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ABSTRACT

Obtaining accurate, comprehensive data for vocational education has been one of the more elusive objectives of federal policy. Given the long history of unsuccessful attempts to improve the quality and scope of data on vocational education, it is important to understand the lessons of the past before embarking on a new data collection effort mandated by reauthorization efforts for the Carl D. Perkins Vocational Education Act. This paper seeks to improve future efforts to collect and report data on vocational education. It begins by reviewing the history of previous efforts to collect national information on vocational education and then examines why collecting accurate, consistent data has proven so difficult. The specific kinds of information that are needed for national policy and accountability are discussed next. The five areas involved are governance, student information, staffing, finance, and facilities and equipment. Effective strategies are proposed for collecting this information for each area. Finally, the paper concludes with some recommendations for federal policy. (KC)

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University of California, Berkeley

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NATIONAL DATA NEEDS FOR VOCATIONAL EDUCATION

Obtaining accurate, comprehensive data for vocational education has been one of the more elusive objectives of federal policy. For more than two decades, Congress has periodically expressed dissatisfaction with the condition of vocational education data and sought a variety of "fixes" that, for one reason or another, have failed to produce better information. As reauthorization of the Carl D. Perkins Vocational Education Act approaches, there are once again calls for better data on vocational education. In some instances, these are simply requests for rather specific kinds of information—for example, participation patterns of students with special needs. In other cases, full-blown, comprehensive, national data systems have been suggested.

Given the long history of unsuccessful attempts to improve the quality and scope of data on vocational education, it is important to understand the lessons of the past before embarking on a new data collection effort. It is possible to design an effective strategy for obtaining accurate information on the vocational education enterprise, but only if many of the past mistakes can be avoided. Many misunderstandings about the vocational education enterprise and its ability to generate useful national data persist. Unless these can be rectified, reauthorization once again risks asking for the impossible. The inevitable frustration when the impossible cannot be achieved will further undermine the credibility of the field.

This paper seeks to improve future efforts to collect and report data on vocational education. It begins by reviewing the history of previous efforts to collect national information on vocational education, and then examines why collecting accurate, consistent data has proven so difficult. The specific kinds of information that are needed for national policy and accountability are discussed next. The five areas involved are governance, student information, staffing, finance, and facilities and equipment. Effective strategies are proposed for collecting this information for each area. Finally, this paper concludes with some recommendations for federal policy.

THE HISTORY OF EFFORTS TO COLLECT NATIONAL DATA ON VOCATIONAL EDUCATION

Since the passage of the Smith-Hughes Act in 1917, the federal government has collected some form of statistics on vocational education. Until 1963, these amounted only to gross counts of students enrolled in the major program areas supported by federal aid—for example, agriculture, business, and trade and industry. The Vocational Education Act of 1963 and the 1968 Amendments began requiring a series of annual reports that contained more detailed reporting. In addition to enrollment in major program areas, states were asked to report information on total vocational education enrollment by race. They were also asked for information on enrollment of disadvantaged and handicapped students; enrollments in secondary, postsecondary, and adult vocational education programs; and expenditures from federal allocations, as well as state and local expenditures for vocational education.

Responsibility for collecting this data lay with the Bureau of Occupational and Adult Education (BOAE) in the then U.S. Office of Education. Although many states used some of their federal vocational education research funds to develop new automated information systems, little uniformity existed across states. Problems with inaccurate, inconsistent data persisted throughout the 1960s, and Congress frequently complained about the quality of information on vocational education.

Project Baseline

To help address this problem, Congress established Project Baseline in 1970, a joint effort of the National Advisory Council on Vocational Education and the U.S. Office of Education. In Project Baseline's own words, the project "was established to get the information everyone needs and no one seems to have" (Lee, 1972). Project Baseline attempted to work with each of the states to develop a more complete and more reliable national picture of secondary and postsecondary vocational education.

Despite five years of effort, Project Baseline was unable to overcome most of the problems that had plagued the collection of vocational education data throughout the 1960s. Enrollment data still fluctuated wildly from year to year. Follow-up information was either unavailable or based on such small response rates that the data was useless. For example,

in 1972, twelve states reported secondary enrollment in vocational education that was more than twenty percent greater than enrollment in 1971. Thirteen states in 1973 and 1974, fourteen states in 1975, and seven states in 1976 reported secondary enrollment increases of more than twenty percent from the previous year. During the period of 1971 to 1976, from twelve to twenty-four states regularly reported annual data on the number of program completers that represented increases of more than twenty percent over the previous year (Benson, Hoachlander, & Johnson, 1980). While general secondary enrollment was still growing modestly in the early 1970s, the growth was not large enough to make credible changes of more than twenty percent in vocational education enrollments.

To its credit, Project Baseline did not mindlessly report these large fluctuations. It sought explanations from the states, and, in most instances, there were good reasons for the annual differences. New definitions, alterations in reporting systems, duplicative counting, late reporting, and missing data were but a few of the causes of inconsistent reporting over time. However, while Project Baseline could explain the problems, it could not correct them. The sorry state of vocational education data was left unchanged, and Project Baseline ceased collecting data after 1976.

The Vocational Education Data System (VEDS)

In 1976, Congress decided to move primary responsibility for vocational education data collection out of BOAE and lodge it with the National Center for Education Statistics (NCES). As NCES was the primary repository for educational data and had the expertise to oversee the design and implementation of large scale data collection efforts, Congress hoped that NCES would produce more reliable information on vocational education. Thus, the 1976 Amendments to the Vocational Education Act directed NCES to design and operate a Vocational Education Data System (VEDS). Congress wanted VEDS to supply annual information on vocational education students, programs, program outcomes, staff, facilities, and expenditures. Congressman Carl D. Perkins summarized the general purpose of VEDS in his opening remarks during hearings on December 10, 1981: "In mandating this system, Congress was responding to a lack of adequate data to judge program effectiveness and to make important decisions about future directions."

After almost two years in the design stages, VEDS began collecting data in 1978-79. No one knows how much VEDS cost—some estimates were as high as two hundred

million dollars when the resources expended by state and local personnel were counted—but by 1983, the realization was growing that the latest attempt to improve vocational education data had failed. In 1983, NCES performed a number of validity tests on the four years of accumulated data. These checks confirmed what many critics of VEDS had argued from the outset—three major problems plagued the system:

1. *Lack of comparability among states.*
   Data was not comparable from state to state and, therefore, yielded misleading national totals when aggregated.

2. *Year-to-year variability.*
   The data exhibited excessive variation over time, which was difficult to explain. Consequently, the VEDS data could not be used to describe trends over time accurately.

3. *Within-state discrepancies.*
   When VEDS data from some states was compared to state data from other sources, many large discrepancies were observed; these could not be adequately explained.

Following these findings by NCES, the Office of Management and Budget (OMB), in December, 1983, withdrew approval for collecting VEDS data for 1983-84 and 1984-85. In an unpublished memo to the NCES, the OMB stated that this was because "VEDS has substantial and continuing problems collecting data which are accurate and meaningful." OMB directed that the "collection should not be undertaken at this juncture and should remain suspended until the Department [of Education] has fully implemented the plan for improving VEDS."

Improving VEDS, however, proved impossible. Although some parts of the system probably did produce reasonably accurate information, the widely circulated horror stories (e.g., more Native American secondary students enrolled in vocational education in one state than the state's total population of Native Americans) subjected VEDS to such ridicule that there was little hope of salvaging any credibility for an improved system. In February, 1984, the NCES Administrator, with the concurrence of the Office of Vocational and Adult Education (OVAE, formerly BOAE), issued the following statement in a memo to the Secretary of Education:

> The current [VEDS] system has serious technical problems. NCES believes that the technical problems do not lend themselves to correction without a major system redesign. The data are unreliable and subject to serious misinterpretation.

Consequently, VEDS was permanently terminated, and another major effort to produce accurate, reliable national data about vocational education had failed. (For an excellent analysis of the problems inherent in the design and implementation of VEDS, see Robert E. Barnes, "Why VEDS Failed," Office of Planning, Budget, and Evaluation, U.S. Department of Education, February, 1984, unpublished paper.)

Data Collection Under the Perkins Act

In the Fall of 1984, Congress tried once again. The Carl D. Perkins Vocational Education Act directed NCES to develop "a national vocational education data reporting and accounting system using uniform definitions." The system required by this section was to include the following information in regards to vocational education: (1) students (including information concerning race, sex, and handicapping condition), (2) programs, (3) program completers and leavers, (4) placement and follow-up, (5) staff, (6) facilities, and (7) expenditures in relation to the principal purposes of this Act." This data collection mandate differed from VEDS in one very important respect. NCES was to rely on sample surveys rather than a universal census. Furthermore, the information would be updated every other year rather than annually. There was one major exception to the use of sample surveys. Section 423 directed NCES to collect information on all secondary handicapped students enrolled in vocational education and to report this information by four-digit CIP code, instructional setting, and handicapping condition.[1]

The Perkins Act also continued the National Occupational Information Coordinating Committee and charged it with developing and implementing an occupational information system to meet the needs of both vocational education and employment training programs. The primary objective of this system was to gather information on labor market supply and demand.

Efforts to comply with these directives on data collection have proceeded much more cautiously than the earlier attempt with VEDS. To date, rather than develop an inde-

[1]The CIP code is a two, four, or six digit code based on the Classification of Instructional Programs developed by NCES to describe education offerings at the secondary and postsecondary levels. For example, CIP Code 08 represents all Marketing and Distribution programs, Code 08.04 represents Financial Services Marketing, and Code 08.0403 is Credit Marketing. Thus, the level of specificity increases as the code moves from two to four to six digits. CIP codes include academic as well as vocational education offerings (Malitz, 1981).

pendent system for vocational education data collection, NCES has relied on a strategy that emphasizes using a variety of existing data collection efforts and, when necessary, modifying them to obtain better information on vocational educatio' These studies include the National Longitudinal Study of the Senior Class of 1972 (NLS-72), High School and Beyond, and the National Education Longitudinal Study of 1988 (NELS-88). NLS-72 and High School & Beyond figured prominently in the analyses undertaken by the National Assessment of Vocational Education (NAVE), the assessment required of the Department of Education by the Perkins Act (Section 403 (a)). Additionally, NAVE, in cooperation with NCES and the Office of Special Education and Rehabilitation Services (OSERS), led an effort to use the National Assessment of Educational Progress (NAEP) to collect recent secondary school transcripts to analyze participation patterns in secondary vocational education.

Special attention was paid to using this NAEP supplement to develop information on the course-taking patterns of handicapped students. Although the Perkins Act directed NCES to collect information on *all* handicapped students, NCES maintained that this request was unworkable. For reasons that will be made clearer below, Section 423 would simply have forced NCES to repeat the VEDS fiasco, even though it would be limited only to handicapped students. In contrast, the NAEP transcript supplement, while limited to a national sample of handicapped students, has yielded for the first time a rich data base on the participation patterns of handicapped students in all aspects of the secondary school curriculum, academic as well as vocational, by instructional setting and handicapping condition.

Additional information on secondary vocational education will be available from the Schools and Staffing Survey, which was conducted by NCES during the 1987-88 school year. The NELS-88, the most recent longitudinal study undertaken by NCES, will also provide a longitudinal portrait of participation in vocational education beginning with the eighth grade.

At the postsecondary level, NCES has sought to revamp the Higher Education General Information System (HEGIS) to include the full array of institutions offering vocational education outside of high schools. This revised data collection, called the Integrated Postsecondary Education System (IPEDS), replaces HEGIS and will be a major source of data on postsecondary vocational education enrollment and completion, as well as postsecondary staffing, finances, and institutional characteristics. Additionally, the post-

secondary transcripts collected for NLS-72 and High School & Beyond provide a wealth of data on postsecondary course-taking patterns in vocational education. Finally, the National Postsecondary Student Aid Survey (NPSAS) makes data available on financial assistance to postsecondary students participating in vocational education in the full array of postsecondary institutions, including proprietary schools.

NLS-72 and High School & Beyond, as well as the longitudinal study maintained by the U.S. Department of Labor (NLS Youth), have also proven to be excellent sources of data for analyzing labor market outcomes associated with participation in vocational education. Not only do these studies overcome the problem of poor response rates, but they also permit tracking the labor market experiences of participants over much longer periods of time.

In short, much of what Congress requested in the Perkins Act is now available in more useful, accurate, and consistent forms than ever before. Three problems, however, remain. First, there are some major information gaps, as well as shortcomings, in the existing data collection efforts. For example, information on state and local expenditures for vocational education is virtually absent. No information on facilities has been systematically collected since the National Study of Vocational Education Systems and Facilities by Woodruff in 1978. Additionally, the sample sizes of some of the data systems inhibit subnational comparisons among regions and among states. Sample size also limits the degree of programmatic detail that can be achieved in analyzing participation patterns and program outcomes.

Second, the timing of existing surveys does not always coincide with the cycle of reauthorization of the federal law for vocational education. For example, there will be virtually no data available for reauthorization on secondary staffing, although the Schools and Staffing Survey will eventually yield some useful information on secondary vocational education teachers.

Third, while the current decentralized approach to data collection is more sensible than any of the previous strategies for collecting data on vocational education, it increases the risk that important opportunities to improve information will be missed. Presently, no one familiar with vocational education is responsible for helping to coordinate the collection of data on vocational education among departments of the federal government. Education, Labor, Commerce (Census), and Defense all have data collection efforts in place that

produce information on vocational education and employment training. While some conflicts and inconsistencies among these various data systems are inevitable, charging some entity familiar with vocational education with the responsibility for minimizing unnecessary problems would be useful. A similar need exists within departments and even within agencies. Within the Department of Education, for example, NCES, OSERS, and OVAE all collect data on vocational education without any clear means for coordination. Even within NCES, data collection responsibilities are shared among several branches that could benefit from better coordination and communication about what kinds of data on vocational education are needed and with what frequency.

In sum, throughout the history of Congressional mandates, it has been assumed that uniformity in the collection of vocational education data can be obtained from an enterprise whose merits are often imbedded in its diversity. Moreover, legislation has not been adequately sensitive to how vocational education interacts with the rest of the educational system and the implications of these interactions for data collection. As reauthorization of the Perkins Act approaches, what is needed in the area of data for vocational education is not a mandate for a new, independent, centralized vocational education data system. Much more desirable would be a process for identifying major gaps in information and for deciding who is in the best position to fill them. Additionally, information on vocational education can be improved by concentrating on fine-tuning the existing and planned data collection effort to improve timing, eliminate inconsistencies, and to take advantage of low-cost opportunities to collect additional data. Finally, while data collection should remain decentralized, it would be desirable to centralize a corpus of expertise capable of using these various data sets for analyzing vocational education and for providing quick, efficient responses to requests for information. Before describing this strategy in more detail, it is useful to better understand some of the issues and problems that have undermined previous efforts to collect data on vocational education.

WHY HAS GOOD DATA ON VOCATIONAL EDUCATION BEEN SO HARD TO OBTAIN?

Historically, Congress has sought answers to four seemingly simple questions about vocational education:

(1) Who is served?
(2) What is offered?
(3) What is accomplished?
(4) What does it cost?

As described in the previous sections, answering these questions has proven exceedingly difficult. Why is this so?

Who is Served and What is Offered?

Traditionally, efforts to determine who is served by vocational education have concentrated on attempting to count the number of students enrolled in vocational education during the course of the school year. Typically, these efforts have also attempted to report enrollments in different types of vocational education programs (e.g., agriculture, business, health) with different degrees of detail. Rather than simply reporting enrollment in agriculture programs, for example, more detail is often desired such as whether the enrollment is in agricultural science or ornamental horticulture. Moreover, policymakers have insisted on "unduplicated" counts of students, counting a student only once regardless of how many vocational courses a student takes in the course of a year and assigning a student to only one vocational education program. As has been repeatedly demonstrated over the past twenty-five years of attempts to collect data in this fashion, this desire for annual, unduplicated enrollment by type of vocational program is impossible to obtain. It is important to understand why.

Part of the problem is definition. Accurately and consistently reporting who is served and what vocational education is offered depends first on a clear definition of what constitutes vocational education and then on a uniform system for classifying program offerings. The Carl D. Perkins Vocational Education Act, Section 521 (31), defines vocational education as the following:

> organized educational programs which are directly related to the preparation of individuals in paid or unpaid employment in such fields as agriculture, business occupations, home economics, health occupations, marketing and distributive occupations, technical and emerging occupations, modern industrial and agriculture arts, and trades and industrial occupations, or for additional preparation for a career in such fields, and in other occupations, requiring other than a baccalaureate or advanced degree and vocational student organization activities as an integral part of the program.

States have had considerable latitude in interpreting this definition, and, especially at the secondary level, there is substantial variation among states in what constitutes vocational education.

For example, although federal law specifically includes industrial arts in vocational education, it also defines vocational education as programs "directly related to the preparation of individuals in paid or unpaid employment." There is a longstanding debate in several states over whether industrial arts is appropriately termed vocational education because these programs often are not intended to prepare students for employment. Industrial arts was originally conceived by its proponents as an integral part of general education—exposing students (mostly boys, until recently) to the "culture of the industrial world." Such exposure was considered as valuable for the prospective banker or physician as for the prospective carpenter or electrician. Some states have maintained this traditional conception of industrial arts and believe, therefore, that it is not properly included in vocational education.

In other states, industrial arts classes serve as introductory courses for further work in trade and industrial vocational education. In such states, "Woodshop," an industrial arts course, is no different from "Woodworking I," a vocational education course. Indeed, in more rural areas with smaller schools, industrial arts may, out of necessity, play this introductory role because schools are not large enough to support both industrial arts and separate introductory courses in vocational education. Similarly, in states where high schools consist only of grades ten through twelve, industrial arts is more likely to resemble introductory vocational education than in states where high schools include grade nine or grades seven and eight.

Industrial arts, therefore, can mean very different things in different states, depending upon how a state conceives the purpose of the program and the extent to which program offerings are constrained by geography or the organization of secondary education.

Quite properly, these are state decisions made with an eye to local conditions and an understanding as to how vocational education relates to the goals and philosophies of the state's larger educational enterprise. To insist that states uniformly include or exclude industrial arts in vocational education would superimpose a rather mindless federal policy on more carefully thought out state policies for no apparent reason other than the desire for the illusion of "comparable" data.

It might be argued that one way out of this dilemma would be to instruct states to include industrial arts as part of vocational education only if it serves as the first course in a planned sequence of vocational education courses, rather than as a general introduction for all students to the world of industry. The difficulty with this approach, however, is that industrial arts courses may serve both purposes, that is, an introduction for more advanced training for those students electing to pursue it and a one-time exposure to industrial culture for students pursuing other education careers. Who, then, should be counted as being served by vocational education, and if it is only those students pursuing more advanced vocational education, how will this be determined prospectively?

Such problems are not limited to industrial arts. Consider students taking "Typing I," which is typically offered in the business departments of most secondary schools. Typing I is part of at least three different vocational education programs —Business Data Processing, Secretarial Training, and Typing and General Office. Each of these three programs constitutes a unique four digit code in the Classification of Instructional Programs (CIP). Moreover, Typing I is also taken by large numbers of students who will not pursue any additional vocational education at all. As there is rarely any data available on students' long-range intentions (if indeed students clearly know these intentions), accurately assigning students enrolled in Typing I to a specific vocational education program is impossible.[2]

Similar problems exist throughout the vocational curriculum. Agricultural Science and Agricultural Mechanics are required courses for a variety of different agricultural programs. Health is the beginning course in most health programs. Carpentry is the first

[2]This problem is not solved by asking students their intentions or asking them whether they consider themselves "vocational" students. Experience with past surveys indicates large discrepancies between what students say they intend to do in their educational careers and what they actually do. Additionally, when asked what type of program they are enrolled in, there are also large discrepancies between the percentage of students who say they are vocational and the percentage of students who actually pursue an organized program of vocational education.

course in several different woodworking programs, and Electricity is required for electronics programs and electrician programs.

In short, at any given point in time, students enroll in courses, not programs. Accurately assigning students to a specific vocational program cannot, therefore, be done prospectively. Rather, accurate assignment requires retrospective information on the courses students have taken. Moreover, as a program often cannot be uniquely identified until enrollment in the terminal course of a sequence, accurate assignment to a four or six digit program code is most accurately accomplished at the time of program completion.

The need for retrospective data to accurately determine who is served by what types of vocational programs has clear implications for data collection. The best source of retrospective data, at both the secondary and postsecondary levels, is student transcripts. Transcripts not only provide the complete course-taking history that makes possible accurate assignment to programs, they also offer several additional advantages. With transcripts it is possible to impose alternative uniform definitions of vocational education and assess the consequences. One can easily ask, What difference does the inclusion or exclusion of industrial arts courses make in the number of students participating in vocational education? One may also define more uniformly the types of courses constituting a particular vocational education program to ensure that the course content of particular programs is defined consistently. Additionally, it is possible to move beyond simple notions of participation and examine how much vocational education students take, in what areas, and in what sequences. It is also possible to examine how vocational course-taking interacts with course-taking in other parts of the secondary and postsecondary curricula.

Transcript studies have proven exceptionally useful for analyzing secondary and postsecondary participation patterns in vocational education. Recent studies have been sponsored by NCES (National Center for Education Statistics), NAVE (National Assessment of Vocational Education), and OSERS (Office of Special Education and Rehabilitation Services), and some of the earliest explorations of transcript data were conducted by the former National Center for Research in Vocational Education located at Ohio State University (Campbell, Orth, & Seitz, 1981; Hoachlander & Choy, 1986; Turna, Gifford, & Hoachlander, 1989). As valuable as these studies have been, they suffer from several shortcomings that should be alleviated in the future.

First, none of the efforts to collect transcript data were undertaken with vocational education specifically in mind. Even the recent NAEP (National Assessment of

Educational Progress) transcript data collection was undertaken as an afterthought, and, as a consequence, many of the transcript records cannot be linked back to earlier data collected by NAEP on students and schools. Similarly, the two NCES longitudinal studies, NLS-72 and High School & Beyond, while rich sources of data, are not as useful as they might otherwise have been. It is not possible, for example, to determine what courses were taken at area vocational schools versus those taken in comprehensive high schools. Additionally, the time between longitudinal studies tends to be eight to ten years, and it is desirable to monitor course-taking more frequently.[3] What is needed, therefore, is a commitment to routine, a periodic collection of transcripts using a vehicle tailored to the needs of vocational education. Vocational education data need not, indeed should not, be the sole objective of this transcript collection, but the collection should adequately serve the needs for vocational education data.

Second, the sample size of transcript studies is not always large enough to permit sufficiently detailed analysis of course-taking patterns. The NLS Youth cohorts, for example, contain about twelve-hundred students in each cohort. There are, therefore, not enough observations to do any detailed analysis of how participation by race, sex, or special need varies among different types of vocational education programs. Even High School & Beyond, with a sample size of roughly twelve-thousand transcripts, will permit detailed analysis of only about thirty of the largest vocational education programs.

Increasing sample size, of course, increases costs, especially if the transcript data is to be linked to information on student, school, and parental characteristics and to follow-up data on family formation, labor market experience, or further education and training. It is useful, therefore, to consider transcript studies of different sizes to serve different purposes. For example, an examination of how course-taking patterns differ among states or among major racial and ethnic groups might be done with a large sample of transcripts that simultaneously collects only a bare minimum of additional data on selected student characteristics. Its purpose would be largely descriptive and could be repeated perhaps once every five years to analyze major trends over time. In contrast, causal studies of what influences students' course-taking patterns would rely on smaller samples but collect much

[3]In fact, one motivation for undertaking the NAEP transcript study was the recognition that the secondary transcripts available from High School & Beyond were those of 1982 high school seniors. In the absence of more recent data with which to analyze possible changes in participation in vocational education, the 1982 transcripts would have lost much of their value for reauthorization of the Perkins Act in 1989.

more detailed information on characteristics of students, teachers, parents, and schools. Such studies would resemble more closely the longitudinal studies conducted by NCES and the Department of Labor, but would pay closer attention to the kinds of data necessary to untangle course-taking patterns in vocational education.

Finally, sample sizes of transcript studies are never likely to be large enough for detailed analysis at the state or substate level. Nor are they likely to be sufficient for accountability, as opposed to research and analysis. Therefore, to the extent that counts of students served are desired at the state level, it would be more effective to concentrate on counts of students *completing* vocational education programs rather than students enrolled. For the reasons noted above, it is much easier to identify unambiguously who has completed a particular vocational education program than it is to determine who is enrolled in one. Moreover, insofar as completion represents readiness to work in a field related to training, completers are a much more useful indicator of labor market supply than are enrollments.

What degree of programmatic detail is necessary for understanding what is offered and who is served? The CIP (Classification of Instructional Programs) established eleven distinct two digit codes, 128 four digit codes, and 567 six digit codes for classifying vocational education.[4] For purposes of manpower planning or assessing access to vocational education, defining participation at the two digit level has never been very satisfactory. The distinctions are not fine enough to be useful. At the other extreme, six digit reporting includes many rather esoteric programs with very few participants, nationally as well as at the state and local levels. Even four digit reporting far exceeds the number of programs typically offered in secondary and postsecondary institutions. What degree of detail, therefore, is appropriate?

As long as transcripts are the basis for analysis, this question need not be answered *a priori*. With the transcripts, the analyst may impose whatever degree of specificity the data will support. If, however, the analyst does not have direct access to transcripts, the degree of programmatic specificity must be decided before data collection begins. For example, if local officials are expected to report counts of program completers based on their

[4]The Classification of Instructional Programs has not been universally implemented. Many states continue to use the old Office of Education (OE) codes.

own perusal of student transcript information, they must be told what kind of programmatic detail is desired.

The appropriate degree of detail, unfortunately, cannot be consistent for all states and localities. If student records are automated, then the least burdensome requirement may be six digit reporting, as it would require additional programming to aggregate counts of students within two or four digit detail. Computer-generated reports from fully automated student data of participation by race and by sex are straightforward. The report would be based on information from only three variables—program code, race, and sex—a simple task for any modern database software.

If student records are not automated, or if automated transcript records cannot easily be linked to automated records on student characteristics, reporting becomes much more problematic. Under these conditions, a printed form must be completed manually. The form must contain all possible combinations of the three variables, which, depending on the number of values each variable may take, can result in an enormous form. For example, maintaining the complete six digit detail would, therefore, require a form with 5,670 separate cells (567 program codes x 5 racial/ethnic categories x 2 sex categories = 5,670). Even manually reporting at the four digit level would require a form with 1,280 cells. It is this kind of proliferation of data cells that so frustrated OMB (Office of Management and Budget) in its efforts to minimize data burden from federal requests for information.

What is Accomplished?

Historically, the primary goal of vocational education has been to prepare students for employment in occupations requiring less than a baccalaureate degree. Although the major aim of vocational education has been *preparation* for employment, the primary test of the effectiveness of vocational education has been employment *per se*. Federal law traditionally has sought to evaluate the effectiveness of vocational education programs in terms of placement in occupations related to training. Employer satisfaction with the skills and attitudes of completers from vocational education programs has been an added criterion in recent years.

Assessing the accomplishments of vocational education, therefore, has relied primarily on follow-up of participants in vocational education after they have completed or left

vocational education programs. VEDS, for example, required states to determine the status of vocational education participants six months after having completed or having left a vocational education program. States were to report, by program, the number of students employed in occupations related to training, employed in other occupations, pursuing further education or training, enlisted in the military, or not in the labor force.

This approach to follow-up suffered from a number of serious deficiencies. First, response rates to the mail surveys were very low. Response rates of twenty-five percent or less were typical, despite efforts at mail and telephone follow-up of nonrespondents. Such low response rates rendered the follow-up data useless. Second, even were it possible to achieve acceptable response rates, the one-time follow-up only six months after completing or leaving a program offered an incomplete description of the benefits (or lack thereof) of vocational education. Unlike employment training, which is more oriented to achieving short-term benefits, vocational education purports to contribute to longer-range employment skills, a claim that could not be assessed with the one-shot, short-term follow-up requirements under VEDS. Third, because the follow-up data was aggregated first by program and then by state, the data could not be used to analyze variability in employment outcomes. Outcomes could not be linked to student or program characteristics to determine why some participants or some programs were more successful than others. Similarly, there were no provisions for controlling the vagaries of the labor market itself and other external factors affecting outcomes.

Even if such shortcomings could be overcome—and the national longitudinal studies do permit much better analysis of the long-run benefits of participation in vocational education—a major problem would remain: the single-minded focus on employment outcomes is inappropriate. While labor market outcomes are a necessary indicator of the effectiveness of vocational education, they are not sufficient. Many factors other than the quality of a particular program affect a student's employment history. Economic conditions, family formation, personal interests, motivation, and alternative opportunities all figure into what students do after participating in vocational education. Under the right economic conditions, for example, graduates of very poor programs may all do very well in the labor market, at least for a few years.

What is needed, therefore, in addition to labor market outcomes, are more direct indicators of the accomplishments of vocational education, particularly of the *educational* outcomes of vocational education. To date, other than information on the number of

program completers, data on educational outcomes has been absent. Although vocational education in many states has claimed to have become increasingly competency-based, virtually no effort has been made to develop valid indicators of the nature and degree of competency achieved by the instruction. Nor have there been any efforts to develop valid measures of "value added" dimensions of this instruction—the gains and value added thereby from basic and job specific skills realized by students from participation in vocational education. Similarly, while vocational educators have long maintained that the applied, hands-on approach of vocational education provides an effective alternative to conventional academic courses for imparting basic skills in reading, writing, mathematics, and science, there is little evidence of developmental work to produce indicators showing whether these gains have, in fact, occurred. None of this should be surprising or, perhaps, even a cause for apprehension. American public expenditures in the social sciences, humanities, and even in engineering are far higher than in vocational education. Yet these fields have begun a search for indicators of educational accomplishment in terms of competence, values, or intellectual skills.

It will probably be argued that measures of educational outcomes on a national scale would prove hopelessly burdensome. Such an argument would certainly be true if federal law sought detailed data on a universal basis. There are, however, alternatives to universal collection. For example, competency measures could be added to the testing components of the national longitudinal studies. Oversampling students in selected vocational education programs could be done to produce sufficient cell sizes for analyzing the achievement gains of program participants.

Similarly, policy could seek to use general indicators of educational outcomes, rather than more detailed test results. For example, suppose federal policy required states to adopt the following generic definition of program completion: demonstrated acquisition of the basic and job specific skills necessary to perform successfully in an occupation related to training. States and localities might be left free to determine, in collaboration with employers, the precise mix of skills and levels of competency necessary for successful performance. However, whatever mix of skills and levels of proficiency were established, students would be required to demonstrate, through competency testing or other means, the achievement of these requirements before being certified as having completed a particular vocational education program. As a general indicator of educational outcomes, then, states

and localities could be required to report the number of completers of vocational education programs. We shall have more to say on this possibility below.

Leaving states free to determine the mix of skills and required levels of proficiency will result, some will object, in nonuniform definitions of completion across states and localities. Completing auto mechanics in California, therefore, will not mean the same thing as completing auto mechanics in Michigan. This lack of comparability will, some will argue, prevent national aggregates of the data and make the data useless for purposes of national policy. Here, then, is the place for a brief comment on the quest for uniform definitions.

Adopting universal, uniform definitions for vocational education is a longstanding hope in federal policy. The 1976 Amendments, as well as the Perkins Act, explicitly call for uniform definitions in the design of federal vocational education data systems. Unless carefully conceived, however, uniformity may be counterproductive. Consider the case of completion. If by "uniform" one means that completion represents the demonstrated acquisition of the basic and job specific skills necessary to perform effectively in a job related to training, uniformity serves a useful policy purpose. If, however, uniformity also means that completion represents acquisition of the same set of skills via the same means (e.g., a specific sequence of courses), insistence on uniformity may produce undesirable outcomes. Completing an auto mechanics program for employment in a rural area, for example, may require a very different set of skills than completion for employment in the more specialized labor markets of a larger metropolitan area.

In short, vocational education programs are likely to be more effective if they are designed to meet local and regional labor market needs. As these needs may often vary, programs often will be effective only if they are *not uniform* in content or in the specification of skills required to perform in an entry level position. Policy should, therefore, seek uniform generic outcomes—for example, completion should uniformly represent readiness to work—but be wary of insisting on uniform standards for determining whether such outcomes have been achieved.

Similarly, uniform standards for defining a particular state can be misleading. For example, a definition of the economically disadvantaged based on uniform income standards will not uniformly measure economic disadvantage at all. Such a definition will understate the degree of disadvantage in high-cost areas of the country and overstate it in

low-cost areas. The appearance of uniformity will have been achieved at the expense of real meaning.

Leaving states and localities to their own devices, of course, presents a different set of problems. The argument advanced here is not that willy nilly state and local definitions are preferable to federal definitions. Rather, we are simply cautioning that uniformity in definitions must be approached with care and flexibility.

In summary, what is accomplished in vocational education needs to be more broadly conceived. While labor market outcomes should continue to be monitored, they should not be the sole criteria by which the effectiveness of vocational education programs are assessed. Educational outcomes are, in many respects, more within the control of vocational educators and, in this respect, more appropriate measures for accountability. They have the added advantage of often being easier to measure.

What Does Vocational Education Cost?

Congress has asked a number of questions about the finances of vocational education. These include the following:

- How much state and local money is expended for vocational education?
- How much is spent on vocational education for students with special needs?
- What are the "excess costs" required to improve the access of students with special needs and for what are the costs incurred?
- What are the relative costs of different programs and different delivery systems?
- How is federal money allocated among eligible recipients?
- What do federal funds buy?

Some of these questions are easier to answer than others. Although determining what is spent for vocational education may seem straightforward, it is, in fact, quite difficult. At the state level, most state education agencies (SEAs) can easily keep track of the allocation of federal vocational education funds to eligible recipients, but with the exception of those few states that provide separate state funding for vocational education, most states cannot determine how much state money is spent for vocational education.

State funds for vocational education are allocated as part of general assistance to local education agencies (LEAs), and, consequently, cannot be traced to a particular part of the curriculum.

Similarly, at the local level, LEAs maintain accounts that distinguish revenue by source (federal, state, and local) and expenditures by object (e.g., salaries, benefits, supplies, and equipment). Additionally, they can generally distinguish expenditures for instruction from administration or counseling. Most LEAs, however, do not maintain accounts of expenditures by instructional program. Therefore, they do not know how much state and local money is spent for vocational education. Estimates can be and are made, but these are subject to considerable error and variability over time, as evidenced by the widely fluctuating estimates produced by VEDS and its predecessors.

If it is difficult to determine how much is spent for vocational education as a whole, then it is even more difficult to determine how much is spent by each type of vocational education program. VEDS sought expenditures by two digit program code, but the information submitted was highly suspect, often estimated simply on the basis of the distribution of enrollment among the different programs. Even if this prorating technique were an acceptable procedure for estimating expenditures by program—and this is not likely—the underlying enrollment data was inaccurate and therefore could not possibly lead to accurate estimates of expenditure by program.

Even if accurate estimates of expenditures could be obtained by two digit code, the utility of such information is by no means clear. The two digit distinctions are too general to permit any useful analysis of differences in costs and expenditures among programs. Analysis at the four or six digit program level, which could be useful for resource allocation policy, is simply beyond the capabilities of most LEAs and SEAs on a regular basis.

A related problem is the calculation of "excess costs" associated with providing services to students with special needs. Funds allocated under the setasides for handicapped and disadvantaged students, in both the 1976 Amendments and the Perkins Act, are to be used to pay for not more than one-half of the funds expended above the average expenditures per student for students with special needs. In practice, most LEAs have found it impossible to comply with this requirement. Not only do they not know precisely what average expenditures per student are for vocational education, but also their accounting systems are not designed to keep track of additional expenditures on certain types of

students or programs. To satisfy the federal law, therefore, LEAs are likely to use setaside funds only for items that clearly would never be purchased as part of a regular program. The requirement, therefore, encourages compliance behavior, possibly at the expense of more effective but less traceable alternative uses for the funds.

Finally, it should be noted that while it is easy to trace the allocation of federal VEA funds to an LEA, it is difficult to determine how federal funds alone are spent because it is difficult to avoid commingling with state and local revenues. Even separate accounting for federal revenues, a standard local practice, does not really solve this problem because of the "substitution effect." For example, suppose federal funds are used to buy computing equipment. One has no way of knowing whether, in the absence of federal funds, the local recipient would have bought the computing equipment with state and local dollars. If the equipment would have been purchased with state and local dollars and federal dollars simply substituted for these funds, then the federal funds did not enable the purchase of the computing equipment but rather enabled the purchase of whatever was bought with the state and local dollars that otherwise would have been spent on the computing equipment. Sorting out these substitution effects and establishing a direct causal link between the recipient of federal funds and expenditure for a particular purpose is very difficult. Therefore, attempting to isolate the effects of federal expenditures may not always prove fruitful.

To summarize, obtaining good data on vocational education has been frustrated by a wide variety of misconceptions and misunderstandings about how vocational education operates across the fifty states and territories. Like secondary and postsecondary education, vocational education is highly decentralized and subject to substantial variation in what is offered and how it is delivered. Moreover, Congress has asked questions of vocational education that have not been asked of other parts of the education system. It would prove as difficult to determine what the nation spends on mathematics and science education as it has been to calculate what is spent on vocational education. The question has never been asked, however, of mathematics and science. Similarly, if one were to require a universal follow-up of participants in the academic curriculum six months after high school graduation or completion of a postsecondary degree, response rates probably would be no better than those obtained for completers of vocational education programs. Unfortunately, because such information has been sought only for vocational education, it has been tempting to assume that the failure to obtain good data is somehow unique to vocational education—

a failure of the enterprise rather than a failure of those asking the questions or devising strategies for answering them.

Despite these difficulties, a great deal has been learned about gathering information on vocational education. As reauthorization approaches and consideration is given once again to data requirements, it is essential that what has been learned be carefully considered. The following section seeks to use what we know to sketch the outlines of future data collection efforts.

EFFECTIVE STRATEGIES FOR COLLECTING DATA ON VOCATIONAL EDUCATION

In thinking about how best to collect data on vocational education, it is important to distinguish between two types of data needs: data for *accountability* and data for *policy*. One strategy will not serve both purposes. The data necessary to ensure that recipients of federal funds are conforming to the official requirements of the law needs to be maintained annually for all recipients. For purposes of accountability, sampling will not usually suffice; each recipient needs to maintain sufficient, auditable information. Consequently, because these data requirements must be imposed universally, they should be simple and minimize data burden. Moreover, as long as the information is maintained by the recipient for use in audits or for review by the interested public, it is not essential that all data needed for accountability be reported to a central federal agency.

In contrast, assessing federal policy options for vocational education requires different kinds of information. Data requirements are considerably more detailed. Moreover, it will often be useful to follow the same students, staff, or institutions over periods of time. While these data requirements are more complex, the information is not needed as frequently, nor is it needed from the universe of providers of vocational education. As long as information is available to inform the five-year reauthorization cycles of federal legislation and as long as it presents a nationally representative picture of the condition of vocational education, it is not necessary to impose annual data collection requirements on everyone. Less frequent, national samples will suffice. Furthermore, national samples are

better suited for collection by a single agent (e.g., a federal agency or a designated contractor) and are better able to use uniform definitions and uniform data collection strategies.

To illustrate this distinction between data for accountability and data for policy, consider the issue of what constitutes vocational education and who should be counted as participating in it. VEDS took the position that only students enrolled in programs approved under the State Plan, and therefore eligible for federal funds, were to be counted for federal reporting. For purposes of accountability, this position was eminently sensible since Congress wanted to know how many students directly benefited from federal funds. Moreover, requiring recipients of federal funds to determine and report the number of students served is a longstanding requirement of program management.

For policy purposes, however, this definition of vocational education leaves much to be desired. As long as states enjoy considerable discretion in determining what programs are eligible for federal funds, the "State Plan universe" will fall far short of describing the total vocational enterprise. To assess the extent of coverage achieved by federal funds, to evaluate the adequacy of the labor supplied by various training institutions, or to assess the relationship between vocational education and other aspects of the secondary and postsecondary system requires information that describes with reasonable accuracy the nature of the overall enterprise.

The discussion that follows concentrates primarily on data requirements for policy. Data required for accountability would depend on the precise features of federal policy, which will change over time. Data requirements for policy, however, are more stable and therefore can be incorporated into the ongoing data collection efforts of the federal government. Five major areas of data needs are examined: governance and delivery systems, student information, staffing, finance, and facilities and equipment. In describing information to be collected in each area, we do not claim to be exhaustive; rather, we have sought to identify what we consider to be the minimum data requirements for each area.

Governance and Delivery Systems

Federal law has required states to designate a "State Board," operating as the "sole state agency," to receive and oversee the distribution and uses of federal funds for vocational education. While this requirement achieves a final point of accountability for federal

funds, it seldom reflects the true organizational structure of vocational education in the states. For example, in many states, separate boards govern secondary and postsecondary education, and each board has responsibility for vocational education at its respective levels. Similarly, many states operate systems of area vocational schools or vocational technical institutes. Area vocational schools typically serve both secondary and adult students. In some states, these area schools are under the direct control of the secondary governance system; in other states, they are governed by their own boards. A few states have established separate state boards for vocational education that operate independently of the secondary and postsecondary systems.

Complete, current information on governance and delivery systems has not been collected since the National Study of Vocational Education Systems and Facilities by Woodruff in 1978. Federal policy deliberations, as well as other ongoing data collection efforts, would benefit from a periodic updating of this study. The following information should be collected or updated at least once every five years:

- the primary boards responsible for secondary and postsecondary vocational education;
- the constitution and governing authority of each state board;
- the administrative agencies for each board, including the administrator with overall responsibility for vocational education;
- the types of institutions (e.g., comprehensive high schools, area schools, community colleges, technical institutes) and the number of each type administered by each board and their sources of funding;
- the board designated for purposes of federal policy to serve as the State Board of Vocational Education (assuming this federal requirement is maintained);
- the responsibility of each board for secondary, postsecondary, and adult vocational education; and
- the formal provisions for interaction and coordination among state boards and state agencies, including any legislatively created coordinating authorities.

Student Information

Student information falls into two broad categories: program participation (enrollment) and follow-up. In both cases, there are needs for relatively short-term information that can be collected in the course of each reauthorization cycle, as well as longer-term needs that cannot be carried out within five years (e.g., the interaction between secondary and postsecondary participation patterns in vocational education).

Program Participation

By far the best source of information to date on the enrollment of secondary and postsecondary students in vocational education is the student transcript. However, no national transcript study has yet been designed from beginning to end with the information needs of vocational education clearly in mind. In every case, the study's utility for vocational education has simply been assumed, or addressed in midcourse or after the fact. As a result, opportunities to make these transcript studies more useful for examining vocational education have been missed.

For purposes of evaluating federal policy, one major transcript study every four years would probably suffice. Recent work performed for the National Assessment of Vocational Education (NAVE) indicates that participation patterns are fairly stable over time. Moreover, policies aimed at altering participation patterns are likely to take at least four years to generate discernible effects.

At the secondary level, the National Assessment of Education Progress (NAEP) probably offers the best vehicle for a periodic transcript study conducted once every four years. With proper planning for the 1990 NAEP data collection, transcript data could be easily merged with basic information on the characteristics of schools and students, including the students' NAEP test scores. Additionally, it has proven possible to add a special education supplement to NAEP to collect detailed information on the course-taking patterns of special education students. Designed in such a fashion, NAEP could supply the basic information Congress has sought on who is served and what is offered at the secondary level. Reporting participation by race, sex, academic and economic disadvantage, and handicapping condition would be straightforward.

There is nothing equivalent to NAEP at the postsecondary level. The Integrated Postsecondary Data System (IPEDS) presently seeks information on enrollment by

program, but the accuracy and consistency of this data remains to be seen. Postsecondary institutions are much more likely to have the automated student record systems that should make IPEDS reporting more accurate, but there still may be serious problems caused by differences among institutions in the procedures used to assign students to programs. As IPEDS surveys the universe of all postsecondary institutions, a transcript supplement to IPEDS would prove quite burdensome, even if conducted only once every five years. However, a transcript supplement for a sample of IPEDS institutions is worth considering, especially if IPEDS enrollment data is not satisfactory. Other alternatives for obtaining postsecondary enrollment data need to be explored.

In addition to these periodic cross section transcript studies using NAEP and IPEDS, the transcript components of the national longitudinal studies should continue. While these longitudinal studies rely on smaller samples than NAEP or IPEDS, they are the only mechanisms for understanding relationships over time. For example, the longitudinal transcript studies permit analysis of how secondary course-taking patterns in vocational and academic education interact with and influence postsecondary choices in regards to institution and course-taking. Additionally, they provide a richer source of data on students, parents, teachers, and schools. The National Center for Education Statistics (NCES) has begun a new longitudinal study about every eight years. Studies by the Department of Labor have been less frequent.

As long as transcript data is available every four years from other sources, the current pace of initiating a new longitudinal study every eight or ten years is adequate. These studies are very expensive. Moreover, as their greatest value lies in generating information over extended time periods, one is simply forced to wait for results.

While periodic transcript studies, supplemented with data from less frequent longitudinal studies, will supply most of the information needed on program participation, one major gap will remain: participation by students, mainly adults, for whom no transcript is maintained. The size of this group is not precisely known, although there is considerable anecdotal evidence to suggest that it is substantial. Participation in proprietary schools, in customized training programs in community colleges, and in noncredit adult vocational programs often does not produce a student transcript. Nor is there necessarily any information about the length of participation or what was accomplished while enrolled. Determining what needs to be known about this kind of adult participation in vocational education and

how best to obtain it should be a major priority of any future effort to improve the quality of vocational education data.

A related area in which there is a need for better information is program completion. While transcripts will reveal the sequence of *courses* taken by a student and the grades obtained, they will not always document that a particular program was completed. Lack of information on program completion is more a secondary than a postsecondary problem, as the postsecondary transcript will typically indicate the award of a degree or certificate. With transcripts, of course, one can simply impose standard definitions of what sequences of courses constitute program completion, but this approach can be quite arbitrary and fail to capture important local differences in completion requirements. Moreover, inconsistencies in names of course titles increases the arbitrariness of such a procedure.

At the postsecondary level, IPEDS now annually collects data on completers of degrees and certificates. There is, however, no secondary counterpart, and some consideration should be given to collecting such information, especially if it could be linked to other needs for more general information on numbers of high school graduates or numbers of students completing other types of course sequences (in mathematics and science, for example). Furthermore, regular collection of information on completers of secondary vocational education programs would assume more importance if completion data figured in accountability requirements. For example, basing federal funds' distribution on numbers of program completers rather than numbers enrolled would not only encourage secondary programs to be more results-oriented, but would also eliminate basing the allocation of funds on inaccurate and inconsistent enrollment data. Additionally, completion-based funds distribution would need to be carefully designed to avoid creating undesirable incentives to screen students inappropriately (Hoachlander, Choy, & Brown, 1989).

If completion data is sought, more attention needs to be given to the definition of completion at both the secondary and postsecondary levels. We have recommended elsewhere that the secondary definition include high school graduation, as well as demonstrated acquisition of the skills needed to perform effectively in a job related to training (Hoachlander, Choy, & Lareau, 1985). At both the secondary and postsecondary levels, definitions that stress the acquisition of skills may be more appropriate than those that are based on finishing a particular sequence of courses or accumulation of credits.

Student Follow-up Information

For rigorous, mid- to long-term follow-up on the impacts of participation in vocational education, the national longitudinal studies will remain the best sources of data. They cannot be topped for detail over time on student characteristics, education, family formation, and employment history. The primary problems with the longitudinal studies stem from sample size. It is not possible, for example, to conduct follow-up for small to medium sized programs. Nor is it possible to make comparisons among states or types of delivery systems. Hence, some attention should be paid to opportunities for judicious, selective expansion of these samples to study particular problems of interest to vocational education.

Sample size may also be expanded to accommodate the follow-up requirements of states. In fact, several states contracted with NCES to expand the sample within their states so that they would have state specific information from High School & Beyond. Improving this kind of partnership between federal and state data collection should be encouraged.

Although accountability requirements may generate additional needs for shorter-term, more comprehensive follow-up data, it will probably be best to leave states considerable discretion in how they define, collect, and maintain this information. For policy purposes, the national longitudinal studies should remain the primary source of follow-up information.

Staffing

As the nation's teaching force ages and as enrollments grow slowly but steadily during the next decade, problems of teacher shortages are likely to intensify. Moreover, issues of teacher quality and representation of minorities are also likely to continue to be prominent on the education reform agenda. Until recently, the federal government collected little information on teachers. HEGIS supplied some information on postsecondary faculty and staff, but data on elementary and secondary education, including vocational education, has been lacking.

VEDS sought data on secondary and postsecondary vocational education staff by using two digit program codes. The data was requested by race and by sex. While these provided some very rudimentary data on the distribution of staff among the broad program areas in vocational education, even if accurate, they were not very useful. The data could not be linked to other information on teacher qualifications, experience, and age that would have enabled a better understanding of the condition of teaching in vocational education. To the best of our knowledge, the staff data was never carefully analyzed for accuracy and consistency, nor, aside from the Congressional mandate that staffing data be collected, was there any clear use for the information.

More recently, NCES undertook the Schools and Staffing Survey of 1987-88. The survey is being conducted on behalf of NCES by the U.S. Bureau of the Census with data expected to be available by December, 1989. This integrated survey collects detailed information on teachers, schools, and school districts. It also includes a private school questionnaire. There is ample information on race, sex, age, teacher qualifications, experience, salary, household characteristics, and perceptions and attitudes toward teaching. Additionally, the survey is designed to permit follow-up at a later time to study patterns of mobility into and out of teaching. While the survey will permit separate identification of teachers of vocational education, it will provide relatively little detail within the field. Unfortunately, this is a simple coding matter that could have easily been addressed with some more attention to the needs of vocational education prior to finalizing design of the survey instrument. Similarly, it would have been possible to include a few additional attitudinal and perceptional questions aimed more specifically at vocational education teachers.

Despite these shortcomings, the School and Staffing Survey provides an excellent model upon which to build vocational education staffing requirements for both secondary and postsecondary programs. With some fine tuning and assurances that the survey will be conducted with reasonable frequency, policy needs for staffing data should be met. Again, once every five years should be sufficient for vocational education, perhaps with every other survey undertaking a longer-term longitudinal component.

Finance

As long as problems of "substitution effects" are ignored, data on the distribution and uses of *federal* vocational education funds is readily available. Without exception, states know how they allocate their federal dollars to locals, and locals know how they spend the money. While occasional horror stories about misuse of funds can be expected, accounting for the federal money is not problematic. Procedures are in place and reporting is largely satisfactory.

Information on state and local spending for vocational education is far more problematic. While estimates that the federal dollar constitutes about one in ten of state and local dollars for vocational education have been around for some time, the truth is that it could just as easily be one in fourteen or one in nine. As long as this general order of magnitude is all that is needed for federal policy, this traditional ballpark estimate is probably sufficient, and collecting more accurate information on state and local spending could receive relatively low priority.

On the other hand, if there are concerns about such issues as cost effectiveness, levels of support for relatively high-cost/high-tech programs, relationships between cost and quality and access to higher cost/higher quality programs, or the relative costs of different types of delivery systems, better information on state and local expenditures for vocational education will be needed. Obtaining such information accurately is likely to pose a formidable task.

If such information is desired for purposes of federal policy, the best approach for the next reauthorization cycle is most likely a carefully designed, one-time study of a representative sample of secondary and postsecondary institutions. To be done accurately, such a study would probably need to send teams of trained data collectors to the sampled sites to cull the necessary information from school records. As noted previously, rarely do secondary or postsecondary institutions maintain cost and expenditure data by program. Expecting them to ferret out such information in response to a mail survey is certain to prove unworkable.[5]

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[5]Exceptions are most common in states that maintain separate vocational high schools, area vocational schools, or vocational technical institutes. Because these institutions are completely separate from other types of secondary and postsecondary vocational education, separate cost accounting and expenditure accounting is possible. These cases, however, are the exception rather than the rule.

In many respects, the lack of program cost data at the elementary and secondary levels is a sorry comment on the status of financial management in the nation's school systems. It would be nice to believe that vocational education could lead the way to adoption of universal program accounting—throughout all of education, not simply vocational education—or that the federal government could spearhead a broad-based effort for program accounting. Neither scenario, however, is likely. At the secondary level, vocational education accounts for about one-fourth of all programmatic activity, and it is unlikely that the smaller portion of the secondary enterprise could produce a full-scale reworking of state and local accounting systems. Similarly, the federal role in secondary and postsecondary education is too small to lead such a revolution. Consequently, until states and local institutions take up the challenge, a special study of vocational education finance is likely to be the most effective means for obtaining useful information on state and local finances.

Facilities and Equipment

In the 1960s, many states used federal Vocational Education Act funds to construct and equip new facilities for vocational education. While construction is no longer an objective of federal policy, program improvement objectives continue to allow equipment purchases with federal funds, and such purchases have proved widely popular. Not only are local schools generally strapped for state and local funds to purchase equipment, but also equipment purchases are easy to track for federal audit purposes. Additionally, local administrators are sometimes reluctant to use federal funds for hiring staff because the uncertainty and instability of federal funds preclude long-term commitments to personnel.

Since 1976, federal law has asked for information on facilities, but very little information has been collected. The last national study was conducted by Woodruff in 1978. HEGIS and IPEDS regularly collect some information on facility inventory at the postsecondary level, but there is no secondary information. Facilities and equipment are not a subject of NCES's School and Staffing Survey of 1987-88.

That there has been no pressure for such information, despite the legislative language, may indicate that national information on facilities and equipment is a relatively low priority. Precisely what information the federal government needs in this area, and why,

should receive some careful attention before any new data initiative is started. In any event, it is likely that whatever information is collected will not be needed more frequently than once every five years.

RECOMMENDATIONS FOR FEDERAL POLICY

Meeting national needs for information on vocational education does not require creating a totally new data system. Most of the means are already in place. In some cases, these require further refinement to ensure that the data needs of vocational education are adequately covered. In other instances, issues of timing need to be addressed to ensure that the information is available when it is needed to inform federal policy. In a few cases, there are major information gaps that may be necessary to fill. Finances and facilities, especially at the secondary level, are two examples.

However, even if there is agreement that some major new data collection efforts are needed, careful consideration should be given to integrating the needs of vocational education into the needs of education in general. A study of program costs, for example, need not be limited to vocational education. Similarly, a study that looked at the condition of facilities and equipment for secondary education generally, in addition to some more specific information on vocational education, may be more valuable than one simply limited to vocational education. By integrating the collection of vocational education data into efforts to collect information on the larger education systems of which it is a part, not only is vocational education more likely to enlist broader-based support for data collection, but also comparisons with the rest of the education system can be made more easily. It is much more useful, for example, to know what secondary vocational education programs cost relative to other types of secondary education than it is to know the cost of vocational education in isolation. An integrated strategy for data collection will help to ensure that the comparisons are made more consistently and accurately.

If these integrated attempts at data collection are to be successful, however, they must be better informed about the needs and operations of vocational education. To this end, Congress should consider the creation of a National Vocational Education Data Advisory Council (NVEDAC). NVEDAC would serve as a central, national forum for discussing the needs for data in vocational education and coordinating them with other national

data collection efforts. It could also review instrumentation and tabulations of initial statistics. Membership in NVEDAC should include, but not necessarily be limited to, the following:

- representatives of the National Center for Education Statistics responsible for secondary, postsecondary, and longitudinal studies;
- the Office of Vocational and Adult Education, U.S. Department of Education;
- the Office of Special Education and Rehabilitative Services, U.S. Department of Education;
- the Office of Planning, Budgeting, and Evaluation, U.S. Department of Education;
- the U.S. Bureau of the Census, U.S. Department of Commerce;
- the Department of Labor;
- the Department of Defense;
- the National Center for Research in Vocational Education;
- the National Center for Education and Employment;
- the Council of Chief State School Officers;
- the American Association of Community and Junior Colleges;
- the American Vocational Association;
- the National Association of State Directors for Vocational Education;
- the National Advisory Council for Vocational Education;
- the National Occupational Information Coordinating Committee;
- state and local secondary and postsecondary administrators familiar not only with state and local data collection but also with state and local needs for information; and
- education researchers and evaluators.

Just as the quality of vocational education data can be improved by centralizing coordination of data collection strategies in a national council devoted to that purpose, so could the *use* of this data be improved by lodging major responsibility for reporting on and analyzing these data in a central place. Today, it is often the case that the data exist to answer a particular question, but it is not always immediately apparent who knows where

to find the information, how to extract it, and how to present it in a fashion that respects the statistical constraints on the precision of the data.

The logical choice for this responsibility is the National Center for Research in Vocational Education (the Center), and Congress should formally charge the Center with being a central *repository* for national data relevant to vocational education and with responding to requests for information from Congress and the Executive Branch. Such a charge would not mean, of course, that the Center would be the only user of this data or that all requests for information must go through the Center. Rather, it would clearly establish that the Center should be expected to maintain a comprehensive knowledge about what national data are available on vocational education and to have the methodological expertise to report this information accurately.

Note the emphasis on "repository." Under no circumstances should the Center be given the responsibility for *collecting* national data on vocational education. For the reasons already outlined, collection of data on vocational education needs to be integrated with ongoing, routine efforts to collect education data generally. Collection is best done by federal agencies (e.g., National Center for Education Statistics; Office of Vocational and Adult Education; Office of Planning, Budgeting, and Evaluation; & the U.S. Bureau of the Census) that not only maintain the necessary technical expertise but also are in the best position to evaluate the broader education policy perspectives.

What should federal legislation say about what data are to be collected? With the exception of Section 423, which calls for the universal collection of enrollment of handicapped students by four digit code, the language of the Perkins Act does a good job of specifying the kinds of data needed for national policy and permitting sufficient methodological flexibility to obtain the information. Section 423 does need to be rewritten to permit sampling and less frequent data collection. Whether Congress really wants data on state and local expenditures, and to what end, needs clarification, as does the request for data on facilities. Additionally, most of the information is probably not needed more than every five years, with different data collection efforts undertaken sequentially throughout the five-year reauthorization cycles.

An additional problem with existing law is the lack of any specified level of funds for collecting the information. With the federal investment in vocational education approaching one-billion annually, it would be wise to ensure that the information needed for

national policy in this area is adequately supported. Precisely what this figure should be will require some investigation. However, given the costs of existing data collection efforts, it is quite likely that the costs of well-defined vocational education supplements would not exceed three- to four-million dollars annually over what is presently expended. With some additional funds for analysis and reporting, as well as support for NVEDAC, it seems likely that the cost could easily be kept under five-million dollars annually, or less than half of one percent of total federal expenditures for vocational education.

In conclusion, while the collection of vocational education data has been beset by a number of false starts with unsatisfactory results, it is important to keep in mind that Congress has asked much more about vocational education than any other component of equal size in the secondary and postsecondary educational systems. Questions that on the surface would seem straightforward have, in fact, been quite complex. Had they been asked of other parts of the secondary and postsecondary curriculum, they would have proven equally difficult to answer. It is important to remember, therefore, that the problems that have plagued the collection of data on vocational education are not unique to it; rather, they are endemic in the larger systems we use to organize and account for secondary and postsecondary education.

The history of efforts to collect data on vocational education, while frustrating, is also instructive. There are strong indications that we have learned a great deal about how to do it better and that this knowledge is transferrable to other aspects of the educational enterprise. This is, of course, if we should choose to command of it information comparable to what has been asked of vocational education.

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