# Structuring Work-Based Learning | 4

W ork-based learning can be structured in various ways. The systems can vary in respect to the student populations that are served; the learning objectives; the level and means of coordination with school-based instruction; the timing, intensity, duration, and progression of the work experiences; the settings in which the work-based learning takes place; and the payment or nonpayment of the students. Each feature is discussed in this chapter. Variations in these features distinguish several models of work-based learning that are discussed in the next chapter.

THE STUDENTS TO BE SERVED

Work-based learning programs can be mandatory for all students, optional but suited for all students, or optional and targeted at a subset of students. In the last two cases, the criteria for determining whether interested students will be allowed to participate may be strict or lax. And in all three cases, the programs can choose to emphasize, or not to emphasize, the matching of students with employers' wishes. These choices will significantly affect the character of the work-based learning and probably its success.

Although the "Findings" section of STWOA indicates that the legislation was prompted partly by problems in the noncollegiate labor market, the legislation refers to serving "all students" at least 12 times (35). Some people have interpreted that term to mean that *every* student should participate in the system. Others have said the term means that the systems should be suitable for *any* student—from disabled ones to academically gifted ones—but that participation should be voluntary.
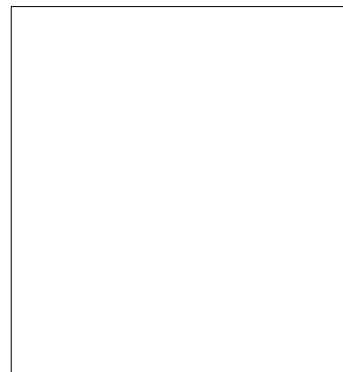
Congress contributed to the confusion by defining "all students" in a manner that does not clarify which of the two meanings was intended. The statute states, "The term 'all students' means both male and female students from a broad range of backgrounds and circumstances. . . ." (Public Law 103-239, Sec. 4[2]). Congress also included language in the act supporting both positions in this dispute. The specified purposes of the act include creation of "statewide School-to-Work Opportunities systems that . . . are part of comprehensive education reform" and establishment of "a universal, high-quality school-to-work transition system," both of which suggest all-inclusiveness (Secs. 3[a][1] and [2]). At the same time, "all students" is often used in contexts such as "offer opportunities for all students" or "provide all students with equal access" which do not imply compulsion (Sec. 3[a][1][C]); Title I, Sec. 101[5]). In addition, the act specifies that career awareness services and selection of an initial career major are to be available to "interested" students, which clearly indicates that Congress did not intend all the components of STWOA to be compulsory (Title I, Sec. 102[1] and [2]).

The people responsible for implementing the STWOA-supported systems are concerned that the systems will be stigmatized if they are perceived as primarily serving students who normally would not be bound for college. That fear appears justified, but any effort to preclude the stigma by designing compulsory systems is likely to elicit a backlash from those parents who do not want their children to make early career decisions and who fear that occupational preparation in high school and work-based learning will hurt their children's chances of going to college (2,30,39).

An alternative approach is to develop systems that provide attractive learning opportunities for students of various abilities and interests. There is good reason to think that some of the most academically talented students will welcome career exploration and work-based learning opportunities. The prestigious Phillips Academy, in Andover, Massachusetts, requires all students to work two periods a week at the school (31). In addition, more than half of the students there se-

lect community service activities, and a modest number choose a one-semester internship working in the U.S. Congress. Thomas Jefferson High School for Science and Technology, a public magnet school in Alexandria, Virginia, with more than 90 National Merit Semifinalists each year, releases interested seniors in the afternoon to do research at local scientific and engineering organizations (37).

The criteria for permitting students to undertake work-based learning assignments can be lax or demanding. Those who urge lax entry standards say that students who have low academic achievement or have displayed problem behavior are the ones who most need a second chance in a different kind of learning environment. Those who urge high standards say that employers will stop participating if presented with slow or troublesome students. There are also some who suggest that although work-based learning should be open to lower-achieving students, it is important to have stronger students participate so that work-based learning does not become stigmatized as a "low track" or "dumping ground," as has often been the case for vocational education programs.

The screening criteria that some schools apply include age, grade level in school, attendance record, disciplinary record, completion of prescribed courses, recommendation of an instructor or guidance counselor, grade point average, test scores, and the student's motivation for work-based learning as indicated by special essays or interviews. Some school-to-work transition programs apply several criteria and some have none. When the criteria are applied, the standards are seldom more than moderate. For instance, one inner-city high school program requires an 85 percent attendance rate and a C average or better; a high school program in metalworking requires a C average or better and completion of two courses each in math, laboratory science, and language arts, before starting the work-based learning component (17). The highest standards OTA found were for an electronics and telecommunications program, cosponsored by a large high-tech company, which required a grade point average of at least B. In the first year of the program, however,

there were not enough applicants who met that criterion, and the standard had to be lowered, at least temporarily (8).

There had been concern that employers would insist on high screening standards, and some scholars and educators worried that those standards would preclude the participation of many minority students (24,36). Recent studies suggest this has not been the case. One study of 12 programs found that the proportion of participants with mostly C or lower grades in math ranged from 29 to 80 percent, and the proportion subject to at least one disciplinary action ranged from 10 to 60 percent (30). In another study of 10 programs, the proportion of African American and Latino students ranged from 7.1 percent to 85.4 percent of the participants, with an overall average of 62 percent (17). In addition, OTA staff repeatedly heard employer representatives, especially those from large companies, state that one of their incentives for participating in school-to-work transition programs was to recruit promising minority students as permanent employees.

There has also been concern that employers' preferences would funnel girls into gender-stereotyped occupations and would minimize opportunities for disabled students. The available evidence does show that male and female participants in work-based learning tend to be in occupations traditional for their gender (8,17), but it is unclear whether that situation reflects the preferences of the employers or other factors, such as the guidance provided by the schools or the preferences of the students and their parents. OTA did not find data on the participation of disabled students except in programs that were designed specifically to serve such students (33).

Almost all of the studies that have investigated employers' satisfaction with work-based learning students have found it to be high (13,22). A recent study of 10 programs that are broadly inclusive found high satisfaction among employers (17). Another study of 16 high school programs that are similarly inclusive found that the school coordinators and employers reported few problems with disadvantaged or low-achieving students, and that none of the programs was planning to tighten the criteria for participation (30).

The widespread satisfaction of participating employers does not necessarily mean that all work-based learning assignments should be open to any interested student. OTA staff visited some programs that were broadly inclusive and others that had moderate standards. In both cases there appeared to be a high degree of satisfaction among the employers who were participating, but the types of job assignments differed. Where low-achieving students were common, they tended to be helping incumbent employees or learning tasks that did not require strong basic skills—tasks such as measuring blood pressure and installing drywall. Higher standards for achievement were common in work-based learning for precision machining and electronics technicians, where the students were participating in rigorous and expensive training programs.

One coordinator told OTA staff flatly that she could not arrange and retain work-based learning in electronics without setting standards that many students in her career center could not currently meet. More than one employer, clearly committed to continued participation, indicated that the students' academic shortcomings, especially in math, had slowed their training during work-based learning or made it more of a burden for the staff. And one manager of a large plant in Appalachia, who was helping to establish a youth apprenticeship program, announced firmly that the schools would have to ratchet up the academic standards.

Maria

Maria, a 17-year-old from a Spanish-speaking family, speaks impeccable English and is poised beyond her years. She has accumulated enough high school credits to graduate at the end of her junior year, and is headed to a well-known university to become a dietitian. This spring she assumed a work-based learning assignment in a hospital kitchen where she undertook a range of functions. The kitchen sometimes prepares cakes for special events, and because Maria likes to bake, she volunteered to prepare one. She was given a recipe and told to triple it. She did not know how to calculate the correct proportions, and the mentor had to show her.

SOURCE: Office of Technology Assessment field visit.

OTA staff visits to work-based learning sites also revealed another side of the selection issue. Over and over again, the students, the school coordinators, and the employers told of how low-achieving and mid-achieving students had risen to the challenge of their work-based learning assignments. Many achieved commendable records of punctuality despite difficult commutes; many mastered skills and fulfilled responsibilities that they had not thought possible; and many acquired new career objectives and an understanding of what would be necessary to achieve them.

Some work-based learning programs can probably thrive without standards for participation, but it is doubtful that any can survive without matching students with employers' wishes. Some civic-minded employers will accept weak students and be willing to give them extra help, whereas others will not make that effort. As a result, programs have some flexibility, but they cannot be oblivious to the expectations and needs of the participating businesses.

Employers are not passive players in the matching process. Some rely on the school coordinator to make the match, but will refuse inadequate students. Some interview each proposed student be-

fore giving final approval. And some interview two or three candidates for each opening.

A recent study of youth apprenticeship programs found that employers who had participated in the program for a year or two reportedly became more willing to take a chance with young people who had obvious weaknesses—especially if they had interviewed them (17). Another study, however, found that programs that served substantial numbers of economically and academically disadvantaged youth generally raised their selection standards after the first year of operation in the hope of reducing problems in the workplace and attrition rates (8).

While school coordinators and employers are screening students, the students are also screening employers. They use information provided by the school coordinators and by students who have returned from work-based learning assignments. One co-op coordinator in Cincinnati observed, "There's nothing that can kill a program quicker than students coming back and complaining about their co-op job. . . . The students really talk to one another about these things—how much they make, what they're doing, and so forth" (13).

Although there are tradeoffs with respect to screening standards, there may also be an important opportunity. If employers create work-based learning positions that are highly attractive to students and then gradually raise their minimum requirements, the schools and students may rise to the challenge. In such cases, both the students and the employers would benefit.

OBJECTIVES

Work-based learning can be directed primarily toward academic enhancement, career exploration, occupational development, or employers' production. The priorities will affect the benefits to students and to participating employers.

Work-based learning can contribute to academic learning in at least three ways. It can motivate learning by demonstrating the importance of academic skills in the workplace, by building work habits and self-discipline in the workplace that

transfer to school, and by raising aspirations and understanding of the prerequisites for achieving those aspirations (5,20,26). Work-based learning can also reinforce and extend academic learning by requiring students to apply their academic skills to the tasks of the workplace.

"I've seen some people who aren't satisfied with their jobs. That's helped me to learn that I should take my education as far as I can so that I won't be doing just anything to survive."
—Student (17)

Work-based learning can contribute to career orientation in many ways. Experience in a productive work environment can help develop young people's attitudes and work ethic. A period of job rotation—when the students assist in several different jobs and departments—can introduce the students to the realities of various jobs and help them determine which are most congruent with their abilities, interests, and goals. Iterations of training and progressively more challenging responsibilities can introduce students to "working your way up." Work-based learning also can provide personal contacts and references that will be useful when the young people seek other job opportunities.

Work-based learning can address a number of aspects of occupational development. Preemployment readiness instills the attitudes, habits, and skills required in every job, such as punctuality, reliability, adaptability, responsibility, relating well to others, following directions, perseverance, initiative, and loyalty. Occupational skills used to be defined by the capacity to carry out specific tasks common to a given occupation, but as many American organizations have adopted flatter organizational structures, flexible production, and continuous quality control, occupational skills are now often considered to include competencies in resource allocation, teamwork, the organization and use of information, systems thinking, and the use of technology (43). Organization-specific procedures are the rules, practices, and norms that vary some from workplace to workplace. Problem solving and creative thinking allow an employee to deal effectively with nonroutine events and to develop new products and processes. Understanding of an industry encompasses a knowledge of the economic, technological, production, and marketing structures that influence the companies within a given industry.

Productive activities give students the satisfaction of having contributed to the creation and distribution of real goods and services and meeting real-world standards. Productive activities are also an employer's payback for the expenses of providing career orientation and occupational development. Without some contribution to the workplace production, it is unlikely that many employers would long participate in work-based learning, especially when they are required to provide substantial training.

STWOA stipulates that the work-based learning should focus on all four objectives—academic development, career orientation, occupational development, and production. It also seeks to prevent narrowly focused training and the use of students as cheap labor. The legislation specifies that work-based learning is to include not only "work experience" but also "instruction in general workplace competencies," "training related to pre-employment and employment skills to be mastered at progressively higher levels . . . relevant to the career majors of students and lead[ing] to the award of skill certificates." Students are to be given "broad instruction, to the extent practicable, in all aspects of the industry" (Title I, Sec. 103[a]) The act also indicates that the school-to-work transition systems are to help students view "a broad array of career opportunities," "identify and navigate paths to productive and progressively more rewarding roles in the workplace," and "attain high academic and occupational standards" (Sec. 3[a]).

COORDINATION WITH SCHOOLING

Work-based learning can be closely or loosely coordinated with school-based instruction. Good coordination can create synergistic effects be-

tween the classroom instruction and the work-based learning experiences.

The coordination can be directed at several purposes. It can help assure that students have the academic and occupational skills that are necessary to meet the expectations of the employers and to benefit fully from the work-based learning. It can allow the schools to structure their instruction to benefit from student interests that are sparked by the work-based learning experiences. It can permit teachers to extend and reinforce what has recently been learned during the work-based learning. And it can allow the work-based learning supervisors and mentors to reinforce and extend what has recently been taught in school.

Several strategies are used to achieve coordination. The school systems and employer community may plan the school-based and work-based learning together. In some cases, representatives of both also manage the program together. Schools and employers may exchange several staff members for a day or longer, so that each person can gain a realistic sense of the other's environment. A school and an employer sometimes negotiate a written training agreement specifying the general responsibilities of each party. The school coordinator, the worksite supervisor, and the student may also negotiate a written training plan that indicates the sequence of school-based preparation, work-based learning activities, and the skills to be mastered by the student at various points in time. If several students will be in one workplace, one employee may be appointed to handle coordination with the school. High schools may adopt flexible scheduling, such as early morning and late afternoon classes to accommodate "parallel" worksite schedules, and many colleges must offer certain courses more often than they would otherwise do, to make them available to all students on "alternating semester" work schedules (13). In addition, the school coordinator may periodically visit the worksite to observe the students' activities and to talk with the supervisor or mentor.

> *"My veterinarian tries to follow [the training plan] and there are things for which she's said, 'If I didn't know you were supposed to do this, I would never have told you to go ahead and do it'." —Student (14)*

There are a number of activities that teachers can use to build on the students' varied work-based learning experiences. These include having students write essays about their experiences, encouraging students to discuss issues they have encountered in their workplaces, and having them engage in self-study of topics that they will soon need for their respective worksite assignments. Similarly, the workplace supervisors and mentors can ask the students what they are covering in school, and give assignments that require application of that material. As discussed in chapter 3, some schools offer an "integrative seminar" that helps students prepare for the work-based learning, deal with problems encountered in the workplace, undertake research in their worksite, and reflect on the implications of the work experience for their future schooling. Schools of the future might rely heavily on computerized tutorials and simulations that would permit highly individualized "on demand" learning, which could further facilitate coordination (9).

OTA was not able to locate evidence of the relative effectiveness of various coordination strategies. The existing literature, some of which is discussed in chapter 5, amply demonstrates that coordination of school-based and work-based learning is difficult to accomplish but important for the effectiveness of the program (2,3,8,30, 32,33,39). One of those studies discerned four practices that appeared to be associated with better coordination: having teachers visit the workplaces, grouping students in key classes by occupational clusters, giving teachers time to plan new curricula, and encouraging teachers to adapt their curricula frequently (8).

In conversations with the high school coordinators of several school-to-work transition programs, OTA staff found that the coordinators usually had extensive previous experience working in industry, they maintained almost daily contact with the employer community, and they constantly made adjustments to meet the needs of the students, schools, and employers. A recent study of exemplary clinical training and cooperative education programs in two-year colleges reported the same finding (3). And a study of programs in Cincinnati, which appears to have more work-based learning at the two-year-college level than any other city in the country, suggested that "clear expectations on the part of employers and educators alike, established in face-to-face contact and constant discussion . . . appear to be the most common mechanisms of establishing and enforcing the high-quality equilibrium" (13).

Juan

Juan was proud of his accomplishments in school. He was smart; he had studied hard, twice skipped a grade, participated in a school-to-work transition program toward the end of his junior year, and graduated from school at the age of 16. When he applied to college, he was rejected because of his low math score on the SATs. So he enrolled at the local community college, where he is now taking Algebra I and doing well after a difficult start. When an OTA staff member asked teachers at Juan's high school how such a student could graduate without taking Algebra I, they said that it had been a "mistake." Afterwards, the school-to-work program coordinator approached the staffer and said, "The teachers didn't tell you the whole story. I messed up too by not checking his transcript. That won't happen again. Now I check the transcripts of all students entering our program."

SOURCE: Office of Technology Assessment field visit.

STWOA has several provisions that could help facilitate coordination. It specifies that the school-to-work transition systems should be planned and developed by a partnership of schools, employers,

and others (Title II, Sec. 203). It calls for the development of a skill certification system, which, if accomplished, should provide a common framework for the schools' occupational curricula and the work-based learning (Sec. 4[22]). It also specifies "connecting activities," including a school mentor to coordinate with the worksite, technical assistance to employers for designing and implementing work-based learning, and linkages with "employer and industry strategies for upgrading the skills of their workers" (Title I, Sec. 104).

TIMING, INTENSITY, DURATION, AND PROGRESSION OF WORK EXPERIENCES

Work-based learning activities can begin as early as the first grade and extend through graduate school. Activities at any point could have potential benefit, but with a limited amount of resources, there will be tradeoffs between the number of grades for which work-based learning is offered and the quality of the experiences.

In the early grades, most work-based learning consists of field trips to workplaces. One elementary school program that provides more than that is called Kids and the Power of Work (KAPOW). Company employees of a participating business take classes of students on a tour of the business and then meet with them monthly throughout the school year to discuss characteristics of different jobs, work attitudes and habits, and the students' career interests. The teachers sometimes build on those sessions, using them as examples in academic course work (18).

At the middle-school or early high school level, students are sometimes given opportunities to "job shadow" an employee for a few hours. They watch the employee go about his or her work and then meet to discuss the job, the required education, and the rewards. Job shadowing is used mostly for motivational and career exploration purposes.

In the early high school years, community service activities are sometimes introduced. The student does volunteer work for charitable or public purposes. The work is intended to develop a sense of civic duty and to introduce generic work skills

and habits. Sometimes the community service is an extracurricular activity, sometimes it is awarded credit toward graduation, and sometimes it is part of a "service learning" course in social studies or civics.

At the high school level, interested students may be given an opportunity to run school-based enterprises that provide goods and services to other students (such as a student bookstore), to the school district (such as a print shop), or to the public. Elective courses are used to prepare the students for the work assignments in the enterprise. Generally the students participate during their later years of high school, but occasionally they can begin in their first or second year.

In the later high school and college years, more intensive work experiences are sometimes offered. In internships, students assume part-time or full-time work positions, usually for only a few weeks or months near the end of their schooling. Work-study programs offer students part-time paid jobs on campus. In cooperative education, there is paid work experience over the last year or two of high school or over the later years of college. The work-based learning is sometimes closely coordinated with the schooling, and sometimes it is not. Clinical training is similar to cooperative education, except that it is almost always closely coordinated with the schooling and with the professional licensing requirements that prevail in the medical fields. Youth apprenticeships closely coordinate schooling and paid work experiences over the last year or two of high school and at least one year of postsecondary education or training, and are aimed partly at preparing students to earn an industry-recognized skill credential.

At the high school level, work-based learning often occurs for several hours, one to five times a week, and may continue on a full-time basis during the summer. In most co-op and youth apprenticeship programs, students spend less time in class than they would otherwise, but some of the programs have minimized the lost class time by rescheduling classes to start earlier or to continue later into the afternoon. When class time is lost, some programs compensate by giving students additional assignments to be done outside class. A common example is keeping a journal of the workplace experiences. When OTA staff visited youth apprenticeship programs, they repeatedly heard students describe how they had adjusted to leaving home at 6 a.m. or to going to bed at 11 p.m. Some scholars worry that the arduous schedules of students in youth apprenticeships are denying them the joys and developmental benefits of extracurricular activities and informal socializing (3).

At the college level, the students may alternate between going to school full time and going to the workplace full time, or they may use the parallel pattern common in high schools, going to the workplace on a part-time basis several days a week. In some college programs, participation in work-based learning extends the time that students need to graduate; in others it does not, but may require enrollment during the summer.

In the United States, work-based learning is most pervasive at the graduate-school level. Students seek teaching assistantships and research assistantships for the income they provide and for the opportunities to work closely with a professor. Student editors exercise full control over the selection and editing of articles published in most American law review journals. Medical schools require all students to participate in extensive internships, and a "residency" after graduation is usually required for licensing and board certification.

Figure 4-1 illustrates one hypothetical progression of work-based learning through 16 years of schooling. OTA knows of a few schools that incorporate two or more forms of work-based learning at different grade levels, but none that includes a progression extending from elementary school through college.

Would such a progression be desirable? There is reason to think that some progression of work-based learning could benefit many students. The evaluation studies summarized in chapter 5 consistently show that work-based learning opportunities excite and motivate many young people. The early experiences could introduce them to the world of work, stimulate career exploration, and develop preemployment skills and habits. Work-

FIGURE 4-1: One Possible Progression Through Several Types of Work-Based Learning
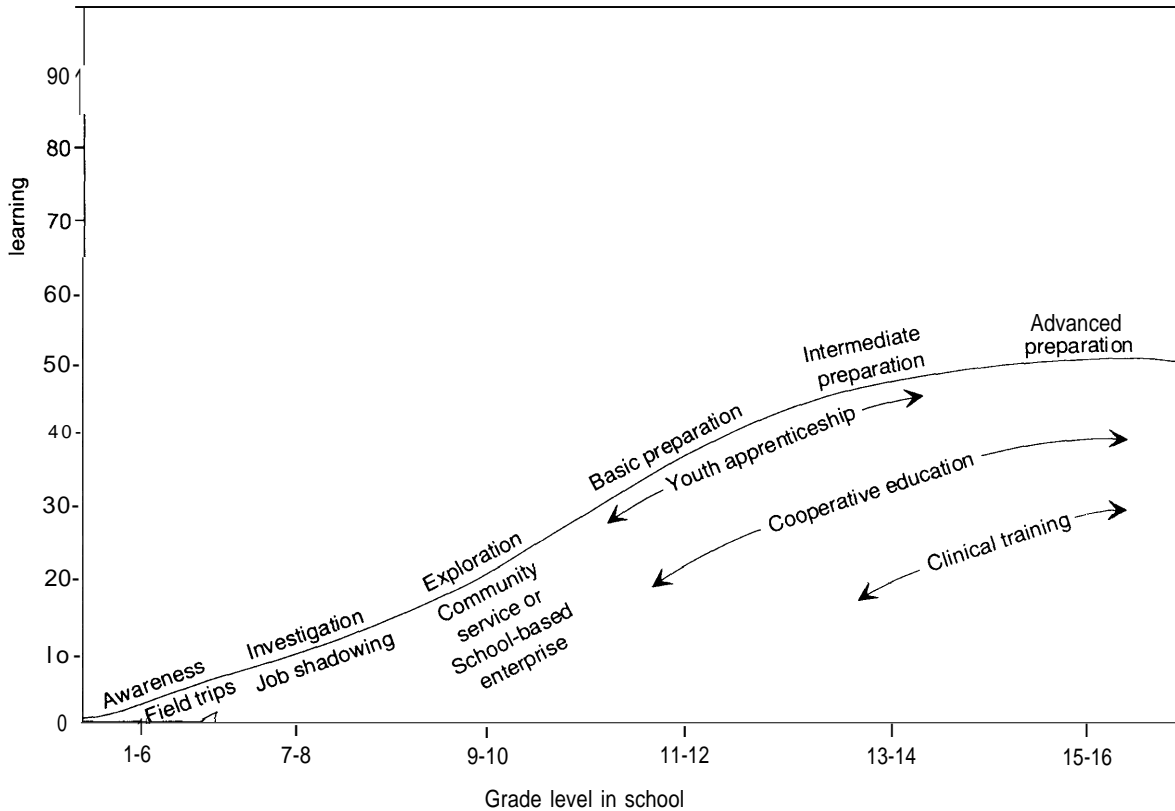
SOURCE: Office of Technology Assessment, 1995

based learning in the higher grades is thought to help narrow career interests and develop occupational skills.

It is clear, however, that a progression would require considerable resources. As suggested earlier in the discussion of coordination and again in the next chapter, cooperative education, clinical training, and youth apprenticeships demand significant effort on the part of school staff and workplace coordinators. Even cursory work-based learning experiences aimed at career exploration require substantial time to arrange. For instance, the minimum arrangements required for three-hour job shadowing experiences include recruiting organizations and employees who will participate, setting up the appointments, giving the students commuting directions, informing the

students about appropriate dress and conduct, preparing students to ask useful questions, and assuring that students write notes of thanks.

Work-based learning directed at occupational skill development requires considerably more effort on the part of both the schools and the employers. Employers have to orient the students to the workplace rules and procedures, periodically provide them with progressively more advanced training for tools and equipment that may be expensive and dangerous to use, closely supervise their initial work performance after each step up the progression, and periodically evaluate their performance and report it to both the student and the school.

It is doubtful that employers would participate to the extent necessary to support an extensive

progression. This country lacks the labor market structures that, in Germany, Japan, and several other countries, provide incentives for extensive employer participation in work-based learning (21). As chapter 6 discusses, prototype school-to-work transition programs in this country have generally found expanding work-based learning opportunities for high school juniors and seniors to be slow going. It is difficult to imagine how the schools would simultaneously arrange for younger students to have opportunities for workplace field trips, classroom speakers from the world of employment, and job shadowing.

OTA found no evidence to suggest at which grade levels work-based learning might be most cost-effective. There is, however, evidence to suggest that work-based learning prior to high school graduation should generally focus on reinforcing academics, providing career exploration opportunities, and developing generic preemployment skills, whereas work-based learning at the postsecondary level should focus on occupational skill development. Five lines of evidence support this suggestion:

1. Most high school students—even those who have chosen to participate in school-to-work transition programs—are undecided about their career choice or change their minds rapidly (1,2,8).
2. Many parents do not want their children forced into early career decisions (8,33).
3. High school students who have participated in work-based learning generally report that its main benefit has been with respect to career exploration rather than occupational skill development (17,30).
4. Many employers think youth make poor employees (see chapter 6 of this report).
5. Job shadowing and opportunities to assist in a workplace require considerably less effort on the part of employers than do clinical internships and youth apprenticeships that involve substantial skills development.

It is possible that successful school-to-work transition systems will change the first four fac-

tors: consequently, some systems that include concerted skill development at the high school level deserve to be tried. But given the hurdles to success, it seems prudent to target most of the systems at more modest goals for the high schools.

A focus on academic reinforcement, career exploration, and generic work skills at the high school level could include some general training and limited work experience. The point is not to avoid training or real work, but rather to reserve the considerable expenditure of time and resources associated with learning semiskilled and skilled occupations until the students are mature enough to make the effort a good investment for everyone concerned—the students, the schools, and the employers. Because students mature at different rates and come to career decisions at different times, flexibility is desirable. Some students may be ready to make good use of intensive training in their junior and senior years of high school, but others may not be ready even by the second year of postsecondary education.

STWOA has no specifications in respect to the timing, intensity, and duration of work-based learning, but it implies that the experiences are to be substantial, by indicating that the systems are to facilitate development of skills "to be mastered at progressively higher levels . . . and lead to the award of skill certificates" (Title I, Sec. 103[a][2]). In addition, interested students participating in school-to-work systems are to select a career major by the beginning of the 11th grade (Sec. 102[2]), but that does not necessarily mean that work-based learning must begin at that point. In addition, the work-based learning is to be relevant to the career major (Sec. 103[2]).

SETTINGS OF WORK-BASED LEARNING

Work-based learning can occur in places of employment (including for-profit firms, private non-profits, and government agencies), in community service settings, in school-based enterprises, in school-related extracurricular activities, and even in simulated work. OTA found little evidence of the relative effectiveness of these options. Each appears to have advantages and disadvantages. In

addition, as is explained later in this section, there is tentative reason to think that, at the high school level, the setting is less important than the quality of the learning opportunities within the setting.

▎ Places of Employment

Places of employment are not the only places where real work is done, but they are the only places where people are hired to do the work and fired if they fail to do it well enough. For that reason, the workplace provides the most realistic setting for career exploration and occupational development.

Work-based learning can occur in large, medium-size, and small places of employment; in "Tayloristic" and "transformed" organizations; in high-tech and low-tech workplaces, and in expanding and declining industries. Not all, however, are necessarily equally good prospects.

Large organizations offer a greater breadth of opportunities and resources than small organizations, but when structured according to Tayloristic principles, large organizations rely on assembly-line principles and narrowly defined jobs. Small organizations usually give employees more responsibilities and flexibility but less training (42). Most schools with extensive experience arranging work-based learning have found that it takes considerably more work to arrange and monitor one placement in each of 10 small organizations than to arrange and monitor 10 placements in a single medium-size organization. Nevertheless, they continue to recruit small organizations because sufficient numbers of work-based learning opportunities cannot be arranged with the larger ones.

"Transformed" organizations have adopted flatter organizational structures, flexible production, and continuous quality control. Employees are often cross-trained in several occupations, work in teams that have considerable discretion, and are judged by continually raised standards of productivity and quality. All this requires a high degree of continuous learning on the part of all employees (7,41).

Given the importance of learning in transformed organizations, and the move in American business toward this form of organization, it might appear preferable to provide work-based learning in transformed organizations. This is not yet possible on a large scale because many companies have not completed the transformation. In addition, students can be trained more quickly for the narrowly defined jobs of Tayloristic organizations and thus can soon pull their weight in the semiskilled jobs of these organizations.

It is possible, of course, that work experience in Tayloristic organizations makes it difficult for people to adapt later to transformed organizations, but some examples suggest this is not necessarily the case. For instance, the joint GM and Toyota automobile manufacturing facility in Fremont, California, hired the same workers GM had formerly used with Tayloristic management and poor results, and soon reached world-class productivity and quality standards (46).

Inasmuch as the trend toward greater use of technology in the workplace appears likely to continue well into the next century, low-tech workplaces are certainly less preferable for preparing tomorrow's workforce. Yet given the thousands of low-tech workplaces remaining in the country, it does not seem feasible for all work-based learning to occur in high-tech settings. In addition, there is little reason to think that low-tech workplaces could not provide high school students with experiences that develop the good attitudes, work habits, and communication skills that so many employers complain are lacking in young workers (28,34).

Declining industries can be relatively poor prospects for work-based learning. During decline, employers are reluctant to take on students because of budget constraints and the labor problems that the students' presence might create. Layoffs hurt morale and usually elicit some dysfunctional behavior that impressionable youth might imitate. In addition, part of the value of work-based learning consists of the experience, contacts, and references acquired in a given industry, and all of these are of less value when the number of job openings is dropping. Still, the declines in many industries are slow enough that new hires

continue to be made, and some companies may thrive by undertaking dramatic changes in organizational practices and technology.

Coordination of work-based learning in places of employment can pose a considerable challenge. Schools and places of employment are dramatically different types of organizations. Students are usually scattered among several worksites that have different organizational structures, equipment, and operating procedures. Large employers may draw students from several schools, further exacerbating coordination problems. Transporting the students between school and the various workplaces consumes time and has associated costs.

▌ Community Service Settings

Most communities have many opportunities for community service. Students can help care for the elderly in nursing homes, clean and preserve public lands, tutor younger children, feed the homeless, and teach adults how to read. This is real work, often requiring punctuality, perseverance, and the application of academic or occupational skills. Students can be prepared for the work through orientations and training. Their performance can be monitored and guided by supervisors. And their learning can be enhanced by exercises that prompt and guide the students to reflect on their experience.

Many community service organizations rely on volunteers and serve people who cannot afford to pay for the services. As a result, poor or mediocre performance might be tolerated. In addition, because community service organizations usually operate with low budgets and limited staff, opportunities for training and mentoring in such organizations may be limited.

▌ School Settings

Schools can be the site of at least four kinds of work-based learning: school chores, paid jobs for needy college students, student-run school-based enterprises, and occupationally oriented extracurricular activities.

Some schools—mostly private ones—require all students to help with the clerical, cleaning, and maintenance work of the school. This work may develop some basic work habits, but there is usually little focus on career exploration or skills development. Rather, the purposes are to reduce operating costs and to develop students' sense of responsibility to the school community.

Colleges and universities usually provide paid jobs for some of the students requiring financial assistance. The wages are partially subsidized with federal "Work-Study" funds. These jobs are supposed to be relevant to the students' educational or vocational goals, but about half of the jobs are clerical or low skilled ones (38).

Student-run school-based enterprises provide products and services for people other than those who run them. They permit close coordination of classes and the work undertaken by students in the enterprise. They also generally require no extra transportation between the school and the place of work. Some enterprises pay the students. A few generate profits for the school, but most are subsidized.

Participation in extracurricular activities, such as working on a school newspaper, participating in a school band, and playing interscholastic sports is intended mostly as recreation but can give students opportunities to explore career options and develop occupational skills (25). Other activities such as 4-H, Future Farmers of America, Future Business Leaders of America (FBLA), Vocational and Industrial Clubs of America (VICA), Junior Achievement, and Distributive Education Clubs of America (DECA) are specifically directed at developing occupational and entrepreneurial skills. Extracurricular activities probably provide students with more opportunity to exercise initiative and to display creativity than any other form of work-based learning, but they may be weak in developing efficient work habits except when there are competitions that stress speed.

∎ Work-Based Learning in Simulations

Rich learning experiences can come from simulated work. War games have been used for centuries to help train battlefield commanders. The Link Trainer, simulating the cockpit of an airplane and the environment of flight, was first used in 1929 and helped train several generations of pilots (29).

Simulations are operational models of mechanisms, processes, or systems. The systems can be as small as an integrated circuit or as large as the world economy. By operating the model, the learner becomes familiar with how to design, control, or repair the represented phenomena. Most simulations are used for initial training, which is then followed with further training in the real system. Simulations may also be used periodically for brushing up on critical situations that are not frequently encountered during actual work. Simulations can use role playing, games, and mechanical representations. Increasingly they are computer based, such as those briefly mentioned in chapter 3.

The "Assembly Line" simulation has students organize mass production units to manufacture paper automobiles. The teacher specifies the number of cars to be produced in a given period of time. The students must organize the assembly line, train themselves to do the various assembly tasks, and supervise their production run to meet the imposed production and quality standards (16).

Role playing is often used to teach interpersonal skills such as job interviewing and customer service. In one example, the teacher plays an employer and a student plays the applicant interviewing for a job. Then the teacher asks the other students whether they would have hired the applicant and why. Following the discussion, the teacher hands out a list of interviewing pointers, has the students read and discuss them, and proceeds with several more rounds of interviews and critiques of the applicants' performance. As the students get better, the teacher asks more complex questions, becomes condescending, or otherwise gives the

students a hard time, preparing them for the worst possible scenarios.

Simulated Medical Cases

High school students at the Oakland Health and Bioscience Academy have to diagnose and prescribe treatments for simulated cases. Small teams are given the medical records of a patient indicating the symptoms and results of initial tests. The students can ask the teacher further questions about symptoms and test results, and the teacher responds as directed in a guide. Each student uses medical encyclopedias, textbooks, and journals to research a hypothesized diagnosis. The students reassemble in their teams to discuss the viability of each hypothesis and to decide which is the correct one. The teacher then tells them the correct answer and explains the "doctor's" reasoning, so that students can compare their own thinking with that of an experienced physician (11).

Some teachers of occupational courses organize and conduct their classes in a manner that partly simulates a workplace. The classroom may be laid out and furnished like a workplace, students may have to "punch in" and "punch out," and they may lose points toward their grade if they are late. In some classes, the students take turns being the office manager—collecting the students' work, grading it, and filing it (10). In a law enforcement program, the students take turns assuming supervisory roles (45). Some teachers help the students "construct an image that the corporate world will find palatable" and have them practice the image when in school (15).

There are several potential advantages to simulated work. The most obvious ones are convenience, safety, and cost savings. The convenience comes from access to work conditions without disruption of real work. In addition, whereas workplaces are structured for production efficiency, simulations can be structured to maximize learning. Simulations eliminate the risks inherent in operating large equipment, working with dan-

gerous substances, undertaking delicate procedures, handling crises situations, and operating a business in the face of competition. They allow students to become competent in meeting the demands of the situation without the risk of harm to people, equipment, and the financial health of the business.

"My teacher treats it like a job. You know, she's the boss. You're her employee, we work for her." —Student (14)

Simulations can accelerate and extend learning in several ways. They can motivate students who are not interested in book-learning but become excited by the active involvement, the sense of realism, a degree of autonomy, and the opportunity for immediate application of their knowledge and skills (16). Simulations can begin by presenting students with simplified representations of overwhelmingly complex systems and then gradually add complications. They can initially operate at less than normal speed and gradually be accelerated beyond normal to "overtrain" the student. They can present students with challenges that are rarely encountered with the real system but pose serious consequences if not handled correctly (16,29). Computerized simulations can store all the input provided by the students and replay it, so that the students can observe their handling of a given situation. They also can compare the students' responses with an expert's handling of the same situation (6).

Simulations also have several disadvantages. If the simulation is too simple, the trainee may be ill-prepared for the real world. A simulation may inadvertently provide additional cues that are unavailable in the real world (29). Simulation may lack the sense of pressure that exists in many workplaces. When used for work-based learning, simulation usually lacks interaction with adults and the positive socialization that may come from that. It may also create false complacency about the dangers involved, because the students are confident of not doing major harm. Conversely, the student may engage in "gaming" the simulation, focusing on maximizing performance by means that would be ineffective or risky in real life. It is also unclear to what extent simulations can develop the attitudes and work habits that are important in the workplace.

The cost of simulations can range from a few dollars to many millions. Flight simulators are among the most costly, but are justified because the cost of operating most jet aircraft is several thousand dollars an hour and mistakes can be catastrophic. Even when the "life cycle" cost of using a simulation is greater than the cost of using the real equipment, the simulation can sometimes be justified by the convenience, risk reduction, and accelerated rate of learning.

❚ Conclusions about Settings

A prudent reading of the research suggests that almost any work in a productive environment can contribute to the occupational development of adolescents, but when the work involves simple tasks that are repeated day in and day out, there will be little learning after the first few weeks or months. Variety, progressive increases in difficulty with the minimum assistance necessary for success, and opportunities for both autonomy and teamwork appear important for sustained learning (4,19,23,26,44). These can be provided in a wide range of businesses and other organizations, including small organizations, Tayloristic organizations (when there is job rotation), low-tech companies, and companies in declining industries. They also can be provided in community service, school-based enterprises, and extracurricular activities. In addition, simulated work can give students a powerful introduction to various work experiences that would otherwise not be available to them.

STWOA does not specify the settings in which the work-based learning is to take place. But the frequent references to partnerships with employers (Sec. 3[a][3]), and the specification that work-based learning must include "broad instruction, to the extent practicable, in all aspects of the industry" (Title I, Sec. 103[a][5]), suggest that Con-

gress was expecting at least some of the work-based learning to occur in places of employment operated by "both public and private employers" (Sec. 4[8]).

Several provisions in STWOA suggest that Congress anticipated that work-based learning could also occur outside of employment. "School-sponsored enterprises" are listed as "permissible" work-based learning activities (Title I, Sec. 103[b]). The states' plans for the school-to-work transition systems are to describe how the systems will be coordinated or integrated with the National and Community Service Act of 1990 (Title II, Subtitle B, Sec. 213[d][6][L]). And the funds from STWOA can be used to "design and implement school-sponsored work experiences, such as school-sponsored enterprises and community development projects" (Title II, Subtitle B, Sec. 215[c][11]).

PAY FOR WORK-BASED LEARNING

Work-based learning can be paid or unpaid. The rate of pay can be the organization's rate for full-time entry employees with the same responsibilities, it can be the minimum wage, and in some cases it may be legal to use a subminimum "training wage." There is sometimes an increase in pay after each year, and a few programs offer bonuses. For students continuing into postsecondary education or training, some employers also provide tuition reimbursement.

The matter of pay for work-based learning experiences was hotly debated during the drafting of STWOA. The House passed a bill requiring paid work-based learning, and the Senate passed a bill with no such stipulation. The conference resolved the difference by specifying that "priority [be given] to applications that require paid, high-quality work-based learning experiences" (Title II, Subtitle B, Sec. 214 [a][2]). In four other places, the act reiterates a preference for paid work-based learning. STWOA also prohibits using federal funds received under the act to subsidize the wages of students in work-based learning or the wages of their mentors (Title VI, Sec. 601[6]).

There were several rationales for paid work-based learning. One was that if employers have to pay the students, they will have an incentive to demand high standards of performance from them (40). Similarly, if the students are paid, they will feel like real employees and rise to the occasion. There was also concern that having students engage in productive activities without pay was exploitative, and would encourage employers to use work-based learning students in place of regular employees. Another reason for pay was that students who rely on earnings from part-time jobs would generally be precluded from participating in unpaid work-based learning.

The main argument against paid work-based learning was that it raises the costs to employers and thus reduces the number of employers who will participate and the number of work-based learning slots that are offered. It was pointed out that, even without payments to students, work-based learning imposes several costs on employers—the costs of planning and coordinating with the schools, the staff time spent training and closely supervising the young people, and the young people's lower outputs when beginning production activities.

OTA found little evidence about the effects of pay on the students. The issue of employer incentives is complex and is discussed in chapter 6. While STWOA strongly encourages paid work-based learning and prohibits the use of federal funds received under the act to reimburse employer expenses, the act leaves the states free to use other mechanisms to reduce employers' costs and to create incentives for their participation. These include state subsidies for students' wages or other expenses, state tax credits, authorization of subminimum training wages, and exemption from having to provide state-mandated benefits and unemployment insurance for the students.

CONCLUSION

Work-based learning can be structured in respect to at least six sets of alternative features. Although there is no definitive evidence about the relative

effectiveness of the alternatives, there are some findings that allow for informed speculations:

- The congressional intent appears to be that the STWOA systems should target a wide spectrum of students but not be compulsory.
- The standards for screening students for work-based learning assignments do not have to be uniformly high, but care should be taken to match students with employers' needs and expectations.
- Work-based learning can be focused on the objectives of academic enhancement, career exploration, occupational development, and productive activities. Although any production work can be a valuable learning experience, after several weeks or months its benefits are likely to decline unless the work involves progressively more challenging tasks.
- Considerable evidence indicates that coordination between the school and the workplace is difficult to achieve. There are two basic approaches to coordination; one involves formal planning and written agreements, and the other involves continuing dialogue between representatives of both institutions. Many highly reputed programs have used both approaches, but a few have used only the latter.
- A progression of work-based learning, beginning in elementary school and extending through college would probably benefit students, but would require extensive resources. Given that the opportunities for work-based learning in workplaces are likely to be constrained, it appears that intensive workplace experiences focusing on occupational skill development should generally be reserved until the postsecondary level.
- Paying students during their workplace experiences appears to have advantages and disadvantages. Payment and nonpayment are both likely to result in tradeoffs.

These six sets of alternative features distinguish among several models of work-based learning. The models are discussed in the next chapter.

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