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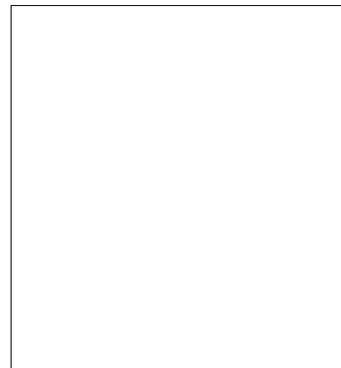
Congress passed the School to Work Opportunities Act (STWOA) with bipartisan support in May 1994. The legislation aims to improve the preparation of young people for their careers and to enhance the productivity of the American workforce.

STWOA established a five-year effort to foster partnerships among schools, employers, and other stakeholders for the creation of school-to-work transition systems. States and localities will receive seed money to restructure existing education and training programs within the broad framework provided by STWOA. The systems are to include school-based components, work-based components, and activities connecting the two. Work-based learning is intended to foster the students' academic and career development in the context of work experience. The appropriation for STWOA in fiscal year 1995 was \$245 million (see box 1-1 for a summary of the legislation).

THE REQUESTED STUDY

The Senate Committee on Labor and Human Resources and the House Committee on Education and Labor (now the House Committee on Economic and Educational Opportunities) asked OTA to examine the potential opportunities and pitfalls of the work-based learning that would be supported by STWOA. The assessment addressed three main questions:

1. What are the alternative models of work-based learning and how effective are they?
2. What new learning technologies could support work-based learning?



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BOX 1-1: School-to-Work Opportunities

State and local school-to-work transition systems are to be planned and developed by partnerships of school staff, business leaders, labor representatives, and other interested parties, Governors are given considerable discretion in structuring and administering the partnerships for the state systems. At the local level, the lead entities may be schools, colleges, nonprofit organizations, and chambers of commerce.

STWOA encourages development of school-to-work transition systems that coordinate career orientation, academic and occupational education, high school and postsecondary schooling, work-based learning, and skill credentialing. The legislation specifically divides these elements into the following three components:

I. School-based Learning

1. Academic instruction in high school that meets the state standards for all students and the applicable standards of the National Education Goals;
2. Career exploration and counseling, beginning no later than the 7th grade for interested students;
3. Initial selection by interested students of a career major beginning no later than the 11th grade;
4. Instruction that integrates academic and occupational learning;
5. Arrangements to coordinate high school and postsecondary education and training; and
6. Regularly scheduled evaluations of students' personal goals, progress, and needed learning opportunities.

II. Work-based Learning

1. Job training and work experiences aimed at developing preemployment skills and employment skills at progressively higher levels, and leading to the award of skill certificates;
2. Broad instruction in "all aspects of the industry," to the extent practical; and
3. Workplace mentoring.

III. Connecting Activities

1. Activities to encourage employers to participate and to aid them in doing so;
2. Assistance in the integration of school-based and work-based learning, and of academic and occupational instruction;
3. Matching of students with the work-based learning opportunities offered by employers;
4. Liaison among the students, schools, employers, and parents;
5. Assistance for graduates in finding appropriate jobs, getting additional job training, or pursuing further education;
6. Monitoring of participants' progress after they complete the program; and
7. Linkage of these youth development activities with employer and industry strategies for upgrading the skills of incumbent workers.

SOURCE School-to-Work Opportunities Act of 1994, Title I.

3. How can employers be persuaded to provide work-based learning experiences for students?

As a consequence of the request from Congress, this report focuses on work-based learning. It does so, however, within the context of the

school-based components and connecting activities of the larger STWOA framework. Unless these other aspects of the framework succeed, work-based learning will be no more effective under STWOA than it has been in the past.

OTA's findings about work-based learning and STWOA are reported in this chapter. The supporting evidence is presented in chapters 3 to 6.

RATIONALES FOR STWOA

At least three perceived problems led Congress to pass STWOA. First, scholars and educators have concluded that because there are few clear pathways between school and careers in the United States, many students are unmotivated in school and spend years bouncing from one low-paying job to another as they look for career opportunities. Second, experts and employers agree that many young people are completing school with low levels of basic academic skills, dysfunctional attitudes and work habits, and little occupational training; as a result, they are inadequately prepared for well-paid employment and career progression. Third, scholars indicate that because of technological changes and international competition, increasing numbers of midlevel jobs now require complex thinking, close teamwork, and the ability to learn continuously while on the job.

STWOA seeks to address these problems by several means. Students are to be offered career exploration and counseling opportunities beginning in the 7th grade so that they will have several years to consider career options and to become familiar with the preparation required for occupations that interest them. Skill standards and certification systems are to be developed to signal the proficiencies required for various occupations and to indicate which students have achieved those proficiencies. Academic work and occupational preparation in schools are to be upgraded and the two are to be integrated so that students can see how academics will be applicable in their work lives. Work-based learning experiences are to extend the academic and occupational instruction of schools, offer opportunities for students to learn the use of tools and equipment found in the workplace, introduce students to the norms of adult work environments, and give them chances to market-test their capabilities. Workplace mentors are to provide guidance and support for the students' intellectual, skill, and career develop-

ment. And both the school-based preparation and the work-based preparation are to extend in a coordinated manner from high school into postsecondary education.

WORK-BASED LEARNING

Work-based learning is a major component of STWOA. Although learning can occur during any work, in the legislation and in this report the term *work-based learning* refers to learning that results from work experience that is planned to contribute to the intellectual and career development of students. The work experience is to be supplemented with activities that apply, reinforce, refine, or extend the learning that occurs during work, so that students develop attitudes, knowledge, skills, and habits that might not develop from work experience alone.

The STWOA approach to work-based learning generally follows what has been called the *youth apprenticeship* model, though the term is not used in the legislation. This model (outlined in box 1-1) differs from earlier models of work-based learning in several ways that are thought to make it more effective, but its relative efficacy remains to be demonstrated. The *clinical training* model is similar to that of youth apprenticeship, but it rarely includes career exploration elements, it is used primarily at the postsecondary level for study in the medical fields, and it involves unpaid worksite experience. *Cooperative education (co-op)* is similar to youth apprenticeship, but while co-op programs are operated at both the high school and postsecondary levels, they do not span both levels; skill certification is also seldom involved. *School-to-apprenticeships* allow high school vocational education students to begin union and employer apprenticeship programs on a part-time basis during their senior year. *School-based enterprises* are school-owned businesses operated by students who take elective classes designed to develop the needed occupational and entrepreneurial skills. *Career academies* are small, career-oriented "schools within schools" that integrate academics, career exploration, occupational preparation, and sometimes work experience. A

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more detailed comparison of these models is provided in chapter 5, box 5-1.

OTA identified five learning processes that are used in work-based learning. *Experiential learning* occurs from students' reflections on their experiences. It can be guided by others who encourage students to observe the workplace astutely and to reflect on those observations. *Work-group learning* occurs when the students are immersed in a work group, interacting with members who assist students to full-fledged participation. *Mentoring* is a one-on-one relationship in which an experienced employee fosters the development of a less experienced person by providing challenges, encouragement, guidance, and resources. *Workplace instruction* is the deliberate conveyance of work knowledge and skills by means of lectures, demonstrations, coaching, or supervision. *Technology-assisted learning*, which is increasingly computer based, has evolved rapidly from simple computerized textbooks to computerized simulations, "intelligent tutors," and other learning tools. Little is known about the relative effectiveness of these processes, but each appears to have advantages and disadvantages.

OTA identified seven forms of computer-assisted learning that appear to have potential for work-based learning. *Career information delivery systems* help students to determine their interests and talents, understand the opportunities and demands of various occupations, and sometimes to identify local job openings. *Computer-based training* presents information, quizzes the students' understanding, and automatically scores the answers. *Business application software* consists of word-processing, database, spreadsheet, accounting, computer-assisted design, and other software that is widely used in workplaces; it often comes with computerized "tutorials" and "help" capabilities. *Hypermedia* are vast collections of text, images, and sound, with indexed linkages between related items. *Intelligent tutoring systems* use "artificial intelligence" to guide students through customized learning paths, tailoring the instruction to each student's knowledge and skills, diagnosing error patterns, and providing customized feedback. *Simulations* are func-

tional models of mechanisms, processes, or systems on which the students can practice operating, repairing, or redesigning. *Computer-supported cooperative learning* allows a group of people to share information and insights, to reach group decisions through a set of structured exchanges, and to engage in collaborative design efforts.

The success of work-based learning under STWOA will depend on the willingness of employers to provide work experiences for students, and this will be costly for employers. In Germany and Japan, where work-based learning for adolescents is extensive, there are strong incentives for employer involvement. In Japan, these incentives are largely internal to companies, whereas in Germany they are embedded in labor laws and the system of industrial relations. No comparable incentives exist in the United States. STWOA seeks to create incentives by having employers participate in the partnerships that plan and control the work-based learning systems and by providing limited assistance to employers in their preparations for work-based learning.

FINDINGS ABOUT THE EFFECTIVENESS OF WORK-BASED LEARNING

A-1. Past work-based learning has yielded mixed results. Evaluations of past programs have found that most students are excited and motivated by work-based learning and that most employers have been quite satisfied with the students. Work-based learning appears to offer students better learning opportunities than the after-school and summer jobs that students find on their own. Yet work-based learning has generally had only small positive effects on the school attendance, grades, graduation rates, and postsecondary enrollments of participating students. And the effects on students' employment, mobility, and earnings during the first few years after graduation have ranged from modestly positive ones to a few small negative results.

A-2. The work-based learning that is intended under STWOA will differ from past work-based learning in ways that might im-

prove its effectiveness. The work-based learning established under STWOA will be part of school-to-work transition systems that are planned with more input from employers, employees, parents, and other stakeholders than has generally been the case for older forms of work-based learning. Work-based learning under STWOA is to be directed more broadly than in the past to career exploration and to the development of good work habits, occupational skills, and problem-solving abilities. It is to be more closely coordinated with initiatives to improve academic instruction, career orientation, and occupational instruction. It will include mentoring to facilitate the young people's personal, intellectual, and occupational development. In addition, students' progress is to be assessed more often and more thoroughly than was common in the past. These differences could improve the effectiveness of STWOA-fostered work-based learning, but they will also make implementation of the work-based learning more complex and problematic.

A-3. Effective work-based learning appears to require considerable effort and coordination on the part of the schools, employers, and intermediary organizations. Effort and coordination are required to recruit and orient employers, to prepare students for the workplace, to match students with work-based learning positions, to give students appropriate training and guidance while in the workplace, to monitor the students' experiences, to assess the students' development, and to provide constructive feedback.

A-4. Though the needs of young people vary considerably, at the high school level work-based learning generally appears better suited for the exploration of careers and development of generic work skills, whereas at the postsecondary level it generally appears well suited for the development of occupational skills. At the high school level, some students have clear occupational objectives and plans to enter the workforce immediately following graduation, but many students are undecided about their career choices, or frequently change their minds, and their parents are reluctant to have them make early decisions. Most high school students who have

participated in work-based learning have reported that its main value was as an exploration of careers rather than development of occupational skills. Because the development of occupational skills requires greater effort on the part of employers, the employers are more likely to make the investment for students who are relatively mature, sure of their direction, and close to entering the labor market. Such students provide employers with a better chance of recouping their training costs.

A-5. At the high school level, the quality of work-based learning experiences appears to depend more on the nature of the work experience than on the kind of organization in which the work is done. There is reason to think that the industry, the style of management, the size of the company, and the level of technology are less important than the nature of the work-based learning opportunities at the high school level. Opportunities that appear to facilitate work-based learning include:

- a broad introduction to the company and its industry;
- experiences that are coordinated with the students' school-based instruction;
- a mix of at least some of the following: experiential learning, mentoring, work group learning, workplace instruction, and technology-assisted learning;
- responsibilities of increasing complexity and importance, with the minimum assistance necessary for success;
- chances to exercise both autonomy and teamwork;
- assignments to solve problems, explore, and innovate;
- opportunities to assume some supervisory functions;
- participation in trade, professional, and union events; and
- guidance in reflecting on the implications of the work experience.

A-6. Most work-based learning now occurs in places of employment, but work in other settings could probably supplement those experiences and perhaps partially substitute for

them. School-based business enterprises run by students, community service activities, occupationally-related extracurricular activities such as Junior Achievement, and various work simulations probably could contribute to the occupational development of students. Some of the means used to enhance students' work-based learning experiences might also enhance the learning derived from after-school and summer jobs that many students arrange on their own.

A-7. There has been little research on how work-based learning actually takes place and on how to best foster it. Most studies have focused on evaluating the effects of one model of work-based learning—cooperative education. Even those studies generally have not addressed how variations in the model might affect students. Hardly any attention has been given to the actual experiences of students during their work-based learning and to the ways those experiences contribute to, or hinder, the students' intellectual and occupational development.

FINDINGS ABOUT TECHNOLOGY-ASSISTED LEARNING

B-1. Several forms of technology-assisted learning appear to have potential for facilitating work-based learning. The evaluation evidence suggests that the older forms of computer-assisted learning have speeded the acquisition of knowledge and skills by 24 to 34 percent. Career information delivery systems, computer-based training, and hypermedia have been successfully commercialized and are available in some schools and workplaces. Intelligent tutoring systems, computer-supported collaborative learning, and computerized simulations are mostly in the development and testing stages.

B-2. Some of these technologies are expensive and cannot be easily modified locally; both problems could be reduced by development of better “authoring” tools. It can take several hundred person-hours to prepare the software for one hour of learning assistance. When that is the case, the software must be sold at a high price unless there is a large market for it. Because teachers

and supervisors usually cannot modify the instructional systems to accommodate local information or an individual organization's practices, the utility and effectiveness of the systems are limited. Both problems would be reduced if easier-to-use and more powerful “authoring tools” could be developed. These tools would partially automate the development and modification of instructional software.

FINDINGS ABOUT EMPLOYER PARTICIPATION IN WORK-BASED LEARNING

C-1. So far, the rate at which employers are participating in prototypes of STWOA's work-based learning has been growing only modestly in most communities. According to the findings of an OTA survey of 15 high school school-to-work transition projects, the median number of employer participants is 35 per program, and the median growth rate is about six employers per year. Because there are only about two students per employer, this growth translates to an increase of about a dozen students per community per year. Other studies have revealed similar findings. Unless the rates of growth improve significantly, it will take a long time before most school-to-work transition systems can serve substantial portions of students in their communities.

C-2. Most programs have found that it takes considerable time and effort to recruit and retain employers. In the 15 communities included in OTA's survey, it has taken an average of one-half full-time-equivalent staff member to recruit six new employers each year.

C-3. A few communities have recruited large numbers of employers. In a few communities, substantial efforts over many years have been devoted to building strong partnerships between educators and employers in which there are reciprocal commitments to quality on both sides. Employers provide high-quality training and work experience opportunities for one semester or longer in order to attract the best students, while the schools prepare students well so they can secure the good placements. In a few other communities,

large numbers have been achieved by arranging brief work-based learning experiences, such as “job shadowing” experiences in which the student follows one employee around for a half-day.

C-4. Employers’ decisions to become involved in work-based learning are influenced by a range of potential benefits and disincentives. The main benefits appear to be recruiting well-trained personnel and contributing to the improvement of education and the community, with the former being of somewhat more importance to employers. The main disincentives appear to be:

- inadequate preparation of students for work placements;
- lack of coordinating support from the work-based learning program;
- the employer’s training costs, which include student wages and the time and effort of supervisors and mentors;
- regulatory restrictions and extra insurance costs, which include child labor and safety laws and general liability and worker’s compensation insurance;
- organizational resistance to work-based learning from management or other employees in the company; and
- economic uncertainty, due to slowdowns in the local economy or changes in a company’s business fortunes.

All these disincentives appear to be of roughly equal importance to employers.

FINDINGS ABOUT POSSIBLE INCENTIVES FOR EXPANDING EMPLOYER PARTICIPATION

D-1. Inasmuch as the disincentives enumerated in C-4 are of about equal importance to employers, policies aimed at inducing employer participation should be directed at several of the barriers simultaneously. One policy alone, such as providing strong coordinating support or a training wage, is unlikely to be very effective.

D-2. Better preparation of students probably would expand employer participation in

work-based learning. About one-quarter of the employers in OTA’s survey reported some problems with the quality of preparation that students received before their work experience, and 16 percent of the employers said that lack of student reliability was the most important disincentive to participating in work-based learning. By reliability, employers primarily mean dependability, responsibility, and initiative for getting work done. The OTA survey results are consistent with other research findings.

D-3. Coordinating assistance, provided by the school or an intermediary organization, could be an inducement to employer participation. Nineteen percent of employers in the OTA survey said that lack of coordinating support was the most important disincentive to work-based learning. More than 60 percent of employers rated coordinating assistance as being “very” or “critically” important. Coordinating assistance typically includes helping the employer plan and start a work-based learning program, screening students and matching them with employers, providing troubleshooting and technical assistance to individual supervisors and worksite mentors, and coordinating student placements. It is through these coordinating services that long-term partnerships between employers and school systems are built.

D-4. Although evidence on the issue is mixed, some financial inducements to reduce employers’ training costs might expand employer participation in work-based learning. Employers consistently report that the time required of supervisors and mentors of work-based learning students is a much larger cost than the wages paid to the students. Although employers have not responded to federal tax credits for employment of disadvantaged young adults, available research indicates that student wage subsidies have been effective in increasing employer participation in some work-based learning programs. Nineteen states are currently planning to implement one or more of the following:

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- state subsidies or tax credits for employers' costs of training students,
- subsidies for the development of training facilities to be used by more than one company,
- grants for the training of students by outside vendors, or
- other training cost subsidies.

Evaluation of the effects of these inducements on employer participation is needed and will require comparisons across states.

D-5. Regulatory reform and insurance pools might expand employer participation, especially in some states and localities. In other cases, providing employers with authoritative information about regulatory and insurance issues may be sufficient. Child labor and safety laws are determined both by the federal and by the state governments, and general liability and worker's compensation insurance are regulated by states and provided by many different companies, thus creating substantial differences among the states and localities. Many fears that employers have about regulatory restrictions and extra insurance costs might be allayed by providing them with authoritative information about the actual restrictions and costs in their communities. States in which employers are found to be having difficulties with regulatory restrictions could review child labor laws and safety regulations to determine whether modification would facilitate work-based learning while retaining their intent. States could also create special entities to provide employers with information about actual insurance costs and to pool the costs of insurance.

D-6. Much remains to be learned about strategies for creating partnerships between businesses and schools that will accelerate the growth of employer participation in work-based learning. Growth in employer participation may or may not speed up as a result of state and local efforts to build comprehensive school-to-work transition systems. Evaluations that compare communities having large increases in employer participation with other communities are needed to identify strategies for expanding employer involvement by an order of magnitude

or more. Otherwise, work-based learning is unlikely to succeed in the near future. States that have ambitious efforts under way to adopt specific incentives and to forge partnerships between business and education at the state level would be good places to look for communities to evaluate. In the absence of such research, the fate of work-based learning under STWOA may largely ride on whatever leadership is forthcoming from the business community.

FINDINGS ABOUT STWOA

E-1. STWOA is a coherent approach for dealing with the problems posed by the changing workplace, the lack of career paths, and the poor preparation of youth for careers. There are several reasons to think that STWOA systems, if implemented as intended, could improve the school-to-work transition for youth. These reasons include:

- The systems are to provide more extensive career exploration and counseling than has previously been available to most students.
- The systems are to upgrade both academic and occupational preparation in schools, and integrate both so that the importance and applicability of academic skills is more apparent to students.
- The systems are to mobilize workplaces to provide work-based learning that reinforces students' schooling, expands and extends the career exploration and occupational preparation of students, offers mentoring for students' personal and career development, and provides students with progressively more challenging work experiences.
- The systems are to adopt skill standards and skill certification procedures for many occupations, signaling to students the needed proficiencies of various occupations and signaling to employers which students have reached those proficiencies.

E-2. The implementation of STWOA will be difficult. STWOA is to foster systemic school reform targeted at major improvements in both aca-

ademic and career preparation, but more modest attempts at reform during the past decade have had troubled histories. Successful implementation will require effective partnerships between businesses and schools—institutions that operate with different cultures and have little experience working together. STWOA systems are to provide students who choose a career major in high school with instruction that integrates academic and occupational learning, and this will require organizing and teaching the curriculum in ways that differ substantially from those used in the past. High-quality work-based learning opportunities will require the investment of considerable time and resources by participating employers. Unprecedented coordination will be required within the school curriculum, between schools and participating workplaces, and between high schools and postsecondary institutions. STWOA will require the development of skill standards and the introduction of new assessment processes that accurately signal proficiencies needed for employment and fairly reflect young people's knowledge and skills. Finally, parents and students will need to be convinced of the merits of these new arrangements, and many may respond initially with skepticism.

E-3. There is ambiguity in STWOA about the extent to which all students in a community should be included in a school-to-work system, and this ambiguity could impede implementation. Congress apparently intended to support the development of school-to-work transition systems that would be well suited for almost *any* interested students, including those who are disabled and those who are academically gifted, but some people have suggested that *every* student should participate. Practitioners are justifiably concerned that if STWOA is directed primarily at students who are not headed to four-year colleges, it will be stigmatized as a system for less able youth. The fact that work-based learning is offered by some prestigious prep schools suggests that it can benefit academically gifted students. If, however, states require every student to take courses that integrate academics and occupational educa-

tion or to engage in work-based learning, some educators, parents, and community members may object strenuously.

E-4. Programs using approaches similar to that of STWOA generally have served substantial portions of minority youth, but some gender stereotyping by occupation is apparent. There had been fears that minority youth might tend to be excluded from work-based learning, but several studies of these early programs indicate this has not been the case to date. Most boys and girls, however, have received education and training in occupations that are common for their gender.

E-5. A few prototypes of STWOA have reported that large proportions of their high school graduates have enrolled in postsecondary education, but whether most of these students were adequately prepared to complete college programs is unknown. In some programs serving predominantly inner-city youth, 85 to 92 percent of the seniors have reported plans for postsecondary enrollment, and in three programs that tracked the students, 69 to 84 percent actually did enroll in postsecondary programs. Very few of the evaluation reports that OTA examined presented data on students' high school achievement, and several employers expressed concern to OTA staff about the low level of students' basic skills. The impressive postsecondary enrollment rates probably reflect stimulation of students' desire to seek further education and the provision of more guidance on college admissions. Perhaps many of the students will make it through the postsecondary program because of the motivation and work habits they have acquired in the programs, but for those students who fail, there could be considerable disillusionment.

E-6. Even the best school-to-work transition programs have required at least five years of implementation and refinement to operate effectively. Neither theory, nor research, nor expert advice appears sufficient to assure quick success, perhaps because success is partly dependent on establishing a reputation with employers, parents, and students, and that takes time.

E-7. Evaluating the effects of STWOA systems on students' success and workforce productivity will require more than a decade, but interim assessments can provide important information. If the systems are given a few years to refine their operations and if students are then followed from the 7th grade (when career exploration and counseling are to begin) through at least one or two years of postsecondary education, a decade will pass before the first cohort receiving the full treatment enters full-time employment. Ideally, the progress of the students in the work world would then be followed for another decade to determine the long-term effects on their career success and on workplace productivity. In the interim, it will be useful to assess several matters, including:

- whether the intended STWOA system components and coordination among them are suc-

cessfully implemented;

- how many students are being served by the systems and what their characteristics are;
- whether students' attendance, discipline, course taking, grades, test scores, and other assessments of progress show upward trends;
- whether evaluations of students' work-based learning are promising;
- whether high school graduation rates and postsecondary enrollment rates rise;
- whether substantial portions of the students do earn the applicable skill certificates; and
- the extent to which employers expand, contract, or terminate their participation.

Both interim and long-term evaluations will require program operators and students to cooperate with the data collection, and that is by no means assured.