Revitalizing High Schools:

What the School-to-Career Movement Can Contribute

A Jobs for the Future Report
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Jobs for the Future

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Preface

This is a time of great challenge and opportunity for all who are working to improve young people's access to high-skill careers and postsecondary learning. The past few years have been a period of ambitious and creative experimentation with different program models and ways of building local, state, and national systems that link school and work. Federal and state interest has been strong. Many programs that were merely a dream five years ago are now reaching thousands of high school students.

Today, though, we are entering a new period. Federal and state governments are reconsidering their roles in education and workforce preparation. Hard questions are being asked about all public investments—and those directed to young people and their futures have come under particularly intense scrutiny. The pressure on school-to-work and other strategies to show evidence of results and of cost-effectiveness is increasing. This comes at a time when the implications of different school-to-career approaches for the organization and reform of high schools (as well as for employers and postsecondary institutions) are becoming clearer. The decisions that leaders of these early initiatives have made regarding size, scale, curriculum, intensity of work-based learning, and other issues can heighten and inform some of the key choices that practitioners and policymakers must make. As the nation struggles toward a more coherent, comprehensive, and integrated system of education and workforce preparation for young people, we can learn much from others' experiences.

This paper focuses on an obviously critical component of these efforts—the links between the design of school-to-career efforts and the reform and revitalization of the American high school. Based on Jobs for the Future's extensive work with local programs around the country and with over a dozen states involved in building school-to-career systems, **the authors argue that school-to-career must be an integral part of a high school reform strategy if it is to be able to achieve scale and be of maximum benefit to young people, employers, and schools**. In addition, the authors provide thoughtful analysis from experience of the pros and cons of different ways of linking school-to-work and high school reform efforts.

Jobs for the Future and its co-publishers, the American Youth Policy Forum and the National Association of Secondary School Principals, believe that this paper makes a powerful case for why—and how—the school-to-career agenda can revitalize high school education. We hope this paper will stimulate new conversations and refinement of both programmatic and policy designs. We intend for it to spark dialogue, debate, anad reflection that will strengthen the school-to-career movement in this new period of its evolution.

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Introduction

In just a few short years, a consensus has emerged in favor of building a school-to-career system in this country comprised of well-defined learning pathways that begin in high school, integrate classroom and worksite learning, and lead to high-skill employment. Enactment of the School to Work Opportunities Act of 1994 provided an additional boost to state and local partnership efforts to connect the worlds of school and work in a system of structured career pathways.[1]

The movement to establish a more formal school-to-career system in this country, in which Jobs for the Future has played an active role, is motivated by two related—but distinct—goals for young people:

(1) improved educational performance and advancement; and

(2) improved employment and career prospects.

School-to-career efforts are not about one or the other: they are committed to helping the nation's youth advance both academically and occupationally. They are about creating new entry points into the primary labor market for young people; at the same time, they are about improving the quality and effectiveness of high schools, particularly for those students "turned off" by the abstract approach of traditional academic programs.

Because of these twin goals, school-to-career initiatives are engaged in a delicate balancing act as they try to reconcile the cultural, economic, and logistical realities of high schools with those of the workplace. As the pioneers in this movement would be quick to admit, there are still more questions than answers about how best to meld the two worlds of school and work in ways that can sustain the involvement of both employers and school systems. While the school-to-career vision is compelling, the hard work of building effective, sustainable programs and systems has just begun.

This paper is Jobs for the Future's initial attempt to flesh out a school-to-career model that balances education and labor market goals without sacrificing either. During the past four years, we have observed and assisted a range of innovative programmatic experiments that have struggled with this challenge. We have seen, for example, the ten school-to-career programs that have been the core of Jobs for the Future's National Youth Apprenticeship Initiative motivate and equip many young people to advance into two- and four-year college programs—a positive development that nonetheless has raised questions about their direct benefit to employers as workforce preparation programs. We have seen other design dilemmas come to the fore as well. For example, how can employers' natural tendency to want to recruit the best students be reconciled with the educational goal of providing access for all students, particularly those who might benefit most from a pedagogy of "learning by doing"? Similarly, how can programs organize their curricula to address employer interest in technical skill development while also meeting the goal of broad educational preparation?[2]

1 *Throughout this paper, we use the term "school-to-career" rather than "school-to-work" to describe this movement. For many, the term "school-to-work" has negative connotations: it is seen as misleading because it implies a one-time transition to employment, and as unappealing because it is associated with entry-level work as opposed to progress onto a career pathway. In the same spirit, Stephen F. Hamilton and Mary Agnes Hamilton suggest the term "career opportunity system" in order "to emphasize the distinction between finding work and entering a career path" (Hamilton and Hamilton, 1994).*

2 *Jobs for the Future has recently produced* Promising Practices: A Study of Ten School-to-Career Programs, *which reports on our assessment of the progress of ten pioneering programs during the past two to three years. Many of the design dilemmas referred to here, as well as the strategies different programs are using to address those dilemmas, are discussed in detail in that report.*

Our purpose in this paper is to describe the basic design elements of an American school-to-career system—**particularly the high school component**—that tackles these dilemmas head-on. We articulate and elaborate upon a set of design principles for high school school-to-career efforts which in our view can strike a balance between educational and labor market goals.

The redesigned high school we envision as part of a comprehensive school-to-career system would be based on the following premises:

(1) Non-tracked, thematic programs of study can prepare all students for entry into both higher education and high-skill employment.

(2) Selection of a career-focused program of study in high school should be based on general interests and should not be a high-stakes career decision.

(3) Work-based learning yields benefits that school-based education alone cannot provide and should be an integral part of the core curriculum for all students.

(4) Separate vocational and academic tracks should be gradually replaced at the high school level with programs of study emphasizing intellectually rigorous, practical education for all.

(5) The integration of secondary and postsecondary learning environments is critical to the development of rigorous programs of career-related education.

These five premises combine to form the outline of a high school reform agenda that integrates rigorous abstract and practical learning and that expands options for postsecondary educational and career development. We believe strongly that too narrow a conception of school-to-career as occupational training can lead to a two-tiered education system, premature specialization, and the sacrifice of time for academic study by students who are most in need of academic success. At the same time, we believe that a school-to-career approach focused solely on classroom reform will squander the power of work as a motivator for young people and diminish what employers have to offer students in terms of confidence, mastery, and connections in the labor market.

The high school redesign that we advocate in this paper is based both on what we have learned from experiments in the field and on our assessment of the unique structures and cultures of this country's educational and economic institutions. As a result, it differs in significant respects from some frequently-cited models, particularly those that draw heavily from European systems of education for work. To an extent, it also differs from some of our own assumptions when Jobs for the Future first began exploring youth apprenticeship and school-to-career strategies.

European workforce preparation systems have served as popular guideposts for system-building in this country because they address many of the most glaring failings of our own system. Instead of unfocused general track programs that lead nowhere, these systems offer students who do

not plan to attend university a coherent and rigorous technical education that combines practical learning at the workplace with classroom instruction. They effectively bridge high school and postsecondary education by creating seamless programs which span the equivalent of the last two years of high school and two or more years of technical college. They place significant numbers of young people on well-marked pathways to high-skill careers. They appear to have achieved a workable balance between educational and employment goals that are agreeable to young people, parents, employers, and educators.

In our view, though, American school-to career models that borrow too literally from European practice are problematic as both education reform and labor market interventions for this country. As labor market interventions, these proposals impose an unrealistic set of occupational training responsibilities on high schools, responsibilities which could more easily and appropriately be met by postsecondary institutions in collaboration with employers. As educational reform initiatives, they are too modest. Proposals to turn the last two years of high school into the first two years of multi-year, occupation-specific training programs underestimate the potential of career-focused, experiential education to raise academic achievement and career aspirations of all students, particularly those traditionally ill-served by the current system.[3]

In general, we resist proposals that encourage the restructuring of high schools into rigidly-defined college-preparation and technical-education tracks. This reform impulse runs the risk of institutionalizing, rather than eliminating, the distinction between practical and academic learning, and between preparation for employment and preparation for higher education. And it does so at the precise historical moment when those distinctions are becoming obsolete and contrary to what employers say they need most from new entrants into the labor market.

For these reasons, our vision of the redesigned high school goes beyond strategies for modernizing vocational education for the "non-college bound." Rather, we advocate a system where high schools (and their feeder elementary and middle schools) are organized to make career-related education a vital feature of **all** students' education through a pedagogy that combines scholarship and craftsmanship. All students should have the opportunity to develop both academic and employment-related competencies in high schools built around non-tracked, thematic programs of study that expect them to learn by wrapping their hands and minds around complex, real-world problems.

In this system, work-based learning experiences would play a critical educational role throughout the high school years, enabling students to deepen their understanding of academic subject matter through substantial, meaningful projects. At the same time, work-based learning experiences would be structured to help students make career plans, gain work experience, and master general and technical competencies valued by employers. Yet, while students in this system would be engaged in work-based

[3] *European apprenticeship systems are themselves beginning to change in response to new economic realities and employer skill demands. For example, Germany is finding that young people are delaying entry into the dual system of apprenticeship in order to spend more time pursuing the basics of a liberal education: the average age of new entrants into apprenticeships is now closer to eighteen years old. Sweden has added an additional year of upper-secondary education for similar reasons. The dual system is also building bridges between employer-based apprenticeships and post-secondary technical colleges so that learning in the apprenticeship years can be credited toward a college degree.*

experiences throughout their high school years, most would not enter formal training programs for specific careers before their senior year—and the choice of a work-based program of study would not be a high-stakes career decision.

This proposal differs significantly from others that would require students to choose between four-year college and technical-training programs by the end of grade 10. In our view, as we discuss later in this paper, occupation-specific training should be delivered primarily by postsecondary institutions, technical training centers, and their business and labor partners through a combination of classroom instruction and on-the-job training. High schools can provide articulated and/or accelerated paths into these programs; but an effective division of labor between secondary and postsecondary institutions would have high schools focus on more generic academic and workforce preparation and postsecondary institutions serve as the backbone of the nation's technical training system.

This proposal, which is detailed in the following sections of this paper, is consistent with the findings and recommendations of the recent National Assessment of Vocational Education (NAVE). The extensive NAVE research project concluded from its analysis of developments in vocational education since 1990 that high school-level preparation for work should: stress development of cognitive and broad technical skills through applied learning; stress competency-based education keyed to high standards; prepare students for some form of postsecondary education; defer much, but not all, specific skill training to the postsecondary level; and support specific skill training for which there is growing demand (Boesel and McFarland, 1994).[4]

We know that the argument advanced in this paper raises significant implementation challenges of its own. For example:

- Is it reasonable to advocate an end to tracking in public high schools? Or is there another way to eliminate the distinction between college-prep and technical training paths in high school?
- If school-to-career programs emphasize career exploration and generic skill development in high school, will employers see enough benefit from participation to justify the cost? Or will they continue, as many have in the past, to "choose against youth"?
- If **all** students should have work-based learning experiences, will enough employers be interested? If the supply of work-based learning opportunities is inadequate, what alternative options can cover the shortfall? And, if students have to compete for limited slots, will at-risk students most in need of school-to-career programs lose out to more academically successful students?
- Will this proposal to redesign high schools according to interdisciplinary career pathways or industry clusters conflict with the emerging emphasis on standards for the academic disciplines?
- Will postsecondary institutions be willing or able to take on the role proposed here?

[4] *The National Center for Research in Vocational Education and scholars associated with it have also generated several recent publications that are also supportive of the vision presented here (National Center for Research in Vocational Education, 1995; Grubb, 1995).*

We do not have answers to all of these questions. We believe, however, that these implementation challenges are the right ones on which to focus. In our view, given U.S. economic and educational institutions and traditions, the redesigned high school program proposed here has a good chance of advancing both the educational and labor market goals of the school-to-career movement.

This paper has four sections. The first section discusses some key issues and concerns regarding the high school component of school-to-career efforts and how different school-to-career proposals address them. The second presents essential principles that guide JFF's vision for transforming American high schools to support young people's entry into high-skill careers. The third explores some of the implications of this proposal for postsecondary institutions and employers. The final section looks at the debate on academic and occupational skill standards through the lens of this approach to school-to-career system building.

I. Design Choices Facing the School-To-Career Movement

The growing school-to-career movement in the United States has its roots in a number of different reform impulses. From the school reform philosophy of John Dewey in the early 1900s with its emphasis on "learning through occupations" to the career education movement of the 1970s and to federal efforts to remake vocational education in the 1980s and 1990s, there is a tradition within American education of trying to improve the links between school and work and to break down the wall between academic and vocational learning. Another influence has been the cyclical interest in the reform of curriculum and teaching methods toward more active, interdisciplinary, project-based learning, and away from conventional "chalk and talk" or "skills and drills" approaches (Grubb, 1995a). At the same time, the search for better ways to prepare young people for careers and for adulthood has also led to examination of the systems of apprenticeship and vocational training in Germany, Denmark and other nations (Hamilton, 1990).

Some of the most comprehensive American school-to-career proposals, including those of the National Center on Education and the Economy (NCEE) and the states of Wisconsin and Maine, have emulated and sought to transfer lessons from the structure and sequence of European education and workforce preparation systems to the American context (Tucker, 1994).[5] While these proposals differ in their details, they tend to share the following features:

- **Achievement of a strong academic foundation by the end of grade 10 through a rigorous program of study emphasizing mastery of core competencies in disciplines that include English, mathematics, science, and, often, social sciences.** General track or watered down academic classes are eliminated and all students—regardless of college plans—are expected to achieve a common and high standard of performance. Most proposals include some type of Certificate of Initial Mastery or gateway assessment to validate student achievement of academic and work-based foundation skills.[6]
- **For most students, entrance by grade 11 into a focused program of study in a career area.** The eleventh grade—after most students complete the Certificate of Initial Mastery assessment—becomes the time of decision regarding future plans, including whether to pursue preparation for four-year college or a technical career. Those who opt for a technical career enroll in a program that spans high school and postsecondary education, and offers a well-structured sequence of technical and academic classes with apprenticeship-style worksite training in an occupational area. Those who opt for four-year college focus on building up academic credentials, through advanced study in high school and college classes.

This model is appealing and elegant. It is based on a commitment to improved academic performance at high standards for all students and

5 *Marc Tucker, president of the National Center on Education and the Economy, has been a vocal and persuasive advocate for standards-driven reform of U.S. education and workforce preparation systems. The recommendations of the National Center's Commission on the Skills of the American Workforce have had significant influence in states and nationally. A number of states have adopted NCEE's approach to reforming American education, which derives significant authority and power through analogy to international competitors and their workforce preparation systems.*

6 *Seven states have adopted the Certificate of Initial Mastery (CIM) concept and are moving to put it into place, though none of these has successfully implemented the CIM to date. There is some variation in the areas of competency that states are including in their CIM (Rothman, 1995). Massachusetts is moving toward a tenth-grade assessment in history and social studies, science and technology, English, and mathematics. Washington is developing essential academic requirements in*

continued on next page

on a career focus for studies that follow the end of compulsory education. It emphasizes the need for continued learning if one is to advance in a chosen occupation or career.

Yet our experience with many different pilot programs and with more than a dozen states around the country working to build effective school-to-career systems leads us to believe that this model needs to be modified if it is to be a broadly-applicable guide to restructuring American high school education. When states and localities move from theory to practice, the need to balance a vision for the future with the demands of organized interests in the present sometimes results in more rigid and less nuanced models than those originally proposed. At the same time, as states adopt these powerful ideas, some are finding that they must loosen and alter certain design elements to make them fit more easily with existing institutions and political realities.[7]

In our view, the above model in its more rigid form poses three systemic challenges:

- The institutionalization of separate college-bound and technical training tracks in the latter years of high school forecloses rather than expands options for large numbers of young people.
- At the same time, delaying until grade 11 the use of intensive career-focused approaches to academic learning runs the risk of alienating and losing less-focused students in earlier grades, before they ever get a chance to enter a technical training program.[8]
- Emphasizing specialized occupational skills training as opposed to broad career-focused education in high school runs up against significant economic, pedagogical, and logistical challenges.

We consider each of these issues in turn.

The institutionalization of separate college-bound and technical training tracks in high school forecloses rather than expands options for large numbers of young people. Basing a school-to-career system on separate college-preparation and technical preparation tracks undercuts what should be major goals of these programs: to eliminate the false dichotomy between preparation for college and preparation for high-skill employment; and to instill in all students the confidence and capacity to pursue further education. It also sends the wrong message to parents, students and employers, dividing young people into two groups—the college-bound and the non-college-bound.

Furthermore, we have seen time and again how teaching academic concepts in the context of work applications can motivate turned-off students to excel in school. And we have watched as students who never thought of themselves as "college material" get a taste of academic accomplishment and of mastery and, for the first time, see higher education as within their reach.

This is indeed what early evidence shows: significant percentages of students in JFF's ten National Youth Apprenticeship Initiative sites are opting to

6 continued
civics and history, geography, arts, humanities, health and fitness, and social, physical, and life sciences. Other states, including New York and Indiana, are creating standards for academic disciplines and for work-related skills, paralleling NCEE's advocacy of national certification of initial mastery in the core subjects of math, English/ language arts, science, and "applied learning" (National Center on Education and the Economy, 1994). (For our views on the CIM, see pages 33–34.)

7 Wisconsin, Maine, and Oregon are three states that have begun to modify their initial designs for state school-to-work systems, which were modeled on European examples. Oregon, for example, which has one of the most ambitious and comprehensive reform proposals, has moved away from its initial two-track approach that called for the development of separate technical education and college preparatory tracks toward a vision of career-focused education for all students.

8 We do not mean to imply that any particular state, locality, or organization actively advocates a school-to-career model that restricts work-based learning until grade eleven. However, as we argue below, an emphasis on academic preparation for a tenth-grade assessment can have this unintended consequence.

enroll in four-year, as well as two-year, colleges after high school.[9] Many of these students would have been previously considered "non-college-bound" by teachers and guidance counselors. Those who are choosing to remain in apprenticeship programs are doing so because they have developed a strong interest in a technical career that does not require a four-year degree for entry. This sizable movement of students out of school-to-career programs into higher education should both be expected and encouraged. (Interestingly, in our experience, participating employers come to understand this dynamic and build it into their expectations of "return on investment.")

Instead of demanding a choice by age 16 between four-year college and technical training, school-to-career initiatives should encourage students to develop individual educational and career plans based on their talents, interests, and performance. Participating students may or may not go on to a four-year college but, as MPR Associates president Gary Hoachlander argues, their choices should be "determined by how their aspirations and abilities develop and how well they perform during their four years in high school" (Hoachlander, 1994). Indeed, to the degree that school-to-career efforts help inform and focus students about career options and prerequisites, they are likely to change individual students' aspirations and postsecondary plans.

This is not to argue that four-year college should become the only acceptable destination after high school, or even the preferred one. Many students now venture off to these institutions simply because they perceive college as their only high-status option. Many find themselves over their heads either academically or financially and they would have been wiser to choose two-year college or a technical training program as their starting place.[10] Especially when viewed as the first step on a career pathway, securing a technical credential and a good first job would be a shrewd move for many. But making this type of calculated career decision to begin with a technical degree and build a career from there requires a high level of social maturity, experience, and guidance.

It is unreasonable to expect young adolescents to make these career choices and educational decisions based only on classroom activities and occasional observations of workplaces. We believe that students will be better able to develop a career plan that balances their interests, talents and circumstances if they can experience the world of work more directly and intensively as a prelude to that decision point.

Instead of asking students to make career **decisions** by grade 11, school-to-career programs should use work-based learning experiences that take place in the upper-secondary years for serious career **exploration**. This is the power of structured work-based learning experiences, in which students spend as much as 10 to 15 hours a week in various departments of a firm learning technical and other workplace skills in the context of productive work, while enjoying the support of caring adult mentors. These experiences can provide an important vehicle for students to try out adult roles and test their career interests. This was the intent of Congress when it

9 *While not all ten NYAI programs have kept comparable records, most have tracked graduating seniors' postsecondary plans and some have been able to certify college enrollment in the following school year. In three programs that track the postsecondary enrollment of graduates (Cornell, Kalamazoo, and ProTech) between 77 and 84 percent of participating students enrolled in postsecondary programs, at either two- or four-year colleges, either full-time or part-time or in combination with work. Of course, enrollment is only one step along the way; it will be important to follow the progress of these students to see how many complete their postsecondary programs.*

10 *One practical argument for preparing every high school student simultaneously for both work and college is that most college students hold paid jobs while in school: if they have been prepared in high school to find jobs that pay a higher hourly wage, they will be in a much better position to survive financially during their college years (NCRVE, 1995).*

passed the 1990 Perkins Act Amendments requiring instruction in "all aspects of the industry." Through exposure to different work environments and different kinds of jobs within a firm, and through structured reflection on these experiences, young people can assess their options. And as students come to know themselves better, they can replace abstract and often unrealistic plans for the future with plans that capture the complexity of their circumstances, desires, and needs.

Delaying until grade 11 the use of career-centered approaches to academic learning runs the risk of alienating and losing less-focused students in earlier grades, before they ever get a chance to enter a technical training program. Models based on European systems that emphasize academic preparation until students cross a hurdle at school-leaving age or, commonly, the end of 10th grade, can fail to tap the power of school-to-career programs to energize **academic** learning for students in earlier grades. Because of the emphasis on the end of the tenth grade as the time for students to choose a college-preparatory or technical preparation track, the first two years of high school can become devoted to traditional academic preparation, minimizing the potentially motivational impact of thematic and experiential learning. Such models risk losing large segments of the "forgotten half" prior to their reaching the 11th grade, due to these students' lack of interest in conventional academic learning and / or their inability to meet minimum program requirements.

This is not an insignificant problem: in many schools, particularly in urban areas, it is the norm. For example, JFF found that the majority of students enrolled in grade 10 in one large urban school system could not qualify for entry into the local youth apprenticeship program, with its modest entry requirements of a C average and 85 percent attendance (Goldberger, 1993). The majority of students who were still attending school were already so dispirited and performing so poorly that the option was effectively closed for them (as it was for their former classmates who had already dropped out).

School-to-career programs that begin in earlier grades offer a powerful means to reach students before they drop out either physically or mentally (Pauly *et al.*, 1995). Career academies and other school-within-a-school programs, which group students and teachers together in small learning units for several years, appear to be among the most successful programs at turning around under-performing students (Stern, Raby, and Dayton, 1992). Yet these programs, which start in grade 9 or 10 and extend through the end of high school, do not fit well into a scheme that calls for occupation-oriented career majors to begin in grade 11.

An American high school reform strategy needs to be flexible enough to incorporate career-focused programs that span three or four years of high school. (By extension, this reform strategy should also be able to accommodate a career education system that begins in elementary and middle schools.) To achieve this flexibility, the model cannot equate entry into a high school program organized around an industry or occupational theme with selection of a definite career. Most ninth- and tenth-grade students

are too young to decide on a first career. They can, however, make a preliminary choice of a career-related course of study as a way to add focus and meaning to their academic studies, knowing that their interests and career plans will likely change as they mature.

Emphasizing specialized occupational skills training as opposed to broad career-focused education in high school runs up against significant pedagogical, financial and logistical challenges. The most innovative school-to-career initiatives in the country are based on the premise that a practical focus on useful—and marketable—skills can boost academic performance. But this powerful insight does not, by itself, solve the dilemma that lies at the heart of career-focused education: how much emphasis should be placed on specialized occupation-specific skills, and how much on broad-based educational competencies?

The depth of this dilemma is only now becoming clear, as school-to-career efforts move off the drawing board and into programmatic reality. By definition, these initiatives are career-centered, offer work experience, and involve the development of both academic and technical skills. But how occupation-specific should high school education be? Which technical skills are best learned during the high school years, and which should be postponed until postsecondary or on-the-job training?

Some would argue that this dilemma is a false one, that technical training that begins in grade 11 can be both generic enough to impart broad education and specific enough to train students for the workplace. However, this stance skirts some significant pedagogical, economic, and logistical obstacles to building a school-to-career system that can serve these two masters.[11]

There are sound pedagogical reasons for favoring breadth over occupation-specific depth during the high school years. Vocational educators know that only about one out of four high school students enrolled in a vocational program finds employment in the field for which they are trained. The more occupation-specific the training, therefore, the greater the risk that what one learns may never be put to use in one's future employment. For this reason alone, many of the most creative school-to-career and vocational programs emphasize the mastery of specific occupational skills within the broader context of more generic academic and technical learning.

The educational goal of school-to-career efforts should **not** be to fully train more technicians by the end of high school, but rather to prepare graduates who know how to acquire the skills they need to advance in the occupation of their choosing. As Peter Drucker (1994) argues in *The Atlantic Monthly*:

> In the knowledge society, knowledge for the most part exists only in application. Nothing an x-ray technician needs to know can be applied to market research, for instance, or to teaching medieval history. The central work force in the knowledge society will therefore consist of highly specialized people. In fact, it is a mistake to speak of 'generalists.' What we will increasingly mean by that term is people who have learned how to acquire additional specialties rapidly in

[11] *In the following discussion, we focus on the challenge of building a school-to-work system in the high school years that operates at significant enough scale that it changes the nature of high school curricula and program choices and alters student and parent calculations about educational options. We believe that, in some industries and occupations and for some students, a model that begins with intensive apprenticeship-like learning in the eleventh grade is indeed appropriate. However, we are reacting to two problems that plague some school-to-career models: (1) a narrowness of program scope that makes it financially difficult for high schools to offer sufficient customized classroom-based learning for the limited number of students involved in each program; and (2) a dichotomous split in high school programs, starting in eleventh grade, between college-prep programs and technical school-to-career programs, which risks limiting the possibility of future university studies for participating students. Our concern that systematic school-to-career initiatives balance educational and labor market goals leads us to this position. We do not, however, mean to substitute one monolithic career-education "solution" for another.*

order to move from one kind of job to another—for example, from market research into management, or from nursing into hospital administration.

But there are also practical problems with assuming that narrow technical and broad educational goals can be served by a single system that gears up in the junior year of high school. The more narrowly a program is targeted, either by industry or job, the more difficult it will be to attract sufficient work-based learning opportunities and sufficient numbers of interested students. Without a critical mass of students, enough to allow the school to dedicate teaching staff to those students, the school-based component of the program will be underdeveloped and understaffed—and the integration of school and work experiences will be difficult. This is, in fact, the dilemma facing a number of school-to-career initiatives with which we have worked that enroll students from a number of different schools or school districts and lack sufficient numbers in any one school to pay for teachers who can devote their time and attention to the program and its demands.

If the pedagogical goal is to produce graduates who combine expert knowledge in a specialty area with the intellectual dexterity of an accomplished "generalist" in Drucker's sense, the challenge is to devise a course of study organized around a career theme broad enough to prevent narrow, premature specialization, yet focused enough on a coherent body of technical knowledge to impart marketable skills. In Sweden, the problem of building breadth into technical training is addressed by organizing its upper-secondary system around fourteen industrial families and two academic tracks. Students who enroll in industry programs spend the first two years acquiring general knowledge and practical experience in the industry before selecting an area of specialization. For this country, Gary Hoachlander (1994) proposes a taxonomy which divides the occupational world into sixteen industrial families.[12]

This is where practical problems arise for program designers. Hoachlander estimates that a four-year curriculum integrating academic and technical instruction for a single industry-family or career pathway would require a minimum of eight academic and vocational instructors and roughly 200 students. If these programs only spanned the last two years of high school, even more students would be needed to make a specialized team of instructors financially viable for a given school. Obviously, given these constraints, organizing the last two years of high school around 15 to 20 different industry families is unrealistic for the vast majority of school districts in this country. Even if a district's entire upper-secondary program were organized around industry programs—a monolithic version of high school that probably has little public appeal—most school districts could support only a subset of these programs. (This may explain why a number of states have decided to cluster industries into between six and ten groupings as they organize their high school school-to-work efforts and why some high schools have organized their programs of study into as few as four to six career pathways.)

[12] *Sweden's 16 national programs are: Aesthetics; Childcare and Leisure; Construction; Electricity; Energy; Foodstuffs; Handicrafts; Health Care; Hotel and Restaurant Trades; Industry; Land and Animal Husbandry; Media; Natural Sciences; Social Sciences; Trade and Administration; and Transport Technology. Hoachlander cites a taxonomy created by an engineer named John Gnaedinger, which divides the U.S. economy into 16 industries: Agriculture; Arts, Culture and Religion; Built Environment; Communication; Education; Energy; Finance; Government; Health Care; Hospitality; Insurance; Manufacturing; Natural Resources; Personal and Business Services; Retailing and Wholesaling; and Transportation.*

Large urban districts might have a large enough pool of high school students to be able to accommodate a full complement of industry programs through the creation of specialized high schools. (Norton Grubb of the University of California at Berkeley has argued recently that "work-centered education" is particularly well-suited as a strategy for urban school reform, because of the size of urban systems and the employer and community resources concentrated in cities (Grubb, 1995b)). However, to make such a system work would require significant transfer of students among industry-specific schools at the beginning of eleventh grade, midway through their high school careers.

Premising the design of a school-to-career system on massive movement of students to new high schools between grades 10 and 11 conflicts with the developmental needs of most teenagers, in particular those ill-served by the current education system. High school is an important institution in the lives of most teenagers; it is the center of their social and academic lives. Asking students to leave their friends, sports teams, teachers, and familiar surroundings to start over in a new school after 10th grade will not be popular with the majority of young people. And for students who thrive in programs based on smaller, family-like learning environments, forcing them to leave programs they entered in ninth or tenth grade to pursue career interests would in many cases be detrimental to their education.

Economic and logistic factors dictate that industry-based programs of study be organized on a regional basis, as is the case in Sweden. The previous discussion highlights reasons why it is ill-advised to reconfigure secondary schools into a regional delivery system for industry-based education. An alternative to requiring that secondary school districts offer a full complement of industry-focused programs is to use postsecondary institutions as primary providers. Postsecondary training institutions—including two-year and four-year colleges, as well as regional skill centers and trade schools—already play the lead role in this country in advanced technical education. Postsecondary institutions, reconfigured into a regional training system, would have the resources and structure to support a training system organized around broad industry families.

This is the solution advocated by Marc Tucker (1994) of the National Center on Education and the Economy. Tucker proposes the creation of a system of regional training centers and postsecondary institutions to serve those students who opt to enter a technical training track after completing their certificate of initial mastery (CIM), which most students would earn by grade 10. Those who opt to pursue a four-year degree may stay on in high school and take advanced college-preparatory courses or enter college directly after completing the CIM.

But if postsecondary institutions are the logical locus for technical training, why make 11th grade the entry point for that training as many states are doing in practice? Why should students be pushed to make a firm decision about career and educational plans by age 16, particularly when entering a career-focused program of education might open up higher-education vistas that previously seemed unreachable or unappealing?

In our view, it seems unnecessary and unrealistic to declare the end of common schooling at grade 10. A high percentage of high school graduates who now go on to community college must enroll in remedial programs before they are permitted to take degree program courses (Kazis, 1993). Reforming high schools so that they produce graduates capable of college work **by grade 12** would be enough of an achievement, given current realities. It seems over-optimistic to expect high schools to increase dramatically the percentage of students qualified for advanced education and training while simultaneously reducing the number of years of schooling.

The introduction of a CIM can—over time—add new academic rigor to American schooling that should enable more and more students to accelerate their learning by several years. But, even in the best scenarios, these changes will take many years to work their way through our schools. Is there a way to redesign secondary schools—and their relationships with postsecondary institutions and with employers—to integrate rigorous abstract and practical learning for all students, and expand options for postsecondary educational and career development for many, while avoiding some of the problems outlined above? The next section addresses this challenge.

II. An Alternative Proposal for the Redesigned High School

Our proposal for the high school component of a comprehensive school-to-career system emphasizes five design elements that are discussed in detail below.

(1) Non-tracked, thematic programs of study can prepare all students for entry into both higher education and high-skill employment. In today's high schools, education tracks are defined by postsecondary destination (*i.e.*, college-prep versus vocational). In place of this institutionalization of high and low status learning paths, we envision focused programs of study which would prepare **all** students for both higher education and high-skill employment. Studies would be organized around broad themes (*e.g.*, arts and communications, natural resource systems) which would foster interdisciplinary approaches to instruction and the integration of work- and school-based learning. These thematic programs would address some of the weaknesses of the "shopping mall high school" by their coherent focus and their delivery through smaller, more supportive instructional units (clusters or schools-within-schools) governed by dedicated teams of teachers.

The majority of focused programs of study would be organized around industry-related themes (*e.g.*, health care, finance, industrial and engineering systems). However, programs based on other types of interdisciplinary themes (*e.g.*, international studies) could also be designed to incorporate practical experience—including worksite learning. High schools would be encouraged to organize instruction around themes which take best advantage of local institutional and community resources. Some communities may have strong biomedical complexes; others may be manufacturing-rich. Some, because of their location, might have special relationships with emerging trading partners in Latin America or the Pacific Rim; others might be tourism and recreation meccas with unique environmental resources and concerns. These local assets can be used to good advantage in the choice and design of thematic programs at the high school level.

Broad educational goals would drive the design of these programs, rather than the training requirements of specific careers. Focused programs would provide students different contexts for exploring and mastering equivalent sets of intellectual and practical skills, such as applying the analytic methods of different academic disciplines to a common problem or working effectively in teams. Regardless of the thematic area selected, students would graduate high school with the core competencies needed to pursue either higher education, high-skill employment, or both. In this regard, our vision is consistent with the emphasis on the development of essential "habits of mind" that is at the core of the reform strategy championed by Ted Sizer and the Coalition of Essential Schools (Sizer, 1992).

Teaching students to use their minds well requires a curriculum that pushes young people to do in-depth work, wrap their minds around a topic, and

pursue it at length. Focused programs of study encourage students to build continuously upon knowledge and skills gained through prior learning. In this sense, specialization and broad intellectual development go hand-in-hand. Through engagement in specific, messy problems, students can sharpen and deepen their general and transferable analytic skills.

For example, an environmental science program might foster this kind of broad intellectual inquiry and development by focusing its curriculum on the interrelated technical, economic, and political issues involved in the management of natural resources. As part of their graduation requirements, students would be expected to produce one or more substantial projects to demonstrate in-depth mastery of an area. In the Midwest, for example, the project might focus on an analysis of crop yields, weather patterns, topsoil characteristics, and individual and public policy strategies for monitoring and reducing soil erosion. In New England, the project might be based on the challenge of the Boston Harbor clean-up or the dilemmas of overfishing of Georges Bank.

(2) Selection of a career-focused program of study in high school should be based on general interests and should not be a high-stakes career decision. Students would select programs of study based on their general intellectual and career interests. In selecting a program, students would not be making a definitive career choice. Rather, they would be opting into a curriculum that teaches academic and practical skills in an engaging and hands-on way through the lens of a career area or discipline that interests them. Programs would be designed to expand rather than restrict career and educational options.

This approach is already in use: it is how many of the nation's most innovative school-to-career programs are organized. These include: Career Academies in California and elsewhere that focus on single industries; Roosevelt High School's Renaissance 2000 project in Portland, Oregon, which is organized around six career pathways starting in ninth grade and has been a model for Oregon's statewide school-to-career reform strategy; Boston's ProTech, which began as a program in the health occupations and has extended to include other career pathways, such as financial services and communications and utilities; and Cambridge's Rindge School of Technical Arts, which uses a range of school- and work-based experiential learning programs to give students a focused opportunity to explore career options and develop specific technical skills.

In this model, program themes are sufficiently broad to embrace a wide range of interests among students and teachers. For example, a program organized around the health care industry could include a student newspaper, a school-based health clinic, and an arts component, as well as science labs. Students with an interest in business or computers might have opportunities to pursue these interests through exploration of management issues in the health industry. As students become clearer and more specific about their interests and career plans—even those who decide against pursuing health-related careers—program staff take the initiative to help find or create avenues for students to pursue emerging passions.

Because selection of a program of study organized around an industry theme would not be a high-stakes, life-choice affair, these programs could start in grades 9 or 10. Three-year and four-year programs of high school study—such as career academies, which create a supportive, school-within-a-school learning community in contrast to larger, more impersonal learning environments—would fit within the model proposed here. This is not to say that industry-based programs would have to start in the first two secondary grades. There are many different ways to configure high schools to provide focus and support to students. The point here is that starting early would not compromise the design of this school-to career model because program selection would not be synonymous with selecting a job-specific career pathway or postsecondary program.

(3) Work-based learning yields benefits that classroom-based education alone cannot provide and should be an integral part of the core curriculum for all students. Throughout the high school years, community and worksite learning experiences would play a pivotal role in students' intellectual and social development, complementing and strengthening the career-focused academic program. In the earlier grades, students would be exposed to workplaces through job shadowing and through employer involvement in classroom and community service projects. Substantial hands-on learning at workplaces would begin in earnest in grades eleven and twelve, as students become more mature and acclimated to leaving the classroom for workplace experiences. For programs that provide significant paid work opportunities, phasing in those opportunities in the eleventh and twelfth grades has the added benefit of lessening the obstacles posed by state and federal child labor laws.

There are several reasons why work-based learning is central to an effective school-to career system. Some have argued that classroom-based activities that are experiential and active in nature and/or simulated work environments at school can provide the same learning opportunities as direct workplace experience. We believe that some understandings are best gained in non-classroom settings, such as exposure to new technologies and to the culture of different profit and non-profit workplaces and organizations. Many of the benefits of work-based learning as an active, experiential pedagogy, can be transferred to classroom-based instruction. However, work-based learning also provides young people with four important benefits that are not easily transferable to the classroom:

- a laboratory for developing and exercising complex problem-solving skills in a setting with authentic constraints and pressures;
- reality-testing about the nature of different kinds of work settings and work roles, which casual observation of workplaces cannot provide;
- an appreciation for the growing importance of learning as a core aspect of what work is about; and
- the development of personal connections to employers, adult mentors, and career pathways.

The workplace can be a powerful environment in which to learn skills such as: diagnosing and solving non-routine problems, acquiring and analyzing data from many sources, and applying technologies to complex tasks. While these skills are generic, they cannot be learned in the abstract. Through grappling with challenging and unpredictable work assignments, students are able to learn how to apply their knowledge and skills to solve complex problems. It is well beyond the resources and expertise of high schools to reproduce on a large scale the complexities and authenticity of the work environment.

Structured work-based learning experiences—10 to 15 hours a week in various departments of a firm learning varied skills in the context of productive work—can be an important vehicle for students to try out adult roles and test their interests in actual work environments. Through exposure to different work environments and structured reflection on these experiences, young people learn more about what is involved in making informed career choices, replacing abstract and often unrealistic ideas about the future with more attainable and realistic plans. Instead of asking students to make career decisions by grade 11, school-to-career programs would use a progression of work-based learning experiences in the last two years of high school for serious career exploration.

Work-based learning provides another benefit, one which is only likely to become more important in the years to come. In today's modern workplaces, there is a growing convergence between production and learning. Learning is becoming a more integral part of work itself. Continuous improvement methods are built upon the assumption of ongoing learning: the rapid changes in technology, work organization, and product mix demand the ability to learn on the job; and the apparent increase in job instability makes it important for individuals to be able to develop new specialties quickly so they can move from one job to the next successfully. Using work for the purpose of learning can help young people appreciate and prepare for the demands of the learning-intensive workplace.[13]

Finally, worksite placements also provide students with solid connections to employment opportunities that can help them advance toward desirable careers. On-the-job activities give students an opportunity to gain practical experience in the demands and workplace norms of their potential field and to gain that valuable experience in a supportive context. Worksite placements connect young people with working adults, as colleagues and peers, providing youth development benefits currently lacking in the predominately adolescent culture of the high school. In addition, these placements can give students a route into a good first job on a career ladder, through employer contacts and references.

In order to make some form of work-based learning available to all students, communities would need to generate a broad array of work-based learning placements. These experiences would include unpaid internships and short-term paid internships in the summer, as well as more intensive paid training experiences (*e.g.*, 10 to 15 hours a week for at least one school

[13] *This advantage of work-based learning is one of the key reasons that other industrialized countries, such as France, Sweden, and Korea, are adding work-based learning to their general education and work-preparation systems, "importing" it from their traditional apprenticeship systems, and why Germany is keeping work-based learning central, even as it begins to change other aspects of its dual system.*

year) such as those provided by many existing youth apprenticeship programs. While the duration and scope of these experiences would vary, all would share features that ensure quality worksite learning. All experiences would be structured by formal learning plans and would provide students the opportunity to work on progressively more complex tasks under the guidance of worksite mentors. Worksite learning would be closely tied to school-based learning and used to reinforce and put into context a student's academic experiences. Senior year projects—designed by students in collaboration with teachers and workplace staff, emphasizing performance and demonstration of academic and technical skill development, and assessed systematically by a panel that might include employers, teachers, and fellow students—could become the focal point for the integration of learning at school and at work.

Programs developed in the last few years as part of Jobs for the Future's National Youth Apprenticeship Initiative provide some excellent models for structuring worksite learning experiences so that they are appropriate for students pursuing diverse post-high school pathways. In Boston's ProTech program and some other health-care industry apprenticeships, for instance, students spend the last year or two of high school rotating through at least three different areas of the hospital, learning skills in the context of paid training experiences. By the middle of their senior year, students are expected to firm up their career plans. Those students who opt for a technical career—such as a diagnostic-imaging technician or respiratory technician—are able to combine hospital-based training and paid work with postsecondary studies. Students who wish to work full-time or pursue less than an associate degree have access to hospital jobs such as multi-skilled patient-care technician or pharmacy technician. Students who opt for four-year degree programs in health care—such as pharmacist or physical therapist—enter these programs as seasoned health care workers familiar with the industry.

Industry-based programs of study that simultaneously prepare participants to pursue a number of different career paths are not confined to health care. Pioneering school-to-career programs of similar design are operating in financial services, communications, environmental services, education, and manufacturing industries. These programs show that it is possible to structure work-based learning experiences that allow students to acquire an impressive set of marketable skills without premature specialization or narrow training for a specific job.

(4) Separate vocational and academic tracks should be gradually replaced at the high school level with programs of study emphasizing practical education for all. All students can benefit from a pedagogy that teaches academic concepts in the context of practical applications. In the redesigned high school, technical and academic instruction—now taught in separate classes that are often physically segregated in different wings of the high school or in different buildings—would be merged. Instead of restricting practical skills training to specialized vocational workshops and classes, this training would become part of the core academic experience of all students.

High schools would be transformed into active learning environments more akin to today's modern, high-performance workplace. Students, as individuals and team members, would be expected to plan and produce projects, pose and solve problems, and present and explain their work through different media (*e.g.*, written reports and oral or video presentations).

All students would have the opportunity to develop intellectually through work on practical projects in the classroom, the community, and the workplace. For example, a project that examines the level of lead exposure faced by residents of different neighborhoods could be designed to develop academic and general work-related competencies simultaneously. Students could learn how to design and execute a scientific experiment, collect and organize demographic data, and apply statistical principles, while learning how to plan and execute a complex work assignment as a team. Older students would have more direct opportunities to combine academics with participation in complex work environments through worksite placements. Instead of a class project measuring environmental hazards, a student might have the opportunity to engage in scientific work as part of a paid traineeship in a community health center, a public health department, or a private environmental services firm.

Secondary school systems would still maintain vocational workshops, but these would no longer be reserved for multi-year occupation-specific training programs offered to small groups of students. They would instead, as advocated by Larry Rosenstock, director of the Rindge School of Technical Arts in Cambridge, "become part of the common curriculum, benefiting all students" (Rosenstock, 1991). Work on practical projects in vocational workshops would be fully integrated into the high school learning environment, providing all students a place to join hand and mind. For example, the electronics lab might be used to design and assemble integrated circuits as part of a physics or pre-engineering class.

This is exactly what is happening, for example, at Alderdice High School in Pittsburgh, where an electronics teacher and a physics teacher joined forces to create an electronics Tech Prep program that melds physics, advanced math, and electronics into a challenging course of study. The classes are not part of a vocational track but instead attract students who have a wide range of career interests and educational plans. Students who are bound for elite engineering programs study side-by-side with those pursuing technical careers, as well as students who simply want to study advanced math and science though a more practical, contextual approach.

To a significant extent, this is also the goal of the Southern Regional Education Board's (SREB) "High Schools That Work" program. This 19-state effort, involving over 100 high schools, is an attempt to upgrade the achievement of career-bound students through comprehensive "whole school" reform approaches that require all students to pursue an upgraded academic core and that arrange for academic and vocational teachers to plan and work together to integrate their curricula. Starting from a base in vocational education programs, SREB's initiative includes a commitment

to revision of the academic and vocational curricula in ways that make them more consistent in their insistence on high standards, stronger academic content across the curriculum, and integration of instruction. Over time, in SREB schools, the distinction between academic and vocational tracks could blur or even disappear.

(5) Integration of secondary and postsecondary learning environments is critical to the development of rigorous programs of career-related education. While our conception of a school-to-career system parts company with efforts to move technical training tracks down into the high school, it embraces efforts to open up the vast resources of postsecondary technical training institutions to high school students. In the redesigned high school, enrollment in postsecondary courses would figure prominently in program majors designed by students to add depth and focus to their high school education. These postsecondary institutions include not only two-year and four-year colleges, but the full array of institutions that offer advanced training for careers: skill centers, trade and technical schools, and registered apprenticeship programs.

As is proposed in Oregon's school-to-career plan, high school-age students would have access to a range of postsecondary institutions that could provide them with specialized courses of study as their career interests sharpen. For example, a student in an industry program in business services who decided to focus his or her senior project on business information systems could take college-level classes on computer programming and system design. Ideally, these classes would complement the student's worksite experiences in the computing services department of a local government agency or private firm. A student majoring in industrial and engineering systems, who wanted to become an automotive technician, could enroll full-time in an automotive technology program at a local skills center or community college by senior year.

Recognizing that young people's career plans will coalesce at different stages, the system we propose would support a range of affiliations among high school and postsecondary programs. High school programs organized around broad industry themes would connect students who decided to pursue a technical career to high-quality, postsecondary training programs that combined on-the-job training with advanced study. Students who reached this career decision early would have the option of foregoing their senior year of high school, and enrolling full-time in postsecondary technical training programs. Students who were less certain of their career plans, or who wished to pursue a four-year degree, would use postsecondary courses as upper-level electives in their program majors.

In recent years, as a result of the federally-funded Tech Prep initiative, many community colleges have collaborated with local school districts to make college-level technical classes accessible to high school students. High school designs which encourage blending of secondary and postsecondary resources (*i.e.*, middle-college models), and school and employer resources (high schools connected to corporate campuses) also fit neatly with this approach to career preparation.

The five premises advanced above are likely to raise many questions in the minds of practitioners and policymakers working to make school-to careers an effective reform initiative in this country. We answer two of the most commonly asked questions about this proposal in the following pages:

- the relationship between this proposal and existing program models; and
- how best to serve students who choose to go directly to work after leaving high school.

What is the relationship between this school-to career vision and existing program models being implemented around the country today, such as youth apprenticeship, career academies, Tech Prep, and school-based enterprises? The evolution of Jobs for the Future's views is deeply indebted to our experience with ten pioneering programs that have been part of JFF's National Youth Apprenticeship Initiative, as well as to the efforts of states we have worked with through our State School-to-Work Consortium. Youth apprenticeship programs developed in manufacturing, metalworking, and printing by the states of Maine, Pennsylvania, and Wisconsin, for example, suggest new and exciting ways to organize multi-year training programs for high-skill occupations. These innovative programs combine rigorous academic learning with a structured sequence of technical training delivered through specialized occupational courses and paid apprenticeships. Technical or community colleges often provide the specialized, occupational classes; regional vocational or technical centers sometimes provide the first year or two of a multi-year sequence of technical courses. In most of these programs, students spend two to three days a week at workplaces in structured apprenticeship training.

These programs can be excellent ways for some young people to move quickly into an up-to-date, employer-responsive, technical training program. Many are already delivering on that promise. However, one feature of these programs—their eleventh-grade start—does not fit easily with the system we envision. For pedagogical, economic, and logistical reasons highlighted earlier in this document, we believe this model can be strengthened by adaptations that make it more consonant with the realities of both high school funding and young people's career decisionmaking. The specialized nature of the training in this model, which requires a specific sequence of technical classes and highly customized school schedules to accommodate extensive worksite training, is difficult to provide at high quality for large numbers of students in the context of American school schedules and cost structures. In addition, these programs ask students to commit to a specific occupation or a closely-related family of occupations before many young people have been prepared to make such a decision.

The specialized nature of youth apprenticeship programs suggests both that postsecondary institutions be the primary providers of the technical instruction (even for students who have not yet completed their high school program) and that students enter these more occupation-specific programs in their senior year, after completing core requirements for graduation. In general, these design modifications would be easy to accommodate in the high school reform model we propose. Some programs

already introduce work-based training in a sequence of progressive intensity, beginning in the eleventh grade with a relatively modest work component of 10 to 15 hours a week and then moving to a more intensive technical training curriculum in the twelfth grade. In grade 11, the emphasis is on academic preparation and broad technical skill development; the following year, the balance shifts toward more occupation-specific technical preparation. This structure for the junior year can be blended into high school programs organized around broad career themes with little difficulty.[14]

Career academies, which feature a school-within-a-school structure and provide a three- to four-year occupationally-focused program of study for participating students, also exemplify many elements of the vision we propose (Stern, Raby and Dayton, 1992). The curriculum is frequently interdisciplinary, with students block-scheduled for many courses and instruction provided by a team of teachers who stay with students for several years. Local employers provide internships and summer jobs, adult mentors, and assistance with curriculum development and program direction. While work experience has historically been the least developed component of academy programs, many academies are now expanding and systematizing their workplace component, as well as building connections to a range of technical and other postsecondary educational institutions.

Career academies appear to be very effective in motivating under-performing students. At the same time, they also tend to serve a diverse, mixed ability group of students. Some attribute the success of this model to the family-like supportive environment and the ninth- or tenth-grade start. What we find equally attractive is the balance that career academies are able to strike between the acquisition of marketable job skills and experience and the use of an industry focus for high-quality learning and career exploration that does not force students into making definitive career choices in high school.

Tech Prep initiatives, which emphasize the integration of academic and occupational learning and a seamless transition from high school to postsecondary technical programs, also have a lot in common with the vision proposed here (Hull and Parnell, 1991). In practice, around the country, Tech Prep programs are becoming increasingly diverse in their basic elements and emphases. For example, the state of Mississippi begins its Tech Prep efforts in the middle school years. JFF's school-to-career system vision does come into creative tension with some Tech Prep models, particularly those that are 2+2 in their structure, beginning in the eleventh grade and focusing on the articulation of traditional vocational programs with specific technical training programs at the two-year college level. In our view, this formulation tends to reinforce the dichotomy between vocational and academic tracks, even while it promotes greater integration of academic and vocational learning within high school vocational programming. However, the Tech Prep movement has shown some early success in building effective partnerships among local-level institutions—including secondary schools, postsecondary technical and community colleges, and

[14] *European nations appear to be moving in a similar direction of trying to increase generic academic and occupational skill development before students enter more occupation-specific technical training.*

some employers (through industry committees). And in many communities, Tech Prep is the umbrella under which high school students are able to enroll in postsecondary technical training courses while they are still in high school, a division of labor that is both efficient and appropriate.

Another model for linking work and learning in American high schools that must be part of any viable, comprehensive school-to-career system is school-based enterprise (SBE). These organized ventures involve students in the production of goods and services for sale or use by people other than the students involved. Today, school-based enterprises exist in thousands of high schools, but they tend to be limited in scope to single classes, usually in vocational education programs. As David Stern and his colleagues argue, though, these enterprises could become a more central element of high school reform strategies that link academic and work-related learning in intensive ways (Stern *et al.*, 1994). While school-based enterprises do not necessarily provide students the kind of personal connections to community employers and their adult workers that characterize youth apprenticeship and career academy models, they offer excellent, flexible opportunities to organize productive work for educational purposes. In any community committed to using work-based learning as a lever for significant high school reform, and particularly in rural and other communities where the employer base is weak, school-based enterprises should be an important piece of a comprehensive strategy.

Doesn't this vision simply give up on vocational education's historical strength and youth apprenticeship's promise—imparting specific, marketable job skills to young people while they are still in high school?
The entry-level job has long been the endpoint of secondary vocational education; for this reason, vocational educators are hesitant to relinquish their focus on job-specific skills. They know that high school graduates face stiff competition in the job market, and that young people must compete with adult job seekers with prior work experience even for entry-level jobs. Without specific job skills, even the most trainable beginner is at a competitive disadvantage.

Yet there is no reason why some highly-desirable specific job skills cannot be taught in the course of a high school program emphasizing broader, more generic work preparation skills. This is especially true if a work-based learning component is an integral part of the high school educational program.

Many high-quality cooperative education programs around the country are able to advance students from novice status to being productive employees in a matter of weeks or months. Emerging school-to-career programs, such as Boston's ProTech and the Cornell Youth Apprenticeship Demonstration Project, provide other examples. With about ten hours of on-the-job training per week, students in these programs have quickly become competent in complex tasks such as administering an EKG to a hospital patient or recording and verifying leases and sales in the financial office of a major manufacturer. While the main goal of these worksite education programs remains broad skill development, students are able to

accumulate a portfolio of job-specific skills and, in some cases, valuable credentials, which position them well for entry-level employment.

Only about 55 out of every hundred high school entrants continue on to postsecondary education and it is unrealistic to imagine a significant change in this proportion in the short- to mid-run. Many young people will continue to opt out. For this reason, the more worksite experience and credentials young people can earn during their high school years—while still developing sufficient academic skills and credentials to pursue college if they so choose—the more and better options they will have in the labor market upon graduation.

III. Changing Roles for Postsecondary Institutions and Employers

The focus of this paper is the high school component of a school-to-career system. However, the high school is but one element of a comprehensive system, and cannot be discussed in isolation from the whole. Postsecondary institutions will ultimately need to change significantly in order to support a national school-to-career **system**. Employers, too, will have important new roles to play.[15]

Implications for the Postsecondary Education and Training System

We have argued above that most occupation-specific technical education and training—even for high school students—should be delivered by postsecondary institutions rather than high schools. There are several reasons for this position. High schools cannot afford the costs of maintaining up-to-date equipment and staff for small, specialized programs; regionalizing those costs in public two-year colleges, regional skills centers that serve young people and adults, and private institutions is a more practical option. Age and maturity are also factors. The younger the student, the more likely he or she will be to change career paths; moreover, as we have seen, participation in school-to-career programs tends to motivate many participants to aspire to four-year higher education or to a different career trajectory. Employers understand this and are more willing to invest significant specific training resources in older students who have already made a more informed, less exploratory choice of educational program. Finally, in today's world, most decent-paying careers require some kind of formal training beyond high schools, whether that be in a two-year college, an apprenticeship, or a four-year college or university. The growing complexity of technical work in this country argues for an expansion—and rationalization—of postsecondary program offerings so that young Americans are able to make choices that keep open rather than foreclose their future learning options.

JFF recognizes that this view of the appropriate locus for formal and specialized technical training implies the need for significant changes in how postsecondary learning is organized and delivered—changes that are perhaps more daunting than those proposed above for high schools. However, this proposal does not run counter to current trends in postsecondary learning. Technical training is perhaps the hottest growth area in two- and four-year postsecondary education; and community colleges have long played an important role in the provision of the related classroom component of registered apprenticeship programs (Stern *et al.*, 1995). Nor does the high school reform vision we propose depend upon a simultaneous redesign of the nation's postsecondary training system. High

[15] *In this paper, we emphasize employer calculations and concerns. At the same time, we recognize the importance of bringing the existing workforce into design and implementation discussions, either through union representation or other forums. Jobs for the Future has addressed labor involvement in school-to-career efforts in other publications (Shenon, 1992).*

school programs can be and are now being created using a career focus and structured work-based learning to prepare all students to choose among the full range of existing postsecondary work and learning options. At the same time, though, we feel it is important to understand the implications for postsecondary institutions of a more deliberate sorting out of secondary and postsecondary responsibilities and roles.

In the following pages, we raise three important implications for postsecondary institutions: the need to bring more standardization, transferability and portability into our nation's postsecondary technical training system; the need to incorporate work-based learning into postsecondary technical training programs; and the critical importance of bringing four-year colleges and universities into a supportive relationship to the changes that school-to-career efforts are making in high school curricula.

A more standardized, less Balkanized postsecondary occupational training system: It is at the postsecondary level that the American school-to-career movement (and workforce development policy more generally), has the most to gain from the innovations of European systems of vocational education. In the Swedish and Scottish systems of technical education, for example, post-compulsory technical training is organized according to a limited number of broad industry families. Individuals who want to pursue training in a given field study a general core curriculum in the relevant industry family; they then add to that one or more specialized training modules (Vickers, 1994a). Most students earn both a broad industry-based credential and qualifications in one or two specialty areas. In contrast, American postsecondary technical training is characterized by a diversity of occupation-specific, two-year associate of science degrees. By and large, these qualifications and credits cannot be transferred to four-year college programs or even to two-year programs in other technical specialties.

Modular training systems organized along the lines of a limited number of broad-banded industry or occupational families offer several advantages to students and employers over current arrangements. Unlike the existing system, which is characterized by a lack of transferability among a myriad of occupation-specific training programs, students would have the option of adding areas of specialization to a core credential, as well as applying credits earned in two-year programs toward four-year degrees. In a reconfigured education and training system, a student could move more easily from one career pathway to another if employment opportunities or personal preferences changed. The modular design would facilitate adaptation of training programs to keep pace with technological change and encourage the development of a multi-skilled, flexible workforce.

To ensure portability and transferability of postsecondary technical education credentials, postsecondary programs would need to conform to national occupational standards and credentialling systems, as they do in most European nations. At the national level, a taxonomy could be developed by the National Skill Standards Board, specifying the 15 to 25 broad industry families within which occupational standards and credentialling

systems were to be developed. Industry groups representing employers, postsecondary educators, and labor could then take the lead in setting national standards and curriculum frameworks for training programs for their industry families. At the local and regional levels, corresponding industry groups would take responsibility for the actual design and delivery of postsecondary programs to meet these standards, including provision of worksite training placements.

We recognize that reorganizing the plethora of specialized training programs into a national system based on 15 to 25 industry and occupational families would be an immense undertaking—making high school reform look comparatively simple. Developing a taxonomy that groups related industries into families based on common skill requirements is a complex technical and political task, as is the task of rationalizing the current non-system of overlapping credentialling and accreditation bodies. Consensus would need to be forged among competing industry associations, professional associations, and postsecondary educators, all of whom have some vested interest in the status quo. In addition, the career clusters of a state's school-to-career system would have to be well-integrated with its higher education industry families so that the two systems would complement each other and ultimately become one effective system.

An interesting early effort to move in this direction is currently being explored for the broadly-defined occupation of manufacturing technician. A group of employers and educators convened by Dr. Arnold Packer of Johns Hopkins University met regularly for over a year to see if they could agree on a common core of skills and materials that should be mastered in a two-year associate's degree in manufacturing. A broad consensus was reached. Efforts are now underway to develop a twenty-two module curriculum that will be tested by industry and community college partnerships in six different communities around the country (Packer, 1994).

Incorporation of work-based learning in postsecondary occupational training: Again borrowing lessons from European models, a redesigned postsecondary training system would incorporate work-based learning as an integral part of postsecondary technical and professional training programs. The benefits of incorporating work-based learning at the high school level discussed above are equally—if not more—relevant at the postsecondary level. Many of the skills that employers want most from technical and professional workers are best learned through experience, which employers can provide at their workplaces. The best professional education programs, including law, business, and medicine, already acknowledge that grappling with challenging work assignments and working in teams can afford students the chance to develop subtle reasoning and judgment skills in ways that classroom simulation can rarely duplicate.

Given the accelerating rate of technological change and the high cost of new technologies, worksite instruction is also necessary to keep training programs up to date. At workplaces, students can be exposed to the latest technologies and production techniques. Combining on-the-job and class-

room instruction also creates a more responsive and innovative system. Despite best efforts, national standards and curricula are bound to lag behind employer needs. In European systems, the close training partnership between employers and educators encourages quicker adaptation and innovation to meet new industry demands.

University admissions policies that accommodate redesigned high schools: If school-to-career programs are to obtain parental support as high-status options for all students, universities will have to be brought into the new system. It will be critically important for universities to adjust their admissions policies so as not to penalize students who have chosen school-to-career programs with significant work-based components in their high school years. As secondary schools move toward performance-based assessments, reorganize curriculum around interdisciplinary thematic areas, and award credit for educational experiences outside the school building, four-year institutions need to redefine applicant qualifications in terms of competencies rather than seat-time in specific, traditional classes. Efforts to develop articulation agreements also need to address the articulation of credits from two- to four-year institutions to facilitate transitions within the postsecondary level and encourage students to continue their education.

The University of Wisconsin (UW) system is a leader in pioneering the types of changes needed to incorporate redesigned high schools into a high-status, seamless education system. The UW system is developing a competency-based admissions policy as a supplement to its traditional freshman admissions policy. UW envisions that, within a few years, students will be admitted to its institutions based on competency attainment, not just completion of traditional Carnegie unit courses. Faculty and staff from the university, in consultation with K–12 schools and technical colleges, are developing a standardized profile of student achievement and performance that will serve as an alternative way to measure applicants' accomplishments.

Implications for Employer Participation and Investment

School-to-career systems rise or fall on the strength of employer investment and participation. Without employers willing to provide workplace learning experiences, hire some students for part-time, summer, and/or entry-level jobs, and work with school staff on issues of expectations, curriculum, and instruction, the promise of school-to-career models will go unfulfilled. Here, again, a comparison with the role of employers in European technical training systems is instructive.

In European apprenticeship systems, the goal of upper-secondary technical education, beginning at about age sixteen, is unambiguous: to prepare students for skilled craft or technical positions needed by industry. Employers and their associations justify the substantial commitment of financial and other resources by the direct benefit they feel they reap in the form of job-ready workers.

An American school-to-career system built upon the premise that students should not be tracked prematurely but should be able to maintain a range of options for work and learning after high school will inevitably have a more complex relationship with industry. The more varied and flexible the career pathways available to students in high school, the less of an immediate return for employers in terms of direct recruitment and hiring of qualified entry-level workers from the pool of participating students. If the return is perceived to be too low, employer commitment will be limited.

Can the system we have described deliver sufficient returns for employers to participate? There are several reasons to be optimistic. Participation in high school programs will still have some immediate, quantifiable rewards for employers. Through work-based learning programs, employers can raise the quality of their entry-level employee pool while lowering recruitment and screening costs. A certain percentage of students who participate in worksite training will elect to stay on as entry-level employees at sponsoring firms upon graduation from high school. Another segment will opt to pursue technical careers as apprentices in postsecondary programs, combining on-the-job training with classroom instruction and contributing significantly to employer production and productivity. If these programs are accelerated to begin in twelfth grade for interested students, employers will have a chance to train an eighteen year old in the culture and practices of that establishment and will have a highly-trained technician fully integrated into the workplace by age twenty.

Employers recognize that participating in a school-to-career program will not answer all their hiring needs, even at the entry and technician levels. And, increasingly, participating employers expect that only a segment of students who participate in a given program will enter that field immediately after high school or stay in that field for an extended period of time. The critical question firms ask themselves when they make their rough cost-benefit analysis is whether they will be able to identify and recruit **enough** students to make the effort cost-effective. How many recruiting successes they need for the program to be worthwhile will vary by industry, firm size, and the level of commitment a firm makes to a given program: for example, one human resources vice president at a New York hospital involved with a local high school in a career-focused mentoring program has stated that if even two students each year take a job at the hospital, the investment of staff time for coordination and training will have been worthwhile (Jobs for the Future, 1995a).

JFF has found through our work with a variety of school-to-career programs in different industries, communities and states that there are additional benefits to firms from their participation beyond direct recruitment of new employees. Some employers find the extra, flexible help that students provide as a valuable buffer against unexpected fluctuations in workload and staffing. In many settings, students become productive workers quite quickly, adding value for participating employers. Perhaps even more promising, participating employers report unanticipated benefits to existing workers who supervise and mentor young people. Improved management skills,

greater enjoyment of their jobs (and hence, better employee retention), and increased attention to improving their own skill development are frequently mentioned by workers and employers we have interviewed (Goldberger *et al.*, 1994).

In addition, many employers find participation in a relatively intensive, structured program attractive. The civic agenda of corporations that has fueled the proliferation of school-business partnerships in recent years has multiplied the number of superficial and low-return contacts that firms have with local schools. Replacing the bewildering number of one-shot and poorly-designed contacts between employers and schools with more focused, regular, and productive relationships can save firms valuable time and energy.

Will these and other benefits be sufficient for employers to get involved in school-to-career programs, make the investment, and stay committed over time? The evidence is contradictory. At the national level, as indicated by the recent Census Bureau survey of employers designed by the National Center on the Educational Quality of the Workforce, employers are extremely negative about young, new workers (Appelbome, 1995). At the same time, though, the experience and testimony of employers who have become involved in programs around the country is more positive: employers appear to maintain their commitment over time and even deepen it as they get to know and work with young people and as they begin to see some of the less obvious benefits of participation (Jobs for the Future, 1995b).

In the end, the final reckoning of costs and benefits by employers depends upon broader calculations than those related to any given program or group of students. A school-to-career system is more likely to be embraced by employers if they feel that it is part of an effective, modernized public/private workforce development system that can respond flexibly to their needs. If employers see signs that school-to-career efforts are leading toward that kind of a more responsive system, their cost-benefit calculus may shift.

School-to-career efforts require the creation of vigorous partnerships at the local and state levels involving employers, schools, and other institutions. They frequently involve existing intermediary organizations or create new ones that assume much of the coordination and administrative burden of participation, making employer involvement easier, more routine, and less costly. Such “connecting activities” include: recruiting employers and organizing their participation in school-to-career programs; coordinating and troubleshooting the collaboration among business, education, labor, and government partners; developing a range of work-based learning placements and matching students with employers; creating a local or regional clearinghouse where all employers post available training opportunities; and assisting students in job placement and the pursuit of further education. These efforts can greatly reduce information, coordination, screening, placement, and other costs for participating employers.

Some employers have found that these partnerships have benefits for relationship-building and inter-firm collaboration beyond their initial school-to-career-oriented functions. According to Rand Corporation economist David Finegold (1993), the more that school-to-career efforts can be linked to the region's workforce development and economic development institutions and infrastructure, the greater the benefits that might accrue to participating employers. Employers might be more likely to get and stay involved if some of these connecting activities were provided in easily-accessible ways by their industry associations or regional, employer-governed intermediaries. The Manufacturing Technology Centers, funded by the National Institute of Standards and Technology, are institutions that might be able to play a positive role, but are currently minimally involved in supporting business involvement in local and regional school-to-career systems.

Finegold argues that if school-to-career efforts were coordinated with or subsumed in broader regional alliances, jointly funded by government and industry, then employers—particularly small companies—could have access to a rich array of important services, including export marketing, technology diffusion, pooled research, and workforce development. This kind of infrastructure, with its significant employer investment and involvement, could drive local education and training institutions to be more responsive to industry's long-term needs for quality training and a quality labor pool. As in many European countries, employers would take the longer view of costs and benefits because they would feel that they had more control over the direction and programmatic offerings of key education and training institutions.

IV. Role of Standards in the Development of a School-to-Career System

No issue has generated more confusion in the nascent school-to-career movement than that of standards, their development, and use. In the final section of this paper, we discuss the school-to-career system we envision—and the respective roles of secondary and postsecondary institutions in that system—in relation to debates now underway on academic and occupational skill standards, their interrelation, and their role in both high school and workforce development reform.

The School to Work Opportunities Act implies that standards should drive the development of state and local school-to-career systems. But what standards? In some sections of the legislation, occupational skill standards are cited as essential guideposts for a national school-to-career system. In others, states are encouraged to link school-to-career standards to academic standards prescribed by Goals 2000. Some states, like Massachusetts, are pursuing a dual strategy, developing separate occupational and educational standards for high school students. Oregon, on the other hand, is trying to merge occupational and academic standards in a single qualification, the Certificate of Advanced Mastery, which certifies that the student has mastered advanced cognitive skills as well as a core body of specialized knowledge in one of six industry families.

We are strong believers in the importance of clearly articulated high expectations for what all young people should know—and easy-to-understand standards of performance that institutionalize those expectations. Our concern here is in the articulation of academic and occupational standards into a coherent system. Clarifying the respective roles of secondary and postsecondary institutions in technical training suggests a way to organize the use of occupational and academic standards in a national school-to-career system. As we have described above, school-to-career programs at the secondary level should focus primarily on broad intellectual development, with most specialized occupational training beginning either in twelfth grade or after high school. The primary educational purpose of organizing high school studies around career or industry themes is to provide a context for students to develop a broad set of academic and practical competencies. While secondary education would afford students many opportunities to learn practical job skills, skill training would be embedded in a curriculum designed to promote sophisticated and versatile thinkers and problem-solvers.

Therefore, the standards used to guide the development of school-to-career programs at the secondary-school level should emphasize broad intellectual preparation over occupation-specific training. They should describe what

all high school students, **regardless of their career or thematic major**, should know and be capable of doing upon graduating high school. In contrast, occupational and industry-specific skill standards should figure prominently in the design of postsecondary programs of professional and technical study.

Specifically, what type of educational standards should school-to-career advocates promote for the secondary level? It is easier to respond by describing the kinds of standards which should be avoided—separate academic and occupational standards at the secondary level. School-to-career efforts around the country are being designed to erase the increasingly-archaic distinction between practical and academic learning. Creating separate standards for technical and academic skills will only reinforce the artificial segregation of theory from practice.

Instead, what is needed are educational standards that promote an approach to teaching and learning in which the ideals of scholarship and craftsmanship are joined to produce versatile thinkers who can put knowledge into action. New standards should be written in ways that support a performance-based, experiential curriculum. Changes in graduation and postsecondary admissions requirements that recognize such standards and that accredit such learning is also an important aspect of a reform strategy. Fortunately, there is already significant progress in this area. A number of exciting and ambitious efforts are underway to develop performance-based standards and assessments that use practical contexts, including workplaces, to develop and demonstrate intellectually-rigorous core competencies—including efforts by Oregon and other states; the New Standards Project, directed by Marc Tucker and his colleague Lauren Resnick of the University of Pittsburgh; and, in the area of performance assessments, the Coalition of Essential Schools.

Still, moving toward a more integrated approach to what students should learn in high school and how they should learn it remains an uphill battle. For example, in response to the Goals 2000: Educate America Act, more than thirty states are in the process of developing new curriculum frameworks and standards for science and mathematics. Unfortunately, there is little connection between the curriculum framework movement and the school-to-career movement. The frameworks being developed ignore workplaces as a possible venue for mastering academic material (Vickers, 1994b). To implement the educational reforms we advocate for the high school component of school-to-career, policymakers and practitioners will need to focus much more attention on linking K–12 academic education reform strategies with the school-to-career agenda.

Where does the Certificate of Initial Mastery (CIM) fit in JFF's vision of standards for secondary education? Many argue that the CIM holds great promise as the vehicle to reshape graduation requirements to reflect the pedagogical reforms advocated in this paper (Tucker, 1994). We agree. The CIM could prove a potent lever for reform and we enthusiastically endorse the approach to testing and standards taken by CIM pioneers such as the

New Standards Project and its member states. We support the introduction of a new high school diploma based on student performance as opposed to seat-time and Carnegie units and based on the belief that all young people should be expected and helped to perform at high standards. However, our enthusiasm is tempered by reservations about the CIM as it is actually being implemented.

In some states, the CIM is being developed as an intermediate certificate that students are expected to earn by grade 10. This version of the CIM, which most students would be expected to complete by age 16, is premised on two features of European systems that we question: the end of common schooling at grade 10; and use of this credential for entry into upper-secondary technical education and college-preparatory programs.

European systems grant a lower secondary credential because that is the point at which students apply for entry into specialized programs of study. The system we advocate delays entry into specialized programs for most students until completion of high school (or at least until grade 12), so creation of an intermediate high school credential would be superfluous, imposing an unnecessary hurdle for students. We are far more enthusiastic about the strategy of states like New York and others that use the CIM (and assessments at earlier ages) as an interim readiness assessment that has no "gatekeeping" function and does not create an additional graduation requirement.

Do occupational standards have a role to play in the design of secondary school-to-career programs? Occupational standards are a critical element of a comprehensive career preparation system and should drive the design of specialized professional and technical training programs. We have argued that, in high schools, development of occupational skills should remain secondary to teaching young people to be good thinkers. But that does not reduce occupational skill development and training to window dressing. In secondary programs, occupational standards should inform the design of programs organized around career themes. It is only sensible that those aspects of an industry that are incorporated into secondary school programs reflect industry standards as they are developed. Additionally, there should be a way to accredit the specialized competencies that students acquire in career-related programs of study. This would enable students to earn advanced standing in postsecondary training programs as well as enhance their immediate prospects for high-skill employment.

Conclusion

This paper set out to reconsider the central dilemma in the design of a school-to-career system for the United States: how to balance the education and employment goals of career-oriented schooling? We have offered here a vision of school-to-career, particularly its high school component, that we feel can accommodate well the rising ambitions of adolescents who get a taste of responsibility and success and that can carry the innovations and insights of contextual, experiential learning deeper into our schools.

We realize that this proposal raises as many questions as it answers. Perhaps the most obvious question is: how realistic is it to hope for these changes in American high schools and their relationships with employers and postsecondary institutions?

We do not underestimate the difficulty of these proposed changes. We wrote this paper precisely because of our own appreciation of the challenges of designing school-to-career initiatives that are attractive to both high schools and employers. It is our view that by better aligning school-to-career with mainstream high school reform efforts and by removing the burden of providing most occupation-specific training inside high schools, implementation can be made easier and more palatable to educators while still meeting enough of the labor market needs of participating employers. Moreover, we believe that this strategy also has the potential to yield significant improvements in American high schools even if it is only partially implemented.

Ultimately, the answer to the above questions will be determined in practice, through experience and experimentation by partnerships of employers, schools, and postsecondary educational providers around the country. And it will be answered in uneven fits and starts, in incremental steps and creative "leapfrogging." We are excited by the current period of experimentation and of debate. We hope that this paper helps provoke constructive discussion and design choices among school-to-career practitioners and policymakers.

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