceeding standards and for serving particular hard-to-serve groups. Ultimately, it is the SDAs, the PICS, and the service providers that respond to these incentives and determine who

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is actually served in the program. All levels play important roles in determining the extent that the hard-to-serve are provided training opportunities in JTPA.<sup>12</sup>

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12. Burt S. Barnow and Jill Constantine, *Using Performance Management to Encourage Services to Hard-to-Serve Individuals in JTPA*, Research Report No. 88-04 (Washington, DC: National Commission for Employment Policy, April 1988), p. 48.