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ABSTRACT

Although objectively measurable achievement of outcomes is an important guide to the quality of education, the process of defining and assuring the quality of technical education and training must include consideration for the context in which technical education and training occurs. It is also critical to remember that education has two sets of clients--students and employers. The following are among 10 policy recommendations that the National Center for Occupational Education has issued regarding defining and evaluating the quality of technical education: (1) view secondary and postsecondary technical as two distinct, related, but consecutive enterprises requiring distinct but related public policy; (2) devise more flexible approaches to programming and assessment of the various institutions delivering postsecondary technical education, including community colleges; (3) develop measures of success at the postsecondary level in the context of the complex nature of its student body and institutional clientele; (4) revise federal policy on funding, training, and financial aid to reflect the increasing relevance and value of noncredit and short-term technical education and training; (5) establish separate expectations and accountability systems for secondary and postsecondary technical education; and (6) stimulate the expansion of programs facilitating coordination of secondary and postsecondary technical education, including tech prep and articulation. (Contains 20 references.) (MN)

How Should "Quality" Technical Education and Training be Defined?

James Everett, Mary Gershwin, Homer Hayes, James Jacobs, and Robert Mundhenk

A Statement from the National Council for Occupational Education

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Introduction

Quality and its measurement have long been concerns of the educational community, yet the achievement of quality and its documentation remain significant challenges. While it may be plausible to assert that we can recognize educational quality when we see it, once pressed to define or measure the term, we are forced into abstractions and qualifications that make precise definitions almost impossible. This paper will attempt in some measure to make concrete the nature of quality in technical education and training while at the same time to distinguish the ways in which definitions of quality vary in different contexts and at different levels; in particular, it will show that different audiences and expectations lead to different definitions of quality—and presumably different methods of assessment—at the secondary and postsecondary levels. Its authors also acknowledge the fact that, as postsecondary educators, their perspective is largely postsecondary; thus the definitions and assertions that pepper this paper are being made from a postsecondary perspective.

Recent attempts to quantify success and quality in education, particularly in the freshly passed education bill, are laudable, but they are also extremely limited. Test scores can tell us some things about academic achievement, and test scores over time can tell us about academic progress, but they do nothing to tell us about the contexts of such achievement or progress. From them we can infer certain ideas of educational quality, but ultimately they do not tell us enough. It is equally important to understand the *context* of that achievement; among those things that constitute that context are the goals and mission of the educating institution, the goals and needs of the students, the economic and social environment, and the level of education or training sought.

This paper seeks to define quality in technical education and training in a multivalent way. While it addresses objectively measurable achievement of outcomes as an important guide to quality, it deals more extensively with the ways in which technical education must define and assure quality in terms of its instructional resources, its institutional identity, and the demands of its environment. Thus it addresses not only the concept of measurement through student achievement of outcomes but also the characteristics that, particularly at the postsecondary level, affect that achievement: flexibility of programming that addresses multiple, variable student and external demands, portability of skills, an orientation toward constant updating of programs and skill levels, and an orientation to lifelong learning.

In short, quality technical education must be defined in terms of its outcomes and in terms of its contexts. This paper attempts such a definition.

Vision Statement: One System, Two Parts

Quality technical education and training must be defined within the scope of the entire career and technical education system that begins in elementary school and continues through postsecondary education, though the two major levels—secondary and postsecondary—are not identical. They differ in the functions they perform, the needs they address, and the clients they serve. In large measure, the goal of secondary vocational education should be to provide foundational competencies, general and career related, through use of contextual instruction focused on broad career pathways. The postsecondary level then should build upon these competencies with more specialized courses that, when possible, include work-based components. It should be noted, however, that a large contingent of postsecondary technical students are not recent high school graduates and that this continuum of technical education deals with only a limited number of postsecondary students.

When secondary technical education is broad, emphasizing foundational skills, postsecondary technical education can build on that foundation by providing students with more specific and advanced skills that lead to long-term, high-value career pathways or by enhancing and renewing the skills of working adults. Both levels of technical education require specific skill sets, as well as distinct but coordinated and focused missions. Such focus and coordination unfortunately do not exist today. If they did, greater efficiencies and a clear enhancement of quality in the delivery of technical education at all levels might be realized.

One of the most important strategies in defining quality in technical education is to recognize the clearly different missions and clienteles of these two levels of technical education. A second is to create a medium for coordination of independent elements by stimulating the creation of close ties between postsecondary education and secondary career and technical programs. While Tech Prep appears to be a natural vehicle for improving students' readiness for postsecondary education and for some levels of employment, it does not deal in any significant way with two other populations who need quality technical education, displaced and incumbent workers whose maturity level and job experience make them gravitate naturally toward postsecondary education. A well-coordinated, high-quality system of technical education would meet the needs of all three of these very different kinds of students; it would assure, as President Bush asserted in a slightly different context, that no one will be left behind.

But students are not the only clients of technical education. Any definition of quality in technical education must recognize another important client group, employers. Both sets of clients make demands at both levels of technical education, but the relatively homogeneous nature of the secondary student population and the primary goal of entry-level employability makes dealing with both sets of clients a relatively simpler task at the secondary level than it is at the postsecondary. The wider range of employer needs and the multiple natures, ages, backgrounds, and expectations of students make the task of postsecondary education more complex, and no definition of

quality in technical education can afford to ignore this difference in clients at these two educational levels.

Thus to define quality and success in career and technical education, it is first necessary to recognize a functional distinction between the two levels. Basic and essential orientation to careers is a primary part of the task of secondary technical education. The primary task for the postsecondary level is advanced technical competence within a career pathway for a wide range of students, from the recent high school graduate seeking a degree to the in-plant supervisor seeking non-credit updating of skills.

Defining the focus for each level in this way will free secondary career and technical education to enrich its primary function, the provision of foundational competencies, as well as to provide more advanced foundational academic skills, particularly in mathematics and science, without being saddled with the unfair expectation of advanced technical training. Enhancement of the foundational skills at the secondary level makes possible the provision of a far greater, more advanced range of skill sets within the postsecondary curriculum while allowing flexible provision of specific career-related technical skills at levels needed by postsecondary clients.

At both levels, ongoing assessment and clear expectations of accountability can help guarantee the achievement and maintenance of quality technical education within these newly defined functions. Assessment must, however, be based in large part not on inputs, such as teacher qualifications and fiscal resources, but on results: job placement and results, career enhancement, career progression, and personal achievement.

There will always be exceptions to the rubrics outlined in the following pages. Schools that serve non-credit, short-term certification needs will differ from rural institutions that, because of small population and job bases, may need to develop and promote programs for job clusters rather than specialties. Yet quality technical education can and should be defined in terms of the foundational and advanced skills it provides its clients, its ability to recognize the wide range and level of client needs, its success in differentiating and coordinating services, its ability to assess its performance, and its willingness to act on the results of that assessment.

Quality at the Instructional Level

The quality of technical education begins necessarily in curriculum and instruction; no form of technical education can assure quality if it does not pay attention to the maintenance of high standards in its assessment of programs and faculty, and in its constant updating of faculty, facilities, and curriculum. Interest in quality at this level led the National Council for Occupational Education to develop and promulgate *Criteria for Excellence in Associate in Applied Science Programs* (1999), but this concern with instructional excellence is not unique to postsecondary career and technical education.

Despite their common interest in providing excellent instruction, there are aspects of postsecondary technical curriculum and instruction that are different from secondary technical education. Though secondary education may address these aspects in some way, the widely diverse student body postsecondary education must address makes attention to quality indicators absolutely critical at the postsecondary level.

Access and Quality

One central difference between secondary and postsecondary technical educational is in the nature of their student populations. While the student population of secondary technical education may be diverse in some ways, it is generally homogeneous by age and by objective, the achievement of high school graduation and either continued education or entry-level employment. By contrast, the student population of postsecondary technical education, particularly at community colleges, is diverse in almost every respect: age, educational objective, skill level, prior educational background, employment status, and employment goals are among the variables with which postsecondary institutions, particularly open admissions ones, must deal.

And the job market calls for higher levels of education. As access to postsecondary education increases, the supply of workers with some college is growing across key sectors of the economy. According to Carnevale (2001), from information technology to health care to office occupations, the new successful technical worker is increasingly likely to bring some college or postsecondary education to his or her craft. The proportion of skilled blue-collar workers with at least some college has grown from 17 percent in 1973 to 28 percent in 1998, while in office occupations the share of workers with at least some college has more than doubled, from 25 percent to 54 percent. In 1973, roughly 60 percent of high technology workers had at least some college; that number grew to 85 percent in 1998.

The movement toward required postsecondary training for many jobs and increasing demands for certification in many fields have caused many adults seeking promotion or new employment to return to school. As a result, postsecondary technical education finds itself with an extraordinarily heterogeneous student population, with an even more diverse set of skills. Students within the same class can include recent high school graduates, displaced workers, incumbent workers seeking promotion but lacking even a high school diploma, bachelor's degree holders, parents returning to work after child-rearing; the list of possible biographies is endless. While the mission of secondary technical education is restricted to a relatively small cadre, limited by age and place of residence, the mission of community colleges in particular is to serve anyone over age 18 seeking postsecondary education. Thus, as the demand for postsecondary education and certification increases, the importance of flexible, responsive postsecondary training and education rises.

This diverse student population creates new demands on postsecondary education, but it also makes essential the need to distinguish secondary from postsecondary technical education in all policy-making. Both secondary vocational/technical schools and community colleges provide access to technical education, but, because the much more heterogeneous student population at the postsecondary level has significantly more diverse needs than the comparatively homogeneous populations at secondary schools, proprietary schools, and four-year institutions, policies and assessments that assume homogeneous student populations with common goals are both irrelevant and unfair. For example, while graduation may be a perfectly appropriate measure of success at the secondary level, since it is virtually impossible to find good entry-level technical work without at least a high school diploma, it has little general applicability at the postsecondary level, where many students are incumbent workers and where many working students are seeking short-term training and education—perhaps as little as a course or two—for short-term goals like promotion, job preservation, or job change.

The provision of access, then, is a measure of quality in technical education insofar as it shows the degree to which technical education serves the multiple populations that seek it. What quality means and how it is measured at secondary and postsecondary levels, however, will differ because of different understandings of access, and consequently different populations, at each level.

Orientation to Learners

Another indicator of quality in technical education can be the degree to which it is learner-oriented. This learner orientation is a paradigm shift from traditional teacher-centered instruction (Huba and Freed, 2000), and it appears to characterize both secondary and postsecondary technical education. Although Milliron and Miles suggest, "Learning has always been an unstated 'given' in higher education" (2000, p. 6), a majority of community colleges see themselves as moving to or adopting strategies that will make them learning-centered, more focused on what a student does with information that with whether he/she recalls it. This learner-centered approach pays attention to performing rather than straightforward recollection or simple application, thereby allowing technical education to "aspire to become places where learning is continual, interactive, and self-renewing" (Rosenfeld, 2000, p. 6). Under this model, students benefit from effective, flexible, assessable learning experiences that depend less on memorization than on integration of skills, and that see learning not as acquisition of isolated skill sets but of the ability to adapt a variety of learned skills sets to many job-relevant situations.

Technical education has led all levels of education in this focus on learning assessment, rather than teaching assessment, because it always has been competency driven. At the secondary level, career and technical education faculty work with business and industry to assure a curriculum that anticipates students exiting programs and courses with the competencies needed to succeed in career paths they are

preparing to enter. At the postsecondary level, though, entry-level competencies are only a small part of the range of learner-centered technical education; close collaboration with employers, employment agencies, adult incumbent workers, adult workers in transition, and displaced workers allows postsecondary technical education to provide for a variety of needs, from full-fledged degree programs to single skill-upgrading non-credit courses to on-the-job training, all in the context of the student's acquisition and application of job skills. Furthermore, this collaboration occurs at both the planning and assessment stages of the course or program to assure that students achieve the skills, knowledge, and attitudes needed to succeed.

The learner-centered approach in technical education requires a variety of responses to the learner, from counseling and remedial services to the inclusion of general education and soft skills. It is a complex task at both secondary and postsecondary levels. Quality at both levels must be measured in part by the way in which institutions responds to the needs of individual learners. But the heterogeneity of the student population in community colleges argues that the response is more complicated than at the secondary level. Given the diversity of the students enrolled in community colleges, and their diversity of reasons for seeking technical education, community colleges provide instruction in a wider range of methods and time frames suited to the needs of many different learners with many different goals.

Ultimately this student-centered, learning-centered approach indicates program quality not only by internal means, the grades that teachers give, but also by student performance away from the institution. Students demonstrate their achievement of skills in many ways: passing licensure and certification exams, succeeding on the job, or transferring and succeeding at a four-year institution. Thus, while completion of a secondary program, or graduation, has been sufficient to assess success at the secondary level, at the postsecondary level the learner-centered approach sees completion as only one indication of skills acquisition; what a student does with those skills is a much more compelling indicator of quality. Adult students, on the job or seeking employment, see acquisition of skills as an objective at least as important as graduation, so assessment of a learner-centered postsecondary curriculum must see skills acquisition as an alternative to graduation in measuring success.

Work-Based Learning

The presence of contextual and work-based technical education within a curriculum is yet another indicator that helps define quality. Research by Giddens and Stasz et al (1999), and others described in National Center for Research in Vocational Education (NCRVE) reports, demonstrates the advantages of contextual learning, particularly in the context of work. The complexities of today's workplace require employees who can draw on their academic and technical knowledge, technical skills, systems knowledge, and workplace expectations to complete tasks and solve problems. While it is true that contextual and work-based learning occur at the secondary level, the real-work orientation of postsecondary adult students, especially those already on the

job, makes it essential that contextual learning be the centerpiece of postsecondary instruction.

Work-based learning provides a synthesis of knowledge, skills, and attitudes in problem solving and task completion because it engages what Howard Gardner (1983) calls multiple intelligences (linguistic, logical/mathematical, musical, spatial, kinesthetic, interpersonal, and intrapersonal) that everyone has in some measure. In addition, the very unpredictability of work-based learning allows learning to occur in different modes and at different paces; as David A. Kolb (1984) argues, learners learn differently: they perceive information abstractly or concretely, and they process it actively or passively. Work-based learning reinforces in active, concrete ways what students may initially have acquired abstractly or passively; thus it makes learning possible in multiple ways.

Whether work-based learning occurs at a workplace, at a training center, or in a college-based simulation setting, the pragmatic, job-oriented, largely adult population of community colleges has driven postsecondary education to provide work-based arenas in which students can learn. Cooperative education, practicum, clinical experience, on-the-job training, skill upgrade training for incumbent workers, and other forms of work-based education are the norm in postsecondary technical education, where employers and instructors work together to facilitate learning. Already a common characteristic of community college technical education (less so of secondary and other forms of postsecondary technical education), work-based learning will undoubtedly be a significant hallmark of quality in technical education in the future.

Quality and Currency of Faculty

The quality of education is always tied to the quality of faculty, and it has been traditional to define the quality of faculty in terms of degrees and professional development. Secondary technical institutions in most states require that faculty have teaching degrees and/or vocational certifications. Community colleges require appropriate terminal degrees or certifications of technical faculty (a master's degree in most cases, though appropriate post-baccalaureate credentials, like Certified Public Accountant (CPA) certifications, are often recognized). Other postsecondary institutions either have no general standard (proprietary schools) or are driven by requirements of the general faculty (four-year institutions).

Technical programs at community colleges have at least one additional indicator of quality that in many respects is more important than the achievement of terminal degrees. Because technical programs and courses are so job-oriented, they must provide students with current, relevant skills, which require current, relevant instruction. A critical mark of the quality of technical education at the postsecondary level, therefore, is the currency of faculty. While it may be possible for faculty at the secondary level to achieve certification and then occasionally update skills or knowledge because they teach foundational skills for which currency of knowledge is not as critical, the presence of a large population of job-savvy, working adults with specific upgrade requirements in the postsecondary student population means that postsecondary faculty must be

current; since the adult population is not a captive one, as secondary students are, faculty must serve this population with current knowledge and skills—or risk losing it.

If postsecondary technical education is to remain successful, it must constantly update the skills of its faculty, the content of its curriculum, and the equipment in its facilities. Given the speed with which knowledge and skills change in technical education, maintaining the quality of faculty will be a difficult and expensive project, but it is one that must be undertaken. If faculty quality is maintained, then upgrading of curriculum and facilities, both requiring knowledgeable, current faculty, will follow. Current federal and state priorities seem to address primarily reform at the kindergarten through grade 12 (K-12) level, but it is critical that the needs of postsecondary technical education, particularly in maintaining the currency of faculty and instructional facilities, not be ignored.

Quality at the Institutional Level

No instructional program or faculty member can provide, maintain, or guarantee the quality of technical education without institutional support; the direct learning experience is only one part of the institutional commitment to quality technical training. For every hour of learning, there must be five to six hours of institutional commitment to support that experience, roughly equivalent to the requirements of a training organization in the private sector (Broadbent, 1998). To support an effective learning experience takes institutional commitment of time, organizational effort, resources, and money (Grubb, 1999).

Institutional support is thus an indicator of quality, especially in technical education. While any effective educational experience requires good teachers who understand the subject matter and are committed to their students while being supported by a variety of strong learning support services, the delivery of technical learning to a wide variety of postsecondary students makes special demands of institutions if it is to be high quality learning.

Understanding the Dual Clientele

Perhaps the most important indicator of quality in institutional support for good technical learning is the institution's understanding that technical programs serve two specific clients. Most other parts of the postsecondary educational enterprise—English or sociology departments, for example—have only a general sense of what their students will do after completion, so their primary audience or client is the student. In technical education, however, employers who hire and promote completers, or professional organizations like the National League for Nursing, which certifies or licenses completers, have an equal claim as clients. Thus postsecondary institutions that offer technical education have a dual clientele for their activities, and no institution that hopes to maintain the quality of its technical programs can afford to forget either.

The more immediate of the two clients, the student, presents more complex problems at the postsecondary level than at the secondary level. While institutional support for the delivery of good technical education at both levels must start with ongoing assessment of foundational skills and student goals and aspirations, the postsecondary institution must also factor in the impact of previous work experience, as well as the variety of student goals—some to learn a trade, some to increase their mobility or security on their present job, some to find a new job. Everything the institution offers this client must fit the needs of the student. Thus quality and success will be defined in part by the degree to which a program meets the disparate needs and deals with the disparate skills of a diverse student population.

Secondary technical education deals with a student population that brings with it a wide range of interests, abilities, and goals. Compared with postsecondary students, however, they have roughly the same age, work experience, and knowledge base. Postsecondary education, on the other hand, must deal with a student population of wildly heterogeneous backgrounds. The needs of an 18-year-old who wishes a career in informational technology, but has no previous classes, work experience, or direct knowledge of the field, are quite different from those of a 35-year-old auto mechanic who needs a certification course in specific automotive components. The needs of single heads of households attempting to support a family while earning their nursing degrees are different from those of currently employed office administrators seeking career stability or advancement through additional certification.

Given the heterogeneity of its student clientele, the quality of postsecondary technical education is necessarily connected with the degree to which postsecondary institutions provide technical training in terms of the functional needs of the learners. Proprietary schools and four-year schools tend to deal with common audiences with common needs and to provide primarily credit-based education. Community colleges, however, offer both credit-bearing and non-credit technical education in a variety of formats and locales. Computer certification classes may be run by the continuing education areas of the college because the main norm of validation, the industrial certificate, is not related to a degree and because the non-credit operation is not bound by semester schedules. Apprenticeship or cooperative programs may offer college credit, but they are also defined more particularly by hours required by a union contract for certain job categories. Companies seeking new computer-aided design (CAD) software training for current employees may want smaller modules that can be completed by employees at work, not in a classroom. At community colleges, the mode of delivery and nature of content are determined in part by the needs of the student client and the demands being placed upon him or her. Postsecondary technical education cannot rely on one generic lesson plan, one fits-all schedule, one kind of student. In a real sense, the quality of this kind of postsecondary technical education is determined by the agility of institutional response.

Flexibility in Meeting Employer Needs

The second client, the employer, hires students or promotes them based upon the technical training an institution provides. Whereas, in the past, business often took on its own training needs internally, increasingly, companies are turning to other institutions to prepare their employees for the world of work (ASTD, 1999) because of a desire to shed non-core functions and a realization that the impact of computer-based technologies and new work organization make continuous learning essential (Osterman, 1998). Increasingly, employers are turning to postsecondary technical education to meet these needs. But the needs of individual employers, even within the same industry, may vary as much as the needs of student, and the quality of service to employer clients, like that to the student client, will be defined by an institution's agility in meeting those needs.

Ironically, what a student seeks from technical education may differ from what an employer seeks. A student's primary goal may be certification that leads to promotion, while an employer may see the certification as merely a step in a long process of lifelong learning that leads to improved company processes, efficiency, and productivity. Thus good technical training must be based upon understanding of the specific technical needs and long-term desires of employers, not just a sense of the use and implementation of technology and technical skills within their workplaces. Knowledge of the specific needs of firms is critical to producing students, whether degree graduates or one-course upgrading employees, who can perform to the employer's satisfaction and fit the employer's long-term goals. In this sense, good technical postsecondary training programs must not only teach subject matter and skills, but also improve workplace performance (Lynch, 1991). Thus, the quality of technical education depends in part on the quality and degree of involvement and cooperation between the institution and the employer in dealing with multiple needs; they must be partners in the planning, development, implementation, and assessment of all technical education, from degree programs to customized workplace training (Jacobs, 1998).

Because it must serve two clients well, high-quality postsecondary education, particularly at the community college, must become an intermediary between students' and employers' needs. This intermediary role requires the institution to develop a means of monitoring the needs of the firms in its environment. One means may be through a community research unit within the institution. It might play a research role with the Workforce Development Board or other local agents of economic and workforce development. The college might even play a role in the prioritization of these activities. At the same time, it must monitor the needs of its students through frequent, consistent internal research.

Quality in technical training thus requires that focus and specialization of activities to meet the demands of students and local industry take precedence over attempts at comprehensiveness through a large menu of programs. High-quality technical education concentrates resources and offers what the market needs. To provide such education and training, an institution must continually monitor the

environment and be agile enough to offer or alter programs and offerings to meet the needs of industry and students.

Quality and External Expectations

As is evident in the foregoing pages, effective technical education and training is by its very nature sensitive to both internal and external forces. While the last section dealt with more immediate local forces, this section deals with larger trends, particularly at the national level, that affect or indicate the quality of technical education. One development that characterizes all trends is the growing role of postsecondary education and training as the medium by which clients achieve access to advanced training resources and economic rewards. Thus, as these trends affect the quality of technical education and training, they create another trend: the growing importance of the postsecondary level.

Earnings as a Measure of Quality

One traditional measure of quality in technical education has been the degree to which that education improved the economic standing of its students. Federal and state measures of quality have often relied on earnings and placement as indicators of quality, though they have rarely relied on ones that were sensitive to the different levels of technical education. In general, though, there is agreement that the quality of a program can be indicated in part by the degree to which it provided its students earning power or salary mobility.

Recent research suggests that once again there is a clear difference between secondary and postsecondary education under this quality indicator. Individuals with "some college" earn higher pay as a class than individuals with a high school diploma or less. Even though the share of workers with at least some college has increased 37 percent in the 1980s to almost 60 percent in the late 1990s, the wage premium for those with at least some college over those with a high school degree or less has jumped from 43 percent to 73 percent over the same time period (Carnevale and Fry, 2001). Thus individuals who complete at least some postsecondary education are more likely to earn more. By contrast, individuals with high school degrees or less have lower wages and fewer opportunities to continue their education and training.

Preparation for Lifelong Learning

Quality technical education must assume that it provides education for a career, not merely for initial placement, so the ability to prepare students for lifelong learning is a sign of quality. Workers recognize the relationship between education and earning or job advancement; according to the latest National Household Education Survey (NHES) (1999) on Adult Education, nearly 80 percent of credential seekers are interested in improving their skills for either a current or new job. By contrast, only 11 percent cite "personal or family" reasons for seeking a credential.

Unlike their predecessors, new technical workers understand that changes in industry and technology require that they accustom themselves to the idea of lifelong learning. They understand that their occupations are sure to change as technology transforms work; consequently, they understand that they must upgrade their skills continually. The rate at which knowledge doubles is currently roughly every seven years, so it no longer is possible for workers to learn the "body of knowledge" of a trade or discipline, so they must understand the general foundations of a technical domain as well as the means to access and use new knowledge as it becomes available. They must be able to leverage foundational skills, particularly in science and mathematics, with technical competency (Roe, 2001). Quality technical education and training provides these new technicians with the functional skills to secure their first job and the general skills that allow them to upgrade their skills for the rest of their careers.

Industry-based Certifications

While provision of technical skills, general skills that prepare one for lifelong learning, and soft skills that make one an effective worker are hallmarks of quality in technical education, an equally important new trend is much narrower in focus; it is the increasing reliance on short-term certification as an external validation of quality. While completion of traditional postsecondary education and training is growing and paying a premium, the growth of a "parallel universe" of industry-based certifications is also becoming a pathway to career opportunities (Adelman, 2000). Unlike traditional degrees, industry-based certifications are issued either by an industry trade association, like the Certified Financial Analyst certification, or by an established vendor like Microsoft or Cisco. According to the National Organization for Competency Assurance, the number of professional industry and trade organizations offering certifications increased from 120 in 1965 to more than 1,600 in 1996 (Pare, 1996).

Educational institutions, particularly at the postsecondary level, have begun to capitalize on this national trend for two reasons. First, they are seeking to provide students the kind of education and training that will lead to career success. Second, certification's external validation is an excellent indicator of the quality of the technical education these institutions offer.

Portability

While short-term technical training may be tailored to the particular needs of a particular local employer, good long-term technical education, particularly at the postsecondary level, where the possibility of employment outside a local area is greater, tends not to focus on meeting the needs of only one firm, but instead to seek to serve a group or agglomeration of the firms, often referred to as a "cluster" or "industry" (Rosenfeld, 2000). If these firms or their trade associations have developed training or curriculum standards, meeting these standards can give students mobility within the industry and provide third-party validation for the appropriateness of the technical

education. Where there are national skill standards, the possibility of portability is even greater.

Postsecondary technical education is most successful when it recognizes the need to certify the validity of its training beyond its service area. Postsecondary technical education must serve not only local firms, but also the needs of professions, like nursing; of companies with many locations; of transfer institutions, for those students who seek four-year degrees instead of immediate employment; and of students who, unlike their high school counterparts, have the ability and the likelihood to relocate. Thus quality postsecondary education must serve local needs, but it cannot be so localized that a completer cannot carry his or her training from city to city or state to state. It must serve the immediate and long-term needs of both students and employers, in ways that secondary technical education need not contemplate, by assuring the portability of that education.

Measuring Quality

Of all the areas of public education and policy that affect technical education, the most significantly in need of change is the area of accountability. While accountability in education is important, the increasing differences between secondary and postsecondary technical education suggest that they can no longer be assessed by the same measures. It is important that postsecondary career and technical education and training be held accountable for adding value and providing recognizable benefits in return for the investment of public funds, but it is time to recognize the fact that expectations should be different for secondary institutions and postsecondary institutions.

Quality Measures at the State Level

Federal efforts to improve accountability for technical education have not been made alone. In her survey of state-level accountability systems for higher education, Jane Wellman (2001) found three state-level models of accountability: (1) Performance Reports, (2) Assessment of Statewide Goals, and (3) Performance Funding. None of these aligns precisely with federal models, particularly in the Workforce Investment Act (WIA) and Perkins, so Wellman describes actual and potential "disconnects" in these systems. While they are intended to "...help reduce bureaucracy and decentralize decision making by replacing control of processes with response to results," the systems sometimes succumb to "...a mind numbing volume of data. Unfortunately, the technical capacity to generate and display data seems to be outstripping the ability of educators and policymakers to agree on broad goals or standards to measure the performance of higher education" (p. 5). Wellman further cautions that measures of performance that are not clearly connected to improvement can degrade the system.

Thus, according to Wellman, having an accountability system is not enough to assure quality. Clarifying the purpose of accountability measures, as well as achieving widespread agreement about the goals and standards for those measures, is essential. She further argues that secondary paradigms are not workable in postsecondary institutions, and that use of them results in irrelevant data and illegitimate conclusions.

The National Council for Occupational Education (NCOE) believes that, because nearly 50 percent of all community college students work full time and over 45 percent are 25 years of age or more (National Profile of Community Colleges, 2000), and because community colleges exemplify the ideals of lifelong learning and flexible enrollment (Grubb, 1999), accountability measures for community colleges that reflect the diversity of population, individual goals, and demands for flexibility that characterize postsecondary technical education, particularly at community colleges, can better document and insure quality technical education than the secondary-focused criteria now in place.

In addition, largely because of the national trends toward lifelong learning mentioned above, accountability systems must include measures for general education as well as for technical skills, as recommended by Judy and D'Amico (1997, p. 114). General education measures, already the focus of many regional accrediting bodies and state boards of higher education, including New York, Florida, and California, must be a part of technical education's quality assurance, but it makes sense not to impose a federal assessment system that might duplicate or even interfere with those that are being developed by accrediting bodies and the states.

Other ways of measuring quality in postsecondary technical education require a new look. Increasingly, students are engaging in postsecondary technical education in ways that elude the grasp of our traditional reporting mechanisms. The American Association of Community Colleges reports that over 48 percent of the students within community and technical colleges today are non-credit students (National Profile of Community Colleges, 2000). These students, combined with credit-seeking students who identify a specific course or series of courses not 'recognized' as a formal certificate or degree, are not universally reported as successes for our institutions; in fact, they are viewed as dropouts by traditional criteria, when many are, in fact, completers of their own expectations and goals. An accountability system that fails to take into account the students' goals—and the completion thereof—is itself a failure.

Targeted Measures of Quality

At the secondary level, traditional measures of success in many states include graduation and retention rates, college acceptance, placement in employment, and entry into the military. Given the fact that secondary technical education can lead to postsecondary technical education, another, more targeted measure of success might be the degree to which students have been prepared for college-level work. While this application is obvious for Tech Prep students, correlating success with qualification for

entry-level college courses, rather than remedial ones, would be a clear means of indicating success of those students who move directly to postsecondary education.

At the postsecondary level, measurement is more complicated because the student mix is more complex. There are at least five distinguishable categories of students at the postsecondary level: (1) students continuing from secondary technical programs; (2) students beginning technical education at the postsecondary level; (3) incumbent workers returning for skills upgrading; (4) adult students seeking to enter a new field, either by choice or unemployment; (5) employees in employer-sought contract training.

Three distinguishing characteristics of community college vocational education warrant consideration in the development of accountability measurements. First, students voluntarily come to the community college for activities. Unlike secondary education, community colleges are not faced with a compulsory market of students. Indeed, every student (or company, if it is a third party payer) that comes to a community college establishes some form of contractual relationship with the college to provide services based on some form of expectation. Since these clients define the relationships, and they define the specific services sought, any accountability measurements must start with a fundamental question: *were these expectations met?*

Second, there is a variety of motivations for students coming to community colleges for vocational education services. These motives can include everything from upgrading through short-term training courses, to seeking a new career through an associate's degree. All of them can be measured through attainment of progress points established by the college. However, these measurements of completion are different, once again based upon the expectation or intent of the student. This variability of expectation complicates the specific measurements and makes for a much larger number of measurements than on the secondary level.

Third, because the primary focus of community college technical programs is the individual student, community colleges must take a learner-centered approach to technical education and training. Yet the focus must extend beyond the learner; there is a variety of third party or indirect customers for the activities of vocational education. These indirect customers include companies paying for apprenticeship programs or customized training, workforce development boards, community-based organizations, or state governments. Any accountability measurements must take into consideration these institutions because they are directly involved in financing the students being served.

For postsecondary institutions, Wellman's research, described above, clearly shows that completion rates for degrees and certificates are valuable, essential measures of the success of some parts of the student population but are insufficient for many others. Measures that more accurately report what individuals, businesses, communities, states, and the nation see as defining quality in postsecondary technical education include

1. Rates of completion of clearly defined, viable student goals. Since many technical students at the postsecondary level have no intention of completing a degree, success cannot be measured by generic retention standards or rates; instead, their success should be measured by their achievement of their self-stated goals.

2. Gains in employment status and earnings over three or more years. While initial placement indicates a degree of success and therefore quality in technical education, persistence, promotion, and salary increases after initial placement indicates that a student has been prepared for a career, not merely a first job.

3. Transfer success of students in technical programs via articulation/matriculation agreements with baccalaureate-degree-granting institutions; the quality of a technical education program can also be measured by the credibility it has with other institutions of higher learning.

4. Credentialing success of (1) institutional programs and (2) students through licensure, certification, and other external standards;

5. Success in meeting the expectations of companies, associations, or other groups (e.g., customized training and other specifically designed assessments and interventions).

Whatever accountability criteria may be developed for postsecondary technical education, they must be consistent across governmental programs. The current confusing, divergent, and contradictory requirements of Perkins and WIA legislation, despite the seeming flexibility that Perkins allows states, create an unnecessary data-gathering and reporting burden on postsecondary institutions because of the variability of state requirements and the multiplicity of their interpretations. NCOE encourages a substantive review of the need for consistency of expectation in legislation and national policy. It is also extremely important that, as in previous federal policy, some flexibility and negotiation on standards for individual states be recognized, and that any federal accountability system for postsecondary technical education be based on genuine input from states, beginning with authentic participation by postsecondary institutions. Finally, the burden of reporting on conflicting requirements from different federal departments needs to be lifted, preferably by requiring educational institutions to report educational accountability data to a single government entity, like the Department of Education.

Summary and Recommendations

Technical education at both secondary and postsecondary levels is likely to be an increasingly important part of the country's economic health and growth for a very long time, but it is essential to understand that the nature of technical education has changed. Traditional views of technical or "vocational" education are mired in stereotypes that are untrue to the student population, the nature of educational institutions, the expectations of employers, and the economic and social climate of 2002. Thus, as we try to define quality in technical education, we must understand and accommodate the changes in technical education.

Among these changes are radical shifts in the conception of technical work. No longer are technical workers able to maintain their skills or positions throughout a career on the basis of a secondary school credential alone. Employers' expectations of constant upgrading and certification mean that technical workers will be technical learners for their full careers, and that change argues for reconceiving the nature and expectations of an increasingly older student population. In this new environment, secondary technical education will appropriately take on the role of providing a foundation in technical skills, while postsecondary will provide more advanced and ongoing technical training and education.

As the student population becomes older and more demanding, the role of postsecondary technical education, particularly at community colleges, will become more important. Because their mission is to provide access to education to all citizens over age 18, community colleges will find themselves increasingly involved not only in entry-level training and education, but also in continuing education for incumbent workers. The heterogeneity of the student population and the demands of employers for effective, efficient training will call for less traditional ways of delivering and assessing instruction.

This dual-client situation, unique to postsecondary technical education, will place additional expectations on community colleges. Among them will be greater emphasis on certain support services, including remediation; ongoing education for faculty, to maintain their currency; increased involvement between institutions and employers; and a wider range of educational "products" in addition to conventional degrees and certificates, from single-course refreshers to work-based training to national certification training. Many community colleges are already doing many of these things, but the changed nature of postsecondary technical education means that many more will have to do so as well.

Concomitant with these changes in technical education must come changes in public policy, particularly regarding funding and assessment. The two levels of technical education, K-12 and postsecondary, can no longer be seen as a single entity with similar procedures and expectations; the demands of the technical workplace, of workers and employers, will simply not allow it. So what the two levels do, how they do

it, how they are assessed, and how they are funded, must align with their populations and their missions, and public policy must begin to address these distinctions.

Policy Recommendations

The National Council for Occupational Education recommends that

1. Secondary and postsecondary technical education be understood as two distinct, related, but consecutive enterprises requiring distinct but related public policy;

2. The heterogeneity of student population and employer expectations at the postsecondary level be seen as requiring more flexible approaches to programming and assessment; the access that community colleges provide as a part of their mission creates widely divergent needs, goals, and educational strategies that must be factored into planning and assessment;

3. Measure of success at the postsecondary level be developed in the context of the complex nature of the student body and institutional clientele. In addition to more conventional measures like graduation rates, which do not necessarily correlate with students' goals, these measures could include the following:

    a. Rates of completion of clearly defined, variable student goals;

    b. Gains in employment status and earnings over three or more years;

    c. Transfer success of students in technical programs;

    d. Credentialing success of (1) institutional programs and (2) students through licensure, certification, and other external standards;

    e. Success in meeting the expectations of employers or other groups.

4. Federal policy on funding, training requirements, and financial aid take into account the increasing relevance and value of non-credit and short-term technical education and training;

5. Government programs designed to facilitate access to higher education, like financial aid and job training programs, accommodate themselves to the needs of an adult population that must work while going to school (the current emphasis on graduation as a performance measure creates a disincentive to serve adult students who need only a course or two for promotion or employment, and current financial aid regulations are skewed to full-time students);

6. Separate expectations and accountability systems be established for secondary and postsecondary technical education because their functions and clientele are significantly different;

7. Federal programs stimulate the expansion of programs that facilitate the coordination of secondary and postsecondary technical education—programs like Tech Prep and articulation;

8. Cooperative relationships between postsecondary technical education and all other educational entities, from Adult Basic Education (ABE) through baccalaureate technical education, be stimulated and encouraged;

9. Accountability standards imposed by different government agencies—as, for example, in the case of Department of Education standards for Perkins and the Department of Labor's standards for WIA—be standardized to avoid duplicative or conflicting accountability measures, and all accountability reports be made to a single government entity;

10. Intragovernmental cooperation be encouraged to assure both consistency of policies across government agencies and efficient leveraging of government resources.

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