DOCUMENT RESUME

ED 406 546 CE 073 791

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TITLE School-to-Work for the College-Bound.
INSTITUTION National Center for Research in Vocational Education, Berkeley, CA.
SPONS AGENCY Office of Vocational and Adult Education (ED), Washington, DC.
PUB DATE Mar 97
NOTE 7p.; Based on ED 405 476.
PUB TYPE Collected Works - Serials (022) -- Reports - Research (143)
JOURNAL CIT Centerfocus; n16 Mar 1997
EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Career Choice; Career Education; *Career Exploration; Cognitive Development; *College Bound Students; *Constructivism (Learning); *Education Work Relationship; Educational Change; Experiential Learning; High Schools; Vocational Education; *Work Experience Programs

ABSTRACT

The case can be made that school-to-work programs can be a college preparatory strategy because they can teach academic skills as well as and possibly even better than more traditional approaches. The skepticism about its potential as a means of preparing students for college is based on misconceptions about its characteristics. Its three basic elements--authentic teaching and learning, out-of-class experience, and career and interest exploration--support all types of learning. Authentic teaching and learning requires students to develop in-depth understanding and apply academic learning to important, realistic problems. Experiences outside the classroom strengthen and increase the amount of knowledge learned, understood, and retained. Systematic exploration of student interests and career goals can stimulate interest in academic learning. Some of the most highly regarded school-to-work programs are explicitly designed for college-bound students. Empirical evidence shows many school-to-work programs have high college attendance rates and the use of authentic pedagogy leads to gains in both traditional test scores and in measures of authentic learning. Reformers have taken three broad approaches to reduce the conflict between participation in school-to-work activities and admission to selective colleges: accommodation of the school-to-work program within the existing college admission system, communication between individual schools and colleges, and reform of assessment and college admissions procedures. (Contains 10 references.) (YLB)

NCRVE

National Center for Research in Vocational Education

University of California at Berkeley

Number 16/March 1997

centerfocus

SCHOOL-TO-WORK FOR THE COLLEGE-BOUND

In 1994, the School-to-Work Opportunities Act articulated an education reform strategy that included innovative approaches to classroom teaching, guided learning experiences outside of the classroom, usually at work, and increased career counseling and guidance. The impetus for this reform was a growing anxiety during the 1980s that America's youth were not prepared for the rapidly changing world of work. Initially, this approach was seen as most appropriate for students not headed for college. But researchers now see that it has the potential to serve as a model for all secondary schools—that school-to-work can prepare young people for work *and* college. This Brief makes the case for school-to-work as a college preparatory strategy, arguing that it can teach academic skills as well and possibly even better than more traditional approaches. By making this case, we hope to expand the use of school-to-work so that all students have the opportunity to benefit from it.

Although the school-to-work model as it was originally conceived has wide support from a variety of constituencies, many parents, teachers, school administrators and counselors, college admissions personnel, and employers are skeptical about its potential as a means to prepare students for college. Parents and teachers are uncertain of the strategy because they believe that it might divert students from academic learning and college preparation. Moreover, even if the approach can teach the skills required for success in college, parents fear that college admissions procedures and standards would not recognize that competence. This fear has considerable justification since college admissions requirements are still based on Carnegie units—the accumulation of classroom hours in traditional academic subjects. The classroom teaching approach and work-based learning that characterize school-to-work do not fit easily into the traditional Carnegie structure.

Yet a good deal of the skepticism of school-to-work is based on misconceptions about its characteristics. In fact, the pedagogical arguments used to support school-to-work apply to all learning, not just learning for some students. A basic element of school-to-work is "learner-centered" or "authentic" teaching, which requires students to develop in-depth understanding and to apply academic learning to important, realistic problems. This pedagogic approach already has widespread support among many teachers and parents, yet few realize that this is a core component of the school-to-work strategy. The second basic element is guided educational experiences outside the classroom, particularly the workplace. Many researchers have come to see that this approach strengthens and increases the amount of knowledge that is learned, understood, and retained. The jobs that students take in connection with school-to-work are designed to contribute to the student's substantive education. The third basic element of school-to-work is a structured approach to help young people think systematically about their aspirations and how they can achieve them. School-to-work can build on those interests and aspirations to help stimulate interest in academic learning.

Authentic Teaching and Learning

Over the last decade, school reformers have advocated a shift from a "teacher-centered" pedagogy, in which the teacher transmits information to the student, toward a "learner-centered" approach in which students are much more actively engaged in learning and in the discovery or "construction" of their own knowledge. This is referred to as "constructivism" or "authentic" teaching and has been made popular in particular by the Coalition of Essential Schools. Authentic teaching often involves long-term projects, usually done in groups, about difficult issues that require some complex written, symbolic, or oral final presentation.

Despite the wide-ranging benefits of authentic teaching, this approach is not free of controversies. It takes a great deal of time for students to "construct" their own knowledge, and it is difficult to know and evaluate exactly what it is that they will construct. Anderson, Reder, and Simon (1996) argue that much knowledge can be taught more efficiently using more traditional methods, and Hunt (1995) points out many practical problems associated with planning a curriculum based on the project approach. But these critics tend to argue against the most ambitious claims of education reformers, not the basic principles. In most cases they agree that a more modest constructivist pedagogy, often making use of project-based learning, does have an important place in education even if it must also coexist with more traditional approaches. Thus, the learner-centered approach to teaching is now widely, although not universally, accepted as at least a desirable objective and is not seen as being in conflict with learning academic skills. For example, it plays an integral part in New York State's *New Compact for Learning*.

Experience Outside the Classroom

Guided educational experiences outside the classroom, particularly in the workplace, are the second central element of school-to-work. The best-known approach involves internships or apprenticeships in which students spend some time employed at a worksite. The vast

majority of the current projects funded under the School-to-Work Opportunities Act are not intensive. Usually, students receive organized and guided work experience in short-term internships that meet a few hours a week during the junior or senior years, or in some cases alternate periods of full-time work with periods of full-time school. There are even less intensive experiences, including job shadowing, mentoring relationships with adults, community service activities, school-based enterprises, and in-school simulations of work experiences. Some schools try to enhance the educational value of the jobs that young people already have by using seminars and other in-school activities to analyze and reflect on situations that students encounter at work.

One of the most common approaches is the development of high schools based on occupational or industry themes. New York City has high schools organized around health occupations, aviation, financial, and business services, and many others. Philadelphia and areas in California have established career academies that combine academic content with training in the technical skills necessary to obtain entry into certain industries or occupations. Educators believe that the industry orientation provides a context and coherence to the curriculum. Thus, learning benefits accrue to all students, not just those seeking employment upon high school graduation. Using the workplace to teach academic skills can motivate students, showing them how their academic skills can be used outside of the classroom.

The importance of experience outside the classroom is incorporated into New York State's *New Compact for Learning*. The curriculum includes hands-on opportunities to learn about the relationships between academic knowledge and technical skills as well as time to report upon and demonstrate what has been learned and how it can be applied to other situations. Packer and Pines (1996) argue that many traditional educational practices focus on contrived applications that are never encountered in the workplace and that the use of more realistic workplace applications will result in better, more prepared learners and workers. This is particularly true of traditional applications in mathematics and science. Both the National Council of Teachers of Mathematics and the American Association for the Advancement of Science are encouraging the integration of examples of workplace problem-solving into the academic standards they have established. Similarly, Forman and Steen (1995) argue that "mathematics in school should closely resemble mathematics at work," and that "mathematics required for work can provide strong preparation for college."

Work-based cooperative education has a long history in the United States, and many people are enrolled in construction and other types of registered apprenticeships. But neither cooperative education nor apprenticeship is perceived to be effective in teaching academic material or preparing students for college. The same cannot be said for guided workplace experiences that come through professional education programs. Internships, guided practicum, and various types of work experience are central components of education for most professions. An education combining school and guided work can provide a deep and broad understanding for lawyers, doctors, teachers, and architects. Indeed, no one would want a doctor who had no practical experience even if he/she had earned A's in biology, organic chemistry, and anatomy.

Career and Interest Exploration

The third component of the school-to-work approach involves systematic exploration of student interests and career goals. The purpose of career exploration is to give young people a chance to think systematically about their interests and, just as important, give them more realistic information about what adults do in their jobs. On the job, students can see firsthand what adults are doing and can often decide that some particular activity is or is not for them. With respect to college, students with some sense of their goals can make a better selection of their postsecondary activities and probably make better use of their time in college.

In high schools, students pursue their interests and passions mainly outside of the classroom—on the athletic field, in their churches and communities, and in other extracurricular or personal activities. A key aspect of the school-to-work model is that it is designed to use those interests to promote academic learning, to integrate student aspirations into the academic pedagogy. For this to work, it is important that students get a chance to explore and reflect on their interests. One advantage of the current school-to-work movement is that it offers schools an opportunity to improve and focus counseling and career exploration functions. Indeed, significant changes will need to be made if school-to-work is to achieve its potential.

School-to-Work Programs That Teach Academic Skills and Prepare Students for College

For school-to-work to develop into a broad reform it must be seen as an equally good path to quality baccalaureate programs. It is important to note, therefore, that some of the most highly regarded school-to-work programs are explicitly designed for college-bound students. The nature of student projects in these programs demonstrates the level of learning that is taking place. The Thomas Jefferson

High School for Science and Technology in Maryland, for example, offers a program of studies in biology, English, and technology linked by an environmental issues forum. Students work as partners with resource managers at a wildlife refuge and a state park to collect data and monitor the daily activities of various species that inhabit the region. Students search existing literature to establish a hypothesis related to a real-world problem, design an experiment to test their hypothesis, run the experiment, collect and analyze data, draw conclusions, and produce a written document that communicates the results of the experiment. The students are responsible for determining what information and resources are needed and how to access them.

At the New Visions Careers in Health program in Rochester, New York, a student in a medical internship studied the intra-aortic balloon pump and prepared a presentation on this subject to the class. Assigned a cardiac patient to follow every day, she read the same medical texts that medical students read, and gave daily reports to the staff on the patient's condition.

Students at the Blair Science, Mathematics, and Computer Science Magnet Program in Maryland conduct year-long research projects at such institutions as the Carnegie Institute, the National Institute of Health, Goddard Space Flight Center, and the Army Research Labs. Senior projects during the 1996 school year included "Computerized Design of the Maryland Functional Math Test" and "Two-Way Video Transfer Over Fiber Optic Cable."

In schools and programs such as these, students present their work in symposium format to parents, teachers, peers, employers, and prospective students. These presentations allow them to begin developing the kind of communications skills that they will use throughout their lives—speaking to a range of audiences with different interests, uses of information, and levels of expertise. In the traditional classroom setting, the teacher and the student's peers are the only audience, which makes the communication less dynamic and true-to-life.

For students with well-formed interests and goals, participation in these types of activities can strengthen their educational experience. In our field work, we have met students who joined a school-to-work program because they wanted to be pediatricians, executives in the travel industry, nurses, or engineers. Through school-to-work programs, these students get a chance to develop their interests and try them out. They sometimes find that their original career goals are not what they wanted. Additional, practical knowledge of career demands, when gained prior to college entrance and the declaration of a major, has the potential to eliminate many wasted dollars and years spent (by parents and students) on "changed majors."

Another group of students that can benefit from school-to-work are those who are disaffected by the standard academic curriculum and pedagogy and consequently do not do well in their classes. They often become convinced that they do not have the ability to succeed in an academic environment. We have found students who had no intention of going on to college but joined school-to-work programs because they saw them as an alternative to boring class work. Once they began to work in a concrete setting that sparked their interest, they found that in fact they were effective learners. Many students told us that the program had changed their attitudes about school: they had been thinking about dropping out, but were now enthusiastic, and D's and F's changed to B's and even A's (see Olson, forthcoming, for many examples of improved academic performance as a result of workplace experiences).

Empirical Evidence

Many school-to-work programs have high college attendance rates. For example, Chicago's High School of Agricultural Science—which admits many students who traditionally are not headed for college—sent 80 percent of its students to college in 1996, 60 percent of whom went to four-year schools. The Philadelphia Academies send nearly 60 percent of their students to postsecondary schools. A 1995 evaluation of three youth apprenticeship programs found that between 69 and 84 percent of the graduates enrolled in some form of postsecondary training or education soon after high school, and the highest postsecondary rate was for an inner-city school where postsecondary enrollments rates are usually low (Jobs for the Future 1995).

The recent work of Newmann and Wehlage (1995) shows gains due to the use of authentic pedagogy both in traditional test scores and in measures of "authentic learning." Programs that include work-based components also have positive results. For example, the Manufacturing Technology Partnership (MTP) Program in Flint, Michigan, enrolled 11th and 12th graders and supplemented a formal school-based curriculum in manufacturing with work-based experiences at General Motors. A recent evaluation, which compared participating students to a similar group of non-participants, found that the average high school grade point average and class rank were higher for MTP students and that the program dramatically reduced absences (Hollenbeck 1996).

New York City's Career Magnet schools provide a particularly compelling opportunity to study the effectiveness of programs with important school-to-work characteristics. New York high school

students must apply for admission to the career magnets. One half of the students are selected by lottery. The lottery losers for the most part attend their local area high school. An evaluation found that career magnet graduates were more likely to have declared a college major when they went to college than their counterparts from area comprehensive high schools, earned significantly more college credits, and were employed more months after graduation (Allen & Crain, unpublished).

Confronting the College Admissions Process

Reformers have taken a variety of approaches to reduce the conflict between participation in school-to-work activities and admission to selective colleges. These strategies can be grouped into three broad approaches. The first is accommodation of the school-to-work program within the existing college admissions system, the second involves the communication between individual schools and colleges, and the third includes attempts at broad change in assessment and college admissions procedures.

Accommodation. This approach attempts to fit school-to-work activities into a traditional college preparatory program, "shoe-horning" school-to-work into traditional Carnegie units and including school-to-work activities with the traditional activities. For example, at Cambridge Rindge and Latin School in Cambridge Massachusetts, applied courses are given familiar academic labels to preserve the university's understanding of student transcripts: "applied technology" was relabeled "physics and applied technology." In some schools, when internships are additional activities that take place after school or during summer vacation, the internship can be seen as an extracurricular activity and treated as such on college applications. Some schools start internships during the second half of the senior year after college applications are complete.

These attempts to accommodate school-to-work initiatives within the traditional college preparatory system have allowed the initial growth of school-to-work reform. But because these compromises often create severe constraints, attempts have been made to get colleges to recognize the value of the school-to-work approach without trying to make it look like the traditional system. Schools have tried to do this either through working with individual colleges or by working towards broader reform in college admissions procedures.

Individual relationships between schools and colleges. Many programs, especially those that are geared toward high academically achieving students, have had to open up communication channels with colleges on an individual student basis. Programs in the Cambridge Rindge and Latin School as well as the Blair Science, Mathematics, and Computer Science Magnet have found it necessary to include a cover letter with their students' transcripts and college applications explaining the details of a student's work experiences, research projects, and the interdisciplinary and applied curricula. Students from Fairdale High School Public Safety Magnet Career Academy who are not admitted to the University of Louisville based on academic credit and ACT scores can challenge the University's decision using their writing and math portfolios. In 1995, seven students received admission based on their portfolios.

Reform in college selection and admission procedures. Several states are now developing assessment and admissions systems that can more effectively evaluate the achievements of school-to-work students. For example, Oregon is replacing the traditional time-based proxies for learning, such as the Carnegie unit, with clearly specified statements of the knowledge and skills that students must master to be accepted into any of Oregon's seven baccalaureate-granting institutions. These standards, involving six content areas and nine process areas, will be used as a basis for freshman admission in 2001.

The University of Maryland has developed an Office of Articulation whose primary goal is to "facilitate the movement of students between and among the educational segments" (Giles-Gee 1996). Faculty and administration at the university have worked with the State Department of Education, community college faculty, and business and industry leaders to identify knowledge, skills and employment opportunities; review curriculum; and create strong career pathways for students in all branches of the State's educational system. They are also working to create a state system of high school assessment with an emphasis on academic proficiency and "skills for success" to replace the traditional Maryland Functional Tests.

Wisconsin is slowly integrating alternative assessments into the college admissions system. Portfolios as well as traditional assessment methods are now used in judging prospective students. Faculty at Boston's Pro Tech are working with the North East Association of College Admissions Counselors to give colleges a different perspective on the work component in students' schooling experience. The school is using the success of preceding students to show that a work component tied to a strong educational curriculum is more significant than mere after-school jobs.

All of the state programs mentioned above involve developments in competency-based assessments. If assessments

include more complex material such as papers, projects, and portfolios, then students with a well-designed school-to-work experience may look better than students in traditional programs. Colleges already appreciate outside interests and commitments. Since school-to-work tries to integrate such interests with academic learning, assessments that can capture that integration should be of particular interest to colleges.

Conclusion

The school-to-work strategy is still evolving, and reforms have only just begun to address the potential for using school-to-work to prepare students for college. The evidence suggests that if school-to-work programs are well planned, students can learn academic skills, earn high grades, score well on tests, and gain access to college. Clearly, however, widespread acceptance of school-to-work as a strategy for preparing students for selective colleges will ultimately require significant changes in assessment and college admissions procedures. While it is understandable that reformers, government agencies, and foundations want to move ahead with innovative programs rather than waiting for time-consuming studies, skeptics are justified in asking for more systematic evidence. But the pressure to expand should not deter programs from collecting student outcome data to be used in the future. Although there are still many open substantive questions that need to be resolved, school-to-work represents a significant change in educational strategies with the potential to benefit all students by better preparing them for college and career opportunities.

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This *CenterFocus* was developed at the Institute on Education and the Economy, Teachers College, Columbia University, which is one of the sites of the National Center for Research in Vocational Education (NCRVE).

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This publication was published pursuant to a grant from the Office of Vocational and Adult Education, U.S. Department of Education, authorized by the Carl D. Perkins Vocational Education Act.

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