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ABSTRACT

An alliance between apprenticeship and vocational education could accomplish more than either system could achieve on its own. An understanding of the system is important prior to working effectively with apprenticeship programs. They are sponsored by single employers or groups of employers acting singly or jointly with a union. Union interest centers around control of craft competence and productivity, increased job security, and union security. Employer interest is based on lower costs of training for groups of small-scale employers. Apprenticeship in practice is concentrated in the building trades, which have over 60% of registered apprentices. Government, specifically the Bureau of Apprenticeship and Training and state apprenticeship agencies, has a supportive and regulatory function. Apprenticeship seems to resemble cooperative education but differs in that the apprentice has a regular job, the cooperative student has a training position. Apprenticeship is industry-based; cooperative education is school-based. Vocational education and apprenticeship can work together in two ways: (1) vocational education can channel well-prepared and well-informed candidates into apprenticeships and (2) public vocational education can serve as a resource for providing the related instruction portion of training in apprenticeship. (Discussion questions and answers are appended.) (YLB)

Occasional Paper No. 66

APPRENTICESHIP IN THE UNITED STATES: IMPLICATIONS FOR VOCATIONAL EDUCATION RESEARCH AND DEVELOPMENT

by

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PREFACE

Even though apprenticeship in America dates back to colonial days, it remains a vital force for today's training needs, especially in the craft occupations. Perhaps no one is more qualified to speak on the role of apprenticeship in the total vocational training effort than Dr. Robert Glover, chairperson of the Federal Commission on Apprenticeship and acting director of the Center for the Study of Human Resources at the University of Texas, Austin.

Dr. Glover has been associated with the Center for the Study of Human Resources at the University of Texas since 1970 and the Lyndon B. Johnson School of Public Affairs since 1977. In addition to these duties, he has distinguished himself in several public service areas. He was vice chairperson of the AFDC Education and Employment Advisory Committee, Texas Department of Human Resources, from September 1977 to July 1979. Since 1976 he has served as field research associate to the Committee on Evaluation of Employment and Training Programs of the National Academy of Sciences. He assumed his present post of chairperson, Federal Commission on Apprenticeship, in June of 1978. In addition, he has been named to the Texas Governor's Task Force on the Undocumented Worker.

Dr. Glover holds three degrees in economics—a bachelor's from the University of Santa Clara and both master's and doctorate from the University of Texas. His specialties are in the areas of labor economics and human resource development. He is the author of several publications in the fields of apprenticeship and minority employment. In addition to other professional affiliations, he is a member of the American Economics Association and the Industrial Relations Research Association.

On behalf of The Ohio State University and the National Center for Research in Vocational Education, I am pleased to share with you Dr. Glover's presentation, entitled "Apprenticeship in the United States: Implications for Vocational Education Research and Development."

Robert E. Taylor
Executive Director
National Center for Research in
Vocational Education

INTRODUCTION

Although apprenticeship dates back prior to colonial days in America, it has evolved considerably from the residential indenture system between master and apprentice. Today's apprenticeship is a structured system of formal training leading to careers in high-paying craft occupations.

Apprenticeship is also one of the least understood systems of training currently used in the United States. Anyone who plans to work effectively with apprenticeship programs in this country must have a clear understanding of the system and its actors. Thus, it seems appropriate to begin this discussion with some remarks about the characteristics of American apprenticeship.

An Overview of Apprenticeship in the United States

Apprenticeship in the United States is primarily a private institution and remains largely an extension of collective bargaining. Apprenticeship is almost entirely privately sponsored and funded. Further, the apprenticeship sponsors remain quite committed to retaining the essentially private character of the system, and they are highly resistant to any effort which they view as government intervention. Partly because of this suspicion of public sector involvement and partly resulting from the failure of public schools to understand apprenticeship and reach out to industry in the past, meaningful alliances between vocational-technical schools and apprenticeship programs are sensitive and difficult to build despite the fact that related classroom instruction is often provided to apprentices by local school systems or community colleges.

A second key point is that apprenticeship is a system for training craft workers whose tasks are manual but require some conceptual or theoretical understanding of the work. The jobs are broad and varied enough to demand a wide range of skills and experience. The major apprenticeable crafts form the elite of blue-collar occupations. The annual income of a plumber, electrician, or machinist compares very favorably with their college graduate counterparts who invest similar amounts of time in occupational training.

Sponsors of Apprenticeship Programs

Apprenticeship programs may be sponsored by single employers, by groups of employers, by single employers working jointly with a union, or by groups of employers working jointly with a union. Nearly 80 percent of all programs are sponsored unilaterally by single employers; however, joint programs are by far numerically the most important, accounting for almost 80 percent of all registered apprentices. Although apprenticeship programs are often described as "union programs," I know of not one apprenticeship program sponsored solely by a union.

Joint programs are administered by joint apprenticeship committees (JACs).[1] These committees are comprised of equal numbers of representatives from unions and employers' associations. In practice, in the construction industry, union representatives tend to have dominant interest and influence on these joint committees whereas in the printing trades, employers and unions tend to participate on a more equal basis.

Apprenticeship committees set policies concerning admission standards, numbers of new apprentices to be accepted, course content, and the like. Day-to-day implementation of these policies in major programs increasingly is left to full-time apprenticeship coordinators. Almost all programs in the construction industry are jointly sponsored, although in 1974 the first programs sponsored by nonunion employers were registered with government agencies.

Although training is one area where, for the most part, employers and unions have mutual interests, their perspectives and concerns are somewhat different. It is useful to review these viewpoints separately.

Union Interest in Apprenticeship

Most students and practitioners agree that a major source of support for high-quality apprenticeship comes from craft unions for whom this training system satisfies several important objectives. The most important of these is controlling craft competence and, therefore, productivity. It would be difficult for union craft workers to maintain their wages at a high level unless their high productivity kept unit labor costs at least as low as those of nonunion workers. A second major objective of unions, especially in casual occupations like the building trades, is to increase job security for their members in order to protect their investment in job skills. This can be accomplished by obtaining partial control over the supply of skills by influencing apprenticeship policies. Third, while protecting their members' interests, craft unions also view apprenticeship as a form of union security. In the absence of unions, employers have a tendency to train specialists in order to reduce the costs of training and increase profits. However, craft unions resist craft fragmentation because it makes union members less adaptable to change and threatens the ability of unions to attract and maintain contracts with employers. Specialized workers are less versatile, which also complicates the task of job referral.

Unions also take an interest in apprenticeship in order to prevent substitution of low-wage apprentices for full-scale journeymen members.

Employer Interest in Apprenticeship

Employers may sponsor apprenticeship programs either individually or through industry associations. These are generally distinct situations arising from quite different motivations.

Employers who train in associations tend to be relatively small-scale firms in a highly competitive industry. In such circumstances, individual employers have a natural reluctance to train workers for fear they will lose them to competitors. Such fears are magnified in a casual industry such as construction which is subject to severe employment fluctuations. Thus, each firm acting in

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[1] Joint apprenticeship committees are sometimes termed "joint apprenticeship and training committees" or JATCs because in addition to apprenticeship they often administer journeyman training to help craft workers upgrade their skills and keep pace with technological advances in their trades.

its own profit-maximizing interest would prefer to pirate away workers others have trained. But if every firm acts this way, the skills of the labor force erode over time, and the health of the industry is jeopardized. Thus, small-scale employers band together and establish mutually-funded programs which spread the costs of training (which may be substantial) over the entire industry. Apprenticeship programs are normally financed by assessing the employers—whether or not they use apprentices—a few cents per hour for the workers they employ. Most smaller-scale employers, as Garth Mangum indicates, "are likely to spend on training only what they are pressured [to spend] by a trade association or union."[2]

A key incentive which motivates employers in the construction industry to participate in registered apprenticeship programs is the Davis Bacon Act of 1931. This act, which mandates that prevailing wages be paid on federally supported construction projects, permits apprentices and trainees registered with federal or state apprenticeship agencies to be paid less than full journeyman rates. Without registration, all workers must be paid at full journeyman wage scales.

Employers in industrial plants are interested in apprenticeship training if their work requires craft workers in identifiable and recognized classifications. Employers in the larger high-wage industries, such as automobile manufacturing, seem to be willing to support apprenticeship programs because they are less likely than lower-wage employers to lose their skilled workers after training.

Several industrial employers sponsor formal training programs which could qualify as apprenticeship. But for various reasons, these employers refuse to register their programs with the government. Although little is known about the extent of nonregistered programs, a common assumption based on a 1963 study by the U.S. Department of Labor places the number of unregistered programs at about one-third of the total.[3]

The Range of Occupations Deemed Apprenticeable

The issues of what occupations are apprenticeable and how apprenticeability is determined are matters of some confusion, controversy, and disagreement. Officially, the Bureau of Apprenticeship and Training (BAT) recognizes approximately 450 occupations as apprenticeable. However, in March 1980 a consolidated list compiled to show the occupations recognized as apprenticeable by the BAT or by state apprenticeship agencies revealed 723 occupational titles in which apprentices were reported registered. The occupations ranged from accordian maker to x-ray equipment tester.

According to Department of Labor regulations, an apprenticeable occupation is a skilled trade which possesses all of the following characteristics:

1. It is customarily learned in a practical way through a structured, systematic program of on-the-job supervised training.
2. It is clearly identified and commonly recognized throughout an industry.
3. It involves manual, mechanical, or technical skills and knowledge which require a minimum of 2,000 hours of on-the-job work experience.

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[2] Garth L. Mangum, "Manpower Training and Apprenticeship: Their Roles in a National Manpower Policy," in *Developing the Nation's Work Force*, edited by Merle E. Strong (Washington, D.C.: American Vocational Association, 1975), p. 191.

[3] *Training of Workers in American Industry*, Bureau of Apprenticeship and Training, Research Division Report No. 18 (Washington, D.C.: U.S. Government Printing Office, 1964), p. 94.

4. It requires related instruction to supplement the on-the-job training.[4]

As one can see, these criteria are quite broad. Indeed, these 1977 criteria represented a substantial broadening of the definition of apprenticeship used in previous years.

Apprenticeship in Practice: Concentrated Within a Few Industries and Occupations

Although more than 400 occupations officially have been declared apprenticeable by the BAT,[5] the bulk of apprentices remain concentrated among a few occupations in the building and metalworking trades. As of December 31, 1978, slightly over 60 percent of the registered apprentices in the country were in building trades occupations, nearly all of them in the unionized sector. In fact, programs in three construction trades—carpenters, electricians, and the pipe trades—contained almost 40 percent of all registered apprentices. Thus, in order to understand apprenticeship, it is essential to have adequate knowledge of the construction industry and construction labor markets. The ten occupational categories with the largest number of registered apprentices at the end of 1978 were as follows:

1. Carpenters	43,174
2. Electricians	34,486
3. Plumbers	17,627
4. Pipefitters, sprinkler fitters, steamfitters	16,417
5. Machinists	15,690
6. Toolmakers, diemakers	13,038
7. Sheet metal workers	11,188
8. Automotive and related mechanics	9,905
9. Bricklayers, stone and tile setters	8,423
10. Structural steelworkers	8,211
TOTAL	178,159

Together these ten occupations accounted for 61.4 percent of all the 290,224 apprentices registered as of the end of 1978.

Although the evidence is somewhat sketchy, apprenticeship is becoming an increasingly important means of entry for certain unionized occupations. A University of Texas study made in the early 1970s revealed the following percentage of surveyed union journeymen who had completed apprenticeships: bricklayers, 61 percent; carpenters, 39 percent; electricians, 56 percent; ironworkers, 25 percent; plumbers and pipefitters, 61 percent; and sheetmetal workers, 57 percent. Furthermore, the percentage of apprentice-trained journeymen has risen over time. The survey showed that 52 percent

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[4] "Apprenticeship Programs: Labor Standards for Registration," Title 29 *Code of Federal Regulations* Part 29.4, as published in the *Federal Register* 42, no. 34, February 18, 1977, p. 10141.

[5] A listing of apprenticeable occupations may be found in U.S. Department of Labor, Bureau of Apprenticeship and Training, *The National Apprenticeship Program* (Washington, D.C.: U.S. Government Printing Office, 1976). Although this publication is obsolete, it is the most recent available. A new listing of apprenticeable occupations is scheduled to be published in the *Federal Register* in Fall, 1980.

of journeymen admitted to union membership since 1960 had served apprenticeships, compared to only 36 percent of those admitted prior to 1950. The operating engineers' program offers a similar example. Ten years ago, there were very few apprentices in that craft; in 1978, there were more than 5,400 operating engineers serving registered apprenticeships.

The Role of Government in Apprenticeship

For the past forty years, the government has served a supportive and regulatory function through registering apprenticeship programs and certifying that they comply with minimum standards. This has included partially funding the institutional or classroom portion of the training for many programs and, especially since the mid-1960s, promulgating measures to assure that apprenticeship training is open to everyone on an equal opportunity basis regardless of race, sex, or ethnic background. The government has played a limited role in promoting the extension of the system and in encouraging improvement in the quality of training offered through apprenticeship.

The law establishing federal policy is the National Apprenticeship (Fitzgerald) Act of 1937, administered by the Bureau of Apprenticeship and Training (BAT) of the Employment and Training Administration, U.S. Department of Labor. In addition, state apprenticeship councils (SACs), which contain more than three-fourths of the nation's registered apprenticeship programs, have been established in twenty-nine states. The Virgin Islands, Puerto Rico, and the District of Columbia also have their own apprenticeship agencies.

The general role of the BAT and SACs is to provide technical assistance and promote the extension of effective apprenticeship programs established on a voluntary basis by employers and unions. More specifically, these public agencies establish minimum standards for apprenticeship, register programs which meet these standards, provide technical assistance to management and labor in matters of apprenticeship and training, and maintain records on apprenticeship.

A central focus of activity in apprenticeship is the Federal Committee on Apprenticeship (FCA) which was reactivated in May, 1974 after being dormant for several years. Authorized under the National Apprenticeship (Fitzgerald) Act of 1937, the FCA advises the Secretary of Labor on ways to strengthen and expand apprenticeship. The committee has a tripartite membership composed of representatives from labor, management, and the public, including minorities and women. Its tasks include reviewing apprenticeship regulations, advising apprenticeship officials on policy matters, and coordinating research on apprenticeship. The FCA has worked on developing general federal regulations for apprenticeship programs.

Registration and Certification

To be approved by BAT or a state apprenticeship agency, an apprenticeship program must meet certain training and administrative standards. Training standards include work rotation processes for on-the-job training, classroom instruction provisions (generally a minimum of 144 hours per year), procedures for progress evaluation and record keeping, and assurance that the ratio of apprentices to journeymen is consistent, with proper supervision, training, and continuity of employment. Training standards also include equal opportunity provisions, a minimum of one year or 2,000 hours of on-the-job training, probationary period restrictions, and safety training. Administrative standards relate to union-management cooperation, qualifications for entry into apprenticeship, specification of a minimum

entry age no younger than sixteen, credit for prior experience, apprentice wage/rate schedules, terms of apprenticeship agreement, and recognition for completion of apprenticeship.[6]

If apprenticeship programs meet minimum standards, they can be registered by the BAT or a state apprenticeship agency. Those who successfully complete such programs are given certificates of completion either by the state agency or by BAT.

Entry into Apprenticeship Programs[7]

Although there is considerable diversity in apprenticeship programs, some generalizations can be made about the usual procedures involved in becoming an apprentice.

Age requirements. Although BAT procedures specify a minimum age of sixteen, the official minimum tends to be seventeen or eighteen. In practice, youngsters of minimum age face increasing handicaps in getting admitted into apprenticeship. Recent court decisions have raised questions regarding the legality of maximum age restrictions (often set at twenty-four or twenty-five with a year-for-year credit for veterans). Elimination of the maximum age restriction will mean that youngsters will face increasing competition from older workers. In response to judicial pressures, most programs have dropped their maximum age restrictions. Also in practice, many programs give preferance to veterans over younger applicants, not only to fulfill veterans preference responsibilities, but also on the assumption that veterans' added age and experience make them more mature and less likely to drop out. Similarly, married men have been favored because of greater stability in work habits perceived to be associated with family responsibilities.

Other requirements. Apprenticeship in the United States is almost exclusively a postsecondary training effort. For most programs, a high school diploma or the equivalent is required for admission. Electrical and sheet metal programs often add special math course requirements.

Applicants also generally must take a written examination. Traditionally, the JACs have constructed and administered their own tests, but there is a trend toward the use of standardized tests which have been validated as job related under EEO requirements.

Almost all apprenticeship programs use an oral interview, generally administered by the JACs or program sponsor, to determine an applicant's interest in the trade and whether he or she is likely to complete it successfully. Because apprenticeship positions are scarce and represent considerable time and resource investment on the part of industry, program sponsors have attempted to find the people who will "fit in" and remain with the industry, which means trainees must be socially acceptable as well as productive workers. In joint programs, especially, there is a certain mystique and fraternal character about apprenticeship which the JAC expects the new apprentice to fit into. Part of the ritual in many trades takes the form of "hazing" and giving menial assignments to the new

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[6] To be eligible for registration/approval by a registration agency, an apprenticeship program must meet the terms of twenty-two training and administrative standards which are outlined in "Apprenticeship Programs: Labor Standards for Registration," Title 29 *Code of Federal Regulations* Part 29.5, as published in the *Federal Register* 42, no. 34, February 18, 1977, p. 10141.

[7] Further details on admission requirements to apprenticeships in building trades unions can be found in Roger A. Comer and Herbert J. Lahne, *Admission and Apprenticeship in the Building Trades* (Washington, D.C.: U.S. Government Printing Office for the Labor Management Services Administration, U.S. Department of Labor, 1971); and Ray Marshall, Robert W. Glover, and William S. Franklin, *Training and Entry into Union Construction*, Manpower R&D Monograph 39 (Washington, D.C.: U.S. Government Printing Office, 1975).

apprentice designed to "initiate" him or her into the trade. Unless women and minority apprentices are forewarned about such behavior, they may perceive it as discrimination.

Carpenter apprentices generally must find their own jobs. However, in most other trades the program sponsor takes responsibility for assuring employment. At the time they are indentured, apprentices are paid a portion (generally about half) of the journeyman wage rate. Their pay is increased at fixed intervals until, upon completion of apprenticeship, they reach the journeyman's rate. This occurs at least a year (and typically four years) after they enter the program.

Apprenticeship programs generally open only once or twice a year for a few weeks. The number of apprenticeship openings varies from trade to trade and city to city. In some trades, such as electricians, plumbers, or sheet metal workers, it is not uncommon to find ten to thirty applicants for every opening. Other programs—such as those for bricklayers, carpenters, or roofers—have fewer openings and are more easily entered.

Apprenticeship: High Quality Craft Training

As a form of craft training, apprenticeship has strong conceptual advantages. Apprenticeship offers an ideal form of skill acquisition in highly skilled crafts because it combines theoretical learning (obtained in institutional or related training in the classroom) with practice at the trade (through on-the-job training under the tutorial supervision of experienced craft workers). Apprenticeship also offers broad skill training covering all major aspects of the craft. As a part of the standard apprenticeship program, apprentices are scheduled to rotate on the job through all phases of the work. Such breadth of training makes the apprenticeship graduate more adaptable and less vulnerable to shifts in demand and technological change affecting parts of the craft.

A variety of follow-up studies of apprenticeship graduates has revealed the following points: (1) apprenticeship graduates seem generally well pleased with the training they have received; (2) individuals who complete apprenticeship show a strong tendency to remain in the trade in which they were apprenticed; (3) apprenticeship graduates tend to work more steadily and to advance into supervisory positions or start their own businesses at greater rates than their counterparts who have not received training through apprenticeship.

One study compared the work patterns of journeymen who had completed apprenticeship against those who had not in six basic construction trades: bricklaying, carpentry, electrical work, plumbing and pipefitting, and sheet metal work. The study found that apprenticeship graduates generally enjoyed more steady employment and thus greater earnings than did other journeymen. Secondly, apprenticeship graduates tend to advance to supervisory positions more rapidly and more often than do other journeymen.[8]

Completions and Dropouts

Statistics on apprenticeship show considerable variation in completion rates by trade, ranging from trades such as the carpenters, which average 50 percent or less, to trades such as the electricians, which have traditionally experienced more than 95 percent competition in some local programs. It

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[8] Ray Marshall, Robert W. Glover, and William S. Franklin, *Training and Entry into Union Construction*, Manpower R&D Monograph 39 (Washington, D.C.: U.S. Government Printing Office, 1975).

should be noted that the carpenters' programs have high dropout rates partly because many apprentices find they are able to work as full journeymen without completing apprenticeships. The carpenters also have lower admissions standards than the electricians.

Apprenticeship and Cooperative Education Comparisons and Contrasts

As the reader may have noted from our discussion of apprenticeship in the previous section, apprenticeship and cooperative education bear a striking resemblance to one another. Both types of training are based on a work-study arrangement in which learning occurs on the job and in the classroom.

To be sure, there is some overlap between apprenticeship and cooperative education. Indeed, this is the basis for a series of experimental or demonstration projects currently under way, sponsored in seven school districts across the country under funding from the U.S. Department of Labor. Entitled "Apprenticeship School-to-Work Linkage Initiative," these pilot programs attempt to combine apprenticeship and cooperative education in such a way that students effectively serve the first part of their apprenticeships while in cooperative education programs. When they graduate, they are advanced apprentices and move into their apprenticeship jobs on a full-time basis. The concept is certainly an attractive one; potentially it is an excellent way that apprenticeship and vocational education can work together on a joint basis. But as the experience of the projects has shown, implementation is not easy. Nevertheless, some success is being achieved and we are all awaiting the finding of the evaluation on the project, which should be completed by summer 1980.

Apprenticeship and Cooperative Education Contrasted

It is a useful and enlightening exercise to compare and contrast cooperative education and apprenticeship. Although both are quite similar in form and similar in other respects, there are differences between the two training systems. In order to initiate discussion on this topic, I want to offer an apprenticeship perspective. I recognize that several of the following statements are broad generalizations that will not hold for every program of cooperative education or apprenticeship, but I think they form a starting point and a framework for discussing the topic. Let us begin by pointing out some of the less significant differences between apprenticeship and cooperative education.

Perhaps the most obvious difference is that apprenticeship is focused on a narrower range of occupations than is cooperative education. Apprenticeable occupations tend to be skilled craft jobs which require longer terms of training than do occupations served by cooperative education. Cooperative education programs are well-established in many retail sales and office occupations that are not generally considered apprenticeable in this country.

Apprenticeship training tends to give greater emphasis to skill development and less to work habits. It tends to place greater emphasis on structuring the on-the-job portion of training, although well-structured and well-supervised on-the-job training is found in some of the better cooperative education programs. Co-op students usually spend as much time in school as on the job, whereas apprentices spend a far greater proportion of their apprenticeship on the job. Co-op education also tends to be of shorter duration than apprenticeship training, and progress on co-op jobs is generally determined by advancement in school rather than on the job, as in apprenticeship. More attention is given in apprenticeship circles to broad training rather than to training for a narrow specialty. The ideal of apprenticeship is to produce craft workers who have mastered the full range of tasks and

skills associated with their trades. Cooperative education, on the other hand, seems more geared to preparing individuals for an entry-level position in the occupation, leaving full mastery of the occupation to be obtained through subsequent work experience.

Now let us move to the more significant differences between the two systems. These relate to the *nature of the job commitment* offered to the individual being trained and the *locus of decision-making control* in each training system. First, the apprentice has a *regular job;* assuming he or she performs satisfactorily, the apprentice will be retained beyond the duration of apprenticeship. The co-op student, on the other hand, has a *training position* which may or may not lead to an offer of a regular job.

A second major difference is that apprenticeship is *industry-based* whereas cooperative education is *school-based*. Thus, under apprenticeship, industry decides on issues such as the length, coverage, and organization of the curriculum. Industry decides on how many applicants to admit to training and what their qualifications should be. Industry decides what qualifications the instructors should have and who should teach. Under cooperative education, these decisions are made by school personnel (with or without meaningful advice and input from industry).

There are several advantages to leaving such decisions regarding the training program to industry officials. First, the training is likely to be more job relevant and will be more likely to keep pace with technological changes in the job. Secondly, the training is more likely to be geared to the labor market in that those who complete the program have greater assurance of continued employment.

On the other hand, there are potential shortcomings to industry decision-making in these matters. For example, left unchecked, an individual employer may train the individual narrowly and specifically to fit the needs of his or her firm so that few transferable skills are taught. Secondly, due to lack of accurate long-range forecasting, conservative outlook, or general reluctance to invest in training, industry may undertrain for a given occupation. Thus, although those who do complete apprenticeship have high assurance of obtaining and maintaining continued employment related to their training, there are often too few trained to meet full labor market needs.

Toward a Working Partnership Between Public Vocational Education and Apprenticeship: Initial Steps

Apprenticeship sponsors will commonly agree to two ways in which vocational education and apprenticeship can work together. First, vocational education can help to channel well-prepared and well-informed candidates into apprenticeship. Second, public vocational education can serve as a resource for providing the related instruction portion of training in apprenticeship. These two roles will be discussed in turn.

Public Vocational Education as a Feeder to Apprenticeship

Much improvement is possible in gearing vocational education to be an effective source of applicants to apprenticeship. However, some limitations should be recognized in this regard. First, we should remind ourselves of the differences in size of the two systems. In 1978, in gross terms, there were an estimated 17 million students enrolled in programs offered at secondary, postsecondary, and adult education programs. However, vocational education deals with a much broader array of occupations than does apprenticeship. Out of approximately 20,000 occupational titles listed in the

Dictionary of Occupational Titles, only a few hundred occupations are considered "apprenticeable." Vocational education, on the other hand, offers training for several thousand occupations.

How many were enrolled in programs aimed at preparing individuals for careers in apprenticeable occupations is unknown. Likewise, how many of the latter were actually apprentices taking related training is also unknown. What we do know is that there were just over a quarter of a million registered apprentices in 1978 and probably half again as many unregistered apprentices.

Even within apprenticeable occupations, there are some limitations to what vocational education can offer as a feeder system. Not all apprenticeship programs are in need of additional applicants, and some programs do not indenture apprentices directly from school. Many apprenticeship programs in manufacturing draw applicants from among current employees. There are programs which select apprentices from a so-called "restricted pool." Sometimes such a provision will be mandated under a collective bargaining agreement in order to provide current employees first opportunity for access to apprenticeship positions. In such cases, admission to such apprenticeship can be quite competitive and is usually allocated at least partially on the basis of seniority. Even when collective bargaining arrangements do not so specify, employers may prefer to select apprentices from among existing employees who are familiar to the employer and who, in a sense, have proven themselves in a probationary period on the job. Such a probationary period also gives the apprentice-to-be an opportunity to inspect the job at close range in order to determine whether he or she is well-suited to the occupation. It should be remembered that apprentices must be highly motivated because apprenticeships are generally quite demanding periods of training, often requiring the apprentice to attend three hours of night school one or two nights a week after working a full eight-hour day. Also, in some manufacturing firms, the starting wage for apprentices may be below the rate of pay received by production workers. Thus, some individuals may have to take a short-term cut in pay to receive a long-term gain.

The exact number of apprenticeship programs which select from a restricted pool of existing employees is unknown. Our best guess is that about a third to half of all programs—containing about 20 to 30 percent of all apprentices—operate this way. Most of the restricted pool programs appear to be concentrated in manufacturing.

In construction, where direct admission to apprenticeship is utilized, trades in many local areas already have an abundance of qualified applicants for limited numbers of apprenticeship openings. Although there is some local variation, this is often the case for the most established programs in the pipe trades, electrical work, and sheet metal work. Sponsors of such programs are unlikely to greet the prospect of receiving additional applicants with much enthusiasm. Gaining entry into such programs is certain to be a highly competitive endeavor.

Due to the aforementioned circumstances, vocational education will find it very difficult or impossible to place applicants in more than half of the apprenticeship positions opening each year. Thus, of the 131,139 apprentices indentured during calendar year 1978, it is unrealistic to expect vocational education to place its graduates in 65,000 of these positions.

Despite the fact that vocational education will not find a good "market" for its graduates in all trades, some apprenticeship programs will welcome qualified referrals from vocational education. Indeed, programs in high-paying trades such as tool and die making or automobile mechanics claim to have chronic shortages of interested applicants in many localities. Also, given the heavy equal opportunity pressures on apprenticeship sponsors, almost all programs will be especially interested in locating well-motivated and qualified women and minority applicants.

Workable arrangements for "articulation" between vocational education and apprenticeship can be developed only if such arrangements are mutually beneficial to apprenticeship sponsors as well as students/apprentices. In gaining entry for vocational education graduates to apprenticeship, the key will be referring qualified and well-prepared applicants. Taking a permissive attitude with respect to job-related qualifications is a certain route to failure.

A major obstacle to placing vocational education graduates into apprenticeships is what might be called the "competency gap." Whether true or not, some apprenticeship officials view vocational education as a traditional "dumping ground" for less motivated and less able students—not a very likely source of good candidates for apprenticeship. If vocational education is to become an effective source of future apprentices, this image must be overcome.

One approach to improving the image of vocational education that offers promise lies in involving apprenticeship sponsors in the activities of student organizations such as VICA (Vocational Industrial Clubs of America). Exposure to highly motivated and competent sutdents—especially contest winners—may have a strong influence on industry representatives.

A final barrier to placing graduates of public vocational education is what might be called the "age gap." We have already noted the preference apprenticeship sponsors have for maturity in their applicants. Apprenticeship training is often costly for employers, and they prefer to admit those who take the work seriously and are less likely to drop out. Although information is sketchy, according to our best estimates the average age of an entering apprentice is twenty-three. This contrasts significantly with the average age of a secondary school graduate who is eighteen. Five years is a significant difference. The issue is a complex one and of major significance. It deserves more thoughtful examination and research.

Arranging Preference for Vocational School Graduates

The picture is not completely pessimistic. It is not uncommon for apprenticeship sponsors to give applicants additional bonus points for taking training at a vocational school in which they have confidence. Often such additional points make the difference between being admitted to apprenticeship and not being admitted.

Experience shows that under the proper circumstances, it is also possible to arrange for individuals graduating from good programs of vocational education to obtain credit toward completion of their apprenticeship. In fact, advanced placement for past training and work experience is provided in almost all apprenticeship programs. However, evaluating past work experience and knowledge is an inexact science, and credit practices are not uniform across local areas, even within the same trade. More research needs to be devoted to such admission preference and credit practices.

Public Vocational Education as a Resource for Related Instruction in Apprenticeship

A second major arena where there is common agreement on the potential for working together is related instruction. Currently, a significant portion of related training in apprenticeship is conducted in the facilities of public vocational education. Even when private industry facilities are utilized, part of the instructor's salary is often funded by vocational education monies from state, federal, and local sources. The Smith-Hughes (1917) and George-Barden (1946) Vocational Education Acts provided for partial reimbursement from federal funds of instructor salaries in states with approved vocational plans.

Important as it is, we do not know how many of the 48,000 registered apprenticeship programs across the country use public vocational education, nor at what level or type of institution. In absence of this information, we can only speculate. There seems to be a trend away from conducting related training in secondary institutions. Concurrent with this development is a rising trend to provide college accreditation for learning in apprenticeship. (This development occasionally presents problems when apprentices attending related training programs in a community college are offered college credits whereas apprentices taking the same course of study at a nearby high school are not.)

Another trend is that the better-financed apprenticeship programs tend to have their own training facilities. Although there are many factors involved in this movement, a primary ingredient is dissatisfaction with the treatment that programs receive in public vocational education facilities. Whether correct or not, many program sponsors feel that they have received low priority in the allocation of public facilities.

The advantages of having one's own facility are numerous and include the following:

- Full access to facilities at convenient times
- Access to space adequate for "hands-on" practice with tools and materials
- Greater control over the use of proprietary curriculum materials
- Greater identity for the program (i.e., a building)
- Reduction of concerns about minimum class size
- Ability to leave standing mock-ups and to leave equipment out and undisturbed between instructional periods
- Access to expensive and technologically current equipment not available in public schools

What the future will bring is uncertain, but certainly most apprenticeship sponsors and apprenticeship coordinators look with envy on those programs that have their own facilities. At the same time, some public vocational education officials and some apprenticeship officials are asking, "What is the need for such duplication?"

Another area in which public vocational education can be of significant assistance to apprenticeship is instructor preparation. Apprentice instructors may have a masterful knowledge of their crafts but be unable to communicate this knowledge effectively in the classroom. As apprenticeship sponsors increasingly recognize, in addition to technical proficiency at the trade, apprentice instructors need to know how to teach. Each state has its own procedures and systems for training and certifying instructors of apprenticeship. Some states are widely praised by apprenticeship sponsors for their effectiveness in delivering instructor training; others are roundly criticized. Perhaps some of the best apprenticeship instructor training is being conducted at Purdue University and Ohio State University under contracts with various national industry apprenticeship training trust funds. Effective delivery of appropriate training for apprentice instructors is a complex topic requiring more attention from researchers.

Successes, Failures, and Trouble Spots

Certainly, related training is the area where apprenticeship and public vocational education work most closely today. State agencies such as Wisconsin and Florida are generally well regarded for their cooperative spirit and practical accomplishments in this area. There are also various model programs and exemplary relationships in local areas across the country. More research needs to be done on documenting these good examples and promoting their replication.

The picture is quite mixed, however, and the area is full of pitfalls even for the most cooperative agencies. Vocational education can get involved in the middle of union-nonunion confrontations, battles between labor and management, or jurisdictional disputes between unions. Difficulties and disagreements can also arise with respect to public access to apprenticeship classes, restrictions on the use of proprietary curriculum materials, funding levels, selection of instructors, and other complex issues.

In a sense, we are fortunate to have such a diversity of experience available to us. Individual agencies and school districts in one part of the country or another have learned to confront the problem issues, cope with them, and even overcome them. And their experience offers guidance to others facing similar situations.

What is needed is greater communication regarding apprenticeship issues between public vocational agencies and institutions. To facilitate such communication, it would be useful for every state education agency to designate a full-time staff member to work with apprenticeship programs and issues. This person should have a substantial background in apprenticeship, be on good terms with apprenticeship sponsors in the state, and possess a good working knowledge of vocational education. Texas and Maryland have both recently adopted such a position. Perhaps other states will follow. Eventually there will be a sufficient number of these liaison individuals to have a national meeting to discuss some of the problems and concerns and to share strategies and ideas for overcoming them.

Conclusion

Some observers view apprenticeship and vocational education as parallel and competitive training systems for occupational preparation. Although it must be acknowledged that there is often antipathy between the two systems, this need not be the case. Far more can be accomplished by forging an alliance between apprenticeship and vocational education than either system will be able to achieve on its own. A lasting alliance must be based on knowledge, on a respect for the integrity of each system, and on recognition of the comparative advantages of each form of training.

This nation has many skill shortages, and we are under-investing in skill training generally. Through cooperation between apprenticeship and public vocational education, such skill shortages can be reduced, and the bias against manual work that pervades American society can be eliminated. But working together effectively will require a solid knowledge and appreciation of one another's systems. And here we have a critical skill shortage. There are not more than a dozen individuals at the national level who are fully conversant with both apprenticeship and public vocational education!

Both apprenticeship and vocational education are decentralized networks. Thus, any arrangements for working together will have to be left to the local level. However, national leadership can help by pointing the way and by creating an environment conducive to cooperation.

This paper has attempted to provide some ideas toward developing a working partnership between apprenticeship and public vocational education. To summarize, there is a big agenda before us.

QUESTIONS AND ANSWERS

Question: Regarding apprenticeship training for women and minorities, is there a difference between trades, and if so, would you comment on what you feel the reasons for these differences are?

That is a complicated question. Overall, the statistics on the participation of minorities and women in apprenticeship run something like this: Out of 290,000 apprentices in 1978, about 20 percent were minority, and approximately 3 percent were women.

The minority participation is a revolutionary change. It is one of the very few areas of affirmative action where there has been dramatic success in the last fifteen years. That has come about from a variety of actions, both affirmative action regulatory pressures on one side and government training programs, preapprenticeship, and other types of government-supported outreach help on the other side. Minority participation in some crafts, such as that of plasterer and bricklayer, has been historically strong in most areas. There are some exceptions, even within those crafts, and that is a complicated issue. For some, particularly in the South, it goes back to slavery and the kinds of crafts that were considered appropriate work for slaves. As slaves, many blacks were trained in selected crafts. In general, you will find that, among the technical crafts that developed in the later nineteenth and early twentieth centuries (e.g., electricians, plumbers, etc.), there has been traditionally low minority participation. This is due partly to supply and partly to a number of other factors. The situation is changing among journeymen, but more slowly than among apprentices.

As for women, there is (except, perhaps, for cosmetology) very low participation in apprenticeable occupations. On the whole, most apprenticeable trades have traditionally been considered "men's" occupations. The factors here seem to be even more complicated. When I talk to apprenticeship sponsors, they throw the problem back to the schools, and the schools throw the problem back to the parents. Everybody is involved, nobody accepts blame, and they all think they are right. There are internal barriers that prevent women from moving into nontraditional occupations, and there are external barriers. There is still outright discrimination; but there is more to it than this. Affirmative action pressures have been late in coming for women. I expect that ten years from now we are going to see substantial participation by women in most crafts, at least in the apprenticeship system. I think we will see a repeat of the experience that we had with minorities in apprenticeship. This is going to take a lot of work, and we're not there yet.

Question: Do you see any trend toward making the traditional "women's" occupations apprenticeable?

Well, there have been efforts in this direction. In 1974, the Bureau of Apprenticeship and Training and the Labor Department developed a "new initiative" program based on the premise that apprenticeship is a good form of training that ought to be extended to new areas. There have been efforts to extend apprenticeship into health occupations. The position of legal secretary is now an apprenticeable occupation, and there have been similar efforts in other traditionally "female" areas.

I might note that this suggestion was made in 1939 or 1940 by the Federal Committee on Apprenticeship. The minutes of their meetings show that the question of participation of women in apprenticeship programs for traditionally "male" craft occupations was raised early on. Instead of getting the women into the male-dominated occupations, the response of the committee was to make the traditionally "women's" occupations apprenticeable. It seems to me that there are some shortcomings to that kind of thinking and that it really doesn't solve the equal participation problems in traditionally apprenticeable crafts. What it does is to extend a structured form of training into new areas, and I think that is a healthy development. By improving and restructuring training in traditionally "female" occupations, women will undoubtedly benefit.

Employment discrimination issues involving women fall into two main categories—occupational segregation and equal pay. Occupational segregation is at the root of a great number of our problems. We are not going to see an end to discrimination in this country until there is more equal participation of both sexes within occupations that have been considered traditionally "male" and better pay offered for work that has been considered traditionally "female."

Question: After the state of Wisconsin adopted a model apprenticeship system, a bill was introduced in the Oklahoma legislature patterned after the Wisconsin system. This bill was bitterly contested. What was the fear of those who opposed the new system?

I don't know what the fears were in this particular instance, but I *have* detected a general fear among apprenticeship communities of apprenticeship being taken over by vocational education. Earlier I mentioned that there are currently twenty-nine states with apprenticeship agencies. There is also one other state with an apprenticeship agency that is not nationally recognized, and that is New Jersey. The New Jersey apprenticeship agency is located in the state education agency, and that has caused a problem for some of the Labor Department people. There may be some other implications and issues that go along with that. There is some interest in trying to extend apprenticeship agencies into the other twenty states, but there is mixed reaction to that idea. Industry people tend to want these agencies to be industry-controlled or industry-based. They are concerned about educators (particularly vocational educators) gaining what they consider to be too much control. It seems to me that this issue needs a great deal more examination and discussion by everyone concerned.

Question: Would you please comment on the issues of trainee credit and performance-based training in apprenticeship programs?

Well, trainee credit for prior vocational training and performance-based training are two separate issues. It seems to me that wherever a local apprenticeship program has confidence in the training provided by the local vocational establishment, whether or not that training is "performance-based" in format, there is a good chance that credit can be negotiated. Credit can be given in terms of bonus points on apprenticeship admission and also in terms of advanced placement.

One of the criticisms frequently heard about apprenticeship (and, I think, undeservedly) is in regard to the length of apprenticeship. Apprenticeship is often maligned because the typical apprentice spends a long period in training, generally four years. But it seems to me that there is a lot of flexibility in that system, particularly through the credit provision. Almost every apprenticeship program gives candidates credit for prior work experience and prior training—for prior training particularly if they know something about the program in question and have confidence in it. Because of the credit provision, there is a lot more flexibility in the period of apprenticeship than is generally recognized.

The performance-based training movement is sweeping apprenticeship right now. Five years ago the Labor Department sponsored a performance-based training study. It was roundly ignored then; today it is not. Industry is taking a second look. One of the significant developments in this area is that the carpentry program, one of the mainstream construction programs, has gone to a form of performance-based training. That is a major development, and it is making apprenticeship people look twice. Two months ago at the California Apprenticeship Council I chaired a panel on performance-based training. This panel generated a great deal of interest. I think we will be seeing even more growth in this area in the near future.

Question: In certification areas (e.g., medical laboratory training, cosmetology, practical nursing, etc.) has anyone done studies that can tell us which program gets the best results?

Not that I know of. Morris Horowitz and Irwin Hernstadt at Northeastern University looked at the trade of tool and die maker several years ago. They found that one training path—vocational high school combined with apprenticeship—produced workers who showed high scores on measures of effectiveness as measured in terms of performance ratings by supervisors, duration of training, and the amount of time it took to become a competent craft worker. At the University of Texas we did a study in six construction trades using a sample of 1,234 journeymen. We compared people who had been through apprenticeship against others, but that study could not give us conclusive results because our sample wasn't large enough to enable us to compare all of the subgroups represented--those prepared through vocational education, proprietary schools, the military, etc. An adequate study has yet to be done, and I think it would be a worthwhile effort. The feeling I have is that apprenticeship is widely recognized as an excellent form of training. I believe documentation would bear out this assumption in most cases. There may be exceptions, however, and such studies would help us to pinpoint those areas where the programs could be improved.

Question: If each state education agency had an apprenticeship expert with background in both apprenticeship and education, would you agree that this would be the ideal situation?

Of course, but I think that is asking a lot right now. In terms of training people, that is one area in which we are experiencing a critical skill shortage. There are very few people who know both systems well. As a matter of fact, the entire training system in the United States is a highly fragmented one. This is true not only with vocational education and apprenticeship, but it is also true with CETA and vocational education, for instance, and I could cite other examples as well. Everybody seems to be moving along parallel tracks doing similar things but failing to communicate with one another. One of these days somebody is going to get it all together into a truly comprehensive system. I am hopeful that your work here at the National Center will help provide this broader vision.

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