
A Progress Report on Apprenticeships

Apprenticeship thrives in Europe, where secondary students receive high-quality vocational training. By adapting the practice to the needs of American youth, we can help them make a smooth transition from adolescence to adulthood.

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Apprenticeship is in . . . again. This ancient practice has recently reemerged as a promising strategy for improving education, especially (but not exclusively) for those who enter the work force immediately after high school.¹

In researching why so many people seem more competent outside of school than inside, cognitive scientists have found that apprenticeship can increase competence in both places. In apprenticeship, a learner observes and assists a master at work, gradually gaining competence by taking responsibility for progressively more challenging aspects of the task. Two important features that distinguish apprenticeship from classroom teaching are: (1) the student performs "real" work, and (2) the teacher *demonstrates* and *coaches* rather than just *tells* the student how to do a task.

But in describing this type of teaching, cognitive scientists too often refer to anthropologists' accounts of apprenticeship in developing countries; thus they tend to reinforce the widespread misconception that apprenticeship has all but died in modern industrial countries. In fact, apprenticeship thrives in Europe. In

Germany, apprenticeship is the largest form of upper secondary education, with some 70 percent of all youth between the ages of 16 and 18 participating.

American observers of German apprenticeship are impressed with the quality of the vocational training it provides, the sense of purpose it lends to academic schooling (which continues part-time), and the smooth transition apprentices make from adolescence to adulthood. Although many have returned from Germany convinced that the United States can learn from German apprenticeship, no one suggests that we should simply transplant the institution. Instead, we need to learn how to adapt the principles underlying German apprenticeship to our institutions and values.

Principles of German Apprenticeship

The basic principle of German apprenticeship is that it uses workplaces as learning environments for youth. U.S. high school students have the highest employment rate among the industrialized countries, but their work is usually unrelated to school; in fact, it often competes with school for their

time and attention. The United States has apprentices, but they are usually adults; the mean age is 29. Moreover, apprenticeships are concentrated in a small number of craft occupations and constitute a tiny fraction of the work force. (About half of all apprenticeships are in the construction trades. Only about 300,000 workers are apprentices, less than half of one percent of the work force.)

In Germany, apprentices' work experience is related to their schooling. German apprentices continue to take social studies and German courses, but instead of learning general math and general science, they take courses with math and science content that is specifically related to their occupations. Apprentice machinists learn the algebra, geometry, and trigonometry they need to transform specifications into machine parts. Apprentice office workers learn accounting. In contrast, both during and after their high school years, American young people are largely restricted to jobs that demand little academic learning, like working in fast food restaurants or as cashiers in clothing stores. Many conclude from their work experiences that school has no relevance to employment.

As apprentices, German youth spend most of their time in the company of adults. Why do we in the United States try to prepare adolescents for adulthood by gathering them all together in schools, where adolescents predominate? Even at work, American young people are more likely to be surrounded by their peers than by adults. Regular and sustained

contact with adults enables young people to see firsthand what adulthood is about and enables some to establish mentoring relationships with adults.

Apprentice is an ideal in-between role for adolescents, who are neither children nor adults. Apprentices are worker/learners. They must produce and are paid for doing so, but it is legitimate for them to ask questions and make mistakes. Employers expect to pay the costs associated with supervising and training them in exchange for their present and future productivity.

In Broome County, New York, Cornell University has initiated the Youth Apprenticeship Demonstration Project to investigate how we can adopt some of Germany's principles of apprenticeship in U.S. high schools. Twenty-one high school juniors entered the program in the fall of 1991. So as to involve several school districts and offer apprenticeships in several occupations, we drew students from five different high schools — Binghamton, Greene, Susquehanna Valley, Union-Endicott, and Whitney Point — and placed them with four employers: a manufacturing firm, two health service providers, and an insurance company.

The Broome County Principles

In developing the project, we have generated a set of principles to guide us in adapting elements of German apprenticeship to this country.

Apprenticeships are organized by career areas, not specific jobs. We have initially focused on three career areas as appropriate domains for apprenticeship:

- Manufacturing and Engineering Technology (facilities technician, electrical technician, manufacturing technician, laboratory technician);
- Administration/Office Technology

(accountant, data analyst, human resource administrator, computer programmer, systems analyst);

- Health Care (medical laboratory technician, pathology transcriber, physical therapy assistant, registered nurse, biomedical technician).

In each of the areas, we train apprentices in a broad range of skills and expect them to perform many

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tasks. Rather than training them narrowly for one job title, we "cross-train" them, systematically rotating them through several jobs. Specialized preparation for particular jobs is postponed as long as possible. In all occupations we emphasize broad and widely applicable knowledge and skills, usable in multiple jobs and in multiple workplaces.

Apprenticeships structure learning through work. The curriculum for an apprentice's learning at school and at work includes goals, competencies, sequencing, and assessment. Basic academic competence is critical in all occupations. Apprentices' work experiences show how reading and

writing, math, science, and social studies are used at work; for example, one health care apprentice came to appreciate his schooling when he found himself using information he had learned in a biology course in his physical therapy placement. Apprentices' supervisors are helping to identify new areas of knowledge to be addressed in future courses.

All apprentices need "the new workplace basics," which include problem solving, teamwork, communication, and learning-to-learn skills. Employers' increasing emphasis on such "higher-order skills" ensure that apprenticeship contributes to a broad general education rather than narrow job training.

We identify the knowledge, skills, and abilities required by specific jobs by analyzing the jobs; then we build into the program appropriate opportunities for acquiring them. Four administration and office technology apprentices at an insurance company, for example, rotate through five areas or departments during their first year, performing work tasks tailored to increase their skills levels in each area.

Employers develop a learning environment for apprentices. Participating employers take a long view of human resource development. They aim to train high school juniors who will be qualified after two to four years in the program. Employers must have well-developed human resource policies and practices. We have selected employers who are capable of providing the planning and support required by apprenticeship and offering reasonable prospects of future employment.

Adults in the workplace perform four instructional roles:

- The "Training Director" is responsible for designing and overseeing the work-based learning program,



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More than 60 percent of young Germans enter the work force through apprenticeships. This student learns from a journeyman in the plumbing and roofing business.

including planning an appropriate job rotation. The training director, ordinarily a human resources professional, is the key contact person for school staff and parents.

- "Area coordinators," usually department heads, are responsible for identifying and assisting coaches, planning the sequence of experiences in their department or area, and evaluating the apprentice's overall performance in the area.

- "Coaches" work on a day-to-day basis with apprentices, assigning tasks, instructing, answering questions, evaluating, and troubleshooting.

- "Mentors" take apprentices under their wing, give them advice not only about the technical aspects of the work but also about social norms of the workplace. They help them set career goals. A mentor may be a sponsor, a confidant, and an advisor. Coaches may also be mentors, but research on

mentors in business has indicated that mentors who are not immediate supervisors can often be more helpful. One mentor arranged for two health care apprentices to witness a knee operation to broaden their understanding of what happens in a hospital and what kinds of jobs are available there. Two other mentors alerted apprentices to company policies concerning tardiness, illness, and appropriate office behavior.

Schools adapt instruction to take maximum advantage of apprentices' work experience. The simplest arrangement in schools merely gives apprentices some released time to go to work early and a chance to do some special work-related projects in class. This has the advantage of low cost, but the disadvantage that it does little to integrate schooling with work experience.

In our project, the fact that we have

only 21 apprentices who are dispersed over 5 school districts makes elaborate school programs impossible at this time. However, several teachers in each school incorporate students' work experiences into their classes. For instance, an apprentice in health care might examine the issue of rising health insurance costs using both library sources and interviews with knowledgeable people in the workplace.

Training and support are provided to classroom teachers, training directors, area coordinators, coaches, and mentors. In European countries where apprenticeship is widespread, workplace instructors have themselves experienced apprenticeship. They have also usually taken special courses on how to teach apprentices. In the absence of a corps of experienced workplace instructors, we are working with training directors to identify needs for training and support and to develop programs that meet them. We expect that careful selection and continuous support will prove more important than formal training.

Youth apprenticeship is potentially appropriate for anyone. Programs that target the neediest audiences tend to stigmatize participants and undermine their own effectiveness because membership in the program is evidence of the participants' inadequacy. Youth Apprenticeship avoids this problem by recruiting young people from the middle of the achievement range — students who are doing well enough in school but do not expect to enroll in four-year colleges. Some top students are included as well. Employers require apprentices to meet certain behavioral and academic standards, but every effort is made to involve and provide special support for young people who are at risk of dropping out of school. The best

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program for "youth at risk" is one that also involves youth who are not at risk.

Apprentices are employees. Apprentices are hired, paid, supervised, and, if necessary, dismissed according to employers' policies. The terms of employment, mutual obligations, and training opportunities are spelled out in a contract signed by the apprentice, parents, and the employer. The special conditions that apply to the apprentice's employee status include being part-time, being assured of opportunities to learn, and having a right to expect special instructional and socialization support, both directly from the employer and indirectly as the employer works with the school and apprenticeship program staff.

Apprenticeships lead youth toward academic diplomas and certification. We envision a four-year apprenticeship beginning in the junior year of high school and continuing through two years of community college. Diplomas will be awarded by high schools and the college according to the same standards they apply to other students. Initially, apprentices' certification as skilled workers will be handled by employers and will be awarded on the basis of demonstrated competence, not hours of training.

We plan to develop a system that allows for incremental or modular certification; that is, apprentices can be "checked off" for particular competencies as they acquire them, not only at predetermined points. Demonstrations of competence may include successful completion of work tasks at an acceptable level, judgments of supervisors, performance on appropriate tests, and performance under simulated conditions (such as constructing a test piece). Ultimately apprenticeships may be registered with the New York State Department of

Labor, yielding a portable credential that is recognized nationwide.

Employers and schools assume operating costs for the apprenticeship program. Employers train apprentices as an investment in the quality of their workforce. Schools redirect resources already available to them to support the education and training of apprentices. Modest state and foundation funds are secured to cover research and development costs.

Cornell's primary contribution to the apprenticeship project is research and development. If we knew how to adapt apprenticeship for youth in the United States, we could concentrate on creating a large-scale system. However, there are so many uncertainties that the first priority has to be answering the question, "How will youth apprenticeship work in this country?" Note that the question is not "whether" but "how." European experience proves beyond doubt that young people can learn what they need to know as workers and citizens by means of apprenticeship. The question is how such an educational institution would function here.

Answering that question entails careful attention to issues ranging in scale from the interactions between an individual apprentice and his or her coach to the legal and institutional foundations for a system of apprenticeship. While sensitive to the latter, our research focuses primarily on how teaching and learning occur in workplaces. We use the findings immediately in the design and refinement of

the program and the principles outlined here. We will share them with others to guide their efforts as well.

Several other efforts with a similar purpose are also in progress. The Pennsylvania Youth Apprenticeship Program will train skilled metalworkers in five metropolitan areas. Boston's Project Protech focuses on health care. Wisconsin, Oregon, and Arkansas have enacted legislation that lays a foundation for youth apprenticeship. Jobs for the Future, a nonprofit organization in the Boston area, provides technical assistance to such efforts and fosters communication among them.

If we want to give apprenticeship a fair chance in this country, we must be clear about the principles involved and creative in trying to put them into practice. Good ideas are genuinely valuable only when they can be translated into action, a process that inevitably transforms the ideas as well. Research guides our project, but our research is also guided by and directed toward the real-world issues raised as we implement the project. We will measure our success not only by the apprenticeship program we create, but also by what we learn that others can use. □

¹ For further reading related to apprenticeship see S. F. Hamilton, (1990), *Apprenticeship for Adulthood: Preparing Youth for the Future*, (New York: Free Press); L. B. Resnick, (1987), "Learning in School and Out," *Educational Researcher* 16.9: 12-20; and Secretary's Commission on Achieving Necessary Skills, (1991), "What Work Requires of Schools: A SCANS Report for America 2000." (Washington, D.C.: U.S. Department of Labor).

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