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ABSTRACT

The emergence of a more learning-intensive economy has begun to change the relationship between education and work. As employers try to promote just-in-time learning and workers move more frequently from one job to another, continual learning at work becomes increasingly important. Four main elements characterize an education system that is likely to prepare students effectively for this new environment. First, most countries, including Japan, France, Germany, the United Kingdom, and the United States have found it necessary to develop curricula that integrate academic and vocational studies. Second, occupational and educational performance standards should be related to each other. The United States, Germany, Australia, England, Scotland, Denmark, and the Netherlands have all moved away from the development of standards and credentials for narrowly defined occupations. In more ambitious approaches, countries are trying to develop vocational credentials that can serve as a step to higher education. Third, initial education and training should include some work-based learning. Two basic strategies are classic apprenticeship and school-supervised work experience. Some countries have developed the school-based enterprise as an alternative. Employers and educators, including both academic and vocational educators, must share responsibility and power in new school-to-work systems. (YLB)

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SCHOOL-TO-WORK POLICY INSIGHTS FROM RECENT INTERNATIONAL DEVELOPMENTS

In countries where young people have been relatively successful in both achieving high academic standards and making smooth transitions to employment—notably, Japan and Germany—employers have taken major responsibility for training. German employers hire and train apprentices in what is called the "dual system" that combines employment with part-time schooling; Japanese employers maintain long-lasting relations with schools and provide extensive in-company training to newly hired graduates. Students in these countries have clear incentives to perform well in school because there are real and discernible connections between good jobs and good grades. Successful systems, especially those in Europe, also depend on widely recognized systems of skill standards and certification that involve employers and educators. Attempting to emulate these successes, other countries have been trying to increase employer involvement in youth education and training.

Changes in labor market conditions are also prompting changes in education and training policy in countries with relatively successful school-to-work systems as well as in other countries. Employer involvement no longer means training students for predictable, static jobs. Instead, employers and schools are caught up in an evolution toward more flexible production and life-long learning. This trend poses challenges for school-to-work systems. One is to overcome the rigidity and fragmentation of vocational training that prepares young people for narrow occupations and leaves them unable to adapt to rapidly shifting markets. The second challenge is to attract young people to vocational education when higher education is still seen as the primary road to higher income and status. To meet these challenges, policies in many industrialized countries are converging on four principles:

- Curricula should integrate academic and vocational studies.
- Occupational and educational performance standards should be related to each other.
- Initial education and training should include some work-based learning.
- Employers and educators, including both academic and vocational educators, must share responsibility and power in new school-to-work systems.

Integrating Academic and Vocational Education

To prepare individuals for work that demands continual learning, education must promote high-level thinking skills for all students, not just for an elite group. Vocational education, traditionally offered for students who were considered to be less academically inclined, is now being reformed and, in some places, radically reconstituted. These reforms are intended to attract more academically proficient students and equip them with the skills necessary for continual learning and problem-solving in rapidly changing work environments. As change proceeds in this direction, the line between vocational and academic education becomes indistinct. Instead of serving as an alternative to general education,[1] vocational education becomes a method for promoting it.

In 1994, ***Japan*** unveiled an "integrated" vocational-academic high school pathway that combines career development with university preparation. At the postsecondary level, enrollment in special colleges offering higher diplomas in industrial, commercial, and other vocational fields stood at 862,000 in 1992. This is double the number in 1978 and more than one-third the 1992 enrollment in universities.

France has created an array of general, technical, and vocational diplomas at the upper secondary level. At age 15, after four years of lower secondary school, most students either continue in a three-year program toward a general or technical diploma or enter a two-year vocational program. A vocational diploma was introduced in 1985 to give graduates of two-year vocational programs an option to receive an upper secondary diploma after an additional two years. In addition, two-year technical institutes housed at the universities offer technical degrees that serve as a post-diploma alternative for secondary school students.

Traditionally, ***Germany*** has maintained separate pathways to apprenticeship and university programs: students who entered a *Gymnasium* and received the *Abitur* diploma went to the university; others entered apprenticeships. The theoretical and intellectual content of apprenticeship training has been continuously upgraded, and is now considered comparable to that of a two-year associates degree in the United States. Moreover, in recent years, the two traditional pathways are merging. A growing number of *Abitur*-holders are completing apprenticeships *before* entering the university. Some employers who previously hired apprentices have recently been turning to universities

[1] In this article we use the phrase "general education" as it is used in many countries outside of the United States. In these countries, general education customarily indicates university preparation and the primary alternative to a specialized vocational curriculum. This is roughly equivalent to what would be considered academic education in the United States.

and polytechnics to supply highly skill entry-level employees. To avoid the resulting threat to the dual system, steps have been taken to facilitate admission of dual system graduates to higher education.

The ***United Kingdom*** has introduced a new program of study leading to General National Vocational Qualifications (GNVQs). These are offered or planned in 14 broad industries or occupational fields. Advanced GNVQs are equivalent to academic "A level" examinations, which are required for entrance to the university. In 1996, 91.6 percent of the 19,353 GNVQ holders who applied for admission to higher education received at least one acceptance offer. The three GNVQ fields that sent the largest numbers to high education were business, leisure and tourism, and health and social care.

In the ***U.S.***, perhaps to a greater extent than in other countries, there is a commitment to keeping the four-year college option open for every student to allow students more flexibility in career choices. Including college-bound students also protects career preparation programs from being stigmatized and shortchanged. This commitment was clearly stated in the 1994 School-to-Work Opportunities Act.

The dichotomy between vocational and academic will not disappear quickly or without struggle, given the strong tradition, in most countries, of using secondary education to sort students into various levels of the occupational hierarchy. But the pressure for change is being felt throughout the industrialized world, and educational policy is responding.

Skill Standards

Closer linking of academic and vocational education also implies that occupational and academic skill standards should be related to each other. Integrated standards tell students what academic and technical knowledge they need to enter a particular occupation; indicate to employers the skills and abilities of applicants; and, perhaps most important, provide a forum for employers and schools to work together. Progress in the development of integrated skill standards in the **U.S.** is signaled by two significant trends. The first involves attempts to incorporate generic workplace skills such as problem-solving and teamwork (SCANS skills) into the standards. The second trend involves developing standards that coincide with broader occupational definitions.

Close partnerships between employers, unions, and schools in ***Germany*** provide the foundation for a system of standards and certification that promotes the integration of vocational and academic education. Indeed, the German dual system is based on the coordination of classroom and on-the-job learning. At the same time, the German system is still evolving as German educators and employers adapt to changing economic and skill requirements. Analysts within German apprenticeship institutions are working towards strengthening the teaching of the interdisciplinary and social skills required in more stable professions that maintain their cultures and identities despite changes in technology. This will allow for a significant increase in the status of vocational credentials; a more thorough integration of academic and vocational education within the apprenticeship system; more closely aligned certifications in the academic and dual system sectors; and easier access to universities using vocational qualifications.

Australia's National Framework integrates the Vocational Education and Training (VET) curriculum taught in secondary schools with postsecondary Technical and Further Education (TAFE) institutions. This framework stresses specific industry skill requirements as well as the acquisition of academic and generic employment-related competencies. The development and implementation of competency-based training (CBT), skill-related pathways within enterprises and industries, and credit transfers and articulation arrangements are other ways in which Australia is producing a more timely and marketable set of vocational credentials that also minimizes the importance of where and when training takes place. Industry Training Boards or Councils define both "key competencies" that resemble SCANS skills in the United States and "functional competencies" that are written in industry-specific terms to deal with employment skills.

Educators in ***England*** and ***Scotland*** have tried to develop two parallel but equal educational streams. The vocational stream centers around assessments that promote the integration of academic and vocational education through General National Vocational Qualifications (GNVQs) in England and Wales and General Scottish Vocational Qualifications (GSVQs) in Scotland.

Unlike GNVQs, England's National Vocational Qualifications (NVQs) are criticized as being too specifically task-based as they certify students based upon their ability to carry out specific workplace functions. Although certification of skills can take place completely on-the-job, the independence and quality of the system is often compromised since employers frequently do both the training and assessment. Even though academic skills or knowledge may be embedded in these skills, they are not certified. Further, the skills are not transferable across industries. Overall, the NVQ route contrasts sharply with the course of study taken by university-bound students.

The GNVQs, initiated in 1991, represent an intermediate alternative between

of the rights and benefits of regular employees with some special entitlements. The German dual system is the largest example of this kind. Several countries including Britain, the Netherlands, and Spain have recently created new apprenticeship systems or expanded existing ones. The same countries, and others including France, Korea, and Sweden, have also taken major new initiatives to expand work-based learning for students who are still under school supervision.

The ***United Kingdom*** has worked to create "modern apprenticeships" in which 16 and 17-year-old school leavers receive government-funded training credits that they can cash in with employers who provide training. Trainees are not required to spend a fixed length of time in the enterprise but are awarded qualifications when they have passed a set of performance-based requirements (the NVQs discussed above). Other countries are also reviving apprenticeship: ***Spain*** passed a new apprenticeship law in 1994, and the number of apprentices in the ***Netherlands*** grew by 50 percent between 1986 and 1992.

In the ***U.S.***, cooperative education, a form of school-supervised work experience, is still the most common form of work-based learning for high school students. It is usually part of a vocational program, as are most of the examples of school-supervised work experience in other countries. ***Korea*** has restructured its vocational high school curriculum to include one full year at work during the three-year program and expanded the opportunities for vocational high school graduates to enter a university. The goals are to increase the attractiveness of the vocational programs and enhance the students' adaptability to actual work situations.

Similarly, ***France*** is making greater use of unpaid internships for vocational students. Vocational diploma students are required to spend at least 16 weeks in enterprises during the two-year program. However, these work experiences are often not closely connected to what students do in their classes, and performance in the workplace has no effect on whether a student receives the diploma. Nonetheless, the enrollment of thousands of vocational diploma students in enterprises has encouraged the educational authorities to extend the practice to two-year vocational programs that start at age 15 and precede the diploma program.

In ***Australia***, the number of students enrolled in courses with a centrally recognized work-based component tripled from 1993 to 1994. "Student traineeships" allow students in years 11 and 12 to combine their school-based studies with work experience and off-the-job training. Policy makers in ***Canada*** are also promoting expansion of work-based learning for high school students, through cooperative education. In ***Sweden***, where upper-secondary vocational education was extended from two to three years in 1992, students are now required to spend 15 percent of their time in work settings. However, this applies only to vocational students. In the ***U.S.***, the School-to-Work Opportunities Act stipulates that work-based learning must be coordinated with school-based learning and be relevant to students' career majors.

School-Based Enterprise. Educational institutions can engage students in productive work in a school setting as an alternative to work-based learning outside the school. In the ***U.S.***, for example, vocational school-based enterprises have built houses and operated retail businesses. Students in these enterprises report that their experiences promote learning more than the jobs they find on their own. In 1992, 19 percent of secondary schools in the U.S. were operating some kind of student enterprise as part of their school activities. Most were associated with vocational programs. ***Denmark*** has also made extensive use of school-based enterprise.

A particularly good example of school-based enterprise is an organization in ***Singapore***, called the German-Singapore Institute (GSI). Founded in 1981 as a joint venture between the Economic Development Board of Singapore and the German Agency for Technical Cooperation, GSI calls itself a "teaching factory" and is organized more like a business than a school. It conducts applied development projects for local manufacturers while preparing technicians and middle managers in a variety of manufacturing specialties. Students spend most of their two or three years in state-of-the-art laboratories largely equipped by German manufacturers. Faculty and students work 44 hours a week and receive short vacations instead of long academic holidays. The departments are named according to their productive functions like tool and die making or data processing, rather than academic disciplines. In 1994, GSI enrolled over 1,000 students and plans to grow to 2,000 students in the next six years.

Governance

Development of work-based learning and links between occupational and academic skill standards call for increased sharing of power and responsibility between educators and employers. In countries where schools still carry the main responsibility for education and training, the role of employers has increased. For example, in recent years employers have taken a more active part in the governance of work-related education and training in Australia, Britain, and France. Both in these countries and in Germany, where employers traditionally have had a major say, the employers' participation in gov-

ernance has been limited to vocational education, however. Employers still exert little direct influence on the curriculum of secondary schools or programs whose primary mission is to prepare students for selective institutions of higher education.

The ***United Kingdom*** established the National Council for Vocational Qualification to create a unified framework for vocational qualifications and coordinate the standards set by industry associations and awarding bodies. Their framework structured the National Vocational Qualifications (NVQs), which are intended to assess the work-based performance of employees of all ages. Educators play a relatively minor role; certification and training are squarely in the hands of employers, independent of any educational program. In contrast, the new vocational secondary degree, the General National Vocational Qualification (GNVQ), is school-based, and employers play a less important role. GNVQs, however, seem to be increasing the collaboration between general (academic) and vocational educators.

The Scottish Vocational Qualification (SVQ) system has achieved a more balanced partnership between the education system and the private sector than its English counterpart. Vocational education in ***Scotland*** is regulated by the Scottish Vocational Education Council (SCOTVEC), an independent entity that works with both employers and educators.

In ***Denmark***, vocational education reform is based on strong cooperation between education and the labor market. As in other continental European countries, representatives from business and labor collaborate with educators to become "social partners"; develop and maintain vocational education and in-company training; and establish recognized certification. National Trade Committees, formed by industry associations and labor unions, formulate the technical objectives and qualification descriptions for vocational education; assure that curriculum, standards, and assessment meet current labor market needs; and set rules for the in-company component of training.

In the ***Netherlands***, National Bodies for Vocational Education comprised of representatives from industry and vocational education have primary responsibility for the realization of a single qualification system for both upper-secondary education and the apprentice system. These bodies link industry, government, and educational institutions. What distinguishes the reforms in the Netherlands from those occurring elsewhere is the involvement of educators from both general and vocational education. There is an increasing emphasis on workforce preparation in all education levels. Many lower-level general education courses have added a career exploration component, and many universities have strengthened vocational elements by adding internships and practical assignments. Although academic and vocational educators appear to be working toward similar goals, they are working more closely with industry than with each other.

Australia's vocational reform has been successful in developing a strong national framework, based on national industry competence standards, for involving industry representatives in the governance of vocational education. In some fields, especially metalworking, automotive, and tourism and hospitality, employer input in the development of competency-based standards has been strong, as have support for implementation. However, the level of support is not consistent across industries. While there is overt cooperation between vocational educators and employers, there is less obvious cooperation between vocational and academic educators. National level government officials, educators, union representatives, and employers have devised any cooperative procedures.

Conclusion

The emergence of a more learning-intensive economy has begun to change the relationship between education and work. As employers try to promote just-in-time learning and people move more frequently from one job to another, continual learning at work becomes increasingly important.

Four main elements characterize an education system that is likely to prepare students effectively for this new environment. Three of these elements—skill standards, workplace learning, and strong links between employers and schools—are evident in countries where school-to-work systems have worked well in the past. Accordingly, countries with less successful systems have been introducing reforms that incorporate these features.

But these elements are no longer sufficient. In addition, most countries have also found it necessary to create a closer connection between academic and vocational education because neither traditional form of education by itself meets the requirements of learning-intensive work. To prepare for continuous change, school-to-work systems are now called upon to equip students both with the abstract theory and analytical skills that the academic curriculum has traditionally tried to teach and the knack for practical application that has been a hallmark of vocational education. Employer involvement, skill standards, and work-based education are reflecting this new policy direction to varying degrees in different countries.

The findings of this study are encouraging for the United States, where local communities, states, and the federal government have been spurred by continuing

the work-based NVQs and the "A level" examinations traditionally required for admission to the university. GNVQs, in principal, give access both to the university and to work.

Scotland's flexible certificate system, leading to a National Certificate (NC), is available in over 3000 modules, each representing 40 hours of study. Students can use the NC as a stepping stone to advanced vocational qualifications as well as more academically oriented "Highers." Thus the National Certificate system has many positive elements—an emphasis on integration, the development of broad occupational clusters, and a focus on preparing for higher education. Nevertheless, academic degrees still form a much stronger foundation for career development than vocational degrees. Although some NC modules have formal equivalence to the academic Highers and are recognized for entrance into a university, there are still two distinct routes to higher education and a persistent disparity in esteem between the two. Moreover, although Scotland is introducing reforms to strengthen the links between academic and vocational education, and increase the vocational content of academic studies and the academic content of vocational studies, a credential-based lower stream will remain as a separate system for students for whom Highers are believed inappropriate.

All vocational education and training courses in ***Denmark*** culminate in a "skilled worker certificate" issued by Trade Committees. Although it sounds vocational, the education leading to the certificate includes basic, area, special, and optional subjects. Basic subjects include traditional academic courses. Area subjects focus on broad occupational fields and provide general as well as specific vocational qualifications. The remaining third is divided between special and optional subjects that offer students specialized training, often geared toward particular company needs.

Denmark has established a series of upper-secondary vocational courses leading to graduation through either a higher technical exam (HTX) or a higher commercial exam (HHX), both of which have improved the reputation of vocational education by becoming valid alternatives to general upper secondary education. These educational routes share many structural and content features with general upper-secondary schools and have become a valued alternative to general education because they qualify students for admission to higher education as well as employment. Although it maintains distinct academic and vocational secondary-level credentials, Denmark has gone far towards creating an upper secondary vocational certification that represents a legitimate step to university education.

National skills standards and a unified qualification structure for vocational education are the major vehicles for integrating academic and vocational education in the ***Netherlands***. Efforts to broaden occupational credentials began in the late 1980s and early 1990s when the government established minimum vocational qualifications that every Dutch resident must meet to function adequately in the labor market and modern society. Vocational education reform in the Netherlands has two primary objectives: (1) reducing the differences between vocational and general education so that students can transfer within the system, and (2) developing more effective workforce preparation. What is unique is that these efforts have actually worked together and become the impetus for changes in *both* the vocational and general education systems—moving them toward each other. Although traditional distinctions between vocational and general education will likely persist for some time, the gap between the two may be bridged.

Every country described here has moved away from the development of standards and credentials for narrowly defined occupations. Some have also incorporated generic workplace skills into standards systems. But these changes can be carried out while maintaining separate academic and vocational streams. For example, in Germany and Australia, these are viewed primarily as reforms of vocational education. While they have strengthened the academic content of vocational streams, they have had less influence on traditional academics or university-based education. In more ambitious approaches, countries are trying to develop vocational credentials that can serve as a step to higher education. The most ambitious strategy is to develop a unified school structure based on one set of credentials for both vocational and academic studies.

Work-Based Learning

Because one hallmark of the emerging economy is the necessity for continual learning in the context of work, a logical implication for initial education and training is that schools should give young people some experience in work-based learning. By gaining practice in the deliberate use of work to develop knowledge and skill, young people should be better prepared for a lifetime of learning at work. There is some evidence from France that this is so. Workplace experience also has been found to be cost-effective in teaching work-related knowledge and skill. And, as vocational and academic education converge, work-based learning may help students better understand abstract, theoretical ideas by applying them in concrete, practical situations.

Two basic strategies for work-based learning are classic apprenticeship and school-supervised work experience. In classic apprenticeship, trainees have some

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criticism to undertake major changes in the institutions that usher young people from education to employment. Although evidence presented in this report suggests that the United States does not, in fact, have the least effective school-to-work system in the industrialized world, it has not been the most effective either. But in the United States, where control of education and training is more decentralized than in most other countries, many localities have launched initiatives that are preparing young people for college and careers at the same time. The main cause for optimism in the United States is that the recent reforms taking shape in American schools and communities—combining an academic and occupational curriculum with work-based learning and high standards for all students—appear likely to provide the best preparation for young people entering an economy where learning and work are intertwined. The fact that most other industrialized countries either have been moving in this direction for some time or are now beginning to do so corroborates the logic of these efforts.

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