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ABSTRACT

The new vocationalism arising out of 1980s educational reforms caused a resurgence of interest in high school vocational education and in the integration of academic and vocational education. The dominant economic motive of the new vocationalism has found expression in the 1990s school-to-work movement. These reform efforts signal the triumph of Dewey's progressive philosophy of education. The forces that have shaped this philosophical transformation include a global economy and the changing nature of skill, work, and jobs. Both secondary and postsecondary educational systems are being challenged by these changes. Although in-company training is increasingly popular, two- and four-year institutions are better suited for the delivery of much-needed training in literacy. Infusing vocational curriculum with academic knowledge can provide the kind of flexibility desired in the modern worker. Possibilities for reconfiguring high school vocational education include the following: (1) detracking of the curriculum; (2)emphasis on standards over subject disciplines; (3) situated cognition; (4) work experience as school; and (5) community service as an important form of work. Postsecondary institutions are advised to focus on the increasing demand for combined literacy and job training, curriculum reform to respond to technological change, and the needs of new clients such as reverse transfer students and hard-to-reach populations. (Contains 141 references) (SK)

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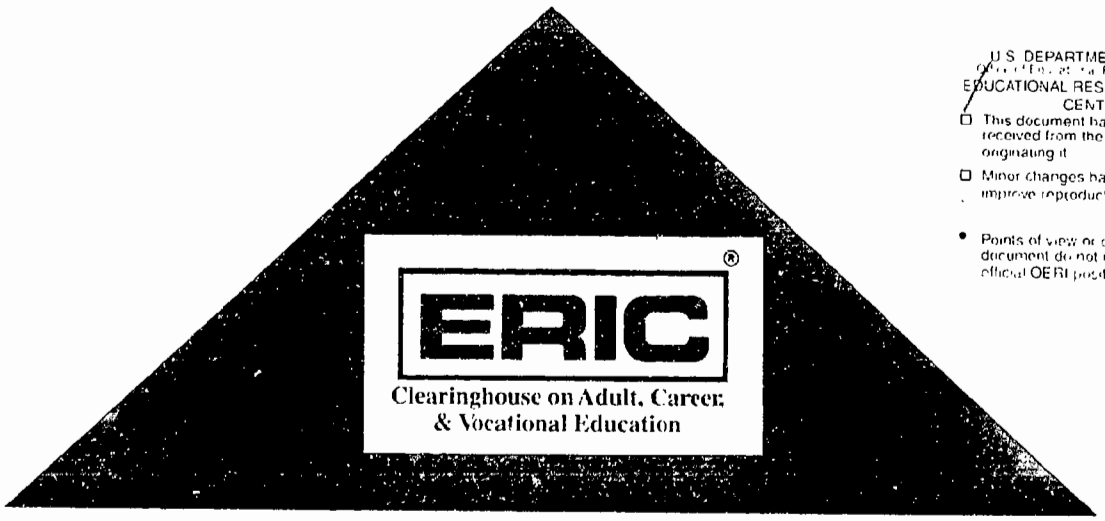

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by

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Foreword

The Educational Resources Information Center Clearinghouse on Adult, Career, and Vocational Education (ERIC/ACVE) is 1 of 16 clearinghouses in a national information system that is funded by the Office of Educational Research and Improvement (OERI), U.S. Department of Education. This paper was developed to fulfill one of the functions of the clearinghouse—interpreting the literature in the ERIC database. This paper should be of interest to vocational educators, program administrators, and policymakers.

ERIC/ACVE would like to thank Theodore Lewis, Professor, Department of Work, Community, and Family Education, University of Minnesota, for his work in the preparation of this paper. Dr. Lewis is Professor, Department of Work, Community, and Family Education, College of Education and Human Development, University of Minnesota. His involvement with vocational education included work as a secondary school technology education teacher and industrial trainer. He is President-Elect of the National Association of Industrial and Technical Teacher Educators and was Editor of the *Journal of Vocational Education Research*, 1995-1997. He currently serves on the JVER editorial board, as well as that of the *Journal of Technology Education*. He has numerous publications in national and international journals and has won several outstanding article awards. His research interests include the impact of technology on work and vocational education as general education.

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Executive Summary

The future prospects of vocational education may be discerned by reviewing the main currents in vocationalism in the United States since the 1983 publication of *A Nation at Risk*. The new vocationalism to which 1980s reform efforts gave rise caused a resurgence of interest in high school vocational education and in the integration of academic and vocational education. The dominant economic motive of the new vocationalism has found expression in the 1990s school-to-work movement. These late 20th-century reform efforts signal the triumph of Dewey's progressive philosophy of education.

The forces that have shaped this philosophical transformation include a global economy in which economic competitiveness is presumed to be linked with work force readiness, and the changing nature of skill, work, and jobs, brought about largely by the impact of technology and high-performance work organization. Both secondary and postsecondary educational systems are being challenged by these changes. Although in-company training is increasingly popular, two- and four-year institutions are better suited for the delivery of much-needed training in literacy within the functional context of technical skills. Infusing vocational curriculum with academic knowledge can provide the kind of flexibility desired in the modern worker.

Possibilities for reconfiguring high school vocational education include—

- detracking of the curriculum
- emphasis on standards over subject disciplines
- situated cognition
- work experience as school
- community service as an important form of work

Postsecondary institutions are advised to focus on—

- addressing the increasing demand for combined literacy and job training
- adjusting curricula to respond to technological change
- responding to the needs of new clients such as reverse transfer students and hard-to-reach populations

The "postmodern realities" of the coming century imply that institutions at all levels must be flexible to meet employer and public demand.

Information on the topic of this paper may be found in the ERIC database using the following descriptors: Economic Change, *Education Work Relationship, *Educational Change, Integrated Curriculum, *Job Skills, Job Training, Postsecondary Education, Role of Education, Secondary Education, Technological Advancement, *Vocational Education—and identifiers: Global Economy, High Performance Work Organizations. Asterisks indicated terms that are particularly relevant.

Background

This manuscript looks beyond the horizon of 20th century vocationalism in the United States in anticipation of what the dawn of the 21st century might bring. If we agree with Kuhn (1970) that change does not necessarily have to be evolutionary- -that it could be paradigmatic or revolutionary—then it may be that many unimaginable surprises are in store and that the most one can do as we await the dawn is offer intelligent surmises as to what it might hold. Who can predict what the workplace of the 21st century might look like? Because the future holds such secrets, and because vocational education will be ineffectual if it is not synchronous with workplace actuality, anticipating it has its perils. Still, whatever its eventual course, vocational education in the next century cannot help but be influenced by the ferment and lessons of this century. For example, who gets vocational education will remain a problematic question, as troubling in the next century as it has been in this one. Will vocational education become able to transcend class, or will it remain essentially a blue-collar enterprise?

Although many issues will endure, we should expect that there would be change. And though the nature of such change is beyond us at this point, much insight about the future can be gained from reflection upon the record, assessment of contextual factors (such as global economic competition) that have shaped vocational education policy and practice, and consideration of philosophical shifts in the field, evident as this century ends.

The basic logic of the manuscript is first to capture and characterize the momentum of vocational education, that is, the tensions, discourses, and belief systems that are the accumulated wisdom of the 20th century and that will be the raw material of the field when the new century dawns. Thus, main currents in vocationalism in the United States from 1983 (year of the publication of ***A Nation at Risk*** (National Commission on Excellence in Education 1983) to the present time are reviewed and reflected upon. Next, global competition and the changing nature of work and jobs are discussed as context. Postsecondary vocational education, inclusive of company training, is then reflected upon. Finally, vocational education in the 21st century is anticipated.

From a Nation at Risk to School to Work

For much of the 20th century, and well into its final decade, vocational education has led a peculiar existence in U.S. schools, on the periphery of curriculum, serving populations at the margins (Little and Threatt 1994; National Assessment of Vocational Education [NAVE] Independent Advisory Panel 1994; Oakes 1985). Despite its grand claim of connection with labor markets, it remained the default curriculum, reserved for those assessed to be unfit for the rigors of the high-status academic subjects, which constitute the trajectory that propels one into the good high-skill/high-wage jobs in the economy.

Even the staunchest advocate would agree that the version of vocational education that has predominated in this century—the job-specific model articulated by David Snedden and Charles Prosser that made its way into law via the Smith-Hughes and subsequent acts—had the serious shortcoming of being class based and often premised upon imperfect estimates of the abilities, talents, and likely destinations of those for whom such education was prescribed.

Vocational pedagogy *per se* was not to be faulted. In its favor, this type of education rejects the sterility of bookish, decontextualized learning, seeking instead to situate knowledge in experience. But despite its clear pedagogic attributes, the subject has yet to gain acceptance as a valid form of school knowledge. Thus, to arrive at its fundamental soundness, one has to ignore the troubling sociological difficulties that have attended it. Beyond race and class propensities, there has been the question of gender. For example, some kinds of vocational programs (e.g., mechanical and construction trades) have been the province of men, and are still viewed as "nontraditional" when pursued by women.

John Dewey (1916) was an early critic of the field, mainly on the grounds that it violated democratic tenets and that it seemed to serve the purposes of capital more than labor. In the 1970s,

neo-Marxist critics (e.g., Berg 1970; Bowles and Gintis 1976; Lazerson and Grubb 1974) raised anew the question whether vocational education was any more than a capitalist device intended to regulate the supply of labor. In the 1980s, the nature of the critique of vocational education shifted. Job-specific vocationalism came to be viewed as an anachronism even by advocates of the subject. The catalyst was the publication of ***A Nation at Risk*** (National Commission on Excellence in Education 1983), a report that showed that the school reformers were unabashedly linking regular schooling with productivity and economic competitiveness, viewing academic fitness as the means by which U.S. dominance in these spheres could be restored.

The first wave of school reformers were clear that it was *academic*, not vocational education, that was the antidote to the superiority of Japanese and German manufacturing. If this line of reasoning were allowed to stand, then vocational education's main claim to uniqueness in the curriculum would be in jeopardy. The vocationalist advocates countered by offering a revised rationale that cast the subject area in essentially liberal terms. Now the focus was on generic skills rather than specific ones. Authors of ***The Unfinished Agenda*** (National Commission on Secondary Vocational Education 1984) argued that vocational education was concerned with student development in—

> (1) personal skills and attitudes, (2) communication and computational skills and technological literacy, (3) employability skills, (4) broad and specific occupational skills and knowledge, and (5) foundations for career planning and lifelong learning. (p. 3)

Copa, Plihal, Scholl, Ernst, Rehm, and Copa (1985) proposed that the purposes of vocational education extended beyond mere preparation for jobs. The subject could also lay claim to—

> building competence, applying the basics to and from vocational education, thinking through problems, learning technical skills, exploring life roles, learning to work together, expressing self, extending self to community, and going on stage with life roles. (p. 3)

In like vein, Pratzner (1985) argued in a paper titled "The Vocational Education Paradigm: Adjustment, Replacement, or Extinction" that vocational education had to move away from entry-level skill development for specialized jobs to an approach that focused

upon autonomy, divergent thinking, and transferable skills. This 1980s push toward restatement of the nature of the field was the first movement of the new vocationalism in the United States. Because the advocacy here was in large measure politically motivated, the survival of the field being the primary concern, I have elsewhere characterized that decade as a period of retreat and inauthenticity (Lewis 1991a). I cautioned that vocational educators could not simply walk away from their traditional clientele, however problematic we found the old vocationalism to be. I was not alone here. Harry Silberman (1988) had cautioned:

> In our efforts to improve the ability of vocational education to reinforce academic skills, we must be careful not to take the heart out of our vocational programs by removing their work-related components. (p. 40)

By the end of the 1980s, first-wave school reforms had led to "a broad shift away from vocational education" (NAVE Independent Advisory Panel 1994, p. ix). Secondary vocational education enrollment was in decline.

By the beginning of the 1990s, however, the school reform movement had entered a second phase, which the NAVE authors refer to as "restructuring reform" (p. 281). Instead of academic basics, the emphasis was upon *workplace* basics. Rather than seeking to raise the academic bar for all, policymakers were now content to revert to the old stand-by of a differentiated curriculum. As usual, some would receive high-status knowledge preparing them for four-year colleges. Others, called the "neglected majority" or the "non-college bound" (Finn 1986; Parnell 1985; William T. Grant Foundation Commission on Work, Family and Citizenship 1988) would be prepared more deliberately for early entry into the labor force. Transition from school to work thus became an important policy focus.

By backing away from a high academic bar for all, second-wave school reform provided a reprieve for vocational education. Now the field could lay claim to those in the bottom half once more. The SCANS report (Secretary's Commission on Achieving Necessary Skills 1991) overtly took real workplaces as its point of departure, pointing out that what work now required was not traditional content knowledge, but "basics" that included 'rithmetic and reading, working in teams, problem solving, and facility with technology. The new vocationalism, like the old, was responding to the dictates of the employer class. Policymakers, schools, and the vocational curriculum were falling in line (Molnar 1996).

The New Vocationalism

The shift away from academic basics toward workplace basics had as a consequence a resurgence of interest in high school vocational education, interest that was magnified with the passage of the Carl Perkins Act. This optimism is captured in accounts by Gray (1991) and Rosenstock (1991). The walls between academic and vocational education were now viewed as being porous, with possibilities for curricular integration. The Perkins Act had in fact made integration of academic and vocational education (see Grubb, Davis, Lum, Plihal, and Morgaine 1991) an imperative for vocational funding, adding a crucial policy dimension to the new vocationalism. As Grubb (1996) illustrates, several models of the integration were to emerge out of this ferment. Such integration is felt to be consistent with the new culture of seamless knowledge in high-performance workplaces (Aring 1993).

These attempts to recast vocational education were not peculiarly American, having counterparts in Britain (see Lewis 1994), and elsewhere in Europe (Dronkers 1993; Howieson 1993; Young 1993a,b). In Britain, the government-funded Technical and Vocational Education Initiative of the 1980s was an attempt to shift focus away from job-specific vocationalism toward generic, transferable skills. Although these attempts were greeted with apprehension by some (e.g., authors in Holt 1987), there were those (such as Dale et al. 1990) who welcomed the new progressive possibilities in the curriculum.

As in the United States, an important subtext of the new vocationalism in Britain was the need to blur the lines between academic and vocational education (see especially conceptions in Coffey 1989; Hodkinson 1991; Hyland 1993; and Proctor 1987). This preoccupation was also evident elsewhere in Europe (Dronkers 1993; Howieson 1993; Leclerq 1994; Young, 1993a,b). Young (1993b) points to reforms in Finland, such as an integrated national board of education and consortia of schools that provide students opportunities to combine vocational and academic course taking. In Sweden he observes an increase in the proportion of general education courses taken by vocational students. Likewise, Dronkers (1993) notes that in the Netherlands the content of vocational education is becoming more general. Howieson (1993) notes that National Certificate reforms in Scotland have helped to blur the lines between academic and vocational education by rejecting specific skills and by specifying broad clusters of study.

As one compares the thought of British and other European advocates with that of U.S. new vocationalists such as Copa et al. (1985) and Beck (1991), one finds the common concern for parity of esteem between academic and vocational learning and the common view that vocational content could be interesting both in intrinsic and instrumental ways. On both sides of the Atlantic there has been the view that blurring the boundaries between liberal and vocational education makes vocational education more appealing, and more in line with the nature of contemporary work.

Sociological Considerations

Bridging the gap between academic and vocational education is more than an epistemological enterprise. The gap, indeed, is largely sociological. There is high-status knowledge and the elite or white-collar class on the one hand, and low-status knowledge and the blue-collar class on the other. Only occasionally does the discussion of vocational and academic integration admit to this. In one such case, Gray (1991) surmised that integration of academic and vocational education in U.S. schools could lead to "greater intermingling of students in both curricular streams" (p. 443). And such intermingling would "do much to end the stigma now associated with vocational education and to remedy the social isolation of vocational education students" (ibid.).

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But it is a truism that curriculum integration remains almost solely a vocationalist preoccupation. It has not been internalized in the academic mainstream. In the propaganda of the new vocationalism, adherents argue that two-year vocational and community colleges are comparable to four-year colleges (Gray 1996) where jobs in the economy are concerned. But they must know that a four-year college education would yield higher lifetime earnings. Grubb (1996) asserts that the new vocationalism offers the possibility of replacing a unitary conception of the high school curriculum with one premised on "principled heterogeneity" (p. 540). That may well be so. However, although the new vocationalism offers the promise of sociological parity in the curriculum, it is a promise that has remained unfulfilled. Curricular tracking endures.

Early in the reform movement, Finkelstein (1984) had made the observation that the most influential reformers had forgotten the first principles of American schooling. They were more willing to call attention to "economic and cultural rather than political and social dangers of academic failure" (p. 277). She wrote:

> Contemporary calls for reform reflect a retreat from historic visions of public education as an instrument of political democracy, a vehicle of social mobility, a center for the reconstruction of community life, or a kingdom of good adjustment. Rather, the educational visions of contemporary reformers evoke historic specters of public schools as crucibles in which to forge uniform Americans and disciplined industrial laborers . . . (ibid.)

The new vocationalism will not escape critique of this order while its context remains a tracked curriculum.

Reforming schools so that they are synchronous with progress is not necessarily inconsistent with democratic principles. But school reform cannot take place in a social vacuum. Poor communities are more likely than affluent ones to produce noncollege-bound students, and reform that ignores this results in the reproduction of inequality, manifested in the uneven distribution of literacy, jobs, and voice in the society (Epstein 1992; Kozol 1985; Levin 1990; Ogbu 1983; Wilson 1996). Levin (1990) asserts that, amid all of the calls for school reform, U.S. policymakers have ignored the problems of the disadvantaged. The consequence is "the emergence of a dual society with a large and poorly educated underclass . . . (and) higher costs for public services that are a response to poverty" (p. 4). These consequences are evident in Wilson's (1996) account of urban poverty.

A new wave of neo-Marxist scholars have called attention to class and gender inequities attending the new vocationalism. Drawing inspiration from Dewey, they interrogate capitalism and its tendency to view working-class children as mere cogs in the industrial machine. They call for a type of vocational education that instead empowers students, making them into critically aware and socially conscious citizens (Kincheloe 1995; Lakes 1997; Rehm 1989).

Adherents of another school have approached the problem of inequity by proposing models of curricular organization that equate vocational knowledge with other forms of knowledge (Beck 1991; Copa and Pease 1992; Silberman 1982), and by suggesting that vocational education is education for all learners, not just for special stigmatized groups. This is a compelling but elusive ideal. At the end of the century, as at the beginning, it has not had nearly the persuasive power of the dominant economic argument.

School to Work

The dominant economic motive that fuels the new vocationalism finds its clearest expression in the slogan "school-to-work" (STW). STW aims at creating clear pathways to jobs for the noncollege bound. Essentially, STW focuses upon the working class, the foot-soldiers at the frontlines of the economic competitiveness war (see Lewis, Stone, Shipley, and Madzar 1998 for a review). In an officially sanctioned analysis, Carnevale, Gainer, and Meltzer (1988) wrote of the United States' inability to sustain competitive advantage, and they proposed that the solution lay in "better skills among non-supervisory skill and craft employees" (p. 7). This "other half" of the work force constituted a chink in the economic armor. The focus had to shift away from the development of "white-collar and technical elites" (p. 7).

This blue-collar analysis is evident in ***Head to Head***, in which Thurow (1992) asserts that U.S. firms expend less on training than do Japanese and German ones. Thus, when breakthrough technologies arrive in plants, the work force cannot adapt. It is on the blue-collar, noncollege bound that economies now depend for the ready diffusion of manufacturing technologies. Concerns of the order expressed by Thurow pervade the congressional findings that provide the preamble for the STW Opportunities Act (STWOA) of 1994 (U.S. Congress 1994). The act lamented the absence of a coherent system of transition and the fact that, though many youth hold part-time jobs, there typically is not linkage between such jobs, career planning, and school-based learning.

High youth unemployment and falling earnings of high school graduates were particular aggravations noted by the STWOA. Though youth on the whole were affected, the act made clear that disadvantaged populations—students of ethnic and racial minorities were particularly vulnerable. Thus, what clearly is a socially constructed problem becomes embedded and obscured in the rhetoric of productivity and global economic competition.

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Apprenticeship on the German model has received much credence in the STW discourse. Hamilton (1993) argued that apprenticeship on the German model is eminently feasible in the United States, though one had to adapt the basic idea to a different set of traditions, institutions, and values. Disagreeing, Bailey (1993) argued that STW is particularly unlikely to improve the lot of at-risk youth, and that moreover, workplaces, hardly bastions of democracy, would set back the work of schools on the question of

inequality. Bailey also cited wrinkles in the German system, such as the problem of inequality of access to the better opportunities. Evans and Heinz (1993) concur that gender disparities in the apportioning of apprenticeships are apparent in that system. Offering a critique of a different order, Raggatt (1988) has pointed out that the German apprenticeship system favored craft skills over more modern skills.

Osterman (1980) offered a developmental explanation that challenges the soundness of STW as social policy. He theorized that, upon leaving school, youth enter the *moratorium* stage, in which exploration is a primary drive. Next follows the settling-down stage where greater seriousness is evident, characterized by less quitting. He opined that, in the circumstances, youth employment policy should focus not on 16-19 year-olds, but on those in their 20s. Disputing such analysis, Hamilton wondered rhetorically "how (then) can American teenagers' German cousins regularly make lifelong career decision and then act like adults in their jobs with no sign of developmental foreclosure?" (p. 11). In Hamilton's view, the German experience suggests that youths are capable of assuming adult roles in labor markets, once they are provided adequate education and training and are afforded good opportunity, and especially if there is deliberate connection between education and labor markets.

There is support for Hamilton's contention that the German transition system yields labor market rewards for those who receive it. Winkelmann (1996) showed that, compared to university or full-time school graduates, apprentices engaged the labor market more directly and faster. Their unemployment rate at the time of transition was lower than that of graduates from universities and vocational schools. These results held even when the apprentices switched firms, an indication that the skills they acquired were generic and portable. It is also the case that only 50-60% of German youth work in the occupations in which they were apprenticed.

A question to be resolved is just what commitment would U.S. firms have to the training of noncollege-bound youth? Will companies be willing to be social partners with the state in this enterprise? Ray and Mickelson (1993) argue that what firms would want here does not extend beyond their desire "to restructure students, especially noncollege-bound students, to be better disciplined and more highly motivated workers" (p. 1). They argue that the corporate climate of restructuring has created situations where youth see their adult kin struggling with financial difficulties, and where

even the best high school graduates cannot hold good jobs before they are 22. Noncollege-bound youth believe that as adults they will face unstable, low-paying jobs in which opportunities for advancement would be lacking and benefits might not be forthcoming. Thus, schooling and labor markets have lost credibility as fair mechanisms for distributing opportunity. Rifkin (1995) agrees with this grim assessment in *The End of Work*.

Critics and advocates of STW alike call attention to a youth labor market in the United States in which social commitment to employing recent high school graduates is low and trust in their capability absent. Stern and Nakata (1989) point out that teenage jobs vary in quality and are concentrated in low skill sectors of the economy. The jobs available offer few benefits and low levels of independence. But they note that paid work in the high school years yields positive benefits (less unemployment, higher hourly wages) that linger up to 3 years after graduation.

School-Based Enterprises

One way to orient youth to work is through workplace contrivance at school. School-based enterprises (Stern 1984; Stern, Stone, Hopkins, McMillion, and Crain 1994) offer such opportunity. These enterprises provide work simulation. Typically, students are attached to vocational programs that start small in-school businesses. Stern examined two such programs that operated restaurants within the confines of their schools and was of the opinion that the experience was educative for students. Pressure for productivity was absent, whereas intrinsically pleasing aspects of the work were highlighted. It has been found that students who participate in such programs tend to be more likely to see the connection between school and work (Stone, Stern, Hopkins, and McMillion 1990).

Reflection

As discussed, the years bounded by the publication of *A Nation at Risk* and the passage of the School-to-Work Act have been years of ferment during which purposes of vocational education have been restated and the content of the field has been reconstituted. There has been profound philosophical transformation. In these last decades of the century, the pragmatism of Snedden and Prosser has been overtaken by the progressivism of John Dewey. Rather than

pursue an isolationist path in the schools, vocational education has been reargued as a complement of the academic curriculum. Why has it taken the greater part of the century for the thought of Dewey to prevail? For that we must look to the times. From the nascent industrialism of the turn of the 20th century, we now witness postindustrialism at the turn of the 21st century. The Fordist factory model of atomized jobs on assembly lines has been superseded by the high-performance workplace, where flexible specialization, the microchip, and knowledge work are prevalent. The age of the unidimensional worker is dead. These changed conditions have provided the context for the reexamination that vocational education has undergone. They are reflected upon next.

Contextual Factors

What are the forces that have been shaping policy, discourse, and curriculum in vocational education in these waning years of the 20th century? In considering this question, two strong and related forces are proposed here: (1) a global economy in which economic competitiveness is presumed to be linked with work force readiness, and (2) the changing nature of skill, work, and jobs, wrought largely by the impact of technology and by high-performance work organization. These related forces have given urgency to the advocacy for vocational education and have altered much, including the structure of the skill delivery system and the content and focus of the curriculum.

The Global Economy

Vocational education cannot be immune from globalization currents (see discussion in Lewis 1991b). That the countries and regions of the world are interlinked and interdependent is a realization that is taken as a commonplace in the 1990s, different from the 1970s, when it took oil crises to jolt the American public into global awareness. Today, the public are more aware of the ripple effect of actions and events that take place far away. Economic crisis in countries of the Far East reduces the ability of those countries to import American goods, which in turn alters the bottom line of American exporting firms, and American multinationals operating on site. Left unchecked, Asian economic dilemmas could result in deceleration of domestic growth. The fact that the American economy is as vibrant as it has ever been this century still does not allow room for complacency by domestic planners. They know that, if these foreign economies fail, the effects of such failure would be far from localized. American stock markets would feel the ripple effects. This is the global economy at work.

The United States had emerged unchallenged as the dominant economic power after World War II, holding three-quarters of the world's invested capital (Horowitz 1965). But by 1970 there was noticeable decline in the U.S. share of world exports. Japan, Germany, and a host of Newly Industrializing Countries (such as India, Brazil, Korea, and Mexico) became competitive in manufacturing, based upon a combination of state protectionism, low wages, high

technology, and trained labor forces. As these countries asserted themselves in manufacturing, U.S. manufacturing was actually in decline, as that sector yielded to the services sector. Bluestone and Harrison (1982) deemed this trend in the economy at the time the "deindustrialization" of America, characterized by disinvestment in older plants and reinvestment in other nonmanufacturing ventures.

Magaziner and Reich (1982) wrote that U.S. monetary and fiscal policy failed in the 1970s, contending that the country's problems were "rooted in its basic ability to create wealth" (p. 30). U.S. ability to be as productive as other nations had declined, and decline in international competitiveness had fueled unemployment. To counter, they suggested that the best defense for the United States was high-skill, high-wage manufacturing, where the required skill could not be trained overnight. They contended:

> Mass production has reduced skill requirements in many countries. The development of numerical computer control has accelerated this process. Significant business segments remain, however, where short run length, special production, and complex testing, maintenance, or process engineering require skills available only in a developed country. These skills can only be acquired over a period of time in the work environment itself. Conditions in many newly industrializing countries do not permit this sort of learning. (p. 101)

This argument gave much credence to apprenticeship and on-the-job training as ways to train skills for the new economy and to the idea of flexible specialization (Piore and Sabel 1984) and lean manufacturing.

The 1980s brought on the realization that firms with global scope and attitude were more competitive than firms not so inclined. The Conference Board (Taylor 1991) reports that, by 1989, 53% of manufacturing among companies in its universe was global. The share of Conference Board firms operating in the Pacific Rim rose from 31% in 1979 to 41% in 1989, whereas the share of worldwide sales in the region increased from 12 to 16 percent in the period. The report showed that multinational firms are more profitable than domestic firms on average, outperforming them in 17 of 20 major industry groups. Of 37 Conference Board firms deemed to be outstanding on the basis of profitability, 80% were multinational, compared to 53% generally.

To focus attention upon the requirements for participation in a global economy, the U.S. government established the Competitiveness Policy Council, a 12-member advisory committee composed of representatives from business, labor, government, and the public. In its first report in 1992, the committee identified three major elements that had eroded U.S. competitiveness: "short-termism" (the propensity not to think beyond a short-term horizon), "perverse incentives" (such as tax laws that penalize savings and offer little incentive to invest), and "failure to think globally" (Organization for Economic Co-operation and Development 1996, p. 101). In its second and third reports, the council recommended that investment in upgrading the skills of the work force was a key to promoting global competitiveness. This investment would be on two fronts: education and training.

As regards training, the Council set forth the goal of creating high-performance workplaces, where workers have "a substantial role in designing work procedures and methods with high performance systems" (p. 102). They proposed improving STW systems through national youth service corps and youth apprenticeships premised on the German model. They also proposed increased training in firms through tax credits or other payroll requirements, increasing resources for the training of dislocated workers, and broadening tax deduction to cover job-related educational expenses that improve employment skills "beyond the current line of work" (p. 103).

A U.S. Department of Commerce (1994) report titled *Competing to Win in a Global Economy* highlighted trade liberalization, work force training, and investment in civilian technology. To arrive at an adaptable work force, viewed as a key to competitiveness, five principles of enhanced education and training were set forth:

- Improve the quality of initial education
- Reduce early departures from school
- Streamline the school-to-work transition
- Move from passive unemployment systems to "reemployment" systems
- Promote lifelong learning and high-performance workplaces

The report pointed out that one of the strengths of the U.S. economy in the 1990s was the ability to create jobs. But many of the jobs were low-wage, in low value-added areas of the economy. It noted:

> Indeed the primary structural labor market problem in the G-7 is a shift in relative labor demand *away from* less educated workers and those who perform routine tasks and *toward* workers with problem-solving skills.

How to create such jobs was the challenge.

The clear message from industry and policy reports then is that, to be competitive, companies must have global reach and to do so they must embrace the principles of "high-performance work organization." In such companies, quality and ability to adapt to change are at a high premium. There is increasing reliance on the "creativity, ingenuity, and problem-solving ability of their workers" (U.S. Department of Labor 1993, p. 1). Skill training is a hallmark of such companies.

But just what role skill must play in the global economy remains an unsettled question. High technology/low wage/low skill, the Asian formula, is not one that can be lightly dismissed. Macesich (1997) offers a caution along these lines as he analyzes the changing global economy and its implications for U.S. policy. He points to lean production as a consequence of globalization. Firms can organize production anywhere in the world, due to ready access to information technologies. According to Macesich, a consequence of lean production is reliance on lower-pay, less-skilled workers. If Macesich is correct, it may be that the rhetoric notwithstanding, high skill might not necessarily be a concomitant of successful companies in today's global economy.

Changing Nature of Work and Jobs

As can be gleaned from this discussion, high-performance work organization is deemed to be the ideal for competitiveness in the global economy and skill training is said to be a key component of such workplaces. At the macro-level, if we follow Bluestone and Harrison's (1982) thesis, there has been a decline in manufacturing and a corresponding rise in service jobs. The high-wage, high-skill jobs are more likely to be in the manufacturing than the services sector. In their outlook on occupations for the years 1990-2005, Silvestri and Lukasiewicz (1991) reported that the service economy provided the majority of jobs, many for workers who were poorly educated and had little skill.

Looking broadly at the growth and distribution of skills in the workplace over the period 1960-1985, Howell and Wolff (1991) found that, paradoxically, there were "high-skill and high-wage jobs in the services, but there was also, unlike the trend in the goods sector, rapid growth of low-skill, low-wage jobs" (p. 496). Cappelli (1993) examined skill requirements in production and clerical jobs over the period 1978-1988, finding significant upskilling within production job families. However, although half of the clerical jobs experienced significant upskilling, the other half had significant deskilling.

Supporting Macesich (1997), Cappelli and Rogovsky (1994) found that high-performance workplaces may demand *less* of workers than behavioral approaches (such as job design) to work organization. One reason is the impact of technology. In such workplaces, individual autonomy is low, task variety moderate, task identity low, but feedback from the work itself high. Employees' decision making occurs in a team setting. These authors argue that the most common skills in lean production are behavioral ones (such as working in teams and ability to communicate), not technical ones.

What then is the nature of work in the modern workplace? The model set forth by Frenkel, Korczynski, Donoghue, and Shire (1995) is useful here. These authors identify a trend toward "knowledge work" mediated by information technology. They construct two prototypic types of worker, a knowledge worker, high in creativity, intellective skills, and theoretical knowledge, and a routine worker who operates from contextual knowledge, low creativity, and low intellective skills. One critique that this model invites is that privilege is given automatically to theoretical knowledge over contextual knowledge. Increasingly though, skill has come to mean "soft" skills, which are associated with education. Tacit knowledge, which increasingly is being transferred to software, appears not to be as highly prized, when it resides still in people.

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Impact of Technology

Technology is at the center of a revolution in workplaces the consequences of which are that skill is being redistributed, the very nature of work is being changed, and jobs are either being transformed or made obsolete (Braverman 1974; Form 1987; McLoughlin and Clark 1994; Milkman and Pullman 1991; Rifkin 1995;

Wallace 1989). Although there is theoretical and empirical support for the view that technology leads to upskilling, improved productivity, and quality in the manufacturing sector (Cappelli 1993; Hirschhorn 1984; Howell and Wolff 1991; Zuboff 1988), the impact of technology on skill remains open to contention. The view that technology is introduced to foster the transference of skill from labor to capital still resonates and has played out in the printing industry where craft has all but disappeared (Kalleberg, Wallace, Loscocco, Leicht, and Ehm 1987; Lewis 1997b; Wallace and Kalleberg 1982).

Some point to mixed effects. For example, Cappelli (1993) found both upskilling and deskilling among clerical jobs. Milkman and Pullman (1991) found similar variation of effects in an auto plant. Keefe (1991) could find no clear trend among workers who operate numerically controlled machine tools.

Much has to do with what we mean by "skill" and what metric we employ to measure it. Skill can mean *substantive complexity*—that is, the degree of mental, interpersonal tasks in a job, or it can mean *autonomy-control*—the amount of discretion a worker can exercise (Spenner 1985). But some suggest that skill is a socially constructed concept (Attewell 1990; Darrah 1994). This latter view becomes especially evident when skill is taken to mean education.

Skills Employers Want

The frontier of the definition of skill is occupied by employers. In one study, the skill employers said they prized most was a good work ethic (Commission on the Skills of the American Workforce 1990). Carnevale, Gainer, and Meltzer (1988) set forth a taxonomy of workplace basics—skills employers want. Included were learning to learn, problem solving, communication, the three Rs, and interpersonal skills. The SCANS (1991) authors echoed these themes in setting forth the skills they felt workplaces to require of schools. Employers needed workers who possessed competencies in five realms: resources, interpersonal, information, systems, and technology.

> "There seems to be no place in these formulations for the kinds of technical skill that are normally associated with vocational education."

There seems to be no place in these formulations for the kinds of technical skill that are normally associated with vocational education, skills such as wiring an electric circuit, running a bead in welding, or machining a shaft to a fine tolerance. This is a serious shortcoming of the discourse on skill. But it is the kind of

conception that has forced reconceptualization of vocational education in the past 2 decades. Skill is valued in proportion to its abstract content.

Literacy

Increasingly, the metaphor for skill has become literacy, though often the view of literacy here is constricted. Literacy and productivity are felt to be intertwined. An Organization for Economic Cooperation and Development (OECD 1992) study indicated that "the new emphasis on skills as a major force in competitiveness has played a major role in propelling the issue of literacy to the fore of the policy debate" (p. 14). The report spoke of widespread illiteracy in advanced countries, permeating into the adult work force.

OECD countries have settled on defining literacy in terms of prose, document, and quantitative dimensions. A study on the literacy profile of adult populations in these countries (OECD 1995) dwelled upon the demand for literacy in occupations in a global economy:

> The emerging information economy changes both the expectations and demands on the population. In this new context information is abundant. Those lacking the skills and knowledge to access, organize and use this information in novel ways are at a disadvantage. More than ever, people need literacy and analytic skills to search for and select the information they need, and to put it in perspective. A literate and educated population is the key to unlocking the benefits of globalization. (p. 23)

In the United States, policymakers, employers, and analysts have also associated work force literacy with competitiveness. Kirsch, Jungeblut, Jenkins, and Kolstad (1993) reported that up to 90 million adult Americans perform at low levels of prose document and quantitative proficiency. They found that adults who performed at these levels were especially prone to being unemployed. Thurow (1992) argues that, in the coming economic battle, "if the bottom 50% cannot learn what must be learned, new high-tech processes cannot be employed" (p. 52). Carnevale et al. (1988) concur that the "trained half" of the U.S. work force are well prepared but that the other half is not, and this is where the competitive race is lost.

Workplace Literacy

When the problem of illiteracy is addressed in conjunction with actual work, that enterprise is referred to as workplace literacy. Programs attempt to teach literacy skills in the context of jobs—deemed to be *functional context* training (Sticht and Hickey 1991; Sticht and Mikulecky 1984; U.S. Department of Education 1992). Functional context theory provides the basic motif of workplace literacy programs (see, for example, Cornell 1988; Gowen 1992; Hull 1993; Jones 1994; Lewis and Griggs 1995; and Philippi 1988). Programs begin with "literacy audits" and the curriculum emerges from actual workplace activities such as the reading of menus, notices, or labels.

One problem with the functional context approach is whether literacy skills learned in particular contexts can be transferred beyond such contexts. Compelling arguments as well as evaluative evidence have been offered against this proposition (Barton and Kirsch 1990; Mikulecky and Lloyd 1992).

Beyond the issue of transfer, workplace literacy programs have drawn sharp social critique (Gowen 1992; Kazemek 1991; Lewis 1997a; Sarmiento 1991; Sarmiento and Kay 1990). These authors contend that workplace literacy is limiting, essentially arguing that literacy must break free from particularistic bounds. But this is not to say that such programs are inherently problematic. Literacy acquired in context is probably a superior form of learning to decontextualized forms of literacy (Lave and Wenger 1991). For example, Hollenbeck (1993) found improvement in communication, work attitudes, mathematics, morale, and self-confidence as outcomes from such programs.

Do vocational institutions have any particular advantage in offering workplace literacy programs? When such institutions collaborate with workplaces and when they have faculty who are adult literacy experts, they could be effective deliverers of such training (Lewis and Griggs 1995).

Reflection

This section of the manuscript has focused upon the context of vocational education policy and practice in the last 2 decades. Thus, the global economy and the changing nature of work, jobs, and skills were examined. The increasing importance of investment

in work force training to high-performance organizations, and to competitiveness, was discussed. Contentions surrounding the interrelation of technology and skill were reviewed. The high premium being placed upon knowledge work was discussed, as was the increasing tendency to view literacy as a measure of skill.

It was this interplay of global economic competition, high-performance workplaces, technology, literacy, and skill that fueled the school reform movement of the 1980s (see a discussion in Johnston 1993). And it was out of this reform movement that the new vocationalism had emerged. Although the focus of the new vocationalism was largely upon the high school curriculum, key aspects of it called for structured transitions from school to work life. This meant that vocational education and training beyond the high school had to be anticipated, and forward linkages to careers had to be created.

Beyond the high school lie postsecondary systems of vocational education and training. Because of their closer proximity to actual jobs, the content and processes of their curricula must be accordingly shaped. The curriculum has to respond directly to economic needs. In the new climate of global economic competition and the changing nature of skill, these postsecondary systems have had, on their part, to become interested in establishing linkages backward to schools. For example, they must now address the issue of work force literacy more deliberately. They must teach reading skills. In doing so, they have to look back upon and seek to collaborate or to align their offerings with the work of schools. In the next section, issues and challenges attending postsecondary vocational education and training systems are discussed.

Postsecondary Vocational Education and Training

Although the high school remains an important system for the purveyance of vocational knowledge and skills, postsecondary institutions are better suited for work force training because such training takes place closer to use. Secondary vocational enrollment has declined in recent years, whereas postsecondary enrollment has risen (NAVE Independent Advisory Panel 1994).

Postsecondary vocational education and training may be viewed in terms of formal and nonformal systems (technical/vocational colleges and community colleges on the one hand and workplaces on the other). The Committee on Post-Secondary Education and Training for the Workplace (Hansen 1994) examined postsecondary vocational systems, finding that four kinds of work-related training are observable: qualifying or initial training, skills improvement or upgrading training, retraining (displaced workers), and second-chance training—basic education and job skills. The committee found that these forms of training are offered in patchwork fashion. "Postsecondary training in the United States is not coherent, readily accessible, closely connected to the world of work, with clearly visible and positive effects on those trained, and of acceptable and measurable quality" (p. 3). This perceived lack of coherence among these systems has become cause for alarm, given their importance to the competitiveness thrust.

> "The fact that there is not coherence among them is not necessarily an indictment of postsecondary vocational systems."

But the fact that there is not coherence among them is not necessarily an indictment of postsecondary vocational systems. The types of training they offer are in their own right indispensable. Each could claim comparative advantage. For example, community colleges specialize in at-risk/second-chance populations. Two-year technical-vocational colleges offer expert technical staffs. Although there might conceivably be some advantage to coordination among

them, more crucial is the need for fluidity between them and four-year colleges. Further, it is crucial that training be available to citizens on demand and that a high premium be placed upon responsiveness and customization within individual systems. The forces of competition, quality, supply, demand, and price can take care of inefficiencies where they exist.

Company Training

Firms have always been important arenas for training, since formal vocational institutions often cannot provide the needed degree of fidelity with workplace equipment. This becomes the case more so, with changing technology. Informal training is probably the most prevalent, and most costly to companies. But within the last 2 decades, U.S. firms have stepped up formal training, and there is evidence that such training enhances labor productivity (Bartel 1994).

Poorly schooled workers are a commonly cited reason for productivity setbacks in firms (Benton, Bailey, Noyelle, and Stanbach 1991; Eurich 1991; Gordon, Ponticell, and Morgan 1991). However, only a small percentage of company training tends to be in the area of literacy. This is a sphere of training for which there has been federal support, through the National Workplace Literacy Program, but firms may be reluctant to venture here, since they do not have expertise here. Further, they can compensate for low levels of literacy by introducing technology (such as robots on production lines, or cash registers that compute change).

A major impetus for training in companies is its linkage with high-performance organization (U.S. Department of Labor 1993). Such training includes teamwork, job rotation, problem-solving groups etc. Examining the relationship between high performance work organization and training, Osterman (1994) concluded that concomitants of such workplaces include high-skill technology, a market with international competition, extensive training, and efforts to increase the commitment of workers. About 35% of private sector firms have employed high-performance work organization and flexible work practices. In a subsequent work, Osterman (1995) confirmed that high-performance systems were indeed associated positively with training effort, but that blue-collar workers receive less than professional and technical workers.

Veum (1995) used the National Longitudinal Study of Youth 1986-1990 to examine the impact of training on wages. He found

that the incidence of training positively influenced wages. The type of training received most was company training (18%). Those who received such training spent 134 hours on average in programs. Again, the evidence was that firms tend to provide training more frequently to the highly educated and those with greater experience. Interestingly, this study showed that participation in postsecondary vocational education was related to wage improvements over time, supporting the case for pursuit and completion of such programs.

Despite the upsurge in training in the U.S. firms, it is believed that they lag behind their European and Japanese counterparts in such investment. Macduffie and Kochan (1995) found support for this in a study set in the auto industry. Training did not correlate with investments in high technology; instead, what gave impetus to training was "the production strategy employed by the organization and some characteristics of the national environment of the parent firm" (p. 164). Their view was that policymakers should seek to enhance the demand for high skill by offering inducements to firms to move to flexible production. Further, policymakers could help by ensuring that schools graduate students who are competent in basic literacy skills.

Firms are important sites of training, more so when the content is specific to them and not transferable to competitors. Work processes, company policies, team-building, company-specific software, and job rotation are examples of training that is best done within companies. It is also better for workers if they are trained on the job, on the same equipment as in the job itself. Firms are also important apprenticeship and internship sites, and here they can be partners with formal institutions such as community and technical colleges, adding realism and context to the curriculum. But there are limitations to company training. For example, firms are not well suited for delivery of certain types of technical skills. Nor are they particularly suited to delivery of literacy training, for which they would have little comparative advantage, relative to formal institutions.

Vocational and Community Colleges

Formal two-year institutions play an important role in providing all of the types of training identified by the Committee on Post-Secondary Education and Training for the Workplace (Hansen 1994). They are important complements to firms. Their role is well

documented in the NAVE report. These institutions are expanding their scope in important ways such as dealing with literacy issues by offering remedial programs and collaborating with firms to provide customized training (Bragg and Jacobs 1993; Cantor 1995; Lewis and Griggs 1995; Naughton 1993; Sayers 1995). Sayers (1995) points out that community colleges have historically been a main provider of basic literacy programs. In the five company cases he examined, there was corporate interest in workplace-specific curricula. Naughton (1993) speaks of an integrated model in which basic literacy and numeracy skills are merged into the vocational curriculum. Vocational institutions could show comparative advantage here by teaching literacy in the functional contexts of technical skills such as welding, carpentry, etc. Collaboration between such institutions, companies, and unions can produce curricula that redound to the benefit of workers as well as workplaces (Cantor 1995; Lewis and Griggs 1995).

If the scope of the new vocationalism is expanded to include postsecondary education, context could thereby be found for a discussion of literacy. Bragg, Reder, and Thomas (1997) and the Illinois Task Force on Academic/Occupational Integration (1997) take such an approach in charting a course for the Illinois community college system. They situate the curriculum within the framework of academic and vocational integration, suggesting that academics should play much more of a role in occupational curricula than in the past. Their reason for integration is that "it affords the opportunity to prepare a more sophisticated and competitive work force for the United States" (p. 3). In her study of academic and vocational integration in the Wisconsin Technical College System, Brewer (1995) likewise concludes that such integration provides the key to the relevance of these colleges as providers of worker education and training for the new workplace.

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Work, workplaces, and skill have changed; thus, the postsecondary vocational curriculum must accordingly change. And such change must give high priority to knowledge and literacy.

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The message from the postsecondary systems in these two states is that the basic principles of the new vocationalism apply to this level as well. Work, workplaces, and skill have changed; thus, the postsecondary vocational curriculum must accordingly change (see Caillods 1994 for a discussion on the convergence of systems). And such change must give high priority to knowledge and literacy.

Reflection

This section focused upon postsecondary vocational systems. Issues and trends relating to company training and training in formal

institutions such as community colleges and technical/vocational colleges were reviewed. It was argued that individual postsecondary systems had their own niches and could thus claim comparative advantage. It was shown further that the new vocationalism had made inroads at this level as well. The vocational curriculum at this level also had to be infused with academic knowledge, to provide the kind of flexibility desired of the modern worker.

Having reviewed vocational education in contexts inclusive of the high school, firms, and postsecondary formal institutions (such as community colleges, and two-year technical/vocational colleges), it is left now to imagine how the momentum engendered by these systems will take effect in the new century. The final section of the paper ventures in this direction.

Toward the 21st Century

It has been suggested here that the nature of vocational education in the final 2 decades of this century has been shaped by global economic competition, technology and a changing workplace in which high-performance work organization and lean production are the marks of competitiveness. Decontextualized skills such as problem solving and teamwork are at a high premium in this new workplace. Contextualized technical skills, in domains such as mechanics, electronics, health, and construction, are not privileged.

But this is deceptive. Skill in problem solving, communicating, or working in teams cannot alone lead to the construction of buildings, the making of tools, the maintenance of airplanes, or the precision casting of engine blocks. These are skills upon which important construction and manufacturing industries depend and which vocational institutions deliver. Examining the perceptions of recent technical-college graduates regarding aspects of the curriculum that were relevant to their jobs, Carlson (1997) found that technical skills outpaced other skills. The factor "technical competence" explained 60.6% of variance. Included were such skills as using information to perform tasks, learning new technologies, troubleshooting on the job, learning new job tasks, and setting up jobs. Interpersonal and communication skills were also important, but explained substantially less variance.

Thus, an unfortunate aspect of the rhetoric of skill when it is associated with global competition and high-performance work organization is that it tends to deemphasize hands-on, blue-collar competence, thereby diminishing the worth of such work and the value of working people. There is need in the discourse on skill to include the voices of blue-collar workers. We need to hear from and about electricians, nurses, machinists, foundry-persons, secretaries, welders, and tool and die makers. It is heartening that there is evidence that the possession of vocational training improves wages. Vocational institutions contribute significantly to the economy by specializing in the delivery of skills needed by the working classes.

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What do the fates hold for vocational education into the next century? An underlying assumption is that what transpires then does not have to be of deterministic character, meaning that we can intervene. What the new century would bring forth should depend not just upon the inevitable march of progress, but upon some sense of idealism that views vocational education ultimately as education of people. In looking ahead, we may focus on—

- possibilities for reconfiguring high school vocational education,
- challenges for two-year vocational institutions, and
- increasing need for *on-the-job* training.

Possibilities for the High School

There are possibilities in the next century for the continued transformation of high school vocational education, leading ultimately to the ***detracking of the curriculum***. This opportunity should emanate from a deliberate kind of idealism—from a grand, Deweyan view of schooling. But it is the pragmatics of the times that seem to make it feasible now (see proposals along these lines in Lewis, in press). As the needs of employers come increasingly to be the dominant consideration of school curricula, *all* of schooling takes on instrumental character and all students could come to have a common core of knowledge that would have integrity in its own right and that coincidentally will possess workplace relevance.

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If the curriculum takes as its starting point the question "what knowledge and competencies should all students possess as minimum at the point of graduating from high school?" and if vocational knowledge can be viewed as valid knowledge in its own right, then labels such as "vocational" and "academic" would become immaterial. This blurring of curricular lines could become increasingly the case as states begin to adopt standards and outcomes for students as high school graduation requirements. In the state of Minnesota, for example, the new proposed graduation standards remove knowledge from the grasp of particular disciplines. What the state sets are standards. *Schools* decide what vehicle would best help students achieve particular standards. A subject called mathematics does not necessarily have monopoly on its teaching. Thus, the *inquiry* standard can be met as well in a technology education product-development class, as in a history class. Technical writing could be met in a machine shop class or in an English class. The ***emphasis on standards over subject disciplines*** allows the possibility for teachers to collaborate, thus blurring boundaries. Standards can be met in school or out.

A second area of possibility in the high school is the continuing force of the idea of ***situated cognition*** (Lave and Wenger 1991; Resnick 1987). I believe that this idea will continue to gather momentum in the years ahead and that, as it does, vocational education will come into its own in the high school, as a vehicle for the inculcation of ideas across the whole curriculum. Beck (1991) was anticipating this when he explored the curricular possibilities that domains such as business and marketing education, agricultural education, and home economics education presented. Vocational subjects can make otherwise difficult subjects reachable to students. The learning task of writing a job application letter is made more authentic in a class that indeed has jobs for which one must apply—say a construction project. Many aspects of mathematics are better understood in the context of electrical circuitry, in a machine shop class, or in a fluid power class. Many differential calculus problems can find practical example in electronics, fluids, or machining.

A third general and often overlooked possibility is that ***vocational classes can teach students about the world beyond school.*** For example, students in a building construction class that actually builds a house from start to finish can learn about hiring, safety, the minimum wage, borrowing money, the role of unions, project management, or working in a team. There are opportunities for estimating cost, managing money and conducting transactions with adult members of the community (such as bankers, city council members, etc.).

A fourth area for the high school curriculum that transcends tracks is ***work experience.*** Here I am not speaking necessarily about school-to-work, but rather of ***work as schooling.*** As many students as possible should have actual supervised and structured work experience. This work could be economic work or service work. A student could work in a manufacturing plant or volunteer in a homeless shelter. Here work is shown as life.

A fifth area, intersecting with the fourth, includes the possibilities for high school vocational education in the area of ***service learning*** (see Schine 1997 for a set of readings). In its essence, service learning assumes that the community setting offers possibilities for learning. Students learn through experience, as they give of their time and talent. But ***service to the community is an important form of work.*** It is an important dimension of Dewey's (1916) vocationalism. Thus, participating in a project where volunteers build low-cost houses for those who need them, can be a way in which

students learn work through service—work that would be ennobling for all.

Challenges for Postsecondary Vocational Institutions

Much of the drama of vocationalism in the next century will be played out in postsecondary institutions (two-year community and vocational/technical colleges). Areas that would be of particular interest include the *coping with increasing demand for combined literacy and job training* as underprepared workers seek to compensate for earlier deficiencies in their education; *adjusting curricula to deal with technological change*; and *adjusting to the needs of reverse transfer students*.

Need for Combined Literacy and Job Skills

In the next century, as at the end of this one, many adults already in the work force, or wishing to enter therein, will find themselves lacking literacy skills. For these adults, one of the best possibilities is to acquire the needed skills in the context of, or in proximity to, technical curricula, provided that these institutions are staffed to attend to matters of literacy. Community colleges have excellent prospects here, because they have a tradition of open enrollment and remedial coursework. Now that such institutions have ventured more deeply into stand-alone vocational programming, they stand poised to be able to offer literacy and technical training in synthesis. Adult workers will be more highly motivated to participate in literacy in a technical context, and probably will show greater staying power in such programs.

Two-year vocational and technical colleges also have good prospects in this area and have shown that, where they have had a tradition of offering adult basic education programming as part of regular fare and when they have competence in offering customized training, they can, with some justification, claim comparative advantage in helping workers improve their reading and basic math skills (see cases in Lewis and Griggs 1995). There are implications here for the staffing of these institutions. *It is conceivable that all such institutions would be staffed with literacy specialists*, who have ability to work cooperatively with technical subject matter experts.

Responding to Technological Change

In the next century, two-year vocational institutions will be called upon often to assist both their corporate and individual customers in responding to technological change. They will have to become nimble, ready to conduct training on site or back at the college. But technological change is going to present dilemmas for these institutions, in terms of what such change implies for traditional craft skills and in terms of the difficulty of knowing what should constitute the training curriculum when change occurs so rapidly.

Some of these tensions were seen first hand in a study of the impact of technological change in the printing industry (Lewis 1997b). Through advisory committees, the companies were pushing the college in question toward the eradication of courses that taught conventional page layout skills. These are skills in which one became expert only after long apprenticeship. Now they could be performed electronically by novice workers. Given this state of affairs, was there merit in teaching at the level of craft origins, or should the college capitulate completely by throwing out the old curriculum and facilities and replacing them with the computers and new software?

Traditional expert craftspersons in the trade who had been converted to electronic stripping were clear that their empirical understanding of the process helped their symbolic understanding greatly. But invariably, colleges capitulate, out of fear that they would be perceived to be irrelevant, thus losing credibility with their corporate clients. Of course, what is needed here is a broadening of the clientele from whom colleges seek advice. ***Advisory committees should include citizens, and unions, who have a different view of needs than companies***. For example, in the printing industry case referred to earlier, some representatives of advisory committees wanted the curriculum to focus on a narrow band of software. Others wanted broader, more comprehensive training. Which of these approaches is better for citizens? That question often does not get answered, but should in the years ahead.

Two-year vocational institutions will often not possess the latest equipment, and their instructors likewise will fall behind in knowledge and skill. The solution here will have to include collaboration between colleges and workplaces. ***Increasingly, colleges will have to resort to adjunct faculty direct from industry***. Further, they will have to include internships as part of their curricular offerings, and

as a way to bring students in proximity with equipment. Collaboration and internships will also have to be the way in which vocational faculty can become retrained and upgraded.

New Clients

Postsecondary vocational institutions will have to be flexible enough to respond to new classes of clients in the next century. New corporate clients can be envisaged, as firms seek out the services of technical colleges or community colleges as partners in the provision of training or education to their employees. Institutions should expect to see their own graduates return repeatedly, as the pace of technology quickens in the workplace. But among the new clients, two groups are particularly intriguing and would demand special attention: reverse transfer students and hard-to-reach students. The latter of these two groups would severely challenge the more traditional institutions.

"Among the new clients, two groups are particularly intriguing and would demand special attention: reverse transfer students and hard-to-reach students."

Reverse Transfer Students. The reverse transfer student is one of the more intriguing and perhaps surprising new clients of two-year vocational institutions. These are students who have either completed or dropped out of four-year college and have decided to pursue vocational programs at two-year vocational/technical colleges. They are being seen more often now, and clearly will in the years ahead be a primary client group for these institutions. In a study of reverse transfer students in Minnesota, Halvorson (1997) found that these students were different from more typical students not just in terms of level of education. They had more resources and tended to have a different course-taking pattern (gravitating to technician-type programs). Pursuit of the technical college course significantly increased their rate of employment after graduation. Although half wished to complete a diploma, the other half did not. Technology change was a prime reason for their decision to attend a two-year technical college. The college degree did not provide them with the specific competencies that new exciting jobs in the economy seemed to demand. They wanted jobs in such domains as graphic design, computer-assisted machining, landscape horticulture, telecommuting technology, and computer networking.

The return of degreed adults to two-year vocational colleges would seem like vindication for those who pragmatically advocate non-college-bound curricula. But that would be a hasty judgment. Halvorson's study suggests that these students had flexibility. They were now adults, and they had *chosen* to attend vocational college *on their own*; they were not tracked there by a guidance counselor

who had thus estimated their talent. That makes quite a difference. Subjects in Halvorson's study were for the most part already enjoying a middle-class existence. Most did not wish to be uprooted. They wished, rather, simply to enhance their job status. Getting a four-year degree and topping up one's education with vocational training is unconventional now. But this trend could become commonplace in the next century. The numbers of students willing to think unconventionally like this can be expected to grow in the future. Vocational institutions have to ready themselves for such students. As one wit has suggested, tongue only partially in cheek, the two-year postsecondary vocational institution has become the new graduate school of our times.

Hard-to-Reach Students. With the dismantling of the welfare system, it will become imperative that methods be found to ready for work those who would otherwise be on welfare rolls. These clients will come primarily from urban communities. They will tend disproportionately to be racial and ethnic minorities, immigrants, and in many instances, non-English speakers. Two-year institutions, particularly community colleges, have traditionally been responsive to these clients, but not totally. Community-based organizations (CBOs) such as the Twin Cities Opportunities Industrialization Center (TCOIC) (Lewis and Griggs 1995) have had good success with them and provide excellent models of the kinds of strategies that work with these hard-to-reach populations. For example, the TCOIC training facility is located strategically within the community. It connects with the various subgroups through community leaders, community newsletters, community radio, and so on. An interpreting service is provided on site. Training is provided in a mixture of literacy skills and technical skills. Training is flexible and can be interrupted midstream if a client finds a job, with no loss of momentum when that client returns in the future. There is much that an institution like this can teach the more mainstream two-year institutions regarding the strategies for dealing with these client groups.

But CBOs and other two-year institutions can hope to offer only palliatives when they try to cater to those that are hard to reach. They cannot cure the problem that pushes the underclass to the welfare rolls. What these clients need most is education, not training. Education has the best chance of getting them out of the bottom half. Vocational education institutions, whether mainstream or CBOs, cannot solve the problem of inequality in the society. By themselves they are likely only to help reproduce inequality.

Increase of On-the-Job Training

As discussed earlier, much vocational training at the postsecondary level is company sponsored, taking place either on the shop floor, at the facilities of equipment suppliers, in company classrooms, or in off-site classrooms. Training of this order will become ever more important, because it could be coterminous with the work itself. In the printing industry case referred to earlier (Lewis 1997b), the companies were substantially ahead of most of the vocational colleges in the state in terms of computerized processes. Most of these colleges were scrambling to catch up. Thus, retraining on computers for the most part was done on site, often on real jobs, under the supervision of someone charged with the responsibility to train. In some instances, the trainer was an expert brought in just for that purpose.

Increasingly, companies may wish to integrate work with training. And they would be seeking out ways to do this that will minimize stoppages or slow down production. Training delivered just in time, on site, will have greater appeal than other types. There are serious implications and challenges here for vocational institutions. They will have to decide if they are nimble enough to deliver training at the time and place where it is needed by corporations and individuals. One way to connect with workplaces just-in-time would be through online training—through the Internet or other technology. Workers need to have information available at precisely the time they wish to use it.

Postscript

Carnoy (1994) counsels that "to be effective VET has to be flexible and tied to actual not future labour market conditions" (p. 239). This is wise advice, not just to developing countries, the audience to which such cautions with respect to training systems are usually addressed, but to advanced countries such as the United States as well. What does flexibility mean, in this context, and how can it be operationalized? At the high school level, it should mean that students are not made to commit to particular careers before they are vocationally mature enough to do so. Instead, they should be exposed to a curriculum that is designed to inculcate *vocational literacy* (Lewis 1997c). At the postsecondary level, in institutions such as technical colleges and community colleges, flexibility must mean curricula that prepare people for a range of jobs, within a job family. Within the construction field for example, graduates could learn not just brick laying, but carpentry and plumbing. They thus become multiskilled. Flexibility at this level also means a curriculum that includes actual work-site internships, and the employment of expert workers as part-time instructors.

Ultimately, it is not systems that must be flexible but people. Flexibility means having the wherewithal to make choices in the labor market. Those who are better educated will have more and better choices. Thus, vocational education systems that are premised on sound early education in kindergarten, elementary school, and secondary school would probably engender greater flexibility than those that make compromises and that internalize the ideology that society and school cohorts will divide into halves anyway.

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In the next century, vocational education would have arrived at its fullest height, when credits earned in two-year institutions are transferable to and are accepted in four-year colleges. As we look back on education for work in the 20th century, we find that institutions specialized in accordance with an occupational hierarchy. Four-year colleges specialized in white-collar, knowledge workers, whereas two-year post-secondary institutions specialized in blue-collar, technical workers. That model was consistent with Fordist production, in which workplaces were organized along hierarchical lines. But in the 21st century, we must deal with postmodern realities. With flatter organizations, workers will no longer be polarized, into blue- and white-collar enclaves. They will belong to teams,

irrespective of occupational rank. They will have access to the same shop floor computers, and the same pool of information. All work will be knowledge work. Machinists would need access to information, as would engineers.

If work itself would require an egalitarian approach to shop floor organization, what would be the justification for training workers in separate institutions? The fluidity that already has begun to characterize workplaces as this century ends will become a model for education and training systems. Thus, in the new century, we can expect that there will be a trend toward merged systems of higher education, in which there would be articulation between two-year and four-year systems. The recently merged system of higher education in the state of Minnesota would be worth monitoring. Here, community colleges and technical colleges articulate their offerings with four-year state colleges. Once the commitment is found to articulate two-year systems with four-year ones, much of the status difficulties that now attend vocational education will begin to erode. There will be no need to imagine school curricula in terms of college and noncollege bound.

Under the old model, we would expect movement between systems to be in one direction only, that is, from the two-year to the four-year. But in the future that traffic will increasingly be two way, once vestibules are established between these systems. Engineers may need course work in welding, just as welders might need course work in metallurgy. Clients could go back and forth through these vestibules as they desire. We could see this sort of system flexibility in the new century, by corporate and public demand.

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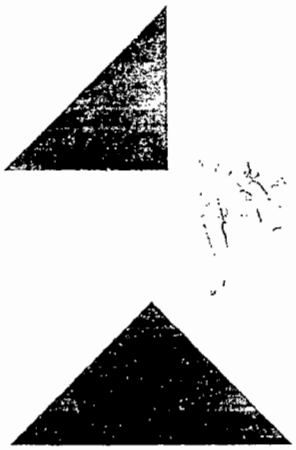

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