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ABSTRACT

The National Assessment of Vocational Education (NAVE) examined how the federal law was implemented and federal funds were distributed under the Carl D. Perkins Vocational Education Act of 1984. This part of the study examined the federal role in supporting vocational education at the postsecondary level. It examines enrollments, course-taking, educational attainments, and labor market outcomes associated with postsecondary vocational education. It compares different groups of students at various types of institutions and considers the relationship between the act and other policies, both federal and state, that also finance postsecondary vocational education. The study found that postsecondary education is a growing enterprise that is central to the educational mission of less-than-baccalaureate institutions. There are 4.3 million vocational students at these schools. The major problem facing postsecondary vocational education is that many students do not stay in school long enough to receive in-depth training. For students who accumulate substantial amounts of vocational credits or complete programs, postsecondary vocational education pays off in economic terms. These findings strongly indicate the need to help students choose a field of study, complete the program, and find a related job. Perkins Act support of postsecondary education is low compared to state and local support. Federal policy in postsecondary vocational education should aim to improve rates of program completion and placement in related jobs, to provide special assistance to at-risk populations, and to improve the transition from secondary to postsecondary vocational education. (KC)

FINAL REPORT
Volume IV

POSTSECONDARY VOCATIONAL EDUCATION

NAVE

NATIONAL ASSESSMENT OF VOCATIONAL EDUCATION
UNITED STATES DEPARTMENT OF EDUCATION

POSTSECONDARY VOCATIONAL EDUCATION

David Goodwin

National Assessment of Vocational Education

1989

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Many people contributed to this study of vocational education at the postsecondary level. When all contractor reports and consultant papers are published by the National Assessment, the full extent to which their ideas, conclusions, and findings shaped this study will be completely revealed.

Norton Grubb of MPR Associates did the major work on postsecondary enrollments and program completions. Gary Hoachlander, Susan Choy, and Cynthia Brown, also of MPR Associates, conducted extensive field work as part of a study of performance-based policy options in postsecondary vocational education. In the area of performance-based policy, various issues of measurement and policy design were addressed through excellent papers prepared by Stephen Barro (SMB, Inc.), Erik Butler (Brandeis University), Charles Manski (University of Wisconsin), David Stevens (University of Missouri), and David Stern (University of California, Berkeley).

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Robin Horn of Decision Resources Corporation analyzed placement rates and earnings of students participating in postsecondary vocational training. John Tuma, Antoinette Gifford and Susan Choy of MPR Associates examined the role of student financial aid in postsecondary vocational education.

I would like to thank the entire NAVE staff--John Wirt, Robert Meyer, Lana Muraskin and Dorothy Shuler. From the beginning of the study, each helped identify the salient issues to be addressed, reviewed technical reports, and provided abundant comments on earlier drafts of this document. Members of NAVE's Advisory Panel also reviewed the report and offered sound advice. Priscilla Taylor edited the report and Adrienne von Glatz supervised preparation of the report for publication.

Although this report relies heavily on the work of others, as always, the author bears full responsibility for all facts and conclusions.

David Goodwin

PREFACE

The National Assessment of Vocational Education (NAVE) was mandated by Congress in the Carl D. Perkins Act of 1984 (Section 403[a]). The mandate calls for "descriptions and evaluations" of the vocational education services delivered to special populations, the effects of the Act in modernizing the vocational education system, the impact of vocational education on academic skills and employment opportunities, and other topics.

The final report from the National Assessment consists of five volumes.

Volume I: *Summary of Findings and Recommendations* summarizes the main findings and conclusions of the National Assessment.

Volume II: *Implementation of the Perkins Act* examines how the federal law was implemented and federal funds were distributed and used under the Perkins legislation.

Volume III: *Secondary Vocational Education* analyzes high school vocational education enrollments, academic achievement and employment outcomes, and recommends federal policy.

Volume IV: *Postsecondary Vocational Education* analyzes postsecondary vocational education enrollments, employment outcomes, issues of finance in relation to federal support for vocational education, and recommends federal policy.

Volume V: *Handicapped and Disadvantaged Students--Access to Quality Vocational Education* describes and analyzes the participation of handicapped and disadvantaged students in vocational education.

These reports were based on a series of studies commissioned by the NAVE. Copies of the NAVE reports and a list of all the contractor reports can be obtained by contacting: NAVE-Room 3141, U.S. Department of Education, 400 Maryland Avenue, SW, Washington, DC, 20202.

A distinguished panel of experts met four times to advise the National Assessment and review drafts of the interim and final reports. The members of the panel, who gave generously of their time and sound advice, were: Charles Benson (University of California, Berkeley), Sue E. Berryman (Teachers College, Columbia University), James Campbell (MISSCO Corporation), Edwin Herr (Pennsylvania State University), Dorothy Horrell (Red Rocks Community College), James Kadamus (State Department of Education, New York), Willis McCleod (Petersburg Public Schools), Milbrey McLaughlin (Stanford University), Daniel Morley (State Street Bank and Trust Company), William Morrill (Math Tech, Inc.), Lawrence Palmer (Cornell University), Robert Scot (North Carolina System of Community Colleges), and David Wise (Harvard University).

NAVE staff began to implement the National Assessment in January 1987, after the study plan was reviewed by congressional staff members in both the House and Senate education committees. The key staff members were Lana Muraskin, David Goodwin, Robert Meyer, and Dorothy Shuler. Specific acknowledgments of all staff and contractor contributions to the final reports are contained in each of the reports.

The National Assessment of Vocational Education was generously supported by the Office of Planning, Budget, and Evaluation of the Department of Education. Key officials of the Office and the Department granted NAVE staff both the funds required and the independence necessary to carry out the study. Special gratitude is owed in this regard to Alan S. Ginsburg of the Planning and Evaluation Service and Thomas M. Corwin of the Budget Service.

However, all conclusions and recommendations of this report are strictly those of the National Assessment and do not necessarily represent views of the Department of Education.

John G. Wirt
Director, National Assessment
of Vocational Education

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EXECUTIVE SUMMARY

BACKGROUND

This report examines the federal role in supporting vocational education at the postsecondary level. It examines enrollments, course-taking, educational attainments, and labor market outcomes associated with postsecondary vocational education. The report compares different groups of students at various types of institutions. It considers the relationship between the Carl Perkins Vocational Education Act and other policies, both federal and state, that also finance postsecondary vocational education.

OVERVIEW OF FINDINGS

Who Enrolls in Postsecondary Vocational Education?

Postsecondary vocational education is a growing enterprise that is central to the educational mission of less-than-baccalaureate institutions. There are a total of 4.3 million "vocational" students at community colleges, two-year technical colleges, public vocational technical schools, and proprietary schools. Three-fourths of all students at these institutions major in vocational subjects, and over the past two decades the percentage of postsecondary students enrolled in vocational education has grown substantially.

- Community colleges are the major providers of postsecondary vocational education, accounting for 62 percent of all postsecondary vocational credits earned.
- Compared to four-year institutions, two-year postsecondary institutions are much more likely to attract a cross-section of students by age, race, socioeconomic background, and level of ability.
- The largest increase in the rate of college attendance in the past decade has been among high school students who majored in vocational education.

At What Rates Do Students Complete Postsecondary Vocational Programs?

The major problem facing postsecondary vocational education is that many students do not stay in school long enough to receive in-depth training. Low rates of program completion and a limited number of courses taken are common for all students regardless of race, gender, economic status, or ability. The problem is most serious, however, among minorities, economically disadvantaged students, and the growing number of high school "vocational" students who pursue postsecondary training. Minorities and disadvantaged students average substantially fewer credits and leave postsecondary institutions without earning a degree or certificate more frequently than do other students.

- Only 19 percent of high school graduates who enter community colleges shortly after leaving high school complete a certificate or associate degree within four years of completing high school.

- One-third of all postsecondary "vocational" students take less than 12 credits in vocational subjects and 50 percent of vocational students earn less than 24 vocational credits. Typically, 30 total credits of academic and vocational subjects are required for a certificate and 60 credits are needed for an associate degree.

- At community colleges, black students earn 30 percent fewer credits than white students, and black students fail to earn a degree or certificate at a rate 20 percent higher than white students.

What Are the Outcomes for Students?

For students who accumulate substantial amounts of vocational credits or complete programs, postsecondary vocational education pays off in economic terms. Students who obtain degrees or certificates, or who otherwise take a substantial amount of vocational training in their major field, are more likely to be employed and more likely to get a job in their field of training than students who take small amounts of vocational training. Students who take more training and are employed in their field also earn higher wages than students who take less training or are not employed in the field in which they trained. These results are for students 5.5 years after graduation from high school.

- Overall, about 58 percent of postsecondary vocational course work was related to the jobs students later obtained.

- Students who completed 30 credits in their major area were 28 percent less likely to be unemployed than students who completed 1 to 12 credits, and 14 percent more likely to get a job related to their training.

- Students with 30 vocational credits related to their job earned an average of $7.52 per hour compared to $6.59 per hour for students with 12 job-matched credits.

- The economic benefits of vocational training are largest for courses taken in a student's major field or subject area. Vocational credits taken outside the students' major field are not used and contribute little to earnings.

These findings strongly indicate the need to help students choose a field of study, construct a coherent sequence of courses in that field, complete the courses or program, and find a related job.

How Is Postsecondary Vocational Education Financed?

Considered together, federal and state policies of financial support to postsecondary vocational education accomplish two major objectives. First, both federal and state policies support access to postsecondary vocational education--federal policy through student aid and loan programs, and state policy through the direct support of public two-year colleges and other vocational-technical institutions. Second, federal policy supports access to the private sector in postsecondary vocational education (mostly proprietary schools), while state and local policy primarily supports access to public sector institutions. State and local support allows

institutions to keep tuition low. Perkins Act funding is small relative to both of these other sources.

- The Perkins Act provides about $320 million in grants directly to public sector institutions--community colleges, technical colleges, and vocational-technical institutes.

- NAVE estimates that two-year public colleges obtain 65 percent of their total revenues from state and local government.

- Federal student grant and loan programs provide $4 billion to postsecondary vocational students. Of this aid, $2.8 billion, or 71 percent of the total, is received by the 14 percent of postsecondary vocational students who attend proprietary schools. A total of $853 million in federal student aid is awarded to the 83 percent of postsecondary vocational students who are enrolled in community and technical colleges. A total of 81 percent of proprietary school students receive federal aid compared to 20 percent of the students at public two-year colleges and 42 percent of the students at public vocational schools.

- Federal student aid is distributed proportionately to family income and the cost of attending different types of institutions. This federal investment contributes substantially more to the access of lower income students to postsecondary vocational education than is possible through the Perkins Act.

- The major forms of financial support for vocational training are student aid and state and local appropriations, both of which provide powerful incentives for institutions to maintain and increase enrollments. Neither provides strong or direct incentives, however, for institutions to address the problems of limited course-taking, low completion rates, or low rates of training-related job placements.

POLICY RECOMMENDATIONS FOR POSTSECONDARY VOCATIONAL EDUCATION

In considering the role of federal policy in postsecondary vocational education, it is important to emphasize that, although funds from the Perkins Act are limited, other federal programs make a substantial investment in improving access to postsecondary training for disadvantaged students. Public policy offers few incentives for improving student outcomes. Our research has identified noncompletions and limited course-taking as serious problems for all groups of students, but particularly for special population groups. Therefore, improving student outcomes, especially for disadvantaged students, is the main problem that federal vocational education policy should address.

To solve the problem, federal policy in postsecondary vocational education should have three major goals:

Improve rates of program completion and placement in training-related jobs.

Provide special assistance to at-risk populations for whom the problem of noncompletion is most serious.

Improve the transition from secondary to postsecondary vocational education in a way that results in more coherent and in-depth training for students.

To achieve these goals, NAVE recommends using the limited federal resources provided to postsecondary vocational education through the Perkins Act to support the state-level development of indicators to measure the performance of institutions and, within four years of reauthorization, the distribution of funds to institutions according to their positive results for students. Extra incentives would be created to improve outcomes for students at risk--disadvantaged students, handicapped students, single parents, and female students enrolled in nontraditional programs. The recommended policy has five parts:

Performance Indicators. States would develop indicators of the performance of postsecondary institutions. These indicators would measure the performance of postsecondary vocational institutions in three main areas:

- Labor Market Outcomes, including the rates at which students are placed in jobs, whether the placements are "training related," the duration of employment and unemployment, and the level of earnings at job entry and selected times thereafter.

- Learning Outcomes, including the rates at which students attain state certification (in fields with certification), achieve occupational competencies, and improve their scores on tests of academic knowledge.

- Educational Attainment, including the rates at which students earn degrees and certificates, take courses in a sequence, and enroll in more advanced level courses such as intended by tech-prep or other similar programs.

Performance Funding. States would distribute funds from the Perkins Act according to the performance of institutions as measured by the indicators developed. Institutions with excellent performance would receive higher rewards. Because improved performance could increase enrollment and retention of students, which in turn is the major determinant of institutional revenue, performance incentives would encourage institutions to use their own resources beyond federal funding to improve programs and outcomes for students.

Serving Special Populations. The fairness of any performance-based system requires that performance ratings not penalize those institutions that enroll at-risk students or are located in areas where employment opportunities are limited. To ensure this, federal policy would require that the performance systems developed by states: (a) adjust for major factors, particularly student characteristics and labor market conditions, that affect student performance but are outside the control of vocational educators; (b) reward both institutional improvement and "value-added" increases in student learning from entry to exit; and (c) provide substantial additional weight in funding formulas, perhaps as much as 50 percent, for the performance of students in special population categories.

Two Phases. Performance funding would be phased in over four years. In the first two years, states would develop performance indicators; in the next two years they would develop formulas for performance funding. In the fourth year, federal funds would be allocated on the basis of performance.

Lead Agency. The governor would designate a lead agency to develop and administer state performance systems. The governor would also provide a broad view of the relationship between vocational programs and other state job-training and economic development needs. The lead agency could spend up to 20 percent of the Basic Grant funds available for postsecondary education for the development of performance indicators and funding formulas.

CHAPTER 1

INTRODUCTION

Postsecondary vocational education has three main purposes, each of which is reflected in the Carl D. Perkins Vocational Education Act:

1. Postsecondary vocational education provides students with occupational skill training that helps them to get better jobs.

2. Enhanced occupational skills improve the productivity of the work force and thereby contribute to economic development.

3. Postsecondary vocational training can attract students to college who might not otherwise go.

Since Volume II of the National Assessment's final report focuses on the Perkins Act, the purpose of this report is to consider the larger context within which postsecondary vocational education occurs. More than one-third of all undergraduate students major in vocational fields. Training is available from many different types of educational institutions in the public and private sectors. Other federal and state programs provide substantially greater subsidies to vocational education than are obtained from the Perkins Act. Accordingly, this report considers the federal role in postsecondary vocational education within the framework of student participation, student outcomes, institutional differences, and other federal (particularly student aid) and state support.

EXPANSION OF POSTSECONDARY VOCATIONAL EDUCATION

Postsecondary vocational education is provided in a variety of settings. This report focuses on education that occurs in formal degree- or certificate-granting institutions such as community colleges, technical institutes, and proprietary schools, where the programs of study generally lead to a degree or certificate.[1] Some students may also take specific training courses designed for clients in industry, the military, or the employment and training field.[2] These

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[1] We focus on these institutions because, with the exception of proprietary schools, this is where the Perkins Act money is distributed. Proprietary schools are major recipients of other federal education resources, mainly student aid.

[2] NAVE's surveys indicate that these secondary sources do not now provide a large share of all students, but that their share of enrollments is expected to grow.

institutions enroll approximately 5.3 million total students, of which about 4.3 million are in occupational programs of study.[3] Most postsecondary vocational students (3.6 million) attend one of roughly 1,200 community and technical colleges. About 763,000 students are enrolled in about 3,000 proprietary schools.[4] Vocational enrollments constitute 35 percent of total undergraduate enrollments in postsecondary education and 77 percent of enrollments in less-than-baccalaureate institutions.[5] Altogether, these institutions operate on total revenues of about $14 billion.

Considerable occupational training also occurs in training programs provided by employers or community-based organizations. Employer-provided training may be provided through on-the-job training, customized training developed with a postsecondary school, or joint union-employer arrangements. Although no reliable estimates exist of the size of this enterprise, it seems probable that resources spent on employer-sponsored training are equal to or may even exceed those spent in formal degree programs.[6] One major source of employer-based training is the military, where much, although obviously not all of the training is for

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[3] There are various ways in which to define "vocational" students. This estimate is based on institution-reported majors of students collected in the National Postsecondary Student Aid Survey (NPSAS), a nationally representative survey of students enrolled in higher education in October 1986.

[4] Estimates of the number of proprietary school students vary widely. See *Undergraduate Financing of Postsecondary Education: A Report of the 1987 National Postsecondary Student Aid Study*, U.S. Department of Education, National Center for Educational Statistics, June 1988, p. 120.

[5] This estimate is based on student-reported majors collected in the NPSAS, 1986. This is a conservative estimate of vocational enrollments. NPSAS data reflect enrollments in October 1986 but many students enroll at other periods during the year. As a result, NPSAS data substantially underestimate the annual enrollment of students in programs of nonstandard length, which primarily include students in two-year, vocational technical, and proprietary institutions.

[6] For a review of studies on employer training expenditures, see Anthony Carnevale and Harold Goldstein. *Employee Training: Its Changing Role and An Analysis of New Data*, ASTD Press, 1988. Another study estimates that employer sponsored training represents 40 percent of the nation's total investment in human capital development. See Roger Vaughan and Sue Berryman, "Employer Sponsored Training: Current Status, Future Possibilities," prepared for the National Assessment of Vocational Education Conference on Employer-Sponsored Training, February 1989.

occupations with civilian counterparts.[7] Finally, a large number of community-based organizations provide occupational training programs. Community-based organizations appear to serve persons who are least likely to obtain training at a college or from an employer--poor and unemployed people and those with language barriers. In many cases, this training is funded by the Job Training Partnership Act (JTPA).

Students enrolled in postsecondary vocational programs are demographically diverse. Programs draw students from all economic strata, races, age groups, and levels of ability. Postsecondary vocational students are more likely than four-year college students to be drawn from working-class and poor families, racial and ethnic minority groups, and the lowest quartile of academic ability. They also are likely to have taken a large number of vocational courses in high school. Postsecondary vocational students are older than the typical college student, they are frequently enrolled part-time, and they are more often financially independent of their parents. At community colleges, where students may concentrate on vocational or academic course work, the demographic profile of both groups is generally similar.[8]

Postsecondary vocational institutions expanded greatly during the 1960s and 1970s, but are now faced with potential enrollment declines. The post-World War II baby boom, coupled with national and state policy goals of eliminating economic barriers to college attendance, resulted in total enrollment growth over two decades of 350 percent, and in the construction of nearly 700 new community and technical colleges to accommodate these students.[9] Now the

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[7] U.S. Department of Defense, *Military Manpower Training Report, FY 88*, February 1987.

[8] Two data sets used in this analysis yield different results on the socioeconomic background of vocational and academic students at community colleges. NPSAS indicates vocational and academic students at two-year public colleges have similar family incomes. Analysis of High School and Beyond (HS&B) data, in contrast, suggests that vocational students at community colleges are more likely to be from economically disadvantaged families than are academic students at the same type of institution.

[9] Elaine El-Khawas, et al., *Community College Fact Book* (New York: Macmillan, 1988) p. 7.

demographics have changed. Declining numbers of high school graduates have reduced the pool from which students are recruited. To maintain enrollments, these institutions must expend considerable effort to recruit students, identify new groups of students, and provide many new kinds of services.

As community colleges expanded, their goals and operating realities evolved. As originally conceived, these colleges were places where students who were not yet academically prepared for a four-year college, or who could not afford one, could begin their college experience. After two years, these students would transfer to a four-year college. Although this purpose was never fully realized, community colleges were d veloped, staffed, and structured with a model of academic higher education very much in mind.

As postsecondary enrollments grew during the late 1960s and 1970s, the demand for vocational studies increased. Postsecondary institutions begin to provide more occupational training that formerly had either been provided by employers or, in an era when the demand for particular occupational skills was less, perhaps not provided at all. This shift in demand largely fueled the rapid growth of community colleges and other institutions--technical colleges, vocational schools, and proprietary schools--dedicated to vocational training. Demand increased for training of different lengths of time (not everyone wanted an associate degree) and for related services such as job placement and remedial basic skill training.

The demographics of the 1980s further contributed to this trend. Declining numbers of 18-year-old high school students stimulated stiff competition between two- and four-year institutions for students and, over time, lowered admissions standards at four-year colleges. As a result, many students who might have enrolled in two-year institutions were able to enroll in four-year institutions directly after high school.

Today, community colleges no longer attract a large number of students who eventually transfer to four-year institutions, although many students still say that transferring is their

goal.[10] Many of these students are c :er students who enroll part-time. The majority of students enroll to obtain occupational training. As community colleges evolved from an academic to a more vocational focus, it has been a challenge to reconcile increased demands for short- and long-term job training, career placement, and remedial education with the original goal of providing an academic foundation for students planning to transfer to four-year institutions.

In addition, some states established one- or two-year technical institutes or colleges as entities apart from or in lieu of community colleges. Technical institutes are dedicated exclusively to providing vocational education. Some less than two year technical institutions--vocational or area vocational centers--began as secondary schools but, feeling the pressure of declining enrollments, began to enroll adults and recent high school graduates. These institutions do not easily fit conventional distinctions between secondary and postsecondary education.

By any number of measures--institutional enrollments, credits in vocational subjects, or major subject areas--less-than-baccalaureate institutions have taken on a more vocational cast. Fewer students are pursuing traditional academic programs. Aggressive recruiting of new populations--adults in need of training, part-time students, and students who could not afford college--has brought in more students intent on acquiring vocational skills. By expanding enrollments among these nontraditional groups, postsecondary vocational programs have managed to increase their share of the postsecondary student "market."

DIFFERENCES BETWEEN VOCATIONAL EDUCATION AT THE SECONDARY AND POSTSECONDARY LEVELS

Although the Perkins Act makes no distinction in its goals between vocational education at the secondary and postsecondary levels, some important differences should be considered in

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[10] W. ' orton Grubb, *Access, Achievement, Completion and 'Milling Around' in Postsecondary Vocational Education*, NAVE Contractor Report (Berkeley, CA: MPR Associates, 1989).

weighing policy options. Secondary and postsecondary vocational education differ with respect to their basic goals, governance structure, and the federal policies affecting each level. Each of these differences is briefly discussed in this section.

Goals

Although secondary vocational education began with a fairly narrow purpose--to provide students with specific occupational skills that can be used at work--over the years other objectives have gained prominence. High school vocational programs may be designed to introduce careers, develop common or generic employment skills, keep students from dropping out of high school, provide a setting to accommodate alternative learning styles, teach specific occupational skills, help students get jobs, or provide a foundation for more advanced training at the postsecondary level. Thus, at the secondary level, vocational education has many goals, and there is no clear consensus on which ones are paramount.

In contrast, at the postsecondary level, vocational training is likely to be both more advanced, technical, and focused on a single basic purpose--providing students with skills and knowledge needed to enter and progress in a chosen occupation. In NAVE's survey of local vocational education practices, 72 percent of postsecondary program administrators rated "preparation for specific occupations" as the primary goal of vocational education, compared to only 13 percent of secondary school vocational program administrators.[11] Whereas at the high school level federal policy operates in a framework of uncertain and hotly debated goals, at the postsecondary level goals are more limited and more widely accepted. Federal vocational education policy at the postsecondary level, therefore, can be more directly focused on policies designed to enhance or reward the achievement of generally accepted objectives.

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[11] Janet P. Swartz, *State and Local Response to the Carl D. Perkins Act: Survey Analysis*, NAVE Contractor Report (Cambridge, MA: Abt Associates, 1989) p. 44.

Governance

Although the federal requirement for a sole state agency to administer secondary and postsecondary vocational education under the Perkins Act suggests a view that vocational education is, or can be made into, a unified system, the realities of state governance suggest something quite different. In almost no case does a single state-level entity administer both secondary and postsecondary vocational education. States designate a single state agency to administer the Perkins Act, but governance authority is really divided in many different ways.[12] When it comes to the use of federal funds, resources are either restricted to institutions under the direct control of the sole state agency or "handed off" to a postsecondary agency that, in turn, allocates resources among community colleges and, depending on state governance, technical colleges as well. When funds are restricted to educational institutions directly under the state department of education, important sources of postsecondary vocational training not under the sole state agency tend to be excluded from receiving Perkins Act funds. When funds are handed off to a postsecondary governing agency, this body is rarely active in overseeing or administering the federal law.[13]

Federal Policies

Finally, more federal policies affect access to postsecondary vocational education, particularly for the disadvantaged, than affect access to secondary vocational education. Federal policies such as student aid and JTPA provide substantial support for adult or postsecondary-level training. Other much smaller federal programs, such as the Trio

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[12] The most frequently designated sole state agency is the state department of education, which oversees secondary school vocational education. In some cases, it also administers technical colleges or vocational technical schools. Almost always a separate state entity is responsible for community college programs; sometimes this body has oversight of the technical college system, and other times there is a separate technical college governing body, or, as previously noted, governance falls within the state department of education. See Mary Ann Millsap, et al., *State and Local Response to the Carl D. Perkins Act, Case Study Analysis, Final Report*, NAVE Contractor Report (Cambridge, MA: Abt Associates, 1989).

[13] Ibid., pp. 112-113.

programs[14] for disadvantaged college students, provide institutional grants that support academic remediation and other services for disadvantaged college students. As the use of Perkins Act funds under the disadvantaged set-aside reflects, academic remediation is an enormous need in postsecondary education. It is appropriate, therefore, that the goals of federal vocational education policy be chosen only after considering the "fit" with other federal programs that have similar purposes.

FEDERAL ROLE AND FEDERAL POLICY ISSUES

The federal government is involved in postsecondary vocational education in many ways and in pursuit of a variety of goals. Among the principal forms of federal participation are grants and loans to individuals enrolled in postsecondary vocational programs; grants to states to finance training under the JTPA; and, under the Perkins Act, state grants to institutions that support services for certain target groups (the handicapped, the disadvantaged, adults, single parents, and homemakers) and to support efforts to improve vocational programs in general. In addition, there is direct assistance to institutions of higher education to finance special services for disadvantaged students under the Trio programs and specific occupational training provided through the military. In the aggregate, as table 1.1 shows, federal financial support for postsecondary vocational education is estimated at $14 billion. Of this sum, Perkins Act grants account for only an estimated $320 million per year (2.3 percent of estimated federal expenditures for postsecondary vocational training). From a different perspective, Perkins Act funds represent only about 5.7 percent of total revenues for vocational

[14] Trio programs are funded under the Higher Education Act and include Talent Search, Upward Bound, Student Support Services, and Education Opportunity Centers.

Table 1.1

Federal Expenditures for Postsecondary Vocational Training, 1986

Type of Program	Amount (millions)	Percentage[a/]
Vocational education	$ 320	2.3%
Trio programs	33	0.2
Student aid	3,753	26.9
Job training	4,286	30.8
Military manpower	3,722	26.7
Veterans	458	3.3
Vocational rehabilitation	1,350	9.7
Total	$13,922	100.0

SOURCE: Findings are based on program records. In programs with multiple goals, only expenditures reasonably allocable to vocational training are counted. To simplify presentation, each of 19 current federal programs is classified into one of the basic program types. For example, the "student aid" category includes six major aid programs under the Higher Education Act; "job training" includes the Job Training Partnership Act, Work Incentive Act, Job Corps, and Trade Adjustment Act; "military" is limited to one type of "specialized skill training;" "veterans" includes various GI and other educational benefit programs; and "vocational rehabilitation" includes programs under the Veterans Department, Department of Education, and Social Security.

a/ Numbers do not add to 100 because of rounding.

programs at community colleges, but probably account for a substantially greater proportion at technical schools and colleges.[15]

[15] This estimate is based on the Center for Education Statistics' Higher Education General Information Survey (HEGIS) data indicating total revenues of $12 billion dollars in 1985-86 at two-year public colleges, allocated according to the number of students enrolled in community and technical colleges, and the percentage of total credits taken in vocational subjects.

The social purposes that have motivated federal outlays under this array of programs may be characterized as, first, "access" or "opportunity" goals, and second, economic development or, more specifically, human capital goals.[16] Under the former, the federal government has sought to extend opportunities for postsecondary education (including, but not limited to, vocational education) to poor persons and other segments of the population that might otherwise be unserved or underserved. Under the goal of economic development, it has sought to promote more rapid national and regional growth, higher productivity, and enhanced economic competitiveness by enlarging the pool of trained workers and upgrading the quality of training.

These general goals translate into a number of more specific operational objectives, such as subsidizing low-income postsecondary students, providing supplemental services to students with special needs, eliminating barriers to students' access to programs, and underwriting program improvement efforts. It is these latter, more specific purposes that are reflected in provisions of the various federal programs.

Few if any of the federal programs affecting postsecondary vocational education were formulated, or are operated, with the particular needs or circumstances of the postsecondary vocational sector in mind. Student aid programs are aimed at helping low-income postsecondary students generally; the fact that many such students are engaged in vocational studies is incidental and not reflected explicitly in the program's design. Similarly, the Trio programs aim to help poor or low-achieving college students generally without distinguishing between vocational and nonvocational enrollees. Programs under JTPA, in contrast, are entirely job-oriented but designed to serve individual participants ... not to improve the system that delivers postsecondary vocational education. Finally, Perkins Act funds are

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[16] Certain program areas fit neither category. Military training is designed to meet military manpower needs, and it is only incidental that the training provides skills useful in the civilian sector. Also, veterans education benefits such as the GI bill may be regarded as compensation or inducements for military service, not social programs purposefully designed to expand education or training.

intended to improve vocational education programs in general but are not directed at postsecondary goals in particular. The Perkins Act makes few distinctions between secondary and postsecondary levels in the purposes for which aid is provided. Thus, although multiple federal programs impinge on the postsecondary sector, there has been no federal postsecondary vocational education policy as such.

As the preceding discussion indicates, it would not suffice to examine the Perkins Act in isolation from the larger context of postsecondary vocational education. How postsecondary vocational education is organized and operates and how Perkins Act grants relate to other forms of federal aid are as relevant in considering the future of the Perkins Act as is the functioning of the Perkins Act programs themselves. In fact, the appropriate federal role in future vocational education legislation cannot be determined without considering the larger framework of participation, outcomes, and other federal support. Accordingly, this report deals primarily with the conditions of postsecondary vocational education and the relevance that other policies, namely student aid, have for vocational education policy.

The issues that need to be considered in assessing the Perkins Act programs at the postsecondary level may be categorized as follows:

1. *Participation in postsecondary vocational education and its relationship to the purposes of the Perkins Act grants.* Describing participation is relevant, first, for what it reveals about the need for types of assistance provided under the act, and second, for what guidance it gives in determining how federal aid can be better directed. For instance, are disadvantaged, handicapped, and other special-need groups well represented among postsecondary vocational education enrollees? How are such students distributed among types of institutions and programs? Are these students, including those in the special groups, successfully completing vocational training? Are there indications that program quality is inadequate? Armed with answers to these questions, policymakers can judge whether the focus of the Perkins Act is appropriate and whether the present apportionment of funds is reasonably related to the incidence and severity of problems.

2. *Outcomes of postsecondary vocational education and their implications for the goal of enhancing employment.* Determining the outcomes of postsecondary vocational education is of obvious importance. If students are not getting decent jobs, then vocational programs are not delivering on their primary goal.

Somewhat differently, outcomes may vary among students in ways that suggest which educational strategies are most beneficial or which target populations, programs, or institutions need special assistance.

3. *The actual operation of the Perkins Act at the postsecondary level.* Issues concerning how the Perkins Act operates are important in determining whether the design and strategies underlying the current Act work as intended. Questions concerning who receives Perkins Act funds, how they are allocated between secondary and postsecondary levels, what kinds of students are served and what federal funds actually purchase at the secondary as well as postsecondary levels have been considered in Volume II of NAVE's final report. These issues, therefore, are not specifically addressed in this report.

4. *The role of student aid in contributing to the federal purpose expressed in the Perkins Act of enhancing access to postsecondary education.* Federal student aid is important to examine because it is a major source of support for postsecondary vocational education and it benefits many of the special population groups of concern in the Perkins Act. Where several federal programs appear to operate toward similar ends, the return on the federal investment can be enhanced if the separate purposes of different policies are clear and complementary.

5. *Possible changes in the Perkins Act or, more generally, in the goals and strategies embodied in this federal program.* Finally, describing and assessing possible changes in the Perkins Act are relevant for identifying ways of dealing with specific shortcomings in the current Act or for dealing with broader problems that may not be addressed at present. Questions such as how federal aid can raise the quality of vocational programs or stimulate more emphasis on desired outcomes of vocational education can suggest options that policymakers should consider in shaping vocational policy for the future.

CHAPTER 2

ENROLLMENTS

A basic objective of the Perkins Act is to help special populations obtain high-quality vocational education. This may occur through general expansion of the vocational education enterprise or through special activities undertaken to help "at-risk" population groups gain greater benefits from postsecondary vocational training. The law allocates 57 percent of appropriated funds to provide services to special populations--including disadvantaged and handicapped persons, adults in need of training, enrollees in programs that are not traditional for their sex, single parents and homemakers, and incarcerated persons. The remainder of the funds are used to expand and improve the overall enterprise.

This chapter presents descriptive data on participation in postsecondary vocational education. For different groups of students, basic findings are presented on rates of enrollment in vocational education and in different fields of study. Subsequent sections discuss issues of the completion of course work and the amount of vocational education actually taken. This description of conditions in postsecondary vocational education can help policymakers clarify the problems faced and select appropriate policy instruments to enhance both access and quality.

DATA SOURCES AND DEFINITIONS

The results presented here are drawn from three different national data bases: High School and Beyond (HS&B Seniors, 1980), the National Longitudinal Survey of the Class of 1972 (NLS-72), and the National Postsecondary Student Aid Survey (NPSAS, 1986). These data bases differ in several important respects. The first two are longitudinal: HS&B Seniors follows the high school graduating class of 1980, and NLS-72 follows the high school graduating class of 1972. The results on postsecondary course-taking come from postsecondary transcripts available in these data bases; HS&B contains transcript data for the first four years after high school and NLS-72 for seven years. Comparisons between both data bases are

limited to the four-year period after high school graduation. Because these data bases include transcripts of individual students' postsecondary education, the results are drawn from official records about the amount and type of education and credentials students earned. Since these data sets are limited to high school graduates who entered postsecondary education shortly after leaving high school, they do not include all postsecondary students.

NPSAS is a nationally representative cross-sectional portrait of all undergraduate students enrolled in October 1986. Unlike the longitudinal data sources, NPSAS contains demographic information on all students--older as well as younger ones. In addition, NPSAS includes information on the student's major field of study and types of financial aid received. The sample includes students who receive financial aid as well as those who do not. Data on the student's enrollment status, field of study, and financial aid come from institutional records and do not rely on student recall.

The various data sets used in this analysis have different characteristics that permit description of the students enrolled in postsecondary vocational education. The results from each data set are not strictly comparable, however, because they differ with respect to the population sampled, the means by which students are classified as vocational or academic, and the classification of different types of institutions.

Types of Institutions

For purposes of analysis, postsecondary institutions are categorized as follows:

Four-year colleges are public and private educational institutions that grant bachelor's degrees in both occupationally specific and academic fields. Some also grant a small number of associate degrees and certificates. Although much of the course work at these institutions is arguably vocational in nature, we have not considered students at these institutions in our analysis of vocational education.

Community colleges are comprehensive two-year institutions that offer programs in both academic and vocational subject areas. These public institutions primarily grant two-year associate degrees, and a small number of certificates.

Public technical colleges specialize in vocational subjects. They are two-year colleges that offer both associate degrees and certificates.

Public vocational schools generally offer certificate programs whose duration is one year or less.

Proprietary schools are profit-making institutions that provide training and education in particular occupational areas. They include schools that specialize in business and secretarial training, cosmetology and barbering, health care, trades, and technical areas. These institutions grant mainly certificates.

Two-year private junior colleges are private, non-profit colleges. They account for less than 1 percent of total enrollments and are generally omitted from our analysis.

There are important differences across data bases in the way institutions of particular interest in this study are categorized. In HS&B and NLS-72, public technical colleges and public vocational schools are pooled in one category called public technical institutes, although most students appear to attend technical colleges. These data sets report community colleges as a separate category. In the NPSAS data, community and technical colleges are classified together as public two-year colleges, although most students attend community colleges. In NPSAS, public vocational schools are reported separately.

Classification of Vocational Education

Because of differences in the data bases used, it was necessary to define vocational students differently across the data sets. For NLS-72 and HS&B, all students attending proprietary schools and technical institutes were assumed to be vocational. At community colleges, where course work may have either a vocational or an academic focus, vocational students were defined as those who earned a majority of credits in vocational subjects during

their first semester in postsecondary education. This definition emphasizes entry-level course-taking. Although somewhat arbitrary, this definition was chosen to examine how well students who began as *vocational* or *academic* persisted and eventually earned degrees (Note: there were no significant differences in the extent to which vocational and academic students attending community colleges completed or failed to complete their courses.)

Courses were divided into three categories--vocational, academic, and remedial--according to a taxonomy of courses. The vocational category encompassed courses in 10 subjects: agriculture, business and management, marketing and distribution, health care, occupational home economics, trades and industry, technical and engineering, education, public service, and communications. This taxonomy is similar to one developed by NAVE to analyze secondary school courses. It also includes subjects unique to postsecondary education--engineering, education, and public service. The taxonomy of postsecondary courses is described in Appendix A.

NPSAS data do not contain transcripts. Therefore, two-year public college students were classified as vocational or academic according to their major field of study as reported by the institution they attended. Vocational students were those with reported majors in fields such as business, health, engineering technology, cosmetology, and law enforcement.

Although the appropriateness of any rule for classifying institutions or students may be debated, the various data bases produce remarkably consistent findings. Table 2.1 uses four different data sets to estimate the proportion of vocational students at community and technical colleges. The first three sources--NLS-72, HS&B Seniors, 1980, and NPSAS--are used in NAVE's analysis. A fourth data source, also collected by the Department of Education's National Center for Education Statistics, describes the proportion of associate degrees awarded in vocational and academic fields. Each data set yields an estimate of vocational course-taking that, considering the different points of time, are of similar magnitude. Each indicates that community and technical colleges are largely vocational.

Table 2.1

Percentage of Vocational Students at Community and Technical Colleges

Data Base	Percentage Vocational	Definition of Vocational Student
NLS-72	61	Credits first semester
HS&B Seniors, 1980	68	Credits first semester
NPSAS, 1986	78	Major field
Associate degrees, 1985	69	Major field

SOURCE: For NLS-72 and HS&B Seniors, 1980, NAVE, *Second Interim Report*; for associate degrees 1985, "Associate Degrees and Other Awards Below the Baccalaureate, 1983-1986," National Center for Education Statistics, May 1987, in *Community College Factbook* (New York: Macmillan, 1988). For NPSAS, see table 2.2 on p. 18.

TOTAL ENROLLMENT IN POSTSECONDARY VOCATIONAL EDUCATION

Table 2.2 contains the most recently available data on enrollments of vocational and academic students in different institutions. Enrollments in public two-year colleges, public vocational schools and proprietary schools accounted for 44 percent of all undergraduate students enrolled in postsecondary education in fall 1986. Thirty-five percent of all undergraduates major in vocational fields, but 78 percent of the less-than-baccalaureate students major in vocational subjects.[17] Thus, the less-than-baccalaureate sector, which comprises nearly half of all undergraduate enrollment, consists primarily of students majoring in vocational subjects.

[17] In its *Second Interim Report*, NAVE reported that 25 percent of all postsecondary students from the high school class of 1972 enrolled in vocational programs and that 30 percent of the high school class of 1980 did so. Those data sets indicate that the proportion of vocational students has grown. Although NPSAS results are not precisely comparable, they suggest a continuation of this trend.

Table 2.2

Postsecondary Enrollments by Type of Institution, Fall 1986

Type of Institution	Percentage of Total Enrollment	Percentage of Enrollment in Less-Than-Baccalaureate Institutions
Four-year colleges	55	--
Two-year[a/]		
Academic	9	20
Vocational	29	65
Total	38%	85%
Public vocational	1	2
Proprietary	5	11
Total[b/]	100	100
Percentage vocational	35	78

SOURCE: NPSAS, fall 1986.

a/ "Two-year" consists primarily of community colleges and a smaller number of public two-year technical colleges. A very small number of two-year private junior colleges are also included.

b/ Numbers may not total exactly 100 percent due to rounding.

In the less-than-baccalaureate sector, 83 percent of all vocational students are enrolled in two-year colleges, either community colleges or technical colleges. Because community colleges are often governed by different state agencies and receive different amounts of federal assistance than technical colleges, the share of vocational students in each is of some concern. Unfortunately, the NPSAS data base, as previously mentioned, makes no distinction among these institutions. Data previously reported in NAVE's *Second Interim Report* indicate that

about 67 percent of vocational students are in community colleges, 14 percent are in technical colleges, 6 percent are in public vocational schools, and 13 percent are in proprietary schools.[18] Based on enrollments, community colleges are the major providers of vocational training. A large majority of their students seek occupational training. This is a role that they are not always comfortable in acknowledging.

Another way to consider "where postsecondary vocational education is taught" is by examining the types of credits--vocational, academic, and remedial--earned by students in different institutions. To do this it is necessary to consider the college transcript data in HS&B Seniors, 1980, and NLS-72.

Table 2.3 indicates that community colleges account for 69 percent of all credits and about 62 percent of all vocational credits earned by students attending less-than-baccalaureate institutions. Twenty-three percent of vocational credits are earned by students initially enrolled in technical institutes (technical colleges and public vocational schools), and 15 percent of vocational credits are earned by students at proprietary schools.[19] These findings are consistent with previous results on program enrollments (table 2.2).

Table 2.3 also shows that the three types of institutions differ sharply in the proportion of their total curriculum that is vocational. At community colleges, a majority of the credits are taken in academic subjects. Even students concentrating in vocational areas (which are the majority of students) take a substantial share of their course work in academic fields. In contrast, students attending technical and proprietary schools take about 70 percent of their courses in vocational subjects. Their academic course work is substantially smaller.

Some types of institutions emphasize remedial course work more than others. Remedial subjects account for 6.5 percent of the credits earned at community colleges. This figure

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[18] NPSAS indicates that the proportion of total vocational enrollments in public vocational schools is only 3 percent, and the proportion in proprietary schools is 14 percent.

[19] This could underestimate the share of credits of proprietary schools. Many transcripts, particularly those from proprietary schools, contain missing information on credits earned. Missing information could result in lower estimates of total proprietary school credits.

Table 2.3

Distribution of Total and Vocational Credits by Type of Institution, 1980

	Community College	Public Technical	Proprietary
Share of all postsecondary credits			
HS class of 1980	68.8%	23.1%	8.0%
HS class of 1972	79.5	13.4	7.0
Share of all postsecondary vocational credits			
HS class of 1980	61.5	23.2	15.3
HS class of 1972	63.9	22.9	13.2
Distribution of credits among curriculum areas			
Vocational			
HS class of 1980	34.7	70.4	69.4
HS class of 1972	29.2	61.8	68.4
Academic			
HS class of 1980	58.3	24.9	28.1
HS class of 1972	64.0	32.8	29.0
Remedial			
HS class of 1980	6.5	3.8	1.5
HS class of 1972	6.4	4.0	2.0

SOURCE: HS&B Seniors, 1980, and NLS-72.

understates the total effort in remediation, because many remedial courses are not for credit.[20] Technical institutes place less emphasis on remedial course work (3.8 percent) and proprietary schools still less (1.5 percent).

[20] Analyses of courses taken suggest that about half of all remedial courses are noncredit. Thus, about 12 percent of all course work at community colleges is of a remedial nature; the amounts at public technical and proprietary schools are substantially less.

There has been a shift over time toward more vocational and fewer academic credits at community colleges and technical institutes. For the high school class of 1972 that entered community colleges, 29 percent of total credits were in vocational subjects and 64 percent were in academic areas. For the class of 1980, vocational course work increased by 6 percentage points, while academic course work declined by 6 percentage points. In effect, vocational course work increased by 19 percent during this period of time.

ENROLLMENT OF SPECIAL POPULATIONS IN POSTSECONDARY VOCATIONAL EDUCATION

The Perkins Act is directed largely at special populations in postsecondary vocational education. This section discusses enrollments of special populations in postsecondary vocational education.[21]

Postsecondary vocational programs draw students from most segments of the population, but the types of students that are enrolled vary with the institution. Table 2.4 presents data on the characteristics of students enrolled in postsecondary vocational education. Several conclusions can be drawn: students enrolled at less-than-baccalaureate institutions represent a broad cross section of the population by sex, race, family income, and age. The breadth of enrollment indicates that the appeal of these institutions is not restricted to poor students or minorities, or to one gender or age group. Students in postsecondary vocational education are in many ways broadly representative of the population, and are certainly more likely to be drawn from different economic, racial, and age groups than are students enrolled in four-year institutions.

Black students continue to be seriously underrepresented in postsecondary education, especially at four-year colleges and at two-year public institutions. Blacks represent 13.7 percent of all high school graduates aged 18 through 24,[22] but only 8 percent of the students

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[21] Data are not available for all the special population categories in the Perkins Act.

[22] American Council on Education, *Fact Book of Higher Education*, 1986-87 (New York: Macmillan, 1987), table 14.

Table 2.4

Percentage of Students Enrolled in Postsecondary Institutions, by Student Characteristics, 1986

Student Characteristics	Four-Year Institutions	Two-Year Public	Public Vocational	Proprietary
Sex				
Male	47%	43%	44%	35%
Female	53	57	56	65
	100[a]/	100[a]/	100[a]/	100[a]/
Race/ethnicity				
American Indian	1	1	1	1
Asian	5	6	4	3
Black	8	9	14	21
Hispanic	5	9	7	14
White	82	75	73	60
Family income				
Up to $23,000	20	42	62	58
$23-$50,000	42	41	31	32
$50,000 or more	28	17	6	8
Age				
Up to 23	73	44	40	54
24-29	13	21	22	21
30 or more	14	34	39	25
Enrollment status				
Full-time	78	39	72	84
Part-time	22	61	28	16
Dependent status				
Dependent	73	48	40	46
Independent	26	51	59	53

SOURCE: NPSAS, fall 1986.

a/ Numbers may not add to 100 percent because of rounding.

enrolled at four-year colleges and 9 percent of total enrollment at public two-year institutions. Hispanics account for 7 percent of the population of high school graduates and reflect or exceed their share of the population at less-than-baccalaureate institutions.

Table 2.4 shows that minorities and women are much more likely to enroll in institutions that offer short-term training. Blacks and Hispanics account for 35 percent of total enrollment in proprietary schools, 21 percent in public vocational institutes, 18 percent at public two-year colleges, and 13 percent in four-year colleges. Women account for 65 percent of the total enrollment in proprietary schools; most of these women are enrolled in office and secretarial programs.

Public two-year colleges, public vocational schools and proprietary schools all attract more students from poor or working-class families than do four-year institutions. In two-year colleges, 42 percent of the students come from families with incomes under $23,000. Public vocational and proprietary schools attract about 60 percent of their students from what might be considered disadvantaged families. In contrast, only 20 percent of the students at four-year colleges are from families with incomes under $23,000.

Students attending postsecondary vocational institutions are, on average, older than students at four-year institutions. Nearly three-fourths of the undergraduates at four-year colleges are under 23 years old--the age group from which college students have traditionally been drawn. In contrast, at two-year public colleges, only 44 percent of the students are under 23 years old, and one-third of all students are over 30 years of age; at public vocational schools, almost 40 percent of the students are at least 30 years of age. Proprietary schools also draw older students, although not quite to the same extent as public two-year colleges and public vocational schools. Consistent with these age differences, the majority of postsecondary vocational students are financially independent of their parents. This is in sharp contrast to students enrolled at four-year institutions, where three-fourths of the students are dependent on their parents.

Students at two-year public colleges are more likely than students in all other institutions to be enrolled part-time. At public two-year colleges, 61 percent of the students are enrolled part-time compared with about three-fourths for all students in all other types of postsecondary institutions. Part-time enrollment rose sharply through the mid-1980s, which

largely accounts for the enrollment growth that occurred at community and technical colleges.[23] In all other types of postsecondary institutions, about three-fourths of all students are full-time.

Table 2.5 describes the educational characteristics of students enrolled in vocational programs and academic programs at various types of institutions. Vocational students are drawn from all ability levels, but compared to four-year college students and academic students at community colleges, vocational students are less likely to be of high ability and more likely to be of low- and mid-level ability.

According to self-reports, a high percentage of postsecondary vocational students enrolled in community colleges (30 percent), public technical institutes (41 percent) and proprietary schools (46 percent) were also vocational students in high school (table 2.5). Indeed, as reported in the National Assessment's *Second Interim Report*, the proportion of high school "vocational students" going on to college increased rapidly in the 1970s.[24] The fact that significant numbers of high school vocational students enroll in college-level vocational programs suggests the value of developing greater continuity between vocational curricula at high school and postsecondary levels, a practice called articulation. This practice could result in more thorough and advanced training at the postsecondary level.

Clearly, postsecondary vocational education is serving groups that might have difficulty attending college--women, minorities, students from poor and working-class families, older students, and students of middle and lower ability. Access of special populations to postsecondary vocational education in general does not seem to be much of a problem, although black students remain underrepresented at four-year and two-year public institutions. Minorities, women, and economically disadvantaged students are disproportionately enrolled in vocational institutions that offer short-term training.

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[23] American Council on Education, *Community College Factbook*, p. 17.

[24] The proportion of high school vocational education students entering postsecondary vocational programs increased by 44 percent between the high school classes of 1972 and 1980.

Table 2.5

Educational Characteristics of Students in Postsecondary Vocational Education

Student Characteristics	Four-Year Institutions	Community Colleges: Academic Students	Community Colleges: Vocational Students	Public Technical Institutes	Proprietary
Ability[a/]					
Low	7.1%	17.8%	22.4%	25.9%	28.7%
Middle	44.5	55.9	59.5	62.5	57.0
High	48.4	26.0	18.1	11.6	14.3
	100.0	100.0	100.0	100.0	100.0
High School Program[b/]					
Academic	68.9	38.5	31.9	22.0	26.0
Vocational	7.8	17.4	29.7	41.2	45.9
General	23.3	44.1	38.4	36.8	28.1
	100.0	100.0	100.0	100.0	100.0

SOURCE: HS&B Seniors, 1980.

a/ Ability is measured by a test of verbal and math skills administered to students in high school. High school program is based on student self-reports about major field of study.

b/ Numbers may not add to 100 percent due to rounding.

Despite the broad access to postsecondary vocational education enjoyed by most groups, there could be differences in access to fields of study and to the highest-quality institutions within a given sector. Table 2.6 describes the vocational majors chosen by different kinds of students. Business and marketing, health, occupational home economics, trades and industry, technical and engineering, education and public service account for 98 percent of all vocational enrollments. The results in table 2.6 indicate virtually no differences in occupational fields of study by race, family income, or age.

Table 2.6

Major Fields of Study in Postsecondary Vocational Education, by Student Characteristics, 1986

Student Characteristics	Business/ Marketing	Health	Occupational Home Economics	Trades/ Industry	Technical/ Engineering	Education/ Public Service
All vocational students	36.0%	14.5%	5.6%	10.0%	21.3%	10.6%
Age						
Up to 23	36.3	13.1	5.5	9.9	22.1	10.6
24-29	32.6	16.2	4.5	10.8	25.5	8.9
30 or more	37.8	15.5	6.6	9.5	17.3	11.7
Family income						
Up to $23,000	37.8	13.3	2.9	9.8	20.2	14.2
$23,000-50,000	37.8	14.9	2.6	7.9	23.6	11.8
$50,000 or more	37.4	11.5	3.6	5.6	23.8	15.0
Race						
White	35.0	15.2	5.4	9.8	21.1	11.1
Black	39.5	13.1	6.7	8.0	20.9	11.0
Hispanic	41.2	11.6	5.8	10.9	20.7	8.4
Sex						
Male	27.0	4.9	1.4	20.5	33.6	9.2
Female	43.0	21.9	8.9	1.8	11.8	11.1

SOURCE: NPSAS, fall 1986.

NOTE: Percentages of students in major field do not add to 100. Due to space limitations, agriculture and communications, accounting for only 2 percent of total majors in vocational subjects, are not presented in this table.

Men and women, however, exhibit substantial differences between men and women in fields of study chosen. Women are concentrated in the fields of business and marketing, health, and occupational home economics; men predominate in trade and industry and technology and engineering. With the exception of gender preferences for different occupations, minorities, lower income and other special populations make the same choice of vocational fields as do other students.

CHAPTER 3

QUALITY IN POSTSECONDARY VOCATIONAL EDUCATION: INSTITUTIONAL PRACTICES

The overarching goal of the Perkins Act is to improve vocational education by increasing the access of special groups to high-quality programs, and by improving the quality of programs overall. The issues of what constitutes a high-quality vocational program and who has access to such programs are therefore central to understanding federal policy.

NAVE undertook a special study to determine the characteristics of high-quality programs in postsecondary institutions.[25] Rather than testing specific school reform proposals, the study was designed to examine four potential influences on program quality: leadership; resources; instructional features; and links between the programs and external groups such as employers, other professionals, and the economic development community. The study design took into account differences in geographic location, subject matter, and type of institution (public or private).

A unique feature of the study is that program quality was based on employer views. Approximately 300 employers in each of eight metropolitan areas were asked to rate the quality of all less-than-baccalaureate accounting and manufacturing programs in their communities. Employers were asked to provide an overall rating for each program based on their assessment of its graduates' knowledge and skills, work habits, and adaptability to work roles in the company.

Institutions were then ranked within each metropolitan area for field of study and location in the public and private sector. One hundred vocational programs were chosen as a sample from those ranked "high," "moderate," and "low." Site visits were conducted to collect extensive information on how each program was organized in four domains--leadership

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[25] Findings in this section are based on Rocco DePietro, Lou Tornatzky, James Jacobs, and Michael Woods, *Predictors of High Quality Postsecondary Vocational Education*, NAVE Contractor Report (Ann Arbor, MI: Industrial Technology Institute, February 1989).

behavior, acquisition and deployment of resources, instructional methods, and program linkages. Interviews were conducted with the program's chief administrator and with a sample of faculty and current students. Through statistical analysis, the most important factors in each of the four program domains were identified. Each of these variables was then considered jointly to determine which ones were the best overall predictors of program quality.

FIVE MAIN FACTORS

Five main factors were found to predict high employer ratings:

- intensity of vocational instruction;
- integration of theoretical and applied aspects of vocational instruction;
- frequency of external linkages through advisory panels of employers and ustomized training programs, as well as other means that keep faculty abreast of developments in their field;
- quality of the placement function; and
- dissemination of "honest" program information.

Each of these aspects of program quality is briefly described in the paragraphs that follow.

Intensity of Instruction

The most important factor directly related to program quality may be the intensity of vocational instruction; that is, the extent to which faculty have opportunities for in-depth, concentrated, and sustained instruction. The best-rated institutions exhibited a strong commitment to teaching. In schools with relatively low employer ratings, instructional intensity is frequently diluted because faculty take on additional responsibilities for management, institutional planning, and recruitment. In other low-ranked programs, extensive reliance on part-time faculty meant that few instructors were available beyond scheduled class hours for consultations or discussions with students. In the best-rated schools, there were, with the exception of curriculum planning, fewer extra assignments unrelated to instruction.

Rewards and promotions, therefore, may have been tied to classroom performance more than to serving on external committees.

Instructional intensity or depth is an important dimension of program quality. The commitment to instruction from teachers and administrators and the amount of instruction students actually receive ("time on task") are found to be important elements of virtually all effective schools.[26] This particular study considered only the extent to which faculty are focused on instructional goals; instructional intensity from the perspective of student course-taking is discussed later.

Applied Learning Opportunities

NAVE's study consistently found that institutions that supplemented classroom work with hands-on lab experience were rated significantly better than those that did not. Lab experiences expand opportunities for students to connect theoretical and applied knowledge. This study suggests that employers respond favorably when the basic understanding and technical training that students receive is enriched through laboratory or similar field experience. Employers also value highly the ability to apply vocational skills.

Employer Linkages

Extensive relationships between programs and industry were found to be an important determinant of program quality. In higher quality programs, linkages included connections to outside sources of information about supply and demand for different skills, student performance on the job, technical developments in the profession, job experience opportunities for students, and customized training for industry. Customized training has sometimes been criticized as a training subsidy for employers that draws resources away from more traditional degree and certificate programs. This study suggests that there may be some instructional benefits for students when faculty, working closely with industry to design and deliver training

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[26] S. C. Purkey and M. S. Purkey, "Effective Schools: A Review," *Elementary School Journal*, 1983(4), pp. 427-52.

using new equipment or systems, acquire knowledge they can carry over to their regular classroom teaching.

Placement

Because this study used employer ratings to measure program quality, it is not surprising that the nature of the placement function would loom as an important predictor of program quality. The efforts a school makes to place its students in good jobs related to their training pays off in terms of employer ratings. In some of the best cases, faculty take on placement responsibilities and use their connections with local employers to develop job leads and to steer students to jobs commensurate with their level of skill. Although involvement in job placement could be seen as a dilution of the instructional role of faculty, these findings suggest that placement and instruction can reinforce each other. This occurs when faculty, through contacts with employers, try to gauge changing demand for students with particular skills or knowledge of particular equipment, and shift their instruction accordingly. In the better programs, placement provides real information about trends in industry that can improve the quality of instruction.

In institutions with less-effective programs, placement practices are often characterized by the total separation of placement from instruction, and the centralization in one office of all placement duties for the institution. In the worst cases, officials minimize their responsibility for placement results. It is not unusual for a single placement office to coordinate all placement activities, but we often found cases in which that office did not actively seek out high-quality placements, spent more time securing part-time jobs for students than pursuing full-time career positions for graduates, and displayed little specific knowledge about the fields in which students were to be placed. Such offices rarely provided feedback to instructors on the kinds of skills their students needed or on the performance of prior students on the job.

Public Information

We also found that the kind of information schools disseminate about their programs is closely related to employers' measures of program quality. Schools try to attract students through a variety of means ranging from routine distribution of descriptive information to high school students, to multimedia high profile presentations targeted at different segments of the public and the employer community. Since schools have moved heavily into the field of customized training, employers themselves are increasingly exposed to information about different vocational training programs.

The study found wide variation in the content and reliability of the information schools provided about their programs. Some schools responded to requests with descriptive information about courses and schedules. Others used all the classic tools of market analysis to deliver their message--segmentation, targeting, penetration, and market share. Marketing studies provided valuable information on the types of students attracted to the school. Sometimes this information trickled down to affect program planning and curriculum decisions.

Some schools provided primarily factual information relating to costs of enrollment, length of program, fields of study, graduation requirement, and prospective fields of post-school employment. Other schools went considerably further by making claims about future employment and salaries. Programs in schools making those kinds of claims, particularly where they were apparently undocumented, were not nearly as highly rated by employers as were programs in schools that provided more factual information. Because institutions disseminate much information to the public about their performance, and it is often of questionable quality, there may be a federal policy interest in improving the quality of public information about a program's capabilities and track record. (This is discussed in Chapter 7, "Conclusions and Recommendations.")

OTHER KEY FINDINGS

Equipment

One of the study's significant findings was the limited role that equipment plays, both its quality and quantity, in explaining program quality. Because about 60 percent of the Perkins Act program improvement money is spent on equipment purchases, it is reasonable to assume that educators think it is an important way to enhance program quality.[27] For each program in our sample, the adequacy of equipment was rated according to the amount available relative to enrollment, and the extent to which it represented current technology in the field. "Adequacy of equipment" did not emerge as a strong independent predictor of program quality.

There are two possible interpretations:

- Equipment may be less important than is widely thought. Although a great deal of Perkins Act resources are spent for this item, schools may simply find it easier to account for federal funds through equipment purchases than to make other improvements that involve structural changes (see Volume II of NAVE Final Report, *Implementation of the Perkins Act*).

- Equipment may be important, but because programs have acquired a considerable amount of equipment over the years, there was no measurable difference between high- and low-quality schools on this dimension. After basic equipment needs are met, what is most important is the manner in which equipment is used--to teach students specific skills and to create an atmosphere that simulates the actual work environment.

Minority Enrollment

One important finding was that minorities were underrepresented in programs with organizational attributes that were predictive of high employer ratings. Programs with high

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[27] Figures on the use of Perkins Act money for equipment purchases are from the *Implementation of the Carl Perkins Act*, National Assessment of Vocational Education, Final Report, Volume II, 1989.

minority enrollment were often rated lower by employers than were programs with low minority enrollment.[28]

There are two possible explanations for this:

- o There may be stigma attached to programs with high minority enrollment that reflects prejudice against minorities. Low ratings, therefore, may have nothing to do with the intrinsic quality of the vocational program itself.
- o Programs with high minority enrollment are, in fact, deficient because they lack some of the attributes of quality just described.

The evidence in NAVE's study most strongly supports the second explanation--programs with high minority enrollment often score low on dimensions that predict program quality. To reach this conclusion, we controlled for various organizational characteristics known to be determinants of program quality, such as employer linkages and instructional focus. When such program characteristics were considered, the correlation between race and employer ratings virtually disappeared. Students' race is undoubtedly a factor in the way that some employers perceive vocational programs, but our results suggest that there are some serious deficiencies in program quality where large numbers of minority students are enrolled.

To summarize, five strong predictors of program quality were identified: the intensity of vocational instruction, opportunities for the integration of theory and practice, linkages with employers, student placement, and the perceived even-handedness of public information about the program. Equipment did not rank high as a determinant of program quality. Race and ethnicity, however, have a strong relationship to program rankings, primarily because of the organizational characteristics of programs with high minority enrollment.

IMPLICATIONS FOR PROGRAM IMPROVEMENT

Although the results from this study of effective postsecondary vocational programs by themselves may not be sufficient to warrant a major change in federal policy, these findings

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[28] The correlation between minority enrollment and employer ratings (-.44) was the strongest coefficient in the analysis.

do have several implications for program improvement. First, the chance of any positive relationship between available equipment and program quality suggests that the extensive use of federal program improvement funds for equipment purchases should be reconsidered. Second, minorities seem to be concentrated in some of the weaker training programs; as previously noted, minority students are also more likely to be enrolled in short-term vocational training programs. Equitable access to high-quality programs remains a serious problem. Finally, the basic findings about instruction, job placement, employer linkages, and the integration of theoretical and applied training are relevant to current suggestions for the improvement of postsecondary vocational education. This is discussed below.

At the postsecondary level, elements of a reform agenda have begun to emerge from a variety of sources. Possible directions for program improvement include the following:

- Performance measures to track the progress of students while they are in school, to assess their competencies upon program completion, and to follow students into the labor market to measure placement and earnings.
- Programs such as Two-Plus-Two or Tech-Prep are designed to improve the continuity between vocational training at the secondary and postsecondary levels, to make occupational training more coherent, and to permit in-depth instruction.
- Increased emphasis on placement of students in jobs related to their training, as well as certification to employers of the competencies that students possess.
- Basic skills remediation more closely integrated in the vocational program.
- Improved ties with business and the economic development community.

There is a strong convergence between NAVE's findings, other research on effective schools, and some of the vocational reform proposals being touted. For example, Two-Plus-Two and Tech-Prep are examples of secondary-postsecondary articulation strategies that are intended to make occupational training more coherent and permit in-depth instruction. The emphasis on training-related placements and linkages with the business/union/economic development community were also supported in this research. Various measures of student

performance provide "intelligence" about whether a program is succeeding or failing, and can be channeled to improve curriculum and instruction. Often, the more highly rated programs acquired this information indirectly in the course of placing students in jobs, or working with employers to develop new training programs. Thus, NAVE's research suggests that some of these ideas may be on the right track.

Despite these and other proposals designed to improve vocational training in postsecondary institutions, the surveys and case studies conducted by NAVE found little evidence that federal program improvement funds were used to any significant degree for these purposes. Instead, program improvement funds were used to purchase equipment. Although institutions may be attempting some of these changes, there is little indication that federal Perkins Act funds are used for any but the most routine types of program improvement.

It has been claimed that federal funds are just too small to be used for other than routine types of program improvement, but NAVE's surveys show that the median postsecondary grant for program improvement is fairly substantial--about $50,000.[29] The average program improvement grant to postsecondary institutions substantially exceeds per-institution grants in any other category of Perkins Act funding. Hence, inadequate funds per se are probably not the main reason that so few of the Perkins Act program improvement funds are directed at large scale or more ambitious reform strategies.

Another possible explanation may be that there are very few cases in which bold alternatives have been fully developed and carefully assessed. Most of what is known about tech-prep, for example, is highly anecdotal. The lack of reliable information raises the uncertainty, and hence the risk, associated with fundamental reform. This suggests that one useful role for federal vocational education policy may be to sponsor careful demonstration and evaluation of promising but unproven reform strategies.

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[29] Janet P. Swartz, *State and Local Response to the Carl D. Perkins Act, Survey Analysis, Final Report*, NAVE Contractor Report (Cambridge, MA: Abt Associates, 1989), exhibit 3.11.

CHAPTER 4

COURSE-TAKING AND PROGRAM COMPLETION

The previous chapter discussed factors related to program quality in postsecondary vocational education. The extent to which teachers were able to focus on instruction was an important predictor of program quality. In this chapter, intensity of instruction is discussed from a different perspective--by describing the amount of vocational education that students take, and the extent to which they complete programs of study.[30] This chapter further explores differences in participation and completion of course work by race, gender, socioeconomic background, and other characteristics of students. These results are based on postsecondary transcripts for a sample of students who entered college shortly after graduating from high school (HS&B Seniors, 1980). The transcripts follow students over four years. Educational attainments of other types of college students, or that followed the four-year observation period are not reflected in these findings.

AMOUNT OF VOCATIONAL EDUCATION TAKEN

While total credits earned by students at community colleges, public technical institutes, and proprietary schools differed little, the amount of vocational credits earned varied widely. The typical student enrolled in a less-than-baccalaureate institution earned about 47 total credits (see table 4.1). Students at community colleges averaged 18 vocational credits, while those attending public technical institutes or proprietary schools earned substantially more vocational credits--27 and 25, respectively.[31] But vocational "concentrators" attending

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[30] This section is based on Norton Grubb, *Access, Achievement, Completion, and 'Milling Around'*, NAVE Contractor Report (Berkeley, CA: MPR Associates, 1988); it is also based on special analyses by Robin Horn of Decision Resources Corporation.

[31] Missing credit information on student transcripts could bias these estimates. Since missing credit information occurred most often on proprietary school transcripts, these estimates are potentially less reliable.

Table 4.1

Distribution of Postsecondary Students by Number of Total Credits Earned and by Number of Vocational Credits Earned

Number of Credits Earned	Percentage of Students in Institutional Sector						
	Community College Vocational Credits			Public Technical Institutes		Proprietary Schools	
	Total Credits Earned	All Students	Vocational Concentrators[a/]	Total Credits Earned	Vocational Credits Earned	Total Credits Earned	Vocational Credits Earned
0-12	31.3%	68.1%	36.1%	23.9%	33.0%	17.0%	28.2%
13-24	18.1	15.5	16.7	15.7	14.8	8.3	19.4
25-36	9.3	7.9	14.1	14.6	14.8	16.0	14.6
37-48	12.0	5.6	16.7	6.9	16.8	21.4	15.5
49-60	11.6	1.9	7.9	12.5	11.8	12.5	7.7
61+	17.7	1.0	8.5	26.4	8.9	24.7	14.6
Average Number of credits earned	48.7	17.8	25.9	45.5	26.8	42.0	25.1

SOURCE: HS&B Seniors, 1980.

a/ Vocational concentrators are defined here as students with at least 50 percent of their credits in vocational subjects.

community colleges earned the same number of vocational credits (26), as students at other types of institutions.

Community colleges are comprehensive institutions that enroll students with both vocational and academic interests and require students, including those in vocational fields, to meet academic distribution requirements. Technical institutes and proprietary schools are dedicated to occupational training exclusively, and course-taking requirements reflect this

focus. Thus, although students average the same amount of total education at these institutions, differences in the amount of vocational credits reflect institutional goals.

Within each type of institution, there are substantial differences among students in the level of educational attainment. Some students earn many credits, but a substantial number of students earn very few credits either overall or in vocational subjects. Table 4.1 shows the distribution of credits earned by students enrolled in different postsecondary institutions.[32] At community colleges, almost one-third of all students earn fewer than 12 total credits and half the students who enter earn fewer than 24 credits. Those earning more than 61 credits are primarily students who transfer to four-year colleges.

Although three out of four students in the NPSAS data (table 2.2) reported majoring in vocational fields, 68 percent of the students at community colleges earn fewer than 12 credits in vocational subjects, and 84 percent earn fewer than 24 total vocational credits. Even vocational "concentrators" take relatively small amounts of vocational course work; 36 percent of the vocational concentrators at community colleges earn fewer than 12 credits in vocational subjects, and 53 percent earn fewer than 24 total vocational credits. This pattern raises serious questions about the intensity of training received by vocational students at community colleges--which NAVE's study of effective postsecondary institutions indicates is an important dimension of program quality. Because community colleges are the largest source of vocational training, providing 61 percent of all vocational credits (see table 2.3), the pattern of course-taking among their students is important in assessing the overall status of postsecondary vocational education.

The pattern of total course-taking at public technical institutes and proprietary schools differs from that in community colleges. Whereas 49.4 percent of community college students earn fewer than 24 total credits, at technical institutes 39.4 percent earn fewer than 24 credits,

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[32] Some transcripts, especially those from proprietary schools, reported clock hours per course rather than credits. Using a standard algorithm, we converted clock hours to equivalent credit hours.

and at proprietary schools 25 percent of students earn fewer than 24 credits. Clearly, community colleges have a larger percentage of students who earn very few credits. Many of these students are enrolled part-time or intermittently.

Students at all types of institutions often earn small amounts of vocational credits. At community colleges, 53 percent of vocational concentrators earn fewer than 24 vocational credits. At public technical institutes and proprietary schools, 48 percent of the students earn fewer than 24 vocational credits. Overall, about one-third of all postsecondary vocational students earn fewer than 12 vocational credits, and one-half the students take fewer than 24 vocational credits.

When only "vocational concentrators" at community college are considered, the amount of vocational training taken by students at community colleges is very similar to that taken by students at technical institutes and proprietary schools. Community college "vocational concentrators" average 26 vocational credits, while students at technical institutes and proprietary schools average 27 and 25 credits, respectively.

CONCENTRATION OF VOCATIONAL EDUCATION

Vocational course-taking may be highly concentrated in a single field or it may be dispersed among different fields. A concentrated pattern, in which students take most of their vocational course work in a single subject area, indicates a focus on specific occupational objectives. If students take very little total vocational course work, a highly concentrated pattern could be desirable. It could suggest that the student has a well focused program of study. Low concentration rates on the other hand, suggest primarily that students are exploring different fields.

Table 4.2 shows that about 80 percent of all vocational credits are earned by students in their principal field. About 20 to 25 percent of vocational course work is taken outside the students' major field. Differences among community colleges, proprietary schools and public technical institutes are not significant. Vocational course work is highly concentrated among

all students regardless of the amount of total vocational credits earned. These findings indicate that students at the postsecondary level engage in very little exploration among different occupational fields, but focus on those of particular interest.

Table 4.2

Proportion of Total Vocational Credits Taken in the Primary Subject Area (Concentration Rate)

Number of Vocational Credits	Community College: Vocational Concentrators	Community College: Other Students	Public Technical Institutions	Proprietary
0-6	0.87	0.80	0.87	0.93
7-12	0.76	0.69	0.84	0.81
13-24	0.79	0.69	0.83	0.78
25-36	0.79	0.74	0.74	0.67
37-48	0.76	0.69	0.79	0.77
48+	0.67	0.74	0.75	0.88
All	0.78	0.73	0.80	0.79

SOURCE: HS&B Seniors, 1980.

RACE, GENDER, AND SOCIOECONOMIC DIFFERENCES AMONG STUDENTS

A major goal of the Perkins Act is to improve the quality of vocational education for special populations. Research already discussed in this report indicates that women, minorities, and disadvantaged students enter vocational programs in substantial numbers, but NAVE's study of effective institutions indicates that minorities have limited access to high-quality programs and other NAVE results indicate that minorities and women are heavily concentrated in institutions that offer short-term training. This section further explores the issue of access to high-quality vocational education by examining the course-taking patterns of women, minorities, and disadvantaged persons. Table 4.3 shows the total credits and vocational credits

Table 4.3

Average Credits, Total and Vocational, Earned by Students in Less-Than-Baccalaureate Institutions

	Community Colleges		Public Technical Institutes		Proprietary Schools	
	Total	Vocational	Total	Vocational	Total	Vocational
Sex						
Male	50.9	19.3	47.8	30.9	40.7	24.3
Female	47.4	17.6	40.1	22.3	42.3	25.8
Race						
White	50.9	19.6	46.3	30.1	41.1	26.9
Black	35.9	12.0	34.5	20.2	45.1	32.4
Hispanic	42.9	14.5	36.4	26.0	41.3	28.4
SES Quartile						
I (Low)	40.7	16.4	35.0	23.8	47.4	26.8
II	41.7	16.6	46.5	33.3	43.4	31.5
III	53.6	20.5	45.5	29.7	38.3	26.9
IV (High)	59.0	19.5	55.4	31.6	44.2	27.4

SOURCE: HS&B Seniors, 1980.

earned by different groups of students at community colleges, public technical institutes, and proprietary schools.

Overall, gender is not an important determinant of students' course-taking level. Men and women attending community colleges and proprietary schools take about the same number of credits--both total credits and credits in vocational subjects (see table 4.3). At public technical institutes (mostly technical colleges and a limited number of vocational-technical schools), the pattern shows that men earn more credits. This difference may be explained by the types of programs in which men and women enroll, with women in more short-term certificate granting programs.

Race and socioeconomic background are important factors in educational attainment, particularly for students at community colleges and public technical institutes. At community colleges, black students average 30 percent fewer total credits than do white students, and Hispanics average 16 percent fewer credits (table 4.3). Black students earn 39 percent fewer vocational credits than white students, and Hispanic students earn 26 percent fewer vocational credits.

At public technical institutes there are also major differences in attainment by race. Blacks earn 25 percent fewer total credits than whites and 33 percent fewer vocational credits (table 4.3); Hispanics earn 21 percent fewer total credits and 14 percent fewer vocational credits.

Because race and socioeconomic background are closely related, it is not surprising that students with low socioeconomic status (SES) at community colleges and public technical institutes also have lower levels of attainment, overall and in vocational subjects, than students from more advantaged backgrounds. As table 4.3 shows, community college students in the bottom two quartiles of socioeconomic status average nearly 30 percent fewer total credits and 20 percent fewer vocational credits than more affluent students. At public technical institutes, low SES students also earn fewer credits than do other students. These findings represent substantial differences by race and socioeconomic background. If quality is, in part, measured by the depth of instruction, this pattern raises serious questions about the quality of education that minority and disadvantaged students obtain.

In proprietary schools, however, there are no significant differences among students of different races and socioeconomic background in the quantity of total credits and vocational credits earned (table 4.3).[33] This pattern differs from that found in community colleges and public technical institutes. The implication seems clear. If proprietary schools, enrolling large numbers of poor and minority students, can produce results that are not conditioned by a

[33] We did find, however, that there are significant differences in the rates at which black and white students attending proprietary schools complete their programs.

student's race or socioeconomic background, so too should community colleges and public technical institutes be able to raise the performance of their least advantaged students. Equitable access to high-quality education continues to be a serious problem.

COMPLETION RATES IN POSTSECONDARY VOCATIONAL EDUCATION

Students may enroll in postsecondary vocational programs for many reasons. Some take only a few courses to satisfy certain job-related or avocational objectives and still others enroll to explore different career alternatives or to gain career information. Finally, some students enroll to earn a certificate or an associate degree or to prepare to earn a bachelor's degree.

Student expectations are important, for limited expectations may be easily satisfied by minimal amounts of postsecondary education. If a postsecondary institution attracts students with minimal educational aspirations, the fact that few students earn degrees would be understandable and acceptable.

Most students who enroll at less-than-baccalaureate institutions plan to earn a degree or certificate. Table 4.4 shows the educational aspirations of high school seniors who subsequently enrolled in a community college, public technical institute, or proprietary school. More than 90 percent of the students aspired to obtain a college degree or certificate; 42 percent wanted to earn an associate degree, and 25 percent sought a certificate.[34] Despite the many possible reasons that students *may* enroll in postsecondary vocational programs, the vast majority of students hope to earn a college degree or vocational certificate. Thus, whether these students obtain a postsecondary degree or certificate, or leave school without one, is a meaningful measure of their educational attainment.

Table 4.5 shows rates of completion and noncompletion of course work for students who, after high school graduation, entered community colleges, public technical institutes, and

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[34] Estimates of postsecondary expectations and of completion status are drawn from the HS&B Seniors, 1980, data. As previously noted, postsecondary transcripts are limited to high school graduates from the class of 1980 who enrolled in postsecondary education within four years after high school graduation. The sample does not include adult students, who might have very different educational expectations.

Table 4.4

Educational Aspirations of Students in Less-Than-Baccalaureate Institutions

Educational Aspirations (in High School)	Percentage
High school only	8.1%
Vocational certificate	25.0
Associate degree	42.4
Bachelor's degree	13.2
Postgraduate degree	11.3
Total	100.0

SOURCE: HS&B Seniors, 1980.

proprietary schools. About 70 percent of these students enrolled in community colleges, but within four years after high school graduation only 19 percent of those students had obtained a postsecondary degree or credential. Of these, 17 percent earned associate degrees, the other 2 percent received certificates. (Certificates require less course work than degrees.)

Completion rates are higher at public technical institutes and proprietary schools where 36 percent of the students earned postsecondary credentials. Higher completion rates at these institutions, however, reflect the award of many more certificates than associate degrees.

When compared with the high school class of 1972, completion rates declined 17 percent at community colleges, increased 11 percent at public technical institutes, and stayed about the same in proprietary schools. Thus, the low completion rates at community colleges

Table 4.5

Completions and Noncompletions Among Students Entering Less-Than-Baccalaureate Institutions

Student Outcome	Community Colleges	Public Technical Institutes	Proprietary Schools
Total completions for			
HS class of 1980	19.1%	36.1%	36.1%
Associate degree	17.1	18.1	12.5
Certificate	2.0	18.0	23.6
HS class of 1972	23.0	32.5	38.5
Leaves without credential			
HS class of 1980	42.0	46.5	42.2
HS class of 1972	30.0	35.8	40.5
Transfers to other institutions[a/]			
HS class of 1980	25.2	8.6	13.2
HS class of 1972	28.2	17.8	16.0
Still enrolled in first school entered			
HS class of 1980	13.8	9.0	14.0
HS class of 1972	19.9	14.0	5.0

SOURCE: HS&B Seniors, 1980 and NLS-72.

a/ Includes transfers to all other postsecondary institutions, not just to four-year colleges.

represent a pattern of declining achievement.[35] Moreover, all the decline in completions occurred in the award of associate degrees; there was no change in the rate at which students earn the less demanding certificates.

[35] An alternative explanation may be that students simply take more time to complete their credentials because of part-time or intermittent enrollment. The four-year observation period in this data could be insufficient to accurately capture all completions. This explanation is unlikely, however, for as indicated in table 4.5, the number of community college students still in school after four years actually declined by 19 percent from the high school class of 19 Thus the pool of potential additional completers shrank substantially.

NONCOMPLETION STATUS

Rates at which students leave school without a degree or certificate are high; the figures for the class of 1980 are 42 percent at community colleges, 47 percent at technical institutes, and 42 percent at proprietary schools (see table 4.5) up from 30, 36, and 40 percent, respectively, for the class of 1970.[36] At community colleges, where students may be either vocational or academic, there are no significant differences between both groups in rates of noncompletion.

These findings reveal a great gap between students' expectations and accomplishments. As table 4.4 showed, 90 percent of postsecondary students enrolled in less-than-baccalaureate institutions expect to earn a college degree or certificate but, according to table 4.5, only a small fraction of these students actually do complete a program of study. Large numbers of students leave college without realizing this objective and often with a very limited amount of occupational training.

Previously discussed research indicated that postsecondary vocational programs attract relatively large numbers of disadvantaged and minority students, and that these students earn substantially fewer educational credits than other students while they are enrolled. The research also demonstrated that many students drop out without earning a postsecondary degree or certificate. Is this simply a problem limited to special populations recently recruited in larger numbers, or is it a more general, institutional issue?

Table 4.6 shows the completion status of different groups of students who enrolled in community colleges. (Similar tables are presented in appendix B for students at public technical institutes and proprietary schools.) Only 9 percent of the black students entering

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[36] These are conservative estimates of the rate at which students leave school without a degree or certificate. Many students who transfer to other institutions subsequently drop out of that institution; they are not counted in this estimate. Students classified as leaving postsecondary education without a credential could turn out to be "stop outs"--students who interrupt their studies but eventually return to earn degrees. The data in NLS-72, which examines degree status after seven years, suggest that although some additional students will complete associate degrees over the longer period of time (28 percent), many more students still in school will eventually lose interest and drop out (47 percent).

Table 4.6

Degree Status of Students Enrolled at Community College, Class of 1980

Student Characteristic[a/]	Percentage of Enrollment	Degree Completed Assoc.	Certif.	Total	Still in School	Left School	Total[b/]
All students	100.0%	17.1%	2.0%	19.1%	39.0%	42.0%	100.0%
Sex							
Males	45.3	15.6	1.5	17.1	44.1	38.8	100.0
Females	54.7	18.4	2.5	20.9	34.3	44.8	100.0
Race/ethnicity							
White	81.1	18.0	2.2	20.2	38.3	41.3	100.0
Black	10.1	7.5	1.4	8.9	40.0	51.1	100.0
Hispanic	6.5	19.5	1.5	21.0	35.2	43.1	100.0
SES							
Low	25.0	16.8	9.0	20.8	26.3	53.0	100.0
Middle	55.6	18.3	2.1	20.4	37.0	42.0	100.0
High	19.4	14.3	.7	15.0	50.6	33.4	100.0
Ability							
Low	24.1	10.9	1.7	12.6	34.2	53.3	100.0
Middle	59.5	17.0	2.8	19.8	38.0	42.0	100.0
High	16.4	22.0	.2	22.2	48.0	29.1	100.0
High school program							
Academic	28.9	22.0	.9	22.9	46.0	31.1	100.0
Vocational	34.1	11.8	1.6	13.4	32.6	54.2	100.0
General	36.9	16.3	3.3	19.6	36.8	43.7	100.0

SOURCE: HS&B Seniors, 1980, Third Follow-up 1986.

a/ High and low quartiles are 25 percent of the total high school graduating class. Ability as measured in high school by the High School and Beyond Senior Test. High school program as self-reported by students in high school.

b/ Total is sum of "degree completed total," "still in school," and "left school."

community colleges earn a degree or certificate, but 51 percent leave postsecondary education within four years of high school graduation without earning a credential. The remaining black students, 40 percent, are still in school after four years. Compared to white students, black

students have significantly lower rates of completion (56 percent lower) and higher dropout rates (24 percent higher). White and Hispanic students have essentially similiar patterns of completion and noncompletion.

The total rate of degree completion (associate degree and certificate) for low-SES students appears equal to or greater than the rate for middle- and high-SES students but, in fact, low SES students tend to opt for certificate programs and more affluent middle- and high-SES students tend to transfer to four-year colleges, often before completing the associate degree. More telling than completions is the extent to which different groups of students leave school without earning a degree or certificate. Fifty-three percent of the low-SES students who enter community colleges drop out within four years without earning a credential. Dropout rates for middle- and high-SES students, although high, are substantially lower than they are for low-SES students.

A similar pattern exists among students of different ability levels. Low-ability students have substantially lower rates of completion (12.6 percent) and higher rates of noncompletion (53.3 percent) than do other students.

Because the rates of completion are generally low and dropout rates are high for all groups of students attending community colleges, it would be incorrect to say that this problem is simply limited to special populations. Noncompletion is a problem that applies to all groups of students enrolled in community colleges. But the findings of large differences between the students who are black or of low-SES and the other students enrolled in community colleges are consistent with the earlier finding on differences in average credits earned by various groups of students. Clearly, many black or low-SES students have special needs for assistance if, once enrolled, they are to complete their programs of study.

Table 4.6 also shows the completion status of high school vocational students who subsequently enroll in community colleges. A large proportion (34 percent) of all community college students were self-classified as vocational students in high school. Although high school vocational education students go on to postsecondary education in increasing numbers,

those enrolled in community colleges have substantially lower rates of degree completion (13.4 percent) than high school academic (22.9 percent) or general program (19.9 percent) students. They also leave postsecondary education without a credential at much higher rates (54.2 percent) than do academic (31.1 percent) or general program students (43.7 percent).

High school vocational education is not just limited to workbound students. It enrolls large numbers of students who enroll in postsecondary programs, particularly vocational programs. These students face a particularly serious problem in making the transition from one level of vocational training to the next. This is one reason that it is important to make occupational training at secondary and postsecondary levels more complementary and sequential. Increased completions might be one goal of such efforts. Another might be to see that the vocational training received, however limited, is at least coordinated in a sequence that permits students to progress to more advanced training.

CHAPTER 5

ECONOMIC OUTCOMES OF POSTSECONDARY VOCATIONAL TRAINING

INTRODUCTION

One of the primary objectives of the postsecondary vocational training system is to provide young people with the skills they need to enter into and achieve success in their chosen occupations.[37] Many high school graduates enroll in postsecondary vocational programs to pursue this goal.[38] In this chapter we investigate the economic outcomes of postsecondary vocational training, focusing on unemployment, course work utilization, and wages. Unemployment is measured because economic benefits of vocational training can only accrue to trainees who actually find jobs. Training utilization is examined because of the likelihood that vocational skills benefit individuals who work in jobs that use their occupationally specific skills and because students expect their training will facilitate access to their chosen careers. Finally, the earnings effects associated with postsecondary training are important because one of the main reasons young people acquire training is to obtain higher future wages.

Our analysis shows that there is considerable variation in how successful these youth were at finding jobs, using their postsecondary vocational skills on their jobs, and obtaining good wages on these jobs. Specifically, of our sample of 24- to 25-year-old postsecondary vocational trainees, 90.2 percent were employed in February 1986,[39] but 19 percent had experienced one or more incidents of unemployment during the previous year. Those employed were using an average of 58 percent of the vocational courses they had taken in postsecondary institutions on their jobs. Only 25 percent of the employed trainees were using

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[37] This chapter was contributed by Robin Horn of Decision Resources Corporation.

[38] Earlier we reported that 78 percent of the students attending less-than-baccalaureate institutions in 1986 majored in vocational programs (table 2.2, Enrollments).

[39] In 1986, the national unemployment rate for 24 year-olds in the civilian labor force was 8.83 percent (Bureau of Labor Statistics, 1989).

nearly all of their training and about 25 percent were using none of their training.[40] Finally, the average wage was $6.67 an hour; one out of four postsecondary trainees earned below $5.00 an hour and one out of four earned above $8.75 an hour.[41]

The diverse nature of the postsecondary training enterprise complicates the analysis of what factors contribute to better economic outcomes for the trainees. Postsecondary vocational courses are provided in a wide variety of public and private institutions to an ethnically, racially, and socioeconomically diverse group of individuals. Individuals also vary substantially in the amount of course work they take, the types of skills they obtain, and the degree to which they concentrate their course work in a single program area. In our analysis, we examined the extent to which students' success in the labor market, as measured in terms of employment, training-related job placement, and earnings, depends on the amount of vocational course work they took in these institutions, and the type of postsecondary institution they attended. In order to isolate the effects of the number of credits taken and the types of institutions attended on economic outcomes, we statistically controlled for a variety of factors that are likely to influence these outcome variables, such as the trainees' major vocational subject area, their socioeconomic and demographic background, and their ability level.

Our analysis is based on the human capital model of economic behavior, which views training as an investment with benefits that accrue to "investors" over the course of their working lives. According to this model, individuals obtain postsecondary vocational skills primarily for economic reasons. They take on the costs of occupational-skill acquisition because they expect that their future earnings resulting from increases in productivity will exceed their investment in training.[42] It follows that, to reap the economic benefits associated

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[40] The methods and data set used to estimate this indicator of vocational course work utilization is discussed below in the text.

[41] The minimum wage in February 1986 was $3.35 an hour.

[42] The largest cost for most of the trainees is the opportunity costs of the investment. These are the foregone earnings the trainees would have received if they were employed full-time in the labor market.

with their higher occupationally specific productivity, trainees need to be employed, and in particular, they need to be employed in jobs that can utilize the skills they acquired. Those who experience unemployment after training are clearly off to a bad start in recouping their training investment costs and in securing increased wages. Those working in occupations that do not utilize the skills they acquired are also failing to reap the full benefits from their increased productive potential.

We begin this chapter with a description of the data sources and methodology used. Next, we discuss our findings on two major questions:

- Is there a relationship between the number of credits trainees take in their major vocational subject and their economic outcomes?
- Is there a difference in economic outcomes for trainees who attend different types of institutions; namely, community colleges, public technical institutes, or private, proprietary institutions?

In the discussion of each of these major questions, we address three topics:

- The effect of vocational training on the incidence of unemployment;
- The extent to which employed trainees actually utilize their vocational training in their jobs; and
- The impact of utilized vocational credits on wage rates.

Finally, we present some implications of our findings for vocational students and postsecondary vocational training institutions.

DATA AND METHODS

The analysis of the economic outcomes of postsecondary vocational education was based on a nationally representative survey of youth who graduated from high school in 1980.[43] These data are derived from the senior cohort of the High School and Beyond (HS&B) data base, which contains questionnaire information from surveys of these students in 1980, 1982, 1984, and 1986. The sample of approximately 1,500 individuals that we analyzed includes only

[43] Actually, 99.1 percent of the sample were high school graduates.

individuals who (a) attended community colleges, proprietary training institutions, or public technical institutes between 1980 and 1984, (b) took at least 15 percent of their postsecondary credits in vocational or technical courses,[44] and (c) were no longer enrolled in postsecondary institutions. A data set containing the complete list of all the courses taken in postsecondary institutions by the HS&B seniors comes from the HS&B senior cohort postsecondary transcript survey.

To assess the degree to which these individuals derived economic benefits from their postsecondary training, we used several outcome measures. For analyzing unemployment, we measured the incidence of unemployment during a 12-month period.[45] The analysis included only those individuals who were either working in the labor market or who reported that they were out of school, unemployed, and looking for work during each month from March 1985 to February 1986.[46] To examine the extent to which employed trainees use their vocational training in their jobs, we computed their *course utilization rate.* The course utilization rate is estimated as the proportion of the trainees' total vocational course work that is related to the

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[44] We excluded individuals who took less than 15 percent of their course work in vocational education because they were most likely academic majors who took vocational courses as incidental electives.

[45] Economists argue that there are two components of an individual's unemployment rate during a given period: the "incidence of unemployment" (whether the individual was unemployed at any time during the period), and the average duration of unemployment in the period. We use "incidence of unemployment" for two reasons. First, previous research supports the view that it is incidence rather than duration in a given period that is the primary cause of youth unemployment (see "Labor Turnover and Youth Unemployment," by Leighton and Mincer, in *The Youth Labor Market Problem*, Chicago: University of Chicago Press, 1982). Second, the High School and Beyond Survey questions the respondents on whether they were unemployed each month in the survey period, but not on how long they were unemployed during each month.

[46] In our analysis, incidence of unemployment is a binary (0,1) variable equal to 1 if, in March 1986, the individual reported having experienced at least one incidence of unemployment during the previous 12 months.

jobs they hold after training.[47] The more vocational courses taken that relate to the jobs in which trainees were employed, the higher the course utilization rate. We also investigated the earnings benefits of utilized versus non-utilized vocational courses. Earnings are measured as the hourly wage received by working individuals. The analysis of course utilization rates and earnings was conducted only on those who were employed in February 1986.

To understand the relationship between one of these outcomes (e.g., unemployment, course utilization rates, or hourly wages) and any one of the factors of interest (e.g., type of institution, number of credits earned), it is important to control for the influence of the exogenous factors (e.g., sex, race, geographic region) and intervening factors (e.g., high school work experience and vocational training, postsecondary vocational program area, and the number of postsecondary credits taken) that might influence that outcome. For example, when comparing the wages of students who studied in proprietary schools with the wages of those who studied in community colleges or public technical institutions, we controlled for intervening factors that might influence wages, such as whether students in proprietary schools have taken fewer vocational credits than those in other types of institutions, whether they are more likely to have majored in business programs than in technical/engineering programs, whether they are more likely to be members of minority groups or, more likely to come from

[47] To estimate the course utilization rate (CUR), we relied upon a matrix that identifies training program-to-occupation matches between vocational courses and occupations. The *matching matrix* used was developed from a correspondence table or "crosswalk" between thousands of vocational course and program titles and hundreds of census occupational titles. The crosswalk was originally produced by the U.S. Department of Labor's National Occupational Information Coordinating Committee (NOICC) for analyzing issues relating to the supply of and demand for workers with varying types of specific skills. To compute the CUR in this analysis, all the courses listed in the trainees' postsecondary transcript records were fed through the *matching matrix* and mapped to the occupations they held. The course utilization rate was computed as the total number of vocational credits taken that relate to the trainees' occupations divided by the total number of vocational credits taken.

an educationally or economically disadvantaged background.[48] When estimating the effect of the variables of interest on the outcome measures, we used multiple regression analysis to statistically control for the influence of the intervening factors that might affect the outcome. We use adjusted means in our presentation of the results of the regression analysis.[49] Adjusted means show, for example, what the difference in the average wage of youth who attended proprietary schools, in contrast to other postsecondary institutions, would be if there were no other differences in the exogenous and intervening factors (e.g., family and student background characteristics, and the number of vocational credits earned).

EFFECT OF VOCATIONAL COURSE-TAKING ON ECONOMIC OUTCOMES

As explained earlier, this paper focuses on two major questions: 1) Is there a relationship between the number of vocational credits taken in the major subject area and

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[48] The choices that high school graduates make regarding postsecondary attendance, the type of institutions they attend, and the number of credits they take may reflect individual differences, for example, in ability and motivation. Such selection biases, if not controlled for, could contaminate our estimates of the consequences of taking additional credits in a particular subject area or of attending alternative types of institutions. Every effort was made to avoid such contamination by including in the multiple regression analysis available measures of individual characteristics and other variables that may have influenced institutional choice. Nevertheless, important unobserved differences between students in different sectors may still exist. For example, despite the considerable research efforts that have been directed at assessing the benefits of the JTPA program, the Department of Labor concluded that substantial uncertainty remains regarding the degree to which JTPA provides benefits to program participants. The Department decided that only through an experimental design, in which individuals are randomly assigned to training and non-training groups, is it possible to assess the impact of JTPA on its trainees free of the influence of selection biases.

[49] The adjusted means are estimated from a weighted multiple regression equation that adjusts for differences in (i.e., holds constant for) the amount of credits taken in the major and non-major vocational subject areas in each type of postsecondary institution and overall, ability (the quartile ranking of HS&B standardized tests taken in 12th grade), race and ethnicity, gender, the region of the country in which the high school was located, the type of degree or certificate obtained (if any), the family socioeconomic status, the type of postsecondary institution attended, the primary subject concentration area, the number of postsecondary credits taker in letters, science and math, social studies, remedial courses, whether the trainee obtained nonschool-based training in 1983-1984 or in 1985-1986, whether the trainee took work-study or cooperative education courses in high school or whether the trainee worked for pay during the senior year of high school, during the period between high school and postsecondary education, or during the last semester before postsecondary education ended. Several controls for local labor-market conditions were also included in the multiple regression analysis.

economic outcomes? and 2) Is there a difference in economic outcomes for students who attend different types of institutions: community colleges, public technical institutes, or private, proprietary institutions? This section takes up each of these questions in turn, examining for each: 1) the effect of vocational training on the incidence of unemployment; 2) the extent to which employed trainees actually use vocational course work in their jobs (utilized credits); and 3) how utilized credits affect earning levels.

Is There a Relationship Between the Number of Credits Trainees Take in Their Major Vocational Subject and Their Economic Outcomes?

Incidence of Unemployment

On average, 18.9 percent of our sample of postsecondary, non-baccalaureate vocational trainees experienced one or more spells of unemployment between March 1985 and February 1986 (table 5.1), although the unemployment rate for these individuals during any given month was about one-half of that.[50] Table 5.1 shows that trainees who took few vocational credits (12 or fewer credits) in their major subject area[51] were about as likely to have experienced a spell of unemployment as those who took a moderate amount of credits (13 to 30 credits) in their major. The overall average, however, does not control such key exogenous and intervening factors as the number of credits the trainees took outside their vocational major, the amount of academic course work they took, the types of postsecondary institutions they attended, the subject areas they pursued, their socioeconomic and demographic characteristics, their ability level, previous job experience, local labor market conditions, and other factors (see footnote 14). When these characteristics are held constant through multiple regression techniques, the relationship between the number of major subject credits taken and individual

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[50] The unemployment rate for this sample during the month of February 1986 was 9.8 percent.

[51] The major subject area is defined as the vocational subject from which the largest share of vocational courses were taken. On average for our sample, approximately 80 percent of the vocational courses were taken from the major subject area. We focus on the effect of courses from the major area because we believe students exercise their choice of occupations through their choice of the vocational major.

Table 5.1

Economic Outcomes of Postsecondary Vocational Education
by Number of Credits Taken in Major Subject Area

	Unadjusted Means	Regression Adjusted Means[a/]
Economic Outcomes		
Unemployment	18.9	18.9
Course Utilization Rate	58.0	58.0
Hourly Wage Rate	6.67	6.67
Economic Outcomes by Number of Credits Taken		
Unemployment[b/]		
Few Credits	16.5	20.5
Moderate Level of Credits	17.2	16.3
Many Credits	12.3	13.0
Course Utilization Rate[b/]		
Few Credits	50.2	51.0
Moderate Level of Credits	58.4	59.0
Many Credits	56.0	61.4
Hourly Wage Rate[c/]		
Few Credits	6.93	6.59
Moderate Level of Credits	7.30	7.42
Many Credits	7.98	8.00
Increase per Year (30 Credits) of Vocational Course work[d/]		Percentage Point Gain
Unemployment		-6.0
Course Utilization Rate		5.1
Hourly Wage Rate		12.2

Note: Data derived from the High School and Beyond Survey, Senior Cohort. Only includes individuals who attended postsecondary institutions and took at least 15 percent of their course work in vocational subjects.

a/ Regression adjusted means control for the following variables: sex, region, race/ethnicity, marital status, SES, ability quartile (multiple content area tests measured while trainee was a senior in high school), educational plans, high school program, and work history while a senior in high school, the number of postsecondary credits taken in language and humanities, science and math, social sciences, fine and liberal arts, and remedial courses, the types of institutions attended, the number of credits taken in each institution type, the degree attained, the vocational subject area from which the majority of the postsecondary courses were taken, additional postsecondary work and non-school training experiences, local unemployment rate, employment growth rate, and average manufacturing wage (all measured in 1982), and the number of months since the postsecondary training ended. Data set for estimating the adjusted means includes students who transferred from community college to four-year institutions and other students who attended multiple types of institutions.

b/ For the unadjusted means:
Few means = 12 or fewer credits in the major subject area
Moderate = from 13 to 30 credits in the major subject area
High = greater than 30 credits in the major subject area
For the adjusted means:
Few = 12 credits in the major subject area
Moderate = 30 credits in the major subject area
High = 50 credits in the major subject area

c/ For the unadjusted means:
Few = 12 or fewer credits utilized on the job
Moderate = from 13 to 30 credits utilized on the job
High = greater than 30 credits utilized on the job
For the adjusted means:
Few = 12 credits utilized on the job
Moderate = 30 credits utilized on the job
High = 50 credits utilized on the job

d/ For unemployment and course utilization rate, courses in major subject area
For hourly wage rate, credits that are utilized on (related to) the job

incidence of unemployment emerges as quite pronounced. *That is, when we calculate the adjusted incidence of unemployment we find that a higher level of participation in the vocational major is associated with a significantly lower incidence of unemployment.*

Specifically, the adjusted mean incidence of unemployment for trainees who took few credits (12 credits) in their major subject area is 20.5 percent (table 5.1). The adjusted mean drops down to 16.3 percent for those who took a moderate number of credits (30 credits) in their major area. Each additional 30 credits of course work in the major area *lowers* the incidence of unemployment by approximately 6 percentage points.

Our analysis also found that vocational credits taken from subjects other than the major area *do not* contribute to a lower incidence of unemployment for these youth. In other words, the relationship between higher levels of participation in vocational education and a decreasing incidence of unemployment only holds when the courses students take are from their major vocational area.

Course Utilization Rates

We define course utilization rates as the proportion of postsecondary vocational credits that the employed youth in our sample used on the jobs they held five years after leaving high school. We found that the more credits that trainees took in their major subject area, the higher the proportion of vocational credits they used in their jobs. That is, compared to students with few vocational credits (12 or fewer), students with a moderate number of vocational credits in their major area of study (13 to 30 credits) were more likely to be in training-related jobs[52] and used a greater share of their vocational training in those jobs. The unadjusted mean course utilization rate for the sample is 58 percent. For trainees with few vocational credits in their major it is 50.2 percent; for trainees with a moderate number of vocational credits it is 58.4 percent (see table 5.1).

[52] The definition of a training-related job is one in which the course utilization rate is greater than zero.

When we control for background characteristics and other relevant variables, as discussed above, the relationship between the number of credits taken in the major subject and the extent to which vocational trainees utilize their training on the job comes through clearly. *The course utilization rate increased significantly with additional credits taken in the major subject area.* As table 5.2 shows, the course utilization rate increased 16 percent--from 51 percent for trainees with few credits in the major subject credits to 59 percent for trainees with a moderate level of credits, and to 61 percent for those with a high number of credits in their primary subject area. For each 30 credits of courses taken in the major subject area, the course utilization rate increased by approximately 5 percentage points.[53]

As we found in our analysis of the incidence of unemployment, additional courses taken from outside the major subject area do not contribute appreciably to the rate of vocational course utilization.

Wages

The results for wages show a clear and direct relationship between hourly earnings and utilized vocational credits. *That is, the more courses that trainees took that were related to the jobs they held, the higher their hourly earnings.*[54] As table 5.1 shows, the unadjusted mean hourly wage rate climbed from $6.93 an hour for trainees who had few utilized vocational credits (12 or fewer) to $7.30 an hour for those with a moderate number of utilized credits,

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[53] This is equivalent to an 8 percent increase in the course utilization rate at the mean. Table 5.5 indicates that less than one in four individuals in our sample (22.1 percent) took more than 30 credits in a single vocational subject area.

[54] When we analyzed unemployment and vocational course utilization rate outcomes, we focused on the effect of taking additional courses from the major subject area. In our analysis of wage outcomes, however, we examined the contribution of taking utilized courses; that is, vocational courses that provided skills related to the jobs in which trainees were working in February 1986. We shifted our focus from the earnings effect of courses in the major subject area to the earnings effect of job-utilized courses because the latter focus is the most relevant for our study. Students who took more utilized courses earned higher wages. It is the contribution of utilized credits to earnings that we seek to assess and quantify in this section.

Table 5.2

Incidence of Unemployment by Type of Institution and by Number of Credits Taken in Major Subject Area

	Unadjusted Means	Regression Adjusted Means[a/]
Institution Type		
Community College	17.0	18.9
Few Credits[b/]	14.9	16.1
Moderate Level of Credits	10.4	10.6
Many Credits	18.3	6.8
Public Technical Institute	12.7	16.5
Few Credits	13.8	19.2
Moderate Level of Credits	12.6	11.6
Many Credits	8.7	6.4
Proprietary School	26.3	27.7
Few Credits	28.7	27.3
Moderate Level of Credits	--	28.4
Many Credits	--	29.1
Increase per Year (30 Credits) of Vocational Course work		**Percentage Point Gain**
Community College		-7.5
Public Technical Institute		1.4
Proprietary School		-10.3

Note: Data derived from the High School and Beyond Survey, Senior Cohort. Only includes individuals who attended postsecondary institutions and took at least 15 percent of their course work in vocational subjects.

Cells with "-" have too few observations to provide stable estimates.

a/ Regression adjusted means control for the following variables: sex, region, race/ethnicity, marital status, SES, ability quartile (multiple content area tests measured while trainee was a senior in high school), educational plans, high school program, and work history while a senior in high school, the number of postsecondary credits taken in language and humanities, science and math, social sciences, fine and liberal arts, and remedial courses, the types of institutions attended, the number of credits taken in each institution type, the degree attained, the vocational subject area from which the majority of the postsecondary courses were taken, additional postsecondary work and non-school training experiences, local unemployment rate, employment growth rate, and average manufacturing wage (all measured in 1982), and the number of months since the postsecondary training ended. Data set for estimating the adjusted means includes students who transferred from community college to four-year institutions and other students who attended multiple types of institutions.

b/ For the unadjusted means:
Few means = 12 or fewer credits in the major subject area
Moderate = from 13 to 30 credits in the major subject area
High = greater than 30 credits in the major subject area
For the adjusted means:
Few = 12 credits in the major subject area
Moderate = 30 credits in the major subject area
High = 50 credits in the major subject area

and then to $7.98 for trainees who acquired a high number of utilized credits. (The average wage received by youth in our sample was $6.67 an hour.)

When we use multiple regression analysis to control for differences in student and institutional characteristics, we find that this pattern intensifies. Those with only 12 matched credits earned $6.59 an hour. Trainees with 30 matched credits earned $7.42 an hour, or about $1 more than those with few matched credits (table 5.1). Those who had a high number of credits related to their jobs earned $8 an hour. In other words, *our analysis shows that each 30 credits of utilized postsecondary vocational training yields trainees a statistically significant 12.2 percent increase in their hourly wage.* If we were to interpret this figure as an annual rate of return on an investment, we would note that it exceeds the return on most forms of investment in physical capital and is slightly higher than the rule of thumb for rates of return on a year of academic education, 10 percent.

The regression analysis of the hourly wage also shows that additional vocational courses taken that are not related to the trainees' occupations do not contribute significantly to earnings.

Discussion

Higher levels of occupationally specific training might be associated with a lower *incidence of unemployment* for several reasons. An incidence (spell) of unemployment occurs when individuals quit their jobs (or are involuntarily laid off) either to take another job, to seek another job, or to leave the labor force entirely. Previous research has shown that young people tend to stay in their jobs for relatively short periods of time and to change their jobs frequently. These studies found that as individuals acquire more job-related skills through on-the-job training they have a greater incentive to stay in the same job.[55] We found that the incidence of unemployment is inversely related to the number of credits taken in postsecondary

[55] Linda Leighton and Jacob Mincer "Labor Turnover and Youth Unemployment," *The Youth Labor Market Problem* (Chicago: University of Chicago Press, 1982).

vocational institutions. This suggests that *pre-employment training in job-related skills* lowers the incidence of job change because it may substitute for *on-the-job training in job-related skills.*

Other factors may contribute to this inverse relationship. Employers may reward workers who have acquired many job-related skills with more on-the-job training than their less trained counterparts.[56] This additional on-the-job training may provide those who are better trained with a greater incentive to stay in their jobs.[57]

As discussed above, students with more vocational credits in their major subject not only suffer from less unemployment; they also use more of their credits in their jobs. How can we explain this positive relationship between the number of vocational credits taken in the major subject area and the rate at which vocational credits are utilized? First, individuals with larger investments in occupationally specific training have a greater incentive to find training-related jobs than those with smaller investments. This is because postsecondary training is a costly investment for individuals who could otherwise be employed full-time in the labor market. Individuals who undertake the investment in postsecondary vocational training expect that they will benefit from higher wages (and perhaps greater job satisfaction) if they are able to use the occupationally specific skills they acquired in postsecondary institutions.

On the demand side, employers may establish skill requirements for particular jobs and would more likely hire applicants who meet or approach these skill requirements than those who do not. Moreover, employers may provide better-trained individuals with greater opportunities to use their skills. Finally, employers may prefer to hire trainees with higher

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[56] Perhaps employers provide better prepared workers with more on-the-job training because higher levels of occupational training signals employers that the workers are more motivated, or because individuals with more pre-service occupational training are more capable of benefitting from on-the-job specific training.

[57] Another reason why a higher level of occupationally specific training is associated with a lower incidence of unemployment is that employers may be more willing to initially hire and subsequently retain workers with a higher level of occupationally specific skills.

level of training in a specific area because they believe such trainees are highly motivated and interested in working in that area.

The link between job-related training and wages--that individuals in jobs related to their training earn more than those in unrelated jobs--has been documented before in the literature on vocational education.[58] The greater the level of relevant training that workers have attained, the greater their productivity on the job, and the higher the wages they can command.

Does the Type of Institution that Students Attended Affect Their Postsecondary Outcomes?

In this section we examine how the economic outcomes of postsecondary vocational training vary according to the types of institution from which the training was obtained. In this analysis of the relationship between institution type and postsecondary vocational outcomes, we focus on students who attended three types of less-than-baccalaureate institutions, community colleges (57 percent), public technical institutes (14 percent), and proprietary training schools (7 percent).[59] We first look at the effect of institution type on incidence of unemployment, then on course utilization rates, then on wage levels.

Incidence of Unemployment

Our findings indicate that the type of postsecondary institution attended is related to the average incidence of unemployment for trainees in the labor market. For students who studied in public technical institutes, the unadjusted incidence of unemployment is 12.7 percent (see table 5.2). For trainees who studied in a community college, it was 17.0 percent.

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[58] A summary of economic studies evaluating the earnings benefits of training-related placement is given in John Bishop, "Occupational Training in High School: When Does It Pay Off?" *Economics of Education Review* (vol. 8, no. 1, pp 1-15, spring 1989).

[59] Some of the students in our sample attended both community colleges and four-year colleges (16 percent) and others attended various combinations of postsecondary institutions (6 percent), but we did not analyze the economic benefits of attending multiple types of institutions. While we statistically controlled for students who transferred from two-year to four-year institutions, we did not analyze their labor-market outcomes.

For trainees who studied exclusively in proprietary schools it was 26.3 percent. The regression-adjusted means show a similar pattern. Specifically, the regression equation predicts that 16.5 percent of the public technical institute trainees, 18.9 percent of community college trainees, and 27.7 percent of the proprietary school trainees should have experienced unemployment during some part of the 12-month period under examination. After controlling for differences in student characteristics and other individual and community-level factors, among those who took 30 credits of postsecondary training, those who attended proprietary institutions are significantly more likely to experience unemployment than students who attended community colleges.[60]

These mean values for institution type do not tell the whole story, however. In particular, the relationship between type of institution and incidence of unemployment may depend on the number of credits in the major subject area that students take within each institution. Table 5.2 shows that community college and public technical institute trainees with a high level of vocational course work taken in the major subject area experienced a lower incidence of unemployment than trainees from those institutions with a low level of vocational course work (7.6 points lower for community college students and 5.5 points lower for public technical institute students).[61]

Additional credits taken by individuals who only enrolled in a proprietary school did not appear to reduce the incidence of unemployment, however. This result may be explained by the fact that proprietary school programs are mostly fixed at one year in length and hence have less variation in total course work than, say, community or technical college programs.

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[60] Taking into account both the type of institution attended and the number of credits taken on average by students who attended that type institution, the incidence of unemployment was significantly higher, at p. < 05%, for proprietary school students compared to community college students.

[61] To simplify the discussion of the effect on unemployment of the number of courses taken by institution type, we only discuss the regression adjusted means.

Course Utilization Rates

The unadjusted mean course utilization rate for students trained in a community college is 58 percent (table 5.3). Students trained in public technical institutes and proprietary schools have higher unadjusted course utilization rates (61.3 and 65.5 percent, respectively). However, when we control for individual background and course enrollment differences, we discover that the course utilization rates for community college students (60.2 percent) and public technical institute trainees (60.3 percent) are higher than the rates for trainees from proprietary schools' (52.6 percent).[62]

The effect of the number of credits taken on the course utilization rate, as discussed in the preceding section, also depends on the type of institution from which the credits were taken.[63] Recall that the course utilization rate increases by about 5 percentage points for each 30 credits of courses taken in the major subject area. Our regression equation predicts that, if those credits are taken in a community college, one year of vocational course work boosts the course utilization rate by 20 percentage points. One year of vocational courses taken from a proprietary school is predicted to raise the course utilization rate by only 4.9 percentage points.[64] One year of major subject courses taken in a public vocational institute results in a nonsignificant one-percentage-point drop in the course utilization rate. As with the incidence of unemployment, the benefits to community college students from additional credits taken in the major subject area are particularly large.

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[62] The course utilization rate for community college trainees is significantly higher than for proprietary school trainees, but there is no statistically significant difference in the course utilization rates between public technical institution trainees and proprietary school trainees.

[63] To simplify the discussion of the effect on course utilization rates of the number of courses taken by institution type, we only discuss the regression adjusted means.

[64] The increase in the course utilization rate associated with additional credits taken in a community college is significantly higher than the increase in the course utilization rate associated with additional credits taken from other types of institutions.

Table 5.3

Course Utilization Rates by Type of Institution and by Number of Credits Taken in Major Subject Area

	Unadjusted Means	Regression Adjusted Means[a/]
Institution Type		
Community College	58.0	60.6
Few Credits[b/]	49.1	47.5
Moderate Level of Credits	60.9	62.5
Many Credits	65.5	72.7
Public Technical Institute	61.3	60.3
Few Credits	60.8	61.1
Moderate Level of Credits	61.1	60.2
Many Credits	61.4	59.5
Proprietary School	55.5	52.6
Few Credits	54.8	49.2
Moderate Level of Credits	--	53.0
Many Credits	--	56.6
Increase per Year (30 Credits) of Vocational Course work		Percentage Point Gain
Community College		20.4
Public Technical Institute		4.9
Proprietary School		1.3

Note: Data derived from the High School and Beyond Survey, Senior Cohort. Only includes individuals who attended postsecondary institutions and took at least 15 percent of their course work in vocational subjects.

Cells with "-" have too few observations to provide stable estimates.

a/ Regression adjusted means control for the following variables: sex, region, race/ethnicity, marital status, SES, ability quartile (multiple content area tests measured while trainee was a senior in high school), educational plans, high school program, and work history while a senior in high school, the number of postsecondary credits taken in language and humanities, science and math, social sciences, fine and liberal arts, and remedial courses, the types of institutions attended, the number of credits taken in each institution type, the degree attained, the vocational subject area from which the majority of the postsecondary courses were taken, additional postsecondary work and non-school training experiences, local unemployment rate, employment growth rate, and average manufacturing wage (all measured in 1982), and the number of months since the postsecondary training ended. Data set for estimating the adjusted means includes students who transferred from community college to four-year institutions and other students who attended multiple types of institutions.

b/ For the unadjusted means:
Few means = 12 or fewer credits in the major subject area
Moderate = from 13 to 30 credits in the major subject area
High = greater than 30 credits in the major subject area
For the adjusted means:
Few = 12 credits in the major subject area
Moderate = 30 credits in the major subject area
High = 50 credits in the major subject area

Wage Differences

Table 5.4 shows that the unadjusted mean wage for community college trainees was $7.03 per hour, for public technical institute trainees $6.74 per hour, and for proprietary school trainees it was $8.59 per hour. But the regression-adjusted means show little statistically significant differences in the wages received by individuals trained in each of the institution types. There is one exception: public technical institute trainees earned significantly less on average than community college and proprietary school trainees. Although the adjusted mean wage for proprietary school trainees reported in table 5.4 appears higher than the adjusted mean wage for community college trainees, the difference is not statistically significant.

SUMMARY AND CONCLUSION

Our analysis of the relationship between the amount of postsecondary vocational training that individuals take and the economic benefits they subsequently receive yields two important findings.

- **Trainees who derive the greatest benefits take many vocational courses in a coherent program of occupational-based studies and find jobs that utilize their training.** Compared to these individuals, those who take few courses in a single subject area, or who spread their training across multiple vocational majors, are more likely to experience unemployment and less likely to utilize their training on the jobs they find. Moreover, those who do utilize their training earn higher wages.

- **Additional courses taken outside the vocational major, perhaps valuable to students in other ways, do not increase the economic benefits derived from a given level of vocational training.**

These findings suggest that students at less-than-baccalaureate institutions could obtain significant economic payoffs from engaging in further training. Schools might encourage this by public information campaigns, counselling, or incentive programs to encourage students who enter into postsecondary vocational programs to take a coordinated program of vocational studies and to pursue their studies long enough to complete them. Further, considering the wage benefits associated with job-related vocational course work, institutions should provide

Table 5.4

Hourly Wage Rates by Type of Institution and by Number of Utilized Credits (Credits that are Job-Related)

	Unadjusted Means	Regression Adjusted Means[a/]
Institution Type		
Community College	7.03	6.63
Few Credits[b/]	6.90	6.58
Moderate Level of Credits	7.00	7.05
Many Credits	--	7.39
Public Technical Institute	6.74	5.90
Few Credits	5.60	5.84
Moderate Level of Credits	7.40	6.61
Many Credits	--	7.19
Proprietary School	8.59	7.40
Few Credits	--	7.38
Moderate Level of Credits	--	7.59
Many Credits	--	7.73
Increase per Year (30 Credits) of Vocational Course work		**Percentage Point Gain**
Community College		9.3
Public Technical Institute		16.8
Proprietary School		13.2

Note: Data derived from the High School and Beyond Survey, Senior Cohort. Only includes individuals who attended postsecondary institutions and took at least 15 percent of their course work in vocational subjects.

Cells with "-" have too few observations to provide stable estimates.

a/ Regression adjusted means control for the following variables: sex, region, race/ethnicity, marital status, SES, ability quartile (multiple content area tests measured while trainee was a senior in high school), educational plans, high school program, and work history while a senior in high school, the number of postsecondary credits taken in language and humanities, science and math, social sciences, fine and liberal arts, and remedial courses, the types of institutions attended, the number of credits taken in each institution type, the degree attained, the vocational subject area from which the majority of the postsecondary courses were taken, additional postsecondary work and non-school training experiences, local unemployment rate, employment growth rate, and average manufacturing wage (all measured in 1982), and the number of months since the postsecondary training ended. Data set for estimating the adjusted means includes students who transferred from community college to four-year institutions and other students who attended multiple types of institutions.

b/ For the unadjusted means:
Few means = 12 or fewer credits in the major subject area
Moderate = from 13 to 30 credits in the major subject area
High = greater than 30 credits in the major subject area
For the adjusted means:
Few = 12 credits in the major subject area
Moderate = 30 credits in the major subject area
High = 50 credits in the major subject area

even students who have completed very few credits with greater assistance in finding jobs that can utilize their training.

We also found that the type of institution students attended affects students' economic outcomes.

- **Community college students were more likely to be employed and to utilize their vocational credits than trainees from other types of institutions.**

- **For students who persisted in their vocational studies, those from community colleges were substantially more likely to find jobs and to utilize their training than those from proprietary schools or public technical colleges. In contrast, for students who took few vocational credits (most students), those from community colleges did not substantially outperform those from other types of institutions.**

Although community college students have the potential to obtain benefits from their training, they take the fewest number of vocational credits relative to trainees from the other types of institutions. Table 5.5 shows that nearly two-thirds (62.5 percent) of the community college students in our sample took fewer than 12 credits from their vocational major.

There are several types of efforts that community colleges should contemplate in light of these findings. First, these institutions should encourage vocational students to take more credits in a well-focused occupationally oriented program. Second, community colleges, who currently award relatively few vocational certificates for short-term targeted training programs, should consider expanding their offerings of highly-focused, certificate-granting training activities. Finally, considering the positive association between utilized vocational credits and wages, community colleges (as well as other types of institutions) should make greater efforts to provide placement assistance to those students who appear determined to terminate their attendance before they complete a degree or certificate program.

Table 5.5

Distribution of Students in the Sample

	Percent of Students
Number of Vocational Credits Taken in Major	
All Students	
Low (less than 12)	45.8
Medium (12-30)	32.1
High (31-50)	17.6
Greater than 50	4.5
Institution Type	
Community College	57.4
Public Technical Institute	14.3
Proprietary School	6.6
Community College Transfers to 4-Year College	15.8
Other Combinations	6.0
Number of Vocational Credits Taken in Major Within Institution Type	
Community College	
Few Credits (less than 12)	62.5
Moderate Level of Credits (12-30)	23.6
Many Credits (31-50)	12.9
Greater than 50 Credits	1.0
Public Technical Institution	
Few Credits (less than 12)	29.2
Moderate Level of Credits (12-30)	41.5
Many Credits (31-50)	22.2
Greater than 50 Credits	7.0
Proprietary Schools	
Few Credits (less than 12)	32.9
Moderate Level of Credits (12-30)	36.5
Many Credits (31-50)	18.9
Greater than 50 Credits	11.7
Job-Matched Vocational Credits Within Institution Type	
Community College	
Zero Credits	26.8
Few Credits (less than 12)	47.3
Moderate Level of Credits (12-30)	15.6
Many Credits (31-50)	9.2
Greater than 50 Credits	1.1
Public Technical Institutions	
Zero Credits	24.2
Few Credits (less than 12)	25.7
Moderate Level of Credits (12-30)	22.9
Many Credits (31-50)	24.1
Greater than 50 Credits	3.1
Proprietary Schools	
Zero Credits	24.0
Few Credits (less than 12)	23.4
Moderate Level of Credits (12-30)	27.1
Many Credits (31-50)	16.9
Greater than 50 Credits	8.7
All	
Zero Credits	25.4
Few Credits (less than 12)	36.0
Moderate Level of Credits (12-30)	20.1
Many Credits (31-50)	14.3
Greater than 50 Credits	4.1

CHAPTER 6

FEDERAL FINANCING OF POSTSECONDARY TRAINING: THE RELATIONSHIP BETWEEN STUDENT AID AND POSTSECONDARY VOCATIONAL EDUCATION

INTRODUCTION

As mentioned earlier, current federal vocational education policy has two major goals: increasing access to vocational programs for students with special educational needs and improving the quality of vocational education programs for all students to ensure the supply of well-trained and productive workers. The federal government has two general types of policy instruments available to achieve these goals. The first is "supply-oriented" and provides direct grants to institutions that meet certain federal statutory and regulatory requirements; the Perkins Vocational Education Act represents the main supply-oriented approach to federal vocational education policy. The second is "demand-oriented" (student aid) and provides grants and loans to students seeking to participate in postsecondary education, including those in vocational programs.[65]

Although both student aid and direct federal funding for postsecondary vocational education are designed to make postsecondary education more accessible for students who are underrepresented in the postsecondary sector, the means by which these objectives are pursued are quite different. Student aid policy seeks to increase access by providing money to students who lack sufficient resources to attend the school of their choice. Vocational education policy directly intervenes in the delivery of vocational education to increase access by legislating goals and distributing resources to schools that serve students with special education needs, including disadvantaged and handicapped persons and adults who need training. Financial aid policy focuses on removing financial barriers to postsecondary education, but has not been designed to achieve enrollment objectives for groups other than those in economic need.

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[65] Results on student aid are based on John Tuma, Antoinette Gifford, and Susan Choy, *Student Financial Aid and Postsecondary Vocational Education*, NAVE Contractor Report (Berkeley, CA: MPR Associates, 1989).

Although vocational education and student financial aid policies both seek to increase access, their goals with respect to improving the quality of vocational education are quite different. Federal vocational education policy pursues the goal of improvement by targeting federal funds to enhance existing programs or establish new ones. Student financial aid may enable students to obtain a better education than they otherwise could afford, but student aid programs have no clear objective to improve existing programs or create new ones.

Program improvement provisions in federal vocational education legislation acknowledge the importance of up-to-date technological resources in vocational education. The Perkins Act encourages state and local education agencies to invest in technologically advanced training programs to ensure a supply of workers for modern occupations.

Student aid policies, in contrast, are occupationally neutral; financial aid is distributed on the basis of criteria that are not necessarily related to the national interest in supporting technologically advanced training. Students make the decision about where to invest resources made available through financial aid, although presumably they do so in part on the basis of perceived opportunities.

Finally, federal vocational education policy limits funding to educational agencies in the public sector, whereas student aid policy is institutionally neutral. Students may spend their resources at any type of institution in the public or private sector.

Student financial aid is currently the major source of federal funding for students enrolled in postsecondary vocational education. Federal financial aid programs supply substantially more financial resources to vocational students than does the Perkins Act. Little is known however about how the major student financial aid programs interact with postsecondary vocational education--who is getting aid, how much, what kinds of aid they are receiving, and whether financial aid helps students to complete their vocational programs. The findings to be presented address these issues.

METHODS

The primary data source used for this analysis of student aid is the National Postsecondary Study Aid Survey (NPSAS). It contains data collected during the 1986-87 academic year for 32,500 undergraduates enrolled in October 1986. Because NPSAS represents a cross section of all students enrolled, it includes data on older students enrolled in retraining programs as well as more traditional students who enter college soon after high school. Although the sample of students in NPSAS is weighted to be representative of all students enrolled in fall 1986, many vocational students are enrolled in programs that do not correspond to the academic school year. Training programs may last 10 or 15 weeks; then a new group of students will enter the program. As a result, although NPSAS data are an accurate reflection of all students enrolled in fall 1986, the data substantially underestimate the annual enrollment of students in programs that operate on a nonstandard term. This particularly affects students in proprietary, vocational, and public two-year institutions (in NPSAS, the category "public two-year institutions" includes community and technical colleges).

TOTAL AMOUNT OF FEDERAL STUDENT AID TO VOCATIONAL EDUCATION

Federal aid consists of two basic types of financial aid programs, portable and campus-based. Portable programs include the largest federal aid programs--Pell Grants and Stafford Loans (formerly Guaranteed Student Loans). Portable aid follows the students regardless of which institution they choose to attend, or whether they choose to pursue a vocational or academic course of study. Campus-based aid--the Supplemental Education Opportunity Grants (SECG), College Work-Study, and Perkins Act Loans (formerly the National Direct Student Loan)--is distributed to institutions by formula; the institutions then make decisions about which students will receive aid from these programs, based on criteria established by Congress. The Pell and Stafford programs are by far the largest aid programs, so students who receive federal aid are much more dependent on portable aid than on campus-based aid.

Most financial aid is awarded to students according to their financial need, which is determined by reference to formulas that consider the students' own financial resources (e.g., family income, siblings in college) and their cost of attendance (tuition, fees, books, room and board).[66] The main goal of federal financial aid policy is to increase access to postsecondary education generally and, in particular, to increase access for economically disadvantaged students. Federal policy is not designed to influence the supply of specific types of education programs. The distribution of federal aid may have significant consequences, nonetheless, in terms of the types of programs supported.

Table 6.1 shows the distribution of "generally available" federal aid among students enrolled in different postsecondary institutions.[67] In 1986, the major generally available student aid programs provided nearly $4 billion in aid to vocational students enrolled at two-year public and private, vocational and proprietary institutions, compared with approximately $320 million allocated directly to public vocational education institutions through the Perkins Act.[68] The aid available to vocational students through student aid was 10 times the amount spent on postsecondary vocational education under the Perkins Act.

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[66] Family income and cost of attendance are the two main criteria for determining financial eligibility to receive federal Title IV financial aid, but students must meet other basic non-financial criteria as well. Students must be enrolled in an eligible program and institution, they must be a U.S. citizen or eligible noncitizen, and they must maintain satisfactory academic progress; if they have defaulted on a student loan, they cannot obtain another loan until they have made appropriate arrangements to repay their defaulted loan. In addition, to receive a Pell Grant or Perkins Loan, students must be enrolled at least half-time for the purpose of obtaining a degree or certificate; students may qualify for a Stafford or PLUS (Parent Loan for Undergraduate Students) if they are enrolled half-time, regardless of degree objectives. Provisions requiring half-time enrollment to receive a Pell Grant or Stafford Loan are particularly important for students at community colleges, where a majority of the students enroll part-time.

[67] Generally available aid consists of those federal student aid programs available under Title IV of the Higher Education Act. It excludes aid limited to specific populations, such as veterans, Social Security recipients, or nurses.

[68] The estimate of student aid presented here is based on data from NPSAS. Estimates for postsecondary expenditures under the Perkins Act refer only to those made under the Basic Grant section.

Table 6.1

Federal Student Aid to Postsecondary Education
by Institution and Vocational Students, 1986-87

Type of Program	Amount (millions)	Percentage
Four-year private	$ 2,950	26%
Four-year public	3,778	33
Two-year public	1,456	13
Vocational students only[a/]	(853)	(7)
Two-year private	270	2
Vocational students only[a/]	(176)	(2)
Public vocational	116	1
Proprietary	2,835	25
Grand total	$11,405	100
Vocational total	$ 3,980	35

SOURCE: NPSAS, 1986.

a/ This is a conservative estimate of financial aid received by vocational students at these institutions because it is based on only those students with a reported major in a vocational field. About one-third of all students who received federal aid lacked a reported major. Some of these students were undoubtedly majoring in vocational fields, or will later do so, but were not counted in this calculation.

Approximately 35 percent of all federal student aid went to vocational students enrolled in two-year public and private, vocational, and proprietary institutions. The share of total aid going to vocational students is consistent with the overall share of undergraduate students enrolled in vocational education (about 35 percent, as shown in table 2.2).

There are some substantial differences between institutions in the share of aid received. Proprietary schools receive over 70 percent of the federal financial aid awarded to postsecondary vocational students, although they account for only 14 percent of total enrollment. In contrast, vocational students at two-year public colleges (mostly community

colleges) receive 20 percent of all the aid obtained by postsecondary vocational students, while acccunting for over 80 percent of total enrollment (table 2.2).

These differences reflect the basic rules that govern the distribution of financial aid. Eligibility is heavily based on need, which is determined by a combination of family income and the cost of attendance. There are also eligibility rules pertaining to enrollment status. Proprietary schools attract a high proportion of low-income students and charge high tuition. Moreover, a high proportion of students at two-year public colleges enroll on a part-time basis. Nonetheless, it is clear from the distribution of aid that although the Perkins Act represents an extremely modest subsidy for vocational education in the public sector, student aid represents a substantially greater federal investment in postsecondary vocational training. In contrast to the Perkins Act, it primarily subsidizes training received in the private sector.

STATE AND LOCAL SUPPORT FOR POSTSECONDARY VOCATIONAL TRAINING

Although most federal student aid received by postsecondary vocational students goes to students attending proprietary schools, public institutions are not without large subsidies.[69] These subsidies come to community and technical colleges through state and local appropriations that provide for the operation of these institutions. Table 6.2 compares the average per-student subsidy from federal student aid with the subsidy from state and local appropriations. To equalize for differences resulting from full- and part-time enrollment, the estimates are for full-time equivalent enrollment.

Federal student aid provides $815 per full-time student for all students enrolled in two-year public colleges, and $2,882 for students attending proprietary schools. Student aid accounts for 12 percent of institutional revenues at public institutions but for a much larger share, at least 44 percent (and probably much more), at proprietary schools.

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[69] Since students must repay these loans, from the student's perspective they are only partial subsidies.

Table 5.2

Average Public Subsidies for Postsecondary Education Per Full-Time Equivalent Student

Source of Funding	Four-Year Public	Four-Year Private	Two-Year Public	Proprietary School
Federal student aid	$1,543	$3,980	$ 815	$ 2,882
Percentage of total revenues	14%	30%	12%	44%[a/]
State and local appropriations	$5,437	$ 165	$3,050	$ 55
Percentage of total revenues	50%	1%	65%	1%

SOURCE: NPSAS, fall 1986, and National Center for Education Statistics, 1988, *State Higher Education Profiles*, p. 25.

NOTE: This table does not include all public subsidies. Specifically excluded are federal grants and contracts for research and other purposes, as well as gifts and endowments that benefit from favorable tax provisions. Such subsidies are primarily of benefit to four-year colleges. Also, the estimate for student aid is based on all students enrolled, not just those receiving aid. In four-year public and community colleges, where average aid exceeds the cost of tuition and fees, the excess is assumed to be used for living expenses, and is not counted in determining the "percent of total revenues."

a/ Due to serious limitations in the data on proprietary school revenues, it is probable that this significantly underestimates the percentage of proprietary school revenues covered by student aid.

The substantial federal student aid to proprietary school (52,882) students is balanced by an equivalent state and local government subsidy for students enrolled in public institutions ($3,050). Two-year public colleges obtain 65 percent of their total revenue from state and local appropriations. Proprietary schools receive virtually no support from state and local government.[70]

[70] Proprietary school students may be eligible for financial aid under state programs.

Student aid and state and local appropriations pay for different types of educational costs. For students attending public two-year colleges, a large share of student aid covers the students' living expenses. For these students, only a small portion of student aid directly supports the educational institution. At proprietary schools, however, most student aid goes to the institution to cover tuition. In contrast, virtually the entire state and local appropriation is used by the educational institution for operating expenses. The figures in table 6.2 reflect only aid retained by the institution for tuition and fees.

A similar pattern exists among four-year institutions, with public sector institutions receiving their revenues largely from state and local sources and private institutions receiving much larger subsidies through the federal student aid program. In effect a division of labor exists: federal policy provides benefits to the private sector, while state and local resources are allocated almost entirely to public institutions. Although the remainder of this discussion focuses on student aid, it should be remembered that the state and local contribution to postsecondary training is substantial.

ROLE OF STUDENT AID IN FINANCING VOCATIONAL TRAINING

This section explores the distribution of financial aid to students in different institutions and the extent to which aid enables students to pay the cost of obtaining vocational training.

Almost half of all postsecondary students enrolled in October 1986--45 percent--received some financial aid (table 6.3). The fraction of students receiving aid, however, varied greatly by type of institution. Students attending higher cost proprietary schools were much more likely to receive aid (84 percent) than students at lower cost public two-year colleges (28 percent) or public vocational schools (52 percent).

The income level of students and the costs associated with different institutions are two major factors affecting the probability of receiving aid, as will be discussed later. An additional factor unrelated to the rules that govern eligibility for student aid is the type of

Table 6.3

Percentage of Students at Various Institutions with Different Types of Financial Aid

Type of Aid	Total	Four-Year Public	Four-Year Private	Two-Year Public	Public Vocational	Proprietary
Any student aid	45%	47%	65%	28%	52%	84%
Any federal aid	35	37	48	20	42	81
Any state aid	15	16	25	9	14	10
Other aid[a/]	17	19	17	45	10	1?

SOURCE: NPSAS, 1980.

a/ Primarily includes institutional aid, although scholarships from business, union, and philanthropic sources are included.

institution attended. After controlling for differences in tuition, parental income, and other factors potentially related to the probability of receiving financial aid, students attending proprietary schools are 26 percent more likely to get aid than students at two-year public colleges and 20 percent more likely than students at public vocational technical schools.[71] Clearly, community colleges do not take the same advantage of available student aid benefits as do proprietary schools.[72]

Because federal aid represents two-thirds of all the financial aid available from different sources (and more than three-fourths at less-than-baccalaureate institutions), the patterns that characterize the receipt of "any student aid" also characterize the distribution of federal aid. Students at two-year public institutions are much less likely to receive federal aid

[71] Based on a regression analysis in Tuma, op. cit., p. 43.

[72] Community colleges are much less dependent on student aid for institutional revenues than proprietary schools and, also, may be reluctant to encourage disadvantaged students to assume debts that they will have difficulty repaying.

(20 percent) than are students at other types of postsecondary vocational institutions. More than 80 percent of the students enrolled in proprietary schools and 42 percent of the students at vocational schools received federal aid.

Table 6.3 also shows the percentage of students receiving state and other types of aid. Compared with all undergraduate students, students at two-year public and proprietary schools were unlikely to receive state or "other" (primarily, institutional) aid. Public vocational school students received state aid as frequently as did other postsecondary students, but they, too, were unlikely to receive aid from their institution.

These findings indicate that students at less-than-baccalaureate institutions who receive aid depend heavily on federal programs, even more so than students at four-year colleges. Student aid from state programs and institutional sources plays a much smaller role at these institutions than it does at four-year colleges. Consequently, changes in federal student aid policies can greatly affect the demand for postsecondary vocational training.

Students enrolled in high cost institutions are more likely to get financial aid and to receive a larger amount of aid. Table 6.4 shows the average amount of aid received by students in different institutions. Students who received financial aid obtained an average of $3,150 from all sources. There are large variations in average aid by type of schools. Students in proprietary schools averaged twice the amount of aid received by students in two-year public institutions and public vocational institutions and 28 percent more aid than students at four-year public colleges. The pattern for federal aid is similar. Students at proprietary schools receive large awards; the average federal aid package even exceeds that of students at four-year private schools. Students may also receive financial aid from state programs or from other sources (their institution, business, foundations, community awards). The amount of aid received from these sources is generally much less than it is from federal sources, and, as previously indicated, is received by relatively few students at less-than-baccalaureate institutions.

Table 6.4

Average Amount of Aid Received by Students
in Different Institutions, 1986

Type of Aid	Total	Four-Year Public	Four-Year Private	Two-Year Public	Public Vocational	Proprietary
Total aid[a/]	$3,150	$2,859	$4,897	$1,676	$2,008	$3,659
Federa. aid[b/]	2,666	2,651	3,147	1,788	2,078	3,394
State aid	1,133	946	1,759	585	855	1,721
Other aid	1,671	1,269	2,538	640	536	2,015

SOURCE: NPSAS, 1980.

a/ The sum of federal, state, and other aid exceeds "total aid" because not all students receive aid from each sourc

b/ Estimates of federal aid differ from those in table 6.2 where the figures were based on all students enrolled and adjusted for differences in full- and part-time enrollment. Table 6.4 is limite[illegible] aided students only and does not reflect differences in enrollment status.

The amount of aid received largely reflects differences in cost associated with the type of postsecondary institution attended. Table 6.5 shows the average one-year cost of attending different types of postsecondary vocational training. Among less-than-baccalaureate institutions, tuition and fees range from lows of $228 an. $326 at public vocational and two-year public institutions, respectively, to $3,347 at proprietary schools. Given the low tuition costs at two-year public and public vocational schools, most of the financial aid that these students receive supports personal living expenses; relatively little goes directly to the institution for tuition. At proprietary schools, in contrast, the aid students receive just about equals the tuition costs, suggesting that little student aid is left over for living expenses.

Table 6.5

Average Costs of Attending Postsecondary Institutions and Proportion of Costs Covered by Aid

Type of Aid	Total	Four-Year Public	Four-Year Private	Two-Year Public	Public Vocational	Proprietary
Tuition and fees[a/]	$1,743	$1,322	$4,230	$ 326	$ 228	$3,347
Total costs[b/]	6,437	5,146	10,097	3,898	2,501	6,881
Percentage of costs covered by -- [c/]						
All aid	75%	78%	63%	85%	97%	79%
Federal aid	61	66	38	73	94	72

SOURCE: NPSAS, October 1986.

a/ Tuition and fees reflect full-year tuition and fee amounts; for schools that charge on a programmatic basis or by clock hour, however, tuition and fees reflect the actual amount students were charged for the program.

b/ Total costs are institution-reported costs, which are based on the budgets used for calculating student financial aid. They include estimated costs for tuition, books, living expenses, and transportation.

c/ Percentage of costs covered is calculated on a student-by-student basis. Because of the distribution of students among low- and high-cost institutions, dividing total aid by total costs underestimates the percentage of costs covered by financial aid.

Previous findings (table 2.4) showed that proprietary schools enroll a high proportion of low-income students, despite the high costs of attendance. There may be many reasons that low-income students attend these schools, but these data suggest two important financial factors:

- Financial aid is widely available, and, as shown in table 6.5, it covers almost 80 percent of the total cost of attendance. Thus, there is often little or no out-of-pocket" cost to students who receive financial aid.
- Although the annual cost of attending a proprietary school is much greater than the cost of a public two-year college, the total cost to the student of completing a one-year vocational program

at a proprietary school may be less than the total cost of a two-year program at a community or technical college.[73]

Table 6.5 shows that students who receive financial aid are able to cover most of the estimated costs of attending their postsecondary institution. On average, about 75 percent of the total costs of attendance are covered for those receiving financial aid. For those receiving federal aid, about 60 percent of total costs are covered. Students at proprietary institutions cover more than 79 percent of total costs through financial aid, but at lower cost two-year public colleges and public vocational schools, financial aid covers 85 percent and 97 percent of total costs, respectively. Thus, for those students who receive financial aid, the out-of-pocket cost of college enrollment is enormously reduced. Although students at higher-cost institutions are more likely to receive financial aid than students at lower cost institutions, their out-of-pocket expenses are also likely to be greater.

WHO GETS AID

The previous section examined the allocation of financial aid among students attending various types of institutions. In part, aid patterns reflect differences in student populations. Some types of students are more likely than others to receive aid. Because one of the primary goals of federal policy is to improve access to vocational education for disadvantaged students as well as others, this section examines the characteristics of students who get financial aid. Two types of student characteristics were examined: characteristics, such as family income and enrollment status, which determine eligibility for financial aid; and other student characteristics that are outside the student aid eligibility rules, but are of particular interest in light of the goals of federal vocational education policy, for example, race, age, gender, and major field of study.

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[73] There may be other reasons why students are attracted to proprietary schools including the emphasis on vocational course work, the short length of the training programs, and the geographic proximity of the schools.

Table 6.6 shows no significant differences by gender or age in the proportion of students who receive federal aid. Overall, 34 percent of the men receive federal aid and 36 percent of the women do so. At public vocational schools, women are more likely than men to receive federal aid, but these institutions represent only 1 percent of total enrollments. Nor does age appear to be a significant factor at less-than-baccalaureate institutions in the receipt of federal student aid. Older students, particularly those attending less-than-baccalaureate institutions, are as likely to receive aid as are younger students.

There are substantial differences related to race/ethnicity and to family income. Except for public vocational schools, blacks are much more likely to receive federal aid than whites. This pattern exists even after controlling for other factors related to the receipt of aid--family income, tuition and fees, and type of institution.[74] In table 6.6, Hispanics at two-year public colleges and proprietary schools appear more likely than white students to receive aid, but this apparent tendency disappears after controlling for income and other factors.

Family income is one of the basic determinants of financial need, and therefore, it is directly related to the likelihood of receiving federal aid. Table 6.6 shows that 61 percent of all students with family incomes under $11,000 received federal aid, whereas only 15 percent of the students from families with incomes over $50,000 obtained aid. At all types of institutions, poor students are much more often recipients of federal aid than middle and upper income students.

Because students attend different institutions with widely varied costs, and cost is also a determinant of receiving aid, the likelihood of receiving federal aid varies considerably even among students with the same family income. Wealthy students (family income over $50,000) attending proprietary schools (not many do) were still more likely to obtain federal aid (55 percent) than were very poor students (family income under $11,000) enrolled at two-year

[74] Tuma, op. cit., Appendix 2.

Table 6.6

Characteristics of Students Receiving Federal Aid, 1986

Characteristic	All Postsecondary Institutions[a/]	Public Two-Year	Public Vocational	Proprietary School
Sex				
Male	34%	20%	32%	80%
Female	36	23	50	81
Age				
Less than 23	39	23	41	80
24-29	34	23	51	89
30+	25	19	34	74
Race/ethnicity				
White	32	20	44	75
Black	56	30	43	92
Hispanic	41	25	33	87
Personal income				
Less than $11,000	61	48	61	94
$11,000-$22,999	50	28	43	87
$23,000-$29,999	40	23	39	82
$30,000-$49,999	20	9	33	69
$50,000+	15	5	32	55
Enrollment status				
Full-time	47	38	53	82
Part-time	14	10	14	72

SOURCE: NPSAS, 1986.

a/ Total is for all students receiving federal aid, including those at four-year institutions.

public college (48 percent). These differences can be attributed largely but not entirely to the costs of attending different types of institutions.

Family income is also related to the amount of federal aid awarded to students. Within each type of institution (table 6.7), students from lower income families receive more federal aid than those from higher income families. The differences are surprisingly small, however, in the amount of aid awarded students of varying income levels. At two-year public colleges,

students receive federal aid. However, more than 60 percent of the students at two-year public colleges are enrolled on less than a full-time basis. For some reason, 72 percent of part-time students at proprietary schools nevertheless still manage to obtain federal aid.

Table 6.8 shows the fraction of vocational students who received aid by vocational major. Although students in some fields are more or less likely than students in other fields to receive aid, there are no clear or consistent differences by field that persist across institutions. Because financial aid is not targeted toward any field of study, whatever differences that exist must relate to the income, enrollment status, or cost of the institution attended by different students.

Table 6.8

Percentage of Students with Aid by Vocational Major, 1986

	Two-Year Public	Public Vocational	Proprietary
Agriculture	43%	--a/	--a/
Business/marketing	28	46%	88%
Health care	39	65	89
Occupational home economics	33	54	72
Trades and industry	33	44	78
Technical and engineering	31	62	89
Communications	18	--a/	83
Education and public service	26	--a/	97

SOURCE: NPSAS, 1986.

a/ Sample size is too small to produce a reliable estimate.

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Education and public service	26	--a/	97

SOURCE: NPSAS, 1986.

a/ Sample size is too small to produce a reliable estimate.

Student aid is occupationally neutral although the decisions that students make about fields of study can be expected to direct federal resources toward fields that are popular or are in demand. To the extent that the Perkins Act also expresses no strong preference for particular fields of study, the two main instruments of federal postsecondary vocational policy may be said to contain no explicit incentives to concentrate resources in fields deemed important, such as those that contribute to economic development or are technologically advanced.

EFFECTS OF STUDENT AID

By reducing financial barriers to attendance, student aid is supposed to increase the access of students, especially low-income students, to postsecondary education and to make it easier for them to remain in school. Studies on the effects of student aid generally support the view that financial aid does in fact increase access and improve persistence. This effect seems to be stronger for students in two-year institutions than it is for students attending four-year colleges.[75] The most sophisticated of these studies, one by Manski and Wise, which analyzed the effects of Basic Educational Opportunity Grants, concluded that the grants had a substantial effect on enrollment in two-year colleges and vocational schools but no significant effect on four-year college enrollments.[76] This study found enrollments in community colleges 32 percent higher and in vocational technical schools 152 percent higher as a result of these grants. Four-year college enrollments were essentially unchanged.

The effects of loans on enrollment decisions are less clear. Loans reduce the money that a student or his family must provide up-front. Several studies have found that low-income students, not surprisingly, are more responsive to changes in tuition than are students

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[75] Despite the large amount of aid going to proprietary school students, there are no studies on the effects of aid upon students at these schools. Aid is clearly important to access because so many students rely on aid to cover their tuition, but whether aid contributes to completion is unknown.

[76] Charles Manski and David Wise, *College Choice in America* (Cambridge, MA.: Harvard University Press, 1983), chapter 7.

from higher-income families.[77] One possible inference is that loans can affect enrollment decisions. However, low-income students, it is also believed, are loathe to accept loans, although these have become the predominant type of federal aid. By not fully using available aid, disadvantaged students, particularly those in community colleges, may have diminished access to vocational training.

Studies of the effect of aid on the persistence of students in education yield mixed results. One recent study found that student aid had a positive effect on persistence, and that loans as well as grants were effective in promoting persistence.[78] But a meta-analysis of the effects of student aid concluded that it permitted "aid recipients to persist about as well as nonrecipients" and that "grant and scholarship aid have a more positive effect on persistence than do loans."[79]

When persistence is measured in terms of the likelihood of completing a degree or certificate, the evidence suggests that students receiving federal aid are more likely to obtain a degree or certificate and are less likely to drop out than students who do not receive aid. Table 6.9 distinguishes between postsecondary vocational students who, over a four-year period after high school graduation never received financial aid, received it occasionally, or were aided every semester that they enrolled. The findings indicate that aided students were much more likely to complete a degree or certificate, and much less likely to drop out, than were students who never received financial aid. Among low-income students, 23 percent of those who were never aided completed a degree or certificate, but for those always aided, completions increased to 48 percent. Similarly, 68 percent of the "never aided" low-income students dropped out, but only 47 percent of the "always aided" students left postsecondary

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[77] Larry Leslie and Paul Brinkman, *Economic Value of Higher Education* (New York: Macmillan, 1988), pp. 124-25.

[78] Edward St. John, Rita Kirshstein, and Jay Noell, "The Effects of Student Financial Aid on Persistence: A Sequential Analysis," (draft) presented at the 1988 annual meeting of the American Educational Research Association.

[79] Leslie and Brinkman, *Economic Value of Higher Value*, p. 179.

Table 6.9

Postsecondary Outcomes for Vocational Students of Various Family Income Who Were Always Aided, Sometimes Aided, and Never Aided

Family Income	Completed	No Degree/Certificate by 1984: Still in School	No Degree/Certificate by 1984: Not in School
Under $12,000			
Never aided	23%	9%	68%
Sometimes aided	36	20	43
Always aided	48	5	47
$12,000-$15,999			
Never aided	21	5	74
Sometimes aided	21	8	71
Always aided	57	3	40
$16,000-$23,999			
Never aided	19	14	66
Sometimes aided	44	10	46
Always aided	59	5	36
$24,000+			
Never aided	34	10	56
Sometimes aided	58	10	32
Always aided	71	2	27

SOURCE: HS&B Seniors, 1980.

educational without a degree or certificate.[80] These patterns exist for all income groups. It should be emphasized that these findings do not show conclusively if student aid actually increases the likelihood of persisting to complete a vocational program. Students intent on earning a degree may be more inclined to seek a grant or loan than students who expect to drop out shortly. At the least, it is clear that financial aid is more likely to benefit those who

[80] These figures on degree completion and noncompletion differ from those presented in table 4.5, p. 46. This analysis relies on a subsample of HS&B students for whom both financial aid records and postsecondary transcripts exist.

complete programs of occupational training than those who leave without earning a degree or certificate.

Student aid can have powerful effects on enrollment and, perhaps, on persistence of students in postsecondary vocational programs. Its effects are probably greatest on disadvantaged students. Nonetheless, the percentage of students who leave commun' , colleges, public technical institutes, and proprietary schools without completing a program of study is very high, and has worsened over time. The problem is particularly acute for disadvantaged and minority students. Financial need is only one reason, and possibly not the most important one, why students leave school. The key to improved retention of students may also lie with improved counseling and tracking of students, changes in curriculum, better occupational training, and job placements to encourage students to persist.

CHAPTER 7

CONCLUSIONS AND RECOMMENDATIONS

INTRODUCTION

Postsecondary vocational training is a growing enterprise that is central to the educational mission of less-than-baccalaureate institutions. A total of 4.3 million "vocational" students are enrolled at community colleges, two-year technical colleges, public vocational technical schools, and proprietary schools. Three-fourths of all the students at these institutions major in vocational subjects and, over the past two decades, the percentage of postsecondary students enrolled in vocational education has grown substantially. Most of the vocational credits in less-than-baccalaureate institutions are earned at community colleges (61 percent). Public technical institutions and proprietary schools account for another 23 percent and 15 percent, respectively, of the vocational credits. Although community colleges may have been started to prepare students for continued academic education in four-year institutions, this goal was never fully realized, and over the years community colleges have become the major providers of postsecondary vocational training. Thus, vocational training is now the principal educational mission in community colleges, as it has always been in other less-than-baccalaureate postsecondary institutions.

Students enrolled in postsecondary vocational programs are demographically diverse, drawn from all economic strata, races, age groups, and levels of ability. Compared with students at four-year colleges, however, postsecondary vocational students are more likely to be from working-class and poor families, and from racial and ethnic minority groups. They are also more likely to be older, independent of their parents, and enrolled part-time.

The reasons that students choose to enroll in postsecondary vocational programs are many and complex-- is are their subsequent decisions about how much training they need and whether to complete a postsecondary credential. Although many students enroll to earn a college degree, it cannot be assumed that all students intend to earn even an associate degree

or certificate. Students may enroll to take a limited sequence of courses to enter a particular field, or to enhance existing career skills. They may enroll to explore career alternatives or to satisfy avocational interests. This mix of educational objectives is inevitable among institutions that offer enrollment to virtually all students who wish to attend.

Diversity in student expectations and abilities poses a difficult problem for institutions trying to accommodate a wide array of student needs--not just those of the traditional, degree-seeking college student. This diversity also suggests that not all students who leave without earning a credential can be considered dropouts or educational failures. On the other hand, noncompletion of degree should not always be condoned under the assumption that the student has fulfilled some alternative but equally valid educational purpose.

The main problem facing postsecondary vocational education is that many students do not stay in school long enough to receive comprehensive training, regardless of whether they actually earn a degree or certificate. Students without sufficient training are unlikely to obtain jobs in the field for which they have trained. Our evidence indicates that the economic benefits of vocational education are greatest for students who complete a multicourse sequence of vocational training. These students obtain better-paying jobs that use their training at greater rates than do other students. Unfortunately, a large number of students enrolled in vocational programs earn very few credits. Among a sample of recent high school graduates, almost half who entered less-than-baccalaureate institutions left without completing a degree or certificate.

Low rates of program completion and limited course-taking prevail among all types of students regardless of race, sex, economic status, or ability. However, the problem is most serious among minorities, economically disadvantaged students, and the growing number of high school vocational students who pursue additional postsecondary training. This limits the extent to which such students get jobs in the fields in which they have trained and, as a result, the wages they are paid.

SUMMARY OF KEY FINDINGS

The National Assessment of Vocational Education (NAVE) conducted research in five main areas: enrollment in postsecondary vocational education, educational attainment, training-related placement, institutional quality, and finance. Keys findings from research in each of these areas are summarized below.

Who Enrolls in Postsecondary Vocational Education?

Enrollments in vocational education at the postsecondary level are high and, over time, the proportion of total course work in vocational subject areas has increased. Community colleges are the main providers of vocational training.

- Thirty-five percent of all undergraduate students major in vocational fields.
- Seventy-eight percent of students enrolled reported majors in vocational fields.
- The share of vocational course work taken by members of the high school class of 1980 who enrolled in community colleges was 18 percent higher than it was for the high school class of 1972.
- Among students attending less-than-baccalaureate institutions, community colleges account for 62 percent of vocational credits earned. Twenty-three percent of vocational credits are earned by students initially enrolled in public technical institutes (technical colleges and vocational technical schools), and 15 percent are earned by students at proprietary schools.

Less-than-baccalaureate institutions draw students from most segments of the population and, compared to four-year colleges, are more likely to attract a cross section of students of different ages, races, economic backgrounds, and levels of ability. Compared to students at four-year colleges, students at less-than-baccalaureate institutions are more likely to be female, black, Hispanic, from families with lower incomes, older, and financially independent of their parents.

Less-than-baccalaureate institutions attract a high proportion of older students and, especially at community colleges, students who are enrolled part-time. Many of these students must balance family and work responsibilities while also attending school.

- Thirty-four percent of community college students and 39 percent of public vocational technical school students are over age 30, compared with 14 percent at four-year colleges.

- Sixty-one percent of community college students are enrolled part-time, compared with 22 percent at four-year colleges.

Furthermore, vocational students are drawn from all ability levels, but compared with four-year college students and academic students at community colleges, vocational students are less likely to be of high ability and more likely to be of low- and mid-level ability.

Not all less-than-baccalaureate institutions attract the same mix of students. Minorities, disadvantaged students, and women are more likely to enroll in schools that offer short-term certificate-oriented training (public vocational-technical and proprietary schools), rather than the longer term programs that lead to an associate degree offered at community colleges.

- At proprietary schools, 65 percent of the students are women, and 35 percent are black or Hispanic.

- At public vocational technical schools, about 60 percent of the students come from families with incomes less than $23,000.

Our research also indicates that high school vocational students increasingly go on to college, where they make up a large share of the students in postsecondary vocational education. Between the high school classes of 1972 and 1980, postsecondary enrollments of students who described themselves as "vocational" in high school increased by 22 percent. Thirty percent of the students enrolled in community college vocational programs were also vocational students in high school. Forty-one percent of students at public technical institutes and 46 percent at proprietary schools were high school vocational education students.

What Types of Training Do Students Receive?

Institutions vary widely in how they balance academic and vocational curricula. At community colleges, a majority of the credits taken are in academic subjects; 35 percent of credits earned are in vocational subjects. Even students majoring in vocational areas take a substantial share of their course work in academic fields. In contrast, students in proprietary schools and technical institutes take about 70 percent of their course work in vocational fields.

There is little difference in the number of total credits or vocational credits earned by students at community colleges, technical institutes, and proprietary schools. The average student earns about 47 total credits. While some students receive an in-depth program of study, there are large numbers of students whose training is quite meager.

- Vocational concentrators (defined as students with a majority of their credits in vocational subjects) at community colleges earn an average of 26 vocational credits, while students at technical institutes average 27 vocational credits, and those at proprietary schools average 25 vocational credits.

- One-third of all postsecondary vocational students take less than 12 credits in vocational subjects, and 50 percent earn less than 24 vocational credits.

The rate at which students who enroll at community colleges complete degrees is low and has declined over time. Nearly all community college students who complete degrees earn associate degrees. Completion rates are higher at public technical institutes and proprietary schools largely because these institutions award many more certificates that require much less course work than does an associate degree. These results, however, are limited to a sample of recent high school graduates who entered college shortly thereafter. The sample did not include older students and mid-career adults, for whom measures of degree completion and non-completion are less meaningful.

- Within four years after high school graduation, 19 percent of the high school class of 1980 entering community colleges earned a college degree or certificate. In contrast, the completion rate for the high school class of 1972 was 23 percent.

- Overall completion rates at public technical institutes and proprietary schools (degrees and certificates) were 36 percent for the high school class of 1980.

Noncompletion rates at less-than-baccalaureate postsecondary institutions are high and have increased over time. Because of the increased rates of non-completion, fewer students have received advanced-level vocational training.

- Data from the High School and Beyond Survey for the class of 1980 show that 90 percent of the students in this sample who enrolled in community colleges, technical institutes, and proprietary schools expected to earn a degree or certificate, but about 42 percent left school without earning either within four

years. Although some students remaining in school after four years will go on to earn degrees, the majority of these students will ultimately drop out. Consequently, these estimates of non-completion must be considered conservative.

- A comparison of the community college experience of two different high school classes (1972 and 1980) indicates that noncompletions for the class of 1980 increased by 40 percent over those for the class of 1972. Over the same period, the proportion of students awarded two-year associate degrees declined by 17 percent. There was virtually no change in the percentage of students receiving certificates, which require shorter training.

Noncompletion is an institution-wide problem that affects students who concentrate in both vocational and academic fields. However, because less-than-baccalaureate institutions are largely, if not predominantly, vocational in the education they provide, it is appropriate that vocational education policy address the noncompletion matter.

The problem of noncompletion and limited training exists among all groups of students, but it is significantly worse for minorities and disadvantaged students.

- At community colleges, black students earn 30 percent fewer credits than white students and fail to earn a degree or certificate at a rate 20 percent higher. Fifty-one percent of black students who enter community colleges leave before completing their program. Hispanic students average 16 percent fewer total credits than white students, although they earn degrees at about the same rate. Dropout rates are significantly higher for the most economically disadvantaged students and their credits earned, both [illegible] and vocational, are much less than those earned by more [illegible]dent students.

- Significant differences in noncompletion also exist among groups of students at public technical colleges and proprietary schools. At proprietary schools, black students leave school without a degree or certificate at a rate 40 percent higher than that of white students and, at public technical institutes, black non-completions are 23 percent higher than those of white students. Similar differences exist among students from different socio-economic backgrounds.

Although high school vocational students often continue their training at the postsecondary level, this group frequently experiences difficulty completing postsecondary programs. There is both considerable need and opportunity to assist these students in making a successful transition from secondary to postsecondary vocational education.

- Among students entering community colleges, 54 percent of those who were high school vocational students leave without earning a degree or certificate.

What Are the Economic Benefits of Postsecondary Vocational Training?

Students take postsecondary vocational training for a variety of reasons, but by far the most important purpose is to obtain economic benefits. Students expect that vocational training will increase their employability, help them to get a job in their chosen career field, and of course, enhance their earnings. To determine whether such benefits are realized, NAVE examined a nationally representative sample of students from the high school class of 1980 who obtained vocational training at community colleges, public technical institutes, and proprietary schools, and who were no longer enrolled in college. We examined the economic status of students who had taken different types and amounts of vocational training about 5 1/2 years following high school graduation. Overall, about 19 percent of the students were unemployed at least once over the course of a year (from March 1985 to February 1986), with about 9 percent unemployed in any particular month. About 58 percent of the vocational course work that students took was later used by students who got jobs related to their training, and the average hourly wage rate of those employed was $6.67.

The degree to which students benefit from vocational training depends on the amount of training received and the coherence of the program taken. Students who take large amounts of vocational training in their major subject area are more likely to be employed and are more likely to be employed in their field of training than students who take small amounts of vocational training in their major subject. Students who obtain degrees or certificates, or who otherwise take a substantial amount of vocational training, are at a substantial advantage in entering the labor market. At the same time, students with limited training have poorer labor market outcomes.

- Compared with students taking many vocational credits in their major area (30 to 49 credits), those with less than 12 vocational credits are 28 percent more likely to be unemployed and are 14 percent less likely to get a job that uses their vocational training.

NAVE found that the economic benefits we measured are limited to vocational course-taking that occurs in a student's major field or subject area. Vocational training dispersed among many fields, although useful for students engaged in exploring career alternatives, adds little to the student's prospects for employment or job placement in a field related to the training. This suggests that a coherent program of training, not just the total amount of courses taken, is an important factor affecting the benefits of vocational education.

Students with valued occupational skills are also deemed more productive in that they are paid more. NAVE found that additional amounts of vocational training that are related to the field of employment result in substantial wage benefits.

- Students with "low" amounts of job-matched vocational credits earn an average of $6.59 per hour, while similar students with a "high" number of credits matching their job earn $8.
- Vocational credits earned by students not matched to the jobs they receive contribute nothing to their earnings.

These findings indicate strongly the importance of helping students determine what fields of training they wish to pursue, constructing a program of study to provide a related sequence of courses, and helping to place students in jobs related to their training.

Students may obtain their vocational training in various types of institutions. After controlling for differences due to the characteristics of students enrolled in community colleges, public technical institutes, and proprietary schools, and their fields of study, we found that economic outcomes varied by type of institution. Students attending proprietary schools were more likely than those at community colleges or public technical institutes to experience unemployment, and were somewhat less likely to utilize their vocational training in the jobs they obtained. Among students who were employed, those who attended public technical institutes experienced lower hourly wages than those trained in community colleges or proprietary schools. An apparent difference in hourly wages between students trained at community colleges and similar students attending proprietary schools is not statistically significant.

- Students enrolled in community colleges and public technical institutes experience similar rates of employment and likelihood of using their vocational training on the job.

- Proprietary school students are more likely to experience unemployment once or more during a year (28 percent) than similar students at community colleges (19 percent) and at public technical institutes (17 percent).

- Proprietary school students are about 13 percent less likely to get jobs that use their vocational training than students with similar amounts of training at community colleges and public technical institutes.

- The hourly wages earned by students from public technical institutes are about 11 percent lower than the wages of students from community colleges and 20 percent below wages of students from proprietary schools.

After controlling for differences in occupational field, amount of training completed, type of institution, and personal characteristics, we found no differences in the use of vocational training in subsequent employment by race, socioeconomic status, ability, or sex. In other words, students of different races and SES who take similar amounts of training, choose similar fields and enroll in similar types of institutions, are likely to experience similar economic outcomes. However, research previously discussed shows significant differences in actual completions and the amount of credits earned between various groups in the population.

What Are the Characteristics of High-Quality Vocational Training Programs?

The issues of what constitutes a high-quality vocational program and who has access to such programs are central to federal policy. Based on employer ratings of program quality and case studies of individual schools, NAVE found four main factors that predict program quality: the intensity of vocational instruction, the integration of theoretical and applied aspects of vocational instruction, the presence of active linkages with employers and others in the profession, and the quality of the job placement assistance provided to students. Although other factors were also important, the ones cited above were statistically significant across different types of institutional settings.

NAVE's study of effective institutional practices revealed that the amount of equipment possessed by programs was not systematically related to employer ratings of program quality. Although programs differed considerably in the quality of their equipment, these differences were not sufficient to affect employer ratings. A program's equipment must meet some minimum threshold, and of course, programs want new equipment to attract students, but NAVE's findings suggest that additional outlays for equipment beyond this threshold may have diminishing returns for program quality. Since most of the Perkins Act program improvement monies are spent on equipment purchases, it may be wise to consider whether this is the most appropriate use of federal resources.

How Is Postsecondary Vocational Training Financed?

Federal policy includes several different instruments for increasing access to postsecondary vocational programs and improving the quality of vocational training that students receive. The Perkins Act provides about $320 million in grants to postsecondary institutions to improve their programs and serve special populations. Although not specific to vocational education, federal student aid is also intended to increase the access of students to postsecondary education. By enabling students to afford a better education, it may also improve the quality of the education they receive. Federal student aid programs provide $4 billion to vocational students attending less-than-baccalaureate institutions, which is 10 times the amount spent on postsecondary training in the Perkins Act.

Although federal student aid is not designed to assist particular types of institutions, the distribution of aid has important consequences for the types of vocational training supported.

- Proprietary school students receive 25 percent of all federal student aid while such schools attract only 5 percent of total undergraduate enrollments. Public two-year colleges receive 13 percent of federal student aid, although their students are 38 percent of total enrollments.

- Eighty-one percent of proprietary school students receive federal aid, compared to 20 percent of the students at two-year public colleges and 42 percent of the students at public vocational schools.

Thus, through the Perkins Act, federal policy provides modest support for vocational training in public institutions. Through student aid programs, federal policy provides greater support for vocational training in public institutions and far greater support for private sector training.

Student aid provides a substantial share of the funds needed to attend college. Students receiving federal student aid average $2,666 per year, covering about 60 percent of their estimated total costs.

- Students in proprietary institutions average nearly twice ($3,394 yearly) the amount of aid received by students in two-year public colleges ($1,788) and public vocational institutions ($2,078).

- For students at public two-year colleges and proprietary schools who receive federal aid, the amount they receive covers 73 percent of the costs of attendance, including tuition and living expenses.

Both the Perkins Act and student aid policy are designed to make postsecondary education more accessible for the disadvantaged. The Perkins Act sets aside 22 percent of the basic grant for disadvantaged students. Since family income is one of the basic criteria determining eligibility for student aid, that aid is heavily targeted to disadvantaged students. Overall, students from low-income families (under $11,000 per year) are four times more likely to receive federal aid than students from the most affluent families (over $50,000 per year). Within each institution type (public two-year, proprietary, public vocational), poor students receive student aid much more frequently than do affluent students. However, since the cost of enrollment is also an important determinant of who gets aid, moderate- and upper-income students attending expensive schools (e.g., proprietary schools) are more likely to receive federal aid than the poorest students attending low-cost schools (e.g., community colleges).

Federal student aid plays a major role in financing vocational training in proprietary schools, but the primary source of support for vocational training in public sector community colleges and vocational-technical institutes is state and local appropriations. NAVE estimates that two-year public colleges obtain 65 percent of their total revenues from state and local government. Considered together, federal policies and state and local policies provide roughly equivalent resources for vocational training in public and private sector institutions.

The major forms of financial support for vocational training--student aid and state and local appropriations, provide similar incentives to postsecondary institutions. Both student aid and state funding formulas provide powerful incentives for institutions to maintain and increase enrollments. At community colleges, revenues are largely determined by the number of full-time equivalent students; similarly institutions dependent on student aid have powerful incentives to maximize student enrollment.

Under enrollment-based finance policies, the incentives to focus attention on student performance (e.g., persistence, completion, achievement, and job placement) are indirect and, at best, weak. While state funding formulas and tuition payments reimburse institutions for students who persist just as they do for new students (and in theory good performance should make an institution better able to attract new students), student enrollments and not outcomes remain the standard by which institutions are judged.[81]

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[81] There may be several reasons why enrollment-based financing provides insufficient incentive for institutions to emphasize student persistence. First, institutions that simply "replace" students who leave are rewarded as much as those whose students persist. In the 1960s and 1970s, when the pool of 18- to 24-year- old students expanded greatly, it was simply easier for schools to admit new students than to initiate programs to retain ones already enrolled. Postsecondary institutions have been slow to recognize that, in a period of more limited enrollment growth, there could be financial rewards for those schools that improved student persistence and completion. A second factor is cost. Students in large introductory courses are less expensive to educate than students in more advanced courses that require expensive equipment and entail higher instructional costs. Both advanced students and students at risk of dropping out require additional, though quite different, services of an expensive nature--e.g., career counseling, job placement, remedial instruction, child care, transportation and other special support. These additional costs may create a financial disincentive for institutions to focus on improving completions. Finally, administrators fear that instituting more rigorous requirements might result in lower enrollments.

Nor does the Perkins Act, which primarily specifies populations to be served and procedures to be followed, directly address issues of student outcomes. In light of the evidence presented on completions, course-taking, and training-related placements, an emphasis on student outcomes is an appropriate role for federal policy.

RECOMMENDATIONS FOR FEDERAL POLICY ON POSTSECONDARY VOCATIONAL EDUCATION[82]

Objectives

In any assessment of the possible roles of federal policy in improving postsecondary vocational education, it is important to observe that Perkins Act funds are very limited; other federal programs have parallel objectives designed to increase the access of disadvantaged students to postsecondary education; and public policies that provide major support for postsecondary vocational training offer inadequate incentives for institutions to improve student outcomes.

There are several basic sources of support for postsecondary vocational training. At most, Perkins Act funds account for 5.7 percent of total revenues for vocational training at community and technical colleges. Federal student aid programs provide $4 billion to postsecondary vocational students, but at two-year public colleges the share of federal student aid for tuition and fees represents only about 12 percent of total revenues. State and local appropriations are the largest source of support, providing about 65 percent of total revenues for postsecondary vocational training in two-year public colleges.

All these policies are input-oriented. They reward institutions according to their enrollment of students. None directly addresses the fundamental problem identified in NAVE's research--although postsecondary vocational training attracts students who might not

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[82] This sections draws heavily on a study conducted for NAVE by Stephen Barro entitled *Issues in Designing Performance Incentives for Vocational Education*, NAVE Contractor Report (Washington, DC: SMB Economic Research, 1989), and on E. Gareth Hoachlander, Susan Choy and Cynthia Brown, *Performance Basea Policy Options for Postsecondary Vocational Education: A Feasibility Study*, NAVE Contractor Report (Berkeley, CA: MPR Associates, March 1989).

o' erwise have the opportunity to attend college, the majority of enrollees do not receive sufficient training, whether measured by complet n of degrees or a sequence of related courses, to realize substantial benefits in the labor market.

Given these findings and the range of existing policies, we recommend that federal vocational education policy should help students complete a comprehensive and coherent program of vocational study and obtain jobs that make full use of that training. Clearly, federal vocational funding is inadequate to finance all the programmatic changes and services needed to achieve this goal. Rather, federal policy can stimulate change by providing incentives for postsecondary institutions to undertake improvements in program content and job placement that will produce measurable gains in completions, program coherence, and placements. This policy should have three basic objectives:

- **To improve rates of program completion and placement in training-related jobs;**
- **To provide special assistance to at-risk populations for whom the problem of noncompletion is most serious.**
- **To improve the transition from secondary to postsecondary vocational education in a way that results in a more coherent and comprehensive training program for students.**

As it is currently structured, the Perkins Act is poorly designed to achieve these objectives. Perkins Act grants are input and process-oriented. The dollars they provide are to be spent in certain prescribed ways, for certain kinds of services, and for certain groups of students. There is little in the Perkins Act to ensure, however, that spending federal funds will actually improve vocational programs. Some recipients of funds become so preoccupied with adhering to federal rules for allocating and using resources that these means become the ends of policy, with little evidence that funds accomplish their intended purpose.

The specific effects of the Perkins Act on postsecondary institutions are also of concern. About 79 percent of eligible postsecondary institutions receive Perkins Act grants in at least one category, but there is little evidence that the Act effectively leverages additional

nonfederal resources for projects to improve the quality of vocational education.[83] Nor do other federal and state policies, which base funding on enrollments, adequately address the serious problems of limited course-taking, low completion rates, and lack of placement in jobs related to training.

Recommendation

We recommend that states use the Perkins Act funds they direct to postsecondary vocational education to develop a system of performance-based incentives. This system would use indicators developed by states and keyed to three areas of performance: educational attainments (e.g., program completions, advanced course-taking), occupational competencies, and labor market outcomes (e.g., employment, earnings). We recommend two specific mechanisms to encourage improvement: dissemination of information to students, policymakers, employers, and the public on the performance of vocational education training institutions; and distribution of federal vocational education funds to institutions in accordance with state-developed performance formulas.

Performance incentives would replace the current emphasis on inputs and process in the Perkins Act with financial incentives based on student outcomes. The change would shift the emphasis in federal policy from compliance with rules for spending funds to obtaining better results for students; induce vocational educators to use more of their state and local resources--not just the small amounts provided by the federal government--in ways that enhance student performance; and create incentives affecting all postsecondary institutions, not just those receiving federal grants in one of the Perkins Act categories.

How Performance Incentives Can Improve Vocational Education

All performance incentive systems share two basic features: a central role for measures or indicators of how well or poorly the suppliers of vocational education perform; and a

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[83] For a discussion on the additivity of federal funds, see Volume II of NAVE's final report on the Implementation of the Carl Perkins Act.

"feedback" mechanism through which information on past performance is used to encourage improved future performance. The basic premise underlying performance-based policy is that information on the performance of vocational institutions, suitably disseminated and linked to funds or rewards, can create strong incentives for programs to improve their performance. Improvements may occur as individual programs make greater efforts (through curriculum upgrading, better teaching or student job placements), or as resources are reallocated toward suppliers who perform best or exhibit the most improvement.

Performance incentives also encourage schools to contribute additional institutional resources for programs to enhance student performance. By increasing student persistence and, perhaps, by attracting new students through a reputation for high job placements and good earnings of graduates, performance standards can generate additional FTE-based revenue.[84]

After studying experiences under the Job Training Partnership Act (JTPA), other state employment and training programs, as well as approaches that states have used in attempting to introduce performance-based elements into their educational systems, NAVE recommends two specific performance incentive mechanisms:

1. *A performance information system* to disseminate information to students, policymakers, employers, and the public on the performance of vocational education institutions; and

2. *A performance-based funding system* that distributes financial aid to institutions according to performance-based funding formulas.

Performance Information

Performance information disseminated to students, employers, political authorities, and administrators can significantly affect the demand for high-quality vocational education. Armed with information on completions, job placements, and earnings, students can shift their

[84] For fear of discouraging enrollments, schools are typically reluctant to require that students demonstrate basic reading, writing, and computational skills. A study of Miami-Dade Community College, however, suggests that mandatory testing resulted in increased minority group retentions and no decline in overall enrollment (see John Roueche, George Baker, and Suanne Roueche, "Open Door or Revolving Door?" *AACJC Journal*, April/May 1987).

enrollment toward suppliers with superior performance. The fact that "money follows students"--that is, revenues from tuition payments, student aid programs, and state appropriations are all linked to enrollment--could provide a strong incentive for programs to raise performance.[85]

Disseminating information to other participants in the educational system--political authorities, administrators, and employers--also can contribute to raising performance. Evidence that some publicly supported institutions perform well and others do not can induce political authorities and administrators to shift funds among programs or to impose more rigorous oversight. Providing this information to employers could strengthen the resolve of administrators and political leaders to make budgetary and other decisions conducive to program improvement, and further encourage students to favor highly rated programs. These concepts undergird the growing effort of states to develop indicators of general education performance.

Performance-based Funding

Under this strategy, performance information would not merely be disseminated, it would be linked directly to the receipt of funds. Distribution of federal vocational education funds would be determined by explicit state formulas based on measures of program performance and improvement. One feature of JTPA that exemplifies this approach is the allocation of 6 percent of program funds as incentive grants to providers who exceed performance standards. As another example of performance-based funding in education, Florida requires that, to be eligible to receive state funds, vocational programs must maintain a

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[85] This approach rests on two assumptions: students are mobile and free to choose among alternative institutions and programs; and students value information on institutional performance in making decisions about where to enroll. The first condition is more likely to exist at the postsecondary level than at the secondary level because adult students can compare different public and private suppliers of vocational training. On the second requirement, the willingness of students to use performance information, there is some evidence that students consider various aspects of program quality in making enrollment decisions. For a discussion of this research, see E. Gareth Hoachlander, Susan Choy, and Cynthia Brown, *Performance-Based Policy Options for Postsecondary Vocational Education: A Feasibility Study*, pp. 92-100.

job placement rate of 70 percent or higher. Tennessee allocates 5 percent of its higher education funding according to six different measures of institutional performance, while South Carolina provides monetary rewards to public schools and districts showing increases in academic achievement.

The rationale for performance-based funding is straightforward. Institutions that score high on measures of performance, or exceed a specified standard, receive more funds, and those that score low, or fall below a state's standards, would have their funding reduced.[86] Institutions would have an incentive to do well, and depending on the level of funding, resources would be reallocated from low to high performers.[87] In Tennessee, local administrators report many cases of institutional improvement in response to performance objectives, including changes in curriculum, student follow-up, counseling of students, and assessment of student capabilities.[88]

In contrast to the prescriptive grants that characterize the Perkins Act, performance-based funding for postsecondary vocational education has several advantages:

- Performance-based funding decentralizes decision making about how best to achieve agreed-upon educational and labor market goals of vocational training.
- Performance-based funding eliminates federal attempts to specify program content or services; in exchange, institutions are held accountable for the results.
- Because money "counts," performance-based funding sends a clear message that improving student performance, however performance is defined and measured by the state, is the goal of federal policy.

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[86] A fundamentally different type of performance-based funding would target resources on institutions with the lowest level of performance.

[87] Assuming that performance-based funding is limited to federal vocational education funds, the reallocative effect would, at most, be quite modest.

[88] Hoachlander, Choy, and Brown, *Performance Based Policy Options*, p. 73.

- The federal performance standard system developed for JTPA has transformed this program (compared with its predecessor, the CETA program) into one that is outcome oriented.[89] Federal performance standards have driven deep into the JTPA service delivery system through the parallel development of performance contracting and competency measures for youth outcomes.

- Instead of using limited federal funds to purchase specific programmatic services, performance-based funding is likely to encourage institutions to use more of their own resources to improve programs so they will earn performance awards.

Measures of Program Performance

Measuring performance is a prerequisite for performance-based policy. The feasibility of creating performance incentives, their likelihood of having beneficial effects, and their chances of gaining political and professional acceptance, all depend on measurement that is fair, objective, and not unduly burdensome. The main initial activity undertaken at the postsecondary level by states should be the development of indicators. The three types of outcomes most relevant for vocational education are labor market outcomes, learning outcomes, and educational attainment outcomes. States would be required to develop measures and, eventually, to award incentive aid in accordance with all three types of indicators. This section discusses the three types of outcomes. The section that follows discusses equity issues and how undesirable outcomes can be avoided.

Labor Market Outcomes

Labor market indicators include the rate at which students are placed in jobs, the degree to which placements are training related, the duration of employment and unemployment, and the level of earnings at entry and at specified times thereafter. Given that

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[89] Erik Butler, *The Search for a Bottom Line in Vocational Training: What Lessons Are Offered by the Job Training Partnership Act?*, NAVE Contractor Report, October 1988. While citing problems with specific performance standards and with the system of competency-based training, Butler concludes: "As policies which will underlie vocational education are developed, JTPA's experience should encourage planners that a focus on outcomes can be achieved" (p. 21).

the basic purpose of postsecondary vocational education is to prepare students for jobs, labor market indicators must play an important role in assessing program performance.

The principal problem with measuring labor market outcomes on a state or programmatic basis has been the inadequacy of data.[90] Student follow-ups administered by schools are frequently characterized by unacceptably high levels of nonresponse and lack of objectivity in determining whether job placements are related to the student's field of training. To establish objective indicators of training-related placements, NAVE has built on work started by the National Occupational Information Coordinating Committee (NOICC) linking fields of training to different occupational classifications.

An important recent development is the increased feasibility of monitoring many labor market outcomes at relatively low cost and without intrusive follow-up efforts. This monitoring can be accomplished by drawing on existing administrative data that all states routinely collect to operate their unemployment insurance systems. Quarterly data covering employment and earnings are now routinely collected from employers. Moreover, state unemployment insurance information is objective, not subject to student recall, and can be used to measure both short- and long-term labor market outcomes. By following students over a longer period of time, the full labor market effects of vocational education programs can be measured.

The feasibility of using state unemployment insurance data to assess students' employment and earnings has been demonstrated in several states. A project undertaken in Arizona in 1985 used unemployment insurance records for students attending both public and proprietary postsecondary institutions to determine job placement rates and earnings.[91] An ongoing effort in Florida augments unemployment insurance data with information on military

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[90] Existing national longitudinal data containing employment records are inadequate for estimating labor market outcomes at any subnational level. Performance-based policy requires outcomes measured at the program or institutional level.

[91] This project is discussed extensively in Hoachlander, et al., *Performance Based Policy Options*.

and postsecondary enrollment. Florida also conducts supplemental employer surveys to obtain occupational classification data from which it determines whether job placements are training related. Vocational programs in several other states have begun to explore the use of unemployment insurance records as a way to measure the labor market performance of students. Parallel efforts are under way in various states by those administering the JTPA program.[92]

State unemployment insurance data do, however, have several limitations. Some categories of workers are not covered, out-of-state workers cannot be traced using a single state's data, only total earnings per quarter and not wage rates are reported, and worker occupations are not identified. Many of these limitations can be rectified by linking unemployment insurance data with additional data sets, or by adding limited and low-cost follow-up employer surveys to determine a worker's hourly wages.

One difficulty with measuring labor market outcomes is that differences in institutional performance may reflect not only differences in program quality but also differences in the types of students served. A program serving many academically disadvantaged students is unlikely to have completion or placement rates as high as a program that serves better prepared students. Differences in student performance may also reflect differences in local or regional labor market conditions. Adjusting for differences in student characteristics and differences in labor market conditions is difficult but not impossible. The Department of Labor has addressed the same problems under JTPA by formulating statistically based adjustment models that states may use, or further modify, to weight the performance standards imposed on service delivery areas. These models take into account multiple client characteristics and local economic factors such as average wages, poverty levels, and

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[92] For a thorough review of the uses and limits of unemployment insurance wage records, see David Stevens, *Using State Unemployment Insurance Wage-Records to Evaluate the Subsequent Labor Market Experiences of Vocational Education Program Leavers*, NAVE Contractor Report, January 1989.

employment rates. Similar models could be used to adjust observed labor market outcomes for different categories of vocational education students.[93]

Learning Outcomes

Learning outcomes include the rates at which students obtain state certification, demonstrate minimum occupational competency or "employability" in their fields, student scores on tests of occupational-specific knowledge and skills as well as their performance on tests of related basic skills, attitudes, and generalized employability.

Measuring learning outcomes is far more complex than measuring labor market outcomes, but methods of testing both general and occupational-specific knowledge and skills or competencies are available. Competency tests have been created in conjunction with introducing competency-based curricula in vocational education. Oklahoma, Vermont, Minnesota, Colorado, and Pennsylvania are implementing competency-based vocational curriculum and developing tests that measure the skills and knowledge that students who complete a program of vocational study should possess. Tests covering a wide variety of occupational fields have been developed by private organizations and are currently used by some postsecondary institutions.[94] In Tennessee, criteria for obtaining 5 percent greater state education funding include the performance of students on tests in their major fields and, as a measure of general educational competence, gains in student test scores from college entry to exit using the ACT entrance examination. According to a report from the Office of Technology Assessment, "...13 states are engaged in testing the occupational competencies of

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[93] For a discussion of JTPA adjustment models, see National Commission for Employment Policy, *JTPA Performance Standards: Effects on Clients, Services and Costs*, prepared by SRI International, September 1988.

[94] The National Occupational Competency Testing Institute (NOCTI) is one such private organization. NOCTI reports testing 9,000 secondary and postsecondary students annually in approximately 60 different fields.

vocational and technical students, and seven states are in the process of developing competency tests for vocational students."[95]

Some experience in using competency measures to assess program performance has also been acquired under JTPA in connection with that program's "positive termination" and "employability enhancement" standards for judging youth training activities. JTPA has placed more emphasis on general "prevocational" competencies than on detailed occupationally specific measures.

The experiences in JTPA and Tennessee indicate that it is possible to tie performance funding to measures of occupational competency and knowledge, but that the process of developing such measures can be time consuming. It will take considerable time to make measures of vocational competency operational in all major fields and in all states. Measures of basic skills and general literacy are already widely used, however, at a large number of community and technical colleges.[96]

Like labor market outcomes, measures of learning outcomes must be adjusted for differences in student characteristics before they become valid measures on which to compare institutional performance. There are two ways in which this may be done. One is to focus on the average learning gains (differences between pre- and post-test scores) for students, rather than on gross levels of knowledge and skills. In Tennessee's performance-based funding system, this "value added" is computed by comparing changes between student entry and exit on the ACT test. The other method is to develop statistical adjustment models that compare observed with expected test score results for different groups of students.

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[95] Office of Technology Assessment, Congress of the United States, *Performance Standards for Secondary School Vocational Education*, April 1989, p. 54.

[96] Roueche, et al. ("Open Door or Revolving Door?") say that "entry-level testing [in math and reading] in [community] colleges is the norm today." Exit testing, however, is far less common.

Educational Attainment Outcomes

This category includes program completion rates, continuation rates, course-taking in a sequence, course-taking above the introductory level, or (to encourage greater secondary/postsecondary "articulation") course-taking in a tech-prep or similar type of program. Continuation and completion rates can be determined at little cost by examining existing student records, which are increasingly automated at postsecondary institutions. If adjusted for student characteristics and length of program, these data can be used to compare completion rates among different institutions. Such adjustments are important, for completion rates at two-year programs should not be compared directly with those at institutions where programs are six months or one year in length. For equity purposes, measures of continuation, completion, and advanced coursetaking can be adjusted to accommodate differences among students of different races, sexes, and economic backgrounds.

Although a common measure of educational attainment, our findings suggest the number of certificates and degrees earned has its limitations as a measure of institutional performance. At community colleges, about 80 percent of students who enter do not earn these credentials. These students may engage in legitimate and valuable patterns of course-taking without earning a degree--although obviously many students do not. Distinctions between students who do not complete would be ignored if a state used degree completion as the sole measure of educational attainment.

For this reason it is important to distinguish among different groups of students and to use measures of educational attainment that are appropriate for each. For students who indicate that they expect to earn a degree or certificate, this standard measure of educational attainment seems most appropriate. For other students, however, alternative measures are called for. Because our research strongly indicates that additional credits earned in one's vocational major increase the likelihood of finding a job in that field, credits in a major field might serve as an alternative measure of educational attainment.

Finally, there is the question of who is a student for the purpose of measuring attainment. Many students are enrolled very briefly, simply taking one or two courses and leaving school. It makes little sense to hold institutions accountable for the educational attainment or labor market performance of such students. Thus, states should set thresholds (e.g., completion of x number of credits) that exclude those students whose engagement in postsecondary vocational education is extremely limited.

Postsecondary vocational education is a complex undertaking with multiple goals. No single measure is likely to be an adequate indicator of program performance.[97] Moreover, use of a single measure could result in perverse effects, as schools attempt to maximize their performance ratings. Measures of occupational competency could encourage narrow "teaching to the test," job placement measures could promote the substitution of job search assistance or placement in low-quality jobs for more fundamental occupational training, and degree completion measures could result in a dilution of graduation standards.

If schools can be rewarded for doing well in one area (such as placement), but can ignore their responsibilities in other areas (such as student learning), performance funding may create undesirable incentives. Therefore, federal policy should require the adoption of multiple definitions of performance. Although states should have considerable discretion to define performance criteria and to select appropriate measures, their formulas should encourage institutions to perform well on several criteria relevant to vocational education. States should be required to develop measures for all three types of outcomes (labor market, learning, and educational attainments) and to design performance-based funding formulas so that no single indicator category counts for more than 50 percent of the total performance rating. It may also be desirable to incorporate explicit penalties in the funding formula for institutions whose performance is one-dimensional.

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[97] This is the conclusion in the report of the Office of Technology Assessment, *Performance Standards for Secondary School Vocational Education*, 1989.

Issues of Fairness

Proposing performance incentive systems always leads to concerns about the potential for "creaming," that is, recruiting only those students with the greatest likelihood of success. Creaming has been a matter of concern in the JTPA program.[98] There are two reasons why creaming is unlikely to cause serious problems in implementing performance-based funding in postsecondary vocational education. First, community colleges, technical colleges, and vocational technical schools generally do not have waiting lists of students. They take all students who wish to enroll. Second, even with performance-based funding, 95 percent of postsecondary vocational funds are likely to remain based on enrollment criteria, thereby providing strong disincentives to cream.[99] As one local administrator said in describing Tennessee's system of higher education performance-based funding, "When 95 percent of my money is still driven by FTE and only 5 percent by perfo ınce, why would I give up $95 to make $5? I will still take any student who wants to enroll."[100] In contrast, the dual system of performance incentives and performance contracts used in JTPA has resulted in the award of considerably more total resources on the basis of performance than is ever likely to be the case in vocational education.

Although selective admissions may not be an issue, the fairness of any performance-based system requires that performance ratings not penalize those institutions that enroll at-risk populations. Indeed, a major purpose of the Perkins Act is to give special help to those

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[98] A recent study found that specific state performance standards policies can affect the types of clients served in JTPA programs. Specifically, an emphasis on exceeding specified performance standards, coupled with the cost of providing services, tends to reduce enrollments among hard-to-serve groups such as welfare recipients and dropouts. In contrast, other policies, such as special incentives for serving specific client groups and the use of adjustment models, encourage service for at-risk groups. See National Commission for Employment Policy, *JTPA Performance Standards*.

[99] NAVE estimates that federal vocational education funds account for only 5.7 percent of total revenues for vocational programs at community colleges, although probably more at public technical colleges.

[100] Hoachlander, et al., *Performance Based Policy Options*, p. 73.

groups and, under a performance-based system, institutions that serve special populations effectively should receive special rewards. To ensure that this occurs, federal policy should require that state systems adjust for non-performance factors (chiefly, the characteristics of students served and labor market conditions), reward both program improvement and "value added," and provide substantial additional weight in funding formulas for performance of students in special population categories. Each of these topics is discussed in this section.

To ensure that the performance of institutions is compared fairly, states should be required to adjust for factors that affect outcomes but are outside the control of vocational educators. Two of the most important of these factors are local labor market conditions and student background characteristics. In the JTPA program, adjustment models developed by the Department of Labor have resulted in increased services to various at-risk client groups. Recent findings indicate that service delivery areas (SDAs) using the Department of Labor model to adjust performance standards served 7.7 percent more welfare recipients and 3.8 percent more school dropouts than SDAs that did not use the adjustment model.[101]

It is important that incentives be designed so that all postsecondary training institutions, not simply those whose students perform best, make an effort to compete for performance-based rewards. If institutions with the highest-performing students are the only ones to receive awards, schools with low-performing students will have little incentive to improve. It is this latter group that it is most important to influence. To ensure that relatively low-achieving institutions are encouraged to improve and are rewarded, a substantial portion of the performance-based funding formula should be tied to measures of institutional improvement in placement, student earnings, completions, occupational competency, or "value added" increases in student learning from entry to exit. On these criteria, schools with low-achieving students are capable of competing equally with schools that enroll better-prepared students.

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[101] National Commission for Employment Policy, *JTPA Performance Standards*, p. 47.

State-developed performance-based funding systems should be required to provide tangible incentives to serve special populations that may be more costly to educate. Assuring that schools serve at-risk populations can be accomplished by requiring that each state's incentive funding formula provide substantial additional weight, perhaps as much as 50 percent, for students whose need is great. In JTPA, several states increased services to welfare and dropout groups by using their 6 percent incentive funds to create special rewards for SDAs serving these groups.[102]

At the postsecondary level, additional incentives should be created for four special populations: academically and economically disadvantaged persons, handicapped persons, older students returning to the labor market after a long absence, and women and men in nontraditional programs. Each state would develop a consistent definition of students in each of the weighted categories. For example, *academically disadvantaged* students might be defined as those who enter postsecondary education with reading scores below the 9th-grade level. *Economically disadvantaged* students could be defined as persons eligible to receive Pell Grants, food stamps or other welfare benefits, or persons receiving unemployment insurance for a period of three months prior to enrollment. Persons returning to the labor market might be those above the age of 24 who have neither worked for salary or attended postsecondary education during the previous five years.

Issues of Design and Administration of Performance Funding

State Administration

The Perkins Act requires states to designate a single agency to oversee the administration of federal funds for both secondary and postsecondary vocational education. In only a handful of states is the designated board responsible for overseeing state and local postsecondary vocational education. In most states the "sole state agency" is responsible only for secondary vocational education and, perhaps, adult or vocational-technical schools.

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[102] Ibid., p. 48.

Agencies directly responsible for administering the postsecondary vocational education system often play a limited role in overseeing the use of Perkins Act funds. Sometimes major providers of postsecondary vocational training are, in effect, excluded from receiving Perkins Act funds. The success of performance-based funding requires strong state leadership at the postsecondary level, which the current Act does not always facilitate.

We recommend that the governor of each state designate a "lead" agency to develop and administer the postsecondary performance information and performance-based funding system. We prefer that the choice be made so as to tie decisions about resource allocation to meeting the state's job training and economic development needs. The designated agency should be required to state publicly which types of institutions (community colleges, postsecondary vocational-technical schools, technical colleges, school district adult education programs, area vocational schools, etc.) are eligible to receive federal vocational education funds. Public disclosure will make decisions to exclude certain types of institutions more difficult.

Performance incentives will be most effective when applied to a broad range of vocational training institutions. However, community colleges may differ from technical colleges and vocational-technical schools in their approach to vocational training so much (especially in requirements for academic course work) that one set of performance measures could effectively exclude one type of institution or the other from receiving federal funds.[103] Therefore, we recommend that the designated state agency should be permitted to allot separate pools of money to different types of institutions in relation to their full-time-equivalent enrollment in vocational courses that carry credit toward a degree or certificate. Vocational training institutions of a similar type would then be rated jointly on performance, and their allotted pool of resources distributed accordingly. It is preferable that states

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[103] For example, a state funding formula that placed heavy emphasis on academic skills and relatively little emphasis on specific occupational competencies would implicitly favor community colleges, where 70 percent of the course work is in academic subjects. Conversely, if occupational competencies were the only learning outcomes valued, more narrowly focused vocational and technical institutions would benefit.

determine full-time-equivalent counts in vocational programs on the basis of credits earned in vocational subjects. The share allotted to different pools should be adjusted at least every three years to reflect changes in enrollment.

The same percentage of funds allotted for state administration and indicator development at the secondary level should also be available to the designated postsecondary agency. Based on the current Act, up to 20 percent of the postsecondary funds would be available to the designated postsecondary agency, with at least 13 percent for the design and implementation of the performance-based information and funding systems, and no more than 7 percent for state administration. Funds for state administration could be used to provide technical assistance to institutions that are performing poorly.

Allocation of Funds to Postsecondary Vocational Education

Under the current Act, each state establishes its own division of resources between secondary and postsecondary vocational education. The result has been wide variations among states in the share of their Perkins Act funds allocated to the postsecondary level. Eight states allocated less than 20 percent of their Perkins Act funds to postsecondary vocational education in 1986-87, and nine states allocated more than 60 percent of their funds to this level. Obviously, states that allocate a small share of their total funds to the postsecondary level cannot be expected to provide credible financial incentives geared to performance. Where postsecondary expenditures amount to less than 20 percent of the state's Basic Grant allocation, it is appropriate to require states to design and implement a system providing performance information only.

Distribution of Funds

Performance-based funding can fail to motivate institutional improvement if the financial consequences of poor performance are indistinguishable from the consequences of superior performance. This situation may occur if performance standards are set so low that virtually all institutions are assured of meeting the standards, or if states simply reallocate their

own funds to "reimburse" those institutions that lose federal funding. The standards problem can be addressed by requiring that the funding formulas that states develop allocate funds among institutions in proportion to their performance rating and that, at a minimum, a given percentage of eligible institutions receive no performance funding (perhaps 25 percent).[104] The substitution problem is discussed below under "How Federal Funds Are Used."

Phasing In the System

Development of a fully operational performance incentive system will take several years, and it must be periodically fine-tuned thereafter. We recommend that performance-based funding be phased-in over a four-year period. In Phase I (years 1 and 2 after reauthorization), states should be required to develop and implement a system of performance information. States should identify performance indicators, develop appropriate measures, obtain the necessary data, and at the end of this period, issue performance reports appropriate for different audiences. In most states this system should focus initially on measures of program attainment and labor market outcomes. The sources of information necessary to measure these performance outcomes are readily available in school records and in the state unemployment insurance wage records. Measures of learning outcomes, because of their complexity, will probably take longer to put in place.

In Phase II (years 3 and 4), states would develop and implement a system of performance-based funding. States would develop rules for linking the allocation of their federal vocational education funds to institutional performance on various types of student outcomes. Year 3 should be devoted to developing appropriate formulas and trial runs that forewarn institutions about how their federal funds are likely to be affected by a

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[104] The key to determining what proportion of eligible institutions should receive a performance-based award is to maintain a large pool of institutions competing for such funds while keeping the average award at an amount sufficient to maintain interest. Under the Perkins Act, 80 percent of the eligible postsecondary institutions receive awards; the median amount, $92,395, is substantial. (See Janet P. Swartz, *State and Local Response to the Carl D. Perkins Act*, exhibits 3.4 and 3.12.)

performance-based formula. In year 4, states should be required to allocate all their federal vocational education funds spent at the postsecondary level in accordance with a federally approved performance funding formula.

Program Coordination

Secondary and postsecondary designated agencies should be strongly encouraged to cooperate in the development of performance measures. Designing ways to access state wage record data, to determine whether placements are training related, and to measure certain occupational competencies are most efficiently undertaken as joint secondary-postsecondary activities. Cooperation would not preclude secondary and postsecondary systems from using different measures of program performance, or placing different weights on similar measures.

Vocational education and the JTPA program share an interest in measuring the labor market performance of students who participate in postsecondary vocational programs. Should both programs increase their reliance on existing unemployment insurance wage records, a direction that appears likely, it would be both inefficient and burdensome on state officials and employers for JTPA and vocational education to proceed independently. Therefore, we recommend a strong federal mandate that JTPA and vocational education coordinate closely any efforts they undertake to use state wage records to assess the labor market performance of program participants.

How Federal Funds Are Used

Performance-based funding leaves decisions about how federal funds are to be spent to local educators. We recommend only two obvious and limited restrictions on the uses of federal funds. First, institutions that receive performance awards should be required to use federal funds for the improvement of vocational education programs. Whether they buy equipment, improve curricula, hire teachers, or give bonuses to their best teachers is their decision. Second, performance rewards should not supplant other sources of state and institutional support for vocational education. If states can decrease state support when they

reward an institution with performance-based federal funds, it will effectively undo any incentive to improve.

Inclusions and Exclusions

For purposes of determining performance ratings, only students taking credit courses in programs that lead to a degree or certificate should be included. Various forms of one-time-only courses, recreational course-taking, customized training, or training that is subject to performance contracts (e.g., under JTPA) should be excluded. Customized training and other contractual training arrangements already contain explicit or implicit performance incentives or rewards.

How to treat proprietary schools and other private sources of vocational training is an important issue. It is desirable to include private training institutions in the performance-based system in order to provide potential students with information on all their training alternatives.[105] Because geographic accessibility can seriously limit student choice, inclusion of proprietary schools in the performance information system may be the only way to provide students with information on all the schools in their community.

Unfortunately, many proprietary schools are not likely to cooperate completely in identifying their students or providing information on fields of study and completers. We recommend that the Higher Education Act be amended to require institutions, as a condition of eligibility for their students to receive Pell Grants and Stafford Loans, to provide to the state agency responsible for performance incentives the Social Security numbers of all students, identifying those that receive degrees and certificates. As states publish the performance information, consumers will be able to compare program completion rates, and the earnings of students who complete programs. We do not recommend, however, that states be required to make proprietary schools eligible for performance funding. Students attending proprietary

[105] Recent Department of Education regulations to lower default rates on student loans require proprietary and vocational-technical schools to divulge completion and placement rates to new students.

schools already receive $2.8 billion in federal student grants and loans. Moreover, the private nature of these institutions makes them accountable implicitly to their customers for performance.

Privacy

States must be required to develop systems that ensure that the privacy of individuals is not violated. States should not reveal any information about the achievement, earnings, or employment of any individual. There must be no possibility that such information would be unwittingly disclosed. One requirement should be that no state publish information on an institution or program in which there are fewer than five students. Under those circumstances, and for other valid reasons as well, it may be desirable to use a three-year rolling average of student performance to measure institutional performance.[106]

National Indicators

The primary purpose of this proposal is to develop fair and objective measures and incentives for improved program performance appropriate to each state. But comparison can also spur states that have been lax in developing a performance orientation. Unfortunately, existing national data are inappropriate for drawing valid estimates of performance by state and rarely contain the types of information needed to fully gauge vocational performance nationally. We therefore recommend that each state be required to provide its performance reports to the federal government. In turn, every two years the federal office of vocational education should submit to Congress a report on national indicators in postsecondary vocational education. We recognize that states will measure performance in different ways. Consequently, comparisons across states will be limited to those areas in which similar measures are employed. Initially, the area most suitable for comparison is labor market

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[106] Use of a three-year rolling average can smooth out large shifts in measures like employment that may reflect temporary local conditions, such as the closing or relocation of a major employer.

outcomes, where the unemployment insurance records are standardized across states and it is easy to define outcomes precisely.

APPENDIX A

CLASSIFICATION OF POSTSECONDARY COURSES

Classification of Postsecondary Courses

The courses described in the HS&B Seniors, 1980 transcripts and NLS-72 transcripts are classified below under vocational, academic, and remedial/avocational categories.

I. VOCATIONAL COURSES

1. Agriculture
   - Agribusiness and agricultural production
   - Agricultural sciences
   - Renewable natural resources

2. Business and management
   - Business management and finance
   - Business support
   - Business and office

3. Marketing and distribution
   - Marketing and distribution
   - Insurance and risk management
   - Marketing management and research
   - Real estate
   - Small-business management

4. Health Care
   - Nursing
   - Nursing-related services
   - Other health care
   - Allied health care
   - Health sciences

5. Occupational home economics
   - Home economics
   - Vocational home economics
   - Personal services
   - Interior design

6. Trades and industry
   - Construction trades
   - Mechanics and repairers
   - Precision production
   - Transportation and material moving

7. Technical and engineering
   - Computer and information sciences
   - Business data programming
   - Business systems analysis
   - Engineering
   - Engineering, technologies and other technologies
   - Engineering-related technologies
   - Science technologies
   - Communication technology

8. Education
   - Education
   - Library science

9. Public service
   - Protective services
   - Public affairs
   - Military science
   - Military technologies
   - Parks and recreation
   - Public administration
   - Law

10. Communications
    - Communications, general and other
    - Journalism
    - Radio/television news broadcast and general
    - Advertising
    - Communications research
    - Public relations

II. ACADEMIC COURSES

1. Letters
   - Literature
   - Writing
   - Speech and linguistics

2. Foreign languages
   - Spanish
   - French
   - German
   - Other languages

3. Humanities
   - History
   - Philosophy
   - Theology
   - Humanities and social sciences
   - Peace studies
   - Other humanities

4. Sciences
   - Biological and life science
   - Physics
   - Chemistry
   - Other sciences

5. Mathematics

6. Social sciences
   - Psychology
   - Economics
   - Political science
   - Sociology
   - Anthropology
   - Archeology
   - Geography
   - Public affairs
   - Ethnic studies
   - Women's studies
   - Other social science

7. Fine arts
   - Visual and performing arts
   - Architecture and environmental design

8. Liberal studies/general studies

III. REMEDIAL/AVOCATIONAL

1. Basic skills

2. Citizenship

3. Personal health

4. Interpersonal skills

5. Leisure and recreational activities

APPENDIX B

DEGREE STATUS OF STUDENTS AT PUBLIC TECHNICAL INSTITUTIONS AND PROPRIETARY SCHOOLS

Degree Status of Students Enrolled at
Public Technical Institutions, High School Class of 1980

Student Characteristic[a/]	Percentage of Enrollment	Degree Completed Assoc.	Certif.	Total	Still in School	Left School	Total[b/]
All students	100.0%	18.0%	18.0%	36.0%	17.5%	46.5%	100.0%
Sex							
Males	52.5%	19.2%	17.2%	36.4%	16.4%	47.4%	100.0%
Females	47.5	16.7	18.9	35.6	19.0	45.5	100.0
Race/ethnicity							
White	82.5	20.6	16.8	37.4	15.6	46.6	100.0
Black	10.6	4.4	5.9	10.3	32.3	57.4	100.0
Hispanic	4.9	--[c/]	--[c/]	--[c/]	--[c/]	--[c/]	100.0
SES							
Low	28.2	14.6	15.4	30.0	10.9	59.1	100.0
Middle	56.6	18.1	19.3	37.4	17.5	45.0	100.0
High	15.2	20.8	19.6	40.3	29.7	30.0	100.0
Ability							
Low	25.9	3.4	21.3	24.6	9.8	65.5	100.0
Middle	62.5	22.0	16.1	38.1	22.6	39.4	100.0
High	11.6	26.1	5.8	31.9	13.8	54.2	100.0
High school program							
Academic	22.0	32.1	8.9	41.0	14.7	44.3	100.0
Vocational	41.2	18.1	25.0	43.1	16.2	40.7	100.0
General	36.8	10.3	16.3	26.6	20.8	52.7	100.0

SOURCE: HS&B Seniors, 1980.

a/ High and low SES quartiles are 25 percent of the total high school graduating class. Ability as measured in high school by the HS&B, Senior Test. High school program is as self-reported by students in high school.

b/ Total is sum of "degree completed total," "still in school," and "left school."

c/ Sample size is too small to produce a statistically reliable estimate.

Degree Status of Students Enrolled at
Proprietary Schools, High School Class of 1980

Student Characteristic[a/]	Percentage of Enrollment	Degree Completed Assoc.	Certif.	Total	Still in School	Left School	Total[b/]
All students	100.0%	12.5%	23.6%	36.1%	21.7%	42.2%	100.0%
Sex							
Males	27.3%	11.2%	17.3%	28.5%	30.7%	40.9%	100.0%
Females	72.7	12.0	26.0	38.0	18.4	42.7	100.0
Race/ethnicity							
White	80.0	13.1	24.7	37.8	22.1	40.2	100.0
Black	13.1	10.9	11.8	22.7	21.7	55.7	100.0
Hispanic	5.8	8.6	32.4	41.0	17.1	41.9	100.0
SES							
Low	25.9	11.0	20.7	30.7	17.6	50.7	100.0
Middle	59.1	10.0	26.7	36.7	21.2	41.4	100.0
High	15.0	27.8	14.1	41.9	36.0	22.2	100.0
Ability							
Low	28.7	3.3	19.5	22.8	24.3	52.9	100.0
Middle	57.0	15.9	26.3	42.2	28.6	28.8	100.0
High	14.3	28.7	20.6	49.3	6.3	44.3	100.0
High school program							
Academic	26.0	23.3	18.8	42.1	22.7	35.2	100.0
Vocational	45.9	10.7	27.7	38.4	17.3	44.3	100.0
General	28.1	7.2	23.4	30.6	26.9	42.5	100.0

SOURCE: HS&B Seniors, 1980.

a/ High and low quartiles are 25 percent of the total high school graduating class. Ability as measured in high school by the High School and Beyond Senior Test. High school program as self reported by students in high school.

b/ Total is sum of "degree completed total," "still in school," and "left school."

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