

# Chapter 12

## Teacher Education and Professional Development<sup>1</sup>

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### 12.1 Historical Introduction

With the onset of the Industrial Revolution near the turn of the twentieth century, the United States encountered the sudden need to prepare large numbers of workers for trade and manufacturing employment. As a response, the first manual training school was established in St. Louis, Missouri (as a part of Washington University) in 1880, with other manual training schools being added shortly after in Chicago, Illinois; New Orleans, Louisiana; Toledo, Ohio; and New York.

When leaders in education and industry began to realize that an increasingly diverse student population was not receiving the type of education needed to prepare them for life outside of school, various organizations and industrial groups began to lobby for federal funds in support of job training or vocational education in US public schools. This eventually resulted in the passage of the Smith-Hughes Act of 1917, which provided federal funds at the high school level in support of programs in vocational education (Barlow, 1976; Scott & Sarkees-Wircenski, 2008). Since then the federal government has continued to fund vocational education through a series of new and renewed federal legislation.

It is important to note that public education in the United States is almost exclusively the responsibility of the 50 states and territories and their related authorities. Most education decisions are left in the hands of locally elected city or county school boards. Even within local school districts, there is often great variability, and many curricular and instructional decisions are made at the individual secondary school or postsecondary college site (Lynch, 2000). But even though a relatively small proportion of the total dollars (estimated between 9 and 10%) allotted for education

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is spent on vocational education (now referred to as career and technical education (CTE)) yearly in the United States, the federal legislation has had an enormous impact on providing direction and financial support for program structure, curriculum, targeted audiences, and teacher qualifications. With some support from federal funds, there are now a great variety of employment-related education programs and courses to prepare youth and adults of all ages for various careers. (For further discussion and elaboration about VET or CTE and its governance in the United States see other chapters in this volume, particularly those by Boesel (Chapter 5) and Zirkle (Chapter 3)).

As a prelude to the Smith-Hughes Act of 1917, much debate and discussion occurred about the proper way to train teachers of CTE. Charles Prosser, the Director of the first Federal Board for Vocational Education, drafted 16 theorems to serve as a foundation for sound and successful vocational education programs. Two of those theorems related directly to the preparation of teachers, linking teaching closely to practical knowledge and skills: “Vocational education will be effective in proportion as the instructor has had successful experience in the application of skills and knowledge to the operations and processes he [sic] undertakes to teach” (Prosser & Quigley, 1950, p. 223) and “The only reliable source of content for specific training in an occupation is in the experiences of masters of that occupation” (Prosser & Quigley, 1950, p. 226).

Prosser believed that teachers’ trade experience would correlate with student outcomes: the more trade experience, the better the outcomes of students. College-level training for trade teachers was neither expected nor considered especially desirable. In fact, he believed that the academic nature of a college education and the time it took to complete a degree would provide difficulties for a practically oriented and experienced craftsperson who was probably older, needed income, and whose needs could not be met at a residential campus. Prosser and the Federal Board concluded that normal schools or state colleges and universities were not capable of preparing teachers for CTE. Prosser did believe in some teacher training for trade teachers, but it was different from the type normally provided for prospective elementary and high school academic teachers. He detailed the competencies and curriculum that should be required and recommended that delivery be provided under the supervision and control of a state board of vocational education (Prosser & Quigley, 1950; Lynch, 1997).

It is interesting to note that Prosser held a different view on teacher training for home economics and agriculture teachers, the other two programs funded through the Smith-Hughes Act of 1917. Prosser believed that most of the “boys” would have worked and lived on farms and studied agriculture in high school. Similarly, a “girl” would have acquired “homemaking interests, insights, and practical doing and managing abilities. . . under the cooperative tutorage of her mother and her high school homemaking teacher” (Prosser & Quigley, 1950, p. 310). So teachers of high school agriculture and home economics programs could be college trained provided they had previously completed high school agriculture or home economics classes and had practical experience identified with the skills or knowledge needed to teach in these areas.

Based on this rationale, we find a two-tier system of preparing teachers throughout the more than 90-year history of CTE in the United States. Those who are teaching in various trade and health fields typically come with years of practical experience in jobs or professions related to their teaching field as their primary credential for teaching. Those teaching agriculture, business, family and consumer sciences (formerly called home economics), technology education (formerly called industrial arts), or marketing (formerly called distributive education) typically are college educated and prepared to teach through preservice teacher education programs in colleges and universities. With definition and description of those vocational areas—and their partial linkage to research in the respective field or profession at the university—we find a teacher preparation structure similar to the German tradition of vocational disciplines that link the preparation of vocational teachers at university to teach in vocational schools in a particular domain or profession in which they specialize. Notably, the establishment of vocational study programs at universities has a longer tradition in the United States than in Germany, in particular in the domains of the personal service sector such as nursing (Pahl & Rauner, 2008).

Various iterations of this two-tier level for preparing teachers are still very much in existence in CTE today. In general, though, the trend in the United States today is to require all CTE teachers to either have a baccalaureate degree, as a minimum, prior to entering teaching or to acquire one within a certain timeframe, say 5–10 years, after beginning to teach. Some specific teacher education is required either through a preservice teacher education program or some version of school-based training sponsored by a local school system or state department of education.

## **12.2 The Work Environments of Teachers in Career and Technical Education**

CTE cuts a broad swath in the educational landscape in the United States, encompassing a tremendous number of programs at both secondary and postsecondary levels. There are some programs in middle high schools (e.g., 6th, 7th, and 8th grades) as well, usually focused on purposes of career exploration in such areas as business, manufacturing and construction, agriculture, family and consumer sciences, and health. At the high school level, CTE is offered for purposes of general and specific labor-market preparation in comprehensive public high schools (e.g., grades 9–12); vocational high schools, area vocational schools, or regional centers; and, more recently, in career academies. At the postsecondary level, CTE is offered in community colleges, technical colleges, and adult learning centers. In addition, several other variations of secondary and postsecondary delivery systems are available in the United States, including privately owned proprietary schools (which offer postsecondary CTE and training in a wide range of very specific occupations such as accounting, automotive technician, barber, or x-ray technologist), vendor certification programs, and human resource development. This range of education-delivery programs sets the scene for the broad variety of work contexts of teachers in CTE.

### 12.2.1 Career and Technical Education at the High School Level

About two-thirds of all *public high schools* offer at least one CTE program, usually identified as three Carnegie unit credits in a single program area identified with a specific labor-market specialty. Unverified data from a recent national assessment of vocational education indicates that 96% of all US high school students take at least one course classified as career and technical; about 25% are “concentrators” who take at least three credits in one occupational area; and 44% are “investors” who take at least three occupational courses, but in different programs (U.S. Department of Education, 2002c).

*Comprehensive public high schools* offer some CTE courses or programs in addition to their generally academic-oriented courses. Typically, those schools serve a wide range of students, with varying abilities and very diverse social-economic demographics, who are enrolled in college preparatory, career and technical, special education, and general programs. *Vocational high schools* are sometimes referred to as “magnet schools,” “technical schools,” or by some other moniker. In 1999–2000, there were 1,048 vocational high schools in the United States (U.S. Department of Education, 2001). They are more apt to be in urban areas and provide CTE programs that can be accessed by students from several of the district’s high schools. Those schools also increasingly offer industry- or vendor-sponsored certification programs (e.g., auto service, metalworking, information technology)<sup>2</sup>; apprentice training; and opportunities for graduates to take state-required licensing examinations such as those offered by the National Occupational Competency Testing Institute (NOCTI, 2002). In addition, they often enroll adults in the instructional programs as well, sometimes in separate evening classes and sometimes directly with the high school students. *Area vocational schools* function in very similar ways, only they serve students from several district high schools, who have chosen to enroll in CTE programs.

*Career academies* are characterized by a program and structure that seek to ensure that the graduates are technically and academically proficient to enter the workforce and enroll in postsecondary education. The original academies were targeted at students who were at risk of dropping out of school, not doing well in the comprehensive high school, or who were just not well served by the structure in a typical classroom. Most of the over 1,500 high school career academies (Stone & Bae, 2002) combine what is thought to be among the greatest strengths of the vocational and comprehensive high schools: (a) clusters of students who share many of the same classes each day and have the same teachers from year to year; (b) academic courses that meet high school graduation and college entrance requirements; (c) career and technical courses sufficient to comprise a career major;

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<sup>2</sup> Fifty-five percent of vocational high schools and 27 per cent of comprehensive high schools report offering vendor certification programmes (U.S. Department of Education, 1999a).

(d) work-based learning experiences built into the curriculum; and (e) business persons who advise the school district on important components of the program such as curriculum, work-based learning, financial aspects, specific courses to offer, and equipment (Lynch, 2000).

Throughout the United States, CTE at the high school level has been historically—and still is in much of the country today—identified with seven program areas: agriculture, business, family and consumer sciences (formerly called home economics), marketing (formerly distributive education), health, trade and industry—or industrial education, and technical. Technology education, usually considered more compatible with general or academic education purposes, is often cited as an eighth program area or field within CTE. Increasingly, programs in business and marketing are being combined for program planning and enrollment-reporting purposes. A number of curriculum standards have been developed by professional associations in those different programs in high school CTE.

In addition, various local school systems and some state systems throughout the country are increasingly replacing or modifying some of these historical programs and/or are adding new programs in response to local or state industry needs; changes in the economy which demand changes in career and technical programs; job and career opportunities for graduates; opportunities for students to start on a career pathway in high school and continue on with it into postsecondary education (i.e., a Tech Prep or articulated, secondary-postsecondary curriculum model); and closer alignment with industry skill standards or new career pathways or clusters. A few examples of “new” programs include culinary arts, computer technology, the performing arts, hospitality and tourism, preengineering, construction or building trades, and auto technology. Another relatively new initiative in the United States includes the conceptualization of 16 career clusters to address the academic and career needs of all students. These clusters are thought to be organized better around today’s occupations, workplaces, and the US economy. The framework for these career clusters was originally developed by the federal Department of Education’s Office of Vocational and Adult Education. At the present time, this initiative is being managed by the National Association of State Directors of Career Technical Education Consortium (NASDVTEc). Its work focuses on the development and implementation of foundation courses, technical core courses, and specialty courses over a span of grades 9–16. State economies vary in what industries and occupations are important, so areas of career clusters within a state also vary.

### ***12.2.2 Postsecondary Career and Technical Education Programs***

Community and technical colleges maintain a unique position to provide education and training for today’s workforce. With students seeking employment-related education and workers returning to school to enhance their job skills, enrollments in postsecondary institutions have been increasing enormously over the last years in the United States.

*Community colleges* are organized to provide postsecondary education programs that serve the community. However, the way in which community colleges do this may vary considerably. For example, some will emphasize college transfer programs by focusing on general education that is typically required in the first two years of an undergraduate education—and which is thus almost identical with the content students would complete in the first two years in a bachelor's degree program at a four-year college or university. Others focus on technical education and offer a wide range of programs, courses, and credentials—including associate degrees, diploma, advanced diploma, certificate, license, etc. Community colleges enroll about 44% of all undergraduates in US higher-education institutions, and about 45% of first-time freshmen enroll in community colleges (Coley, 2000; Phillippe, 2000).

*Technical colleges* are similar to community colleges, but their primary mission is to provide education and training in CTE at the postsecondary level. The curriculum is typically competency-based, benchmarked to business and industry standards, occupationally focused, and technically oriented. Education and training programs are usually developed and delivered using state-of-the-art equipment, the latest technology, and contextualized instructional techniques. Long- and short-term training programs customized for area industries are typically offered, often delivered on company sites. Credentials awarded at technical colleges include the associate degree, one- and two-year technical diploma, short-term (i.e., less than one year) diploma, certificates, apprenticeship, and advanced technical certificates. There are some technical colleges or institutions that do combine general education with technical coursework, and credits earned may transfer to four-year institutions.

In addition to community and technical colleges as the main providers for CTE programs at the postsecondary level, *adult learning centers* provide education and training outside the formal schooling system for adults and youth. While those institutions may focus on literacy or completion of a general education diploma, they also offer apprenticeship programs or other work-related courses. Over 46% of the adult population participates in one or more types of adult education, with work-related and professional development courses identified most frequently (U.S. Department of Education, 1999b).

Several other variations of postsecondary education are available in the United States. Two that are most prominent and rapidly growing are proprietary schools and vendor certification programs. Proprietary schools are privately owned, often organized as a corporation, governed by a board of directors, and are in the business of providing specialized, postsecondary CTE for a profit. Vendor certification programs are designed by vendors themselves and are based on industry standards, skills, and knowledge needed, typical problems to be solved, and a level of performance that must be met. Certification is awarded by a vendor following the “passage of an exam benchmarked to predetermined occupations or professional standards” (Carnevale & Desrochers, 2001, p. 19).

### 12.2.3 Reforms in the Area of TVET

Several prominent initiatives have been enacted either through federal legislation and/or as the result of education commissions that have influenced the content and pedagogy of CTE and teacher education in the United States. These reforms seek to target content knowledge and delivery of CTE courses toward that which is thought to be essential for students to know and do in modern workplaces and to continue to learn throughout their lives. Most of these reforms have been discussed elsewhere throughout this volume (see, for example, [Chapters 5, 2, and 3](#) by Boesel, King, and Zirkle respectively). In summary, the main initiatives include the following:

- **Tech Prep**—a planned, sequenced program of study that combines secondary and postsecondary education. Currently funded through the Carl D. Perkins Vocational and Technical Education Act of 2006 (Perkins IV), Tech Prep is designed to provide students with both academic knowledge and technical skills leading toward an associate degree or a certificate in a specific career field.
- **Integration of academic and vocational education**—mandated in federal Perkins legislation and advocated by most policy groups that have addressed CTE, this initiative fosters academic rigor required of students in career and technical programs, especially in math, science, and language arts.
- **SCANS skills**—in 1991, the Secretary’s Commission on Achieving Necessary Skills researched the general skills that US young people need to succeed in the world of work. Three fundamental skills (i.e., basic skills, thinking skills, personal skills) and five workplace competences (i.e., use of resources, interpersonal skills, acquiring and using information, understanding systems, and use of technology) were identified as essential areas that students needed to be prepared for pursuing postsecondary education and/or entering the workplace.
- **School-to-work**—in an effort to improve the linkages between education and work, Congress passed the School-to-Work Opportunities Act (STWOA) in 1994. It provided nearly \$1.5 billion over five years as seed money for the development of school-to-work programs that had three components: (a) school-based learning (e.g., career majors, high academic standards), (b) work-based learning (e.g., workplace mentors, internships, job shadowing), and (c) connecting activities, such as career counseling, job placement, and support services. STWOA had a sunset clause, and Congress allowed the program to expire at the end of September, 2001.
- **Twenty-first Century Skills**—the Partnership for the 21st Century brought together representatives from the business community, education leaders, and policymakers to advocate for inclusion of twenty-first century skills and outcomes, as they have defined them, to ensure every child’s success as a citizen and worker. In essence, the framework includes student mastery of core subjects and skills in three areas: learning and innovation (e.g., creativity, critical thinking, problem solving); information, media, and technology; and life and career skills.

## **12.3 Preparation of Teachers for Career and Technical Education**

The best, most effective way to educate and prepare career and technical teachers in the United States continues to be debated. The literature has been repleted with studies and reports proposing new or reformed requirements for state certification; standards that prospective teachers must meet; new structures to prepare teachers; specific experiences with children prior to licensure that must be completed; scores on standardized tests that should be achieved; required hours of industry experience that must be acquired; and on and on. Professional associations, education reform groups, political action forces, and others regularly weigh in on the subject and offer plenty of advice to state teacher regulation boards and to colleges and universities on how to best certify and prepare teachers.

### ***12.3.1 Teacher Certification and Licensure: Public Elementary and Secondary Schools***

What is common across the 50 states of the United States is that all teachers, including CTE teachers, must meet certain state requirements prior to being issued a license or certificate to teach in public elementary and secondary schools (K-12). Each state has a governing board and staff that oversees the certification and licensing of K-12 teachers in that state, reflecting the belief that the education of children and youth should be safeguarded by requirements governing qualifications of teacher applicants and that the licensure of teachers is, indeed, in the purview of the public good. However, certification policies and procedures vary widely throughout the 50 states with all states typically setting minimum requirements—such as good health, no criminal record, possibly US citizenship, and some sort of determination of a predisposition to work well with young people.

Generally all K-12 teachers, except those in certain fields identified with CTE, are required to have earned a baccalaureate degree. Some states also require teachers to earn a minimal score on a test of academic achievement, typically using the Praxis series from Educational Testing Services (2003). Praxis I focuses on basic academic skills (reading, mathematics, writing) and is often administered prior to students' admission to preservice teacher education at a college or university or, if being prepared through some alternative route, prior to being issued a state teaching license. Some states also require a minimal score on Praxis II, which focuses on subject-specific assessments (e.g., physics, biology, business education) and principles of teaching and learning. This is usually required at the end of a teacher education program or prior to award of an initial teaching license. Praxis III is a classroom performance instrument for assessing actual teaching skills and performance and is usually administered by the end of the teachers' first year of teaching.

State certification requirements for career and technical teachers at the high school level typically have been much more flexible than for academic or elementary



school teachers. Nearly all states allow a special category for certifying trade, industry, and health occupations teachers by substituting years of work experience in place of a college degree. In fact, there are only three states that absolutely require a baccalaureate degree and seven others require an associate's (i.e., two-year) degree to begin to teach a trade or health subject. At least 43 states permit trade and health teachers to substitute work experience—usually requiring at least two years as a minimum—for any college-level preparation. Five states do require trade and health teachers to earn a baccalaureate degree before they are fully certified (Lynch, 1998). Some states also require prospective trade teachers to pass an occupational test of competency, such as one or more of the 170 written or performance assessments of technical skills administered by the National Occupational Competency Testing Institute (<http://www.nocti.org>). Most states require teacher applicants in all other subjects identified with CTE to hold a baccalaureate degree but they do permit a route into teaching that does not require traditional university teacher preparation.

Thus, there are two main avenues for career and technical teachers in the United States to acquire certification and obtain an initial license to teach: (a) traditional preservice teacher education at a college or university or (b) an alternative route that may have varying structures and pathways. In addition, there are many forms of in-service, professional development that are available in most places for most CTE teachers through either graduate studies at colleges and universities or school system-level staff development.

### ***12.3.2 Requirements for Teaching in Postsecondary Institutions***

Requirements to enter into teaching in postsecondary institutions in the United States are much more disparate than for entry into middle or secondary schools. Bartlett (2002) reviewed the research and literature on state policy and procedures, reporting that very few states require licensure or certification to teach in community or technical colleges. His major finding was that there is a “lack of available knowledge, consistency, and organization of the requirements in this country for an individual to become a postsecondary career and technical educator” (Bartlett, 2002, p. 121).

Rather than relying on state licensing or certification in the United States, states and colleges tend to rely on *standards* for postsecondary career and technical teachers. Standards for faculty qualifications are usually set by one of six regional accreditation agencies authorized to accredit postsecondary community and technical colleges: the Western Association of Schools and Colleges Commission for Community and Junior Colleges; the Northwest Commission on Colleges and Universities; the Middle States Association of Colleges and Schools; the Southern Association of Colleges and Schools; the North Central Association of Colleges and Schools; and the New England Association of Schools and Colleges Commission on Technical and Career Institutions. There are also national accreditation agencies that have specific standards for college faculty, such as the Accreditation Council on Independent Colleges and Schools; Accrediting Commission of Career

Schools and Colleges; and the Council on Occupational Education Commission on Standards and Accreditation. Some community or technical colleges also rely on standards developed by specialized national accreditors of specific programs, such as those developed by the Commission on Accreditation of Allied Health Education Programs; the American Council for Construction Education; the American Association of Family and Consumer Sciences Council for Accreditation; and the National Accrediting Commission of Cosmetology Arts and Sciences, Inc. ([www.chea.org](http://www.chea.org)).

The standards vary and, in some instances, are quite general such as simply requiring that “faculty be academically prepared and qualified,” or “possess educational credentials that testify to appropriate preparation for the courses they are teaching,” or an institution, to be accredited, must have a “sufficient number of faculty members who are qualified by appropriate education, training, and experience to support its programs” (Bartlett, 2002, pp. 111–112). Others are more specific, such as requiring faculty members to possess a degree one level above the degree program in which they are teaching (e.g., a baccalaureate degree to teach in an associate degree program) or a specific number of hours of work experience, or an occupational license or certificate to teach in a specialized program (e.g., licensed nurse, cosmetologist, plumber). To teach in specific career and technical postsecondary education programs, the common denominators seem to be that faculty must document (a) work experience either through specific number of years of employment in the field or profession (e.g., two years); (b) an occupational license and/or a portfolio of work-related activities (i.e., a skill base); and (c) some traditional college-level course work, usually resulting in a degree or a diploma one level above the degree or diploma in which students are enrolled.

### ***12.3.3 College and University Preservice Teacher Education***

Today, the typically required curriculum for a career and technical teacher education student completing a baccalaureate degree at a college and university consists of 124 semester credits, roughly split into three categories: subject matter, general education, and professional education. The subject matter is typically offered through a professional school, general education through a college of liberal arts, and professional education courses in an education college or department. As for professional education courses, Bruening et al. (2001) found that students typically were required to complete semester credits in curriculum development, history and philosophy of education and/or vocational education, integration strategies and techniques, methods of teaching, program planning, and technology to participate in field-based experiences.

Colleges and university teacher education programs typically have institutional approval by which the state has approved the education unit to prepare teachers in compliance with state certification requirements for K-12 teachers. In addition to state approval, about half of all colleges or schools of education are also nationally accredited by the National Council for Accrediting Teacher Education (NCATE).

To be nationally accredited, all career and technical teacher education programs must be approved through a college, school, or department of education and meet standards in six areas related to student performances and the capacity of the unit to deliver, manage, and govern high-quality teacher education (National Council for Accrediting Teacher Education, 1997–2003). In addition to state and NCATE standards and guidelines, colleges and universities are giving increased attention in their preservice teacher education programs through the work of the Interstate New Teacher Assessment and Support Consortium (INTASC, 1992), which was established in 1987. INTASC has developed core standards which require novice teachers to demonstrate competence in 10 different areas such as content knowledge and ability to transfer this knowledge; use of diverse instructional strategies; use of effective verbal, nonverbal, and media communications; use of formal and informal evaluation strategies; and ability to further develop professionally. While those standards are being increasingly applied for a range of discipline-specific teaching, so far there are no plans to produce specific initial standards or performance assessments prior to awarding an initial teaching license in CTE fields.

### ***12.3.4 Alternative Routes to Teaching***

Forty-five out of the 50 states offer some form of alternative route to teaching in all subject areas, including elementary education (U.S. Department of Education, 2002b). Alternative routes to certification have primarily been implemented to broaden the pool of prospective K-12 teachers, seeking to address concerns about quality in teacher education, teacher development, professionalism, and retention (Roach & Cohen, 2002). They are being designed to attract and hold a segment of the population not currently engaged in education. For CTE teachers, an alternative preparation program is increasingly becoming the most common route into teaching.

In its broadest sense, alternative certification is the term applied to policies, programs, and practices designed to certify teachers who have not completed an undergraduate degree in education. The definition of alternative certification varies among the states and encompasses a wide range of practices, from emergency certification given to those with no teaching background to programs designed to license or certify individuals who have an undergraduate degree in the field in which they plan to teach. In analyzing survey data from state departments of education about alternative certification for CTE teachers, Ruhland and Bremer (2002) found that various states are resorting to several routes in order to certify teachers for career and technical fields. Across the country, the most prevalent routes do not require university course work in teacher education. However, one common route does indicate that the emergency-certified teacher will take traditional teacher education courses required for full certification.

Beyond this assessment, not very much is known about the substance of CTE teacher preparation through alternative routes or whether or not it ever has been successful in producing teachers who are effective with students in classrooms. The

one exception has been the longstanding practice in the United States of certifying trade and industrial teachers and some health teachers who did not hold baccalaureate degrees. In reviewing nearly 40 studies as a prelude to their report to Congress, Boesel and McFarland (1994) reported in the National Assessment of Vocational Education, that the practice of certifying teachers who do not have at least a baccalaureate degree should be discontinued. Further, Lynch (1996) concluded that the “survival skill training” that is typically provided to alternatively certified teachers is not sufficient for most trade and other teachers, especially if they have not had college-level education and college preparation in academic and subject-area content.

However, given the anticipated overall shortage of teachers in the United States, including CTE teachers, in the years ahead, no one seriously questions the fact that most states and/or local school districts will need to continue to provide some form of alternative route to teacher certification. Concerning how preparation through alternative routes can be improved, several studies indicate that any template for alternative teacher development should incorporate techniques known to correlate with good teacher education programs. Those include a solid grounding (i.e., a degree) in the subject(s) being taught; some coursework or a workshop prior to teaching that emphasizes curriculum and instructional planning, teaching methods, classroom assessment, and student diversity and classroom management; on-the-job mentoring from master teachers in the same subject area as the novice; rigorous screening of applicants before acceptance into an alternative certification program; and solid assessment practices with the novice teachers (e.g., use of Praxis III). In addition, states need to address how to make teaching in CTE more attractive if they are to resolve problems of recruitment and retention.

## **12.4 Teachers’ Continuing Professional Development**

Current federal legislation providing funds in support of state and local programs of CTE permit money to be used for the professional development of K-12 and postsecondary teachers. These funds are intended to be used to improve teachers’ knowledge and skills and, theoretically, should aid in preparing teachers to achieve the goals delineated in the legislation, such as those identified with CTE reform initiatives; improving programs of CTE; introducing teachers to career clusters; integration of contextual teaching and learning; integration of technology into the curriculum; and inclusion of ‘soft,’ SCANS, or 21st Century job-related skills. Teachers have returned to industry for internships, participated in company training programs, interviewed employers and employees about new knowledge and skills in the workplace, and have increasingly sought advice from business persons on education-related matters. Most initial contracts that CTE teachers hold include some conditions requiring them to participate in professional development or continuing education, at least until they earn tenure.

A major initiative in the United States that has advanced the professional development of middle and high school CTE teachers is the National Board for

Professional Teaching Standards (NBPTS). Created in the early 1990s, NBPTS has established a long-term, ambitious agenda in order to accomplish a three-part mission to (a) establish high and rigorous standards for what accomplished teachers should know and be able to do; (b) develop and operate a national voluntary system to assess and certify teachers who meet these standards; and (c) advance related education reforms for the purpose of improving student learning in US schools. In order to meet this agenda, NBPTS has developed standards for nearly 30 subject areas in US K-12 schools, including CTE (National Board for Professional Teaching Standards, 2002). In 1997, NBPTS approved 13 standards to assess highly accomplished teachers in CTE. Those were clustered into four broad areas that collectively represent accomplished teaching of CTE students, age 11–18: creating a productive learning environment; advancing student learning; helping students make the transition to work and adult roles; and improving education through professional development and outreach. Each of the 13 standards states one aspect of accomplished teaching in terms of observable teacher actions that have an impact on students. Teachers who successfully pass the national assessment in CTE are evaluated to be among the best the profession has to offer. Teachers must have at least three years of classroom experience and hold an earned baccalaureate degree before they are eligible for national assessment and certification.

In addition to establishing standards for teachers' continuing professional development, about 45% of all K-12 CTE teachers hold a postgraduate degree from a college or university (Guarino, Brewer, & Hove, 2000). However, little is known about the specific degree structure of graduate programs in CTE, how many universities offer such programs, and what standards or curriculum frameworks are used to underpin graduate degrees. Presumably, many of the colleges and universities that continue to offer preservice teacher education programs also offer graduate programs targeted at CTE (Lynch, 1991; Bruening et al., 2001).

The University Council for Workforce and Human Resource Education (UCWHRE, 2009) currently consists of 18 US universities that provide leadership, research, service, and instruction in CTE and in human resource training and development. UCWHRE is committed to studying significant issues in CTE in the United States and is concerned with the professional preparation of individuals preparing for roles in CTE and HRD. Membership is limited to universities that (a) have a doctoral program with an emphasis in CTE and HRD, (b) are supported by graduate faculty with expertise in those areas, and (c) have faculty who provide leadership and contributions to the field of CTE and HRD (<http://www.hre.uiuc.edu>).

Another possible indicator of graduate quality in CTE is the annual report of the best graduate schools by U.S. News & World Report, which evaluates graduate programs in various fields of education every year. The rankings are based on expert opinion about program quality on the one hand, and statistical indicators that describe the strength of a school's faculty, its research, and the performance of students both as they enter and leave on the other hand. In its 2009 edition, the magazine identified the top seven graduate programs in vocational and technical education (i.e., CTE) to be University of Georgia, Athens; Ohio State University, Columbus; Pennsylvania State University, University Park; University

of Minnesota, Twin Cities; Virginia Tech, Blacksburg; the University of Illinois-Urbana Champaign; and Oklahoma State University, Stillwater (<http://grad-schools.usnews.rankingandreviews.com>).

## 12.5 Supply and Demand of CTE Teachers at High School Level

The CTE secondary teaching force has declined since the early 1980s. Student enrollment, pupil-teacher ratios, and course-taking patterns are common indicators of demand for CTE teachers. In all indices, the United States took a significant downward turn throughout the 1980s and 1990s in its high school CTE programs. For example, in 1998, students earned 4.0 credits in CTE courses of the total numbers they completed for high school graduation, compared to 4.6 credits in 1982 (U.S. Department of Education, 2002a).

Indicators for the supply of CTE teachers include the number of new teachers being certified each year, the number of certified teachers who enter the profession, and the number leaving the profession. Again, the 1980s and 1990s witnessed a significant decline in the CTE teaching force. Many colleges and universities closed their CTE teacher education programs; fewer CTE college graduates with certification chose to teach, but rather went to work in industry; and large numbers left teaching—some reports citing as much as a 50% teacher attrition rate within the first five years. Overall supply of and demand for CTE teachers can also be directly impacted based upon the number of reported teaching vacancies. And again, various state-level and some national reports cited the large number of CTE high school programs that were closed during the last two decades of the twentieth century (Guarino, Brewer, & Hove, 2000; Lynch, 1991, 1997).

This downward trend may gradually be reversing itself. Some state-level data indicate that the demand for CTE teachers is increasing due to (a) increased numbers of students entering high schools; (b) more college-preparation students choosing to take electives in CTE programs; (c) better, improved, or new CTE programs that are attractive to students; (d) the recognition by students and parents that all high school students need some basic work skills in order to enter employment; and (e) the influence of several national or federal initiatives—School-to-Work Opportunities Act of 1994, Tech Prep, integration of academics into CTE courses, and technology infusion into the schools and curriculum. The federal Department of Education estimates that schools will need to hire more than two million new teachers in the next decade due to teacher retirements and increased enrollments. Shortages are most acute in urban and rural disadvantaged districts and in the fields of special education, science, mathematics, and some programs in CTE.

## 12.6 Issues and Challenges

In this final section we draw attention to three issues related to CTE that may present the greatest challenges for CTE teachers today.

### ***12.6.1 High School Quality***

A considerable debate in the professional literature and policy arenas concerns the role and quality of CTE in US high schools. Indeed, there are many CTE programs that are exemplary with solid standards, increased integration of academics, quality instruction, appropriate learning experiences for students, outcomes that result in good job placements, and other positive indicators. Supported by federal funding for CTE, many programs have improved curriculum and instruction and have forged articulation agreements with postsecondary technical and community colleges. However, there are also programs that are mirrored in a twentieth century model of factory, farm, and homemaking. There are high school programs that are “dumping grounds” for students who cannot or will not do what is necessary to master appropriate academics. Equipment, curriculum, and other instructional resources are limited or outdated. Some school administrators continue to use high school CTE programs as dumping grounds for students who need to be kept in school, busy, and out of trouble (Grollmann, 2005).

Within the debates about directions in CTE a few influential groups and individuals recommend elimination of all high school CTE and shifting technical and job-skill training to postsecondary institutions instead. They advocate that the high school curriculum ought to focus only on academics and that its sole purpose is to prepare students for postsecondary education. Looking at standardized test scores of students’ academic achievement, which especially in math and science encounter a strong push in the United States, no data or substantive, large-scale research findings lead to the conclusion that CTE adds value in raising students’ test scores on standardized tests. Thus, the direction offered favors to increase student enrollment in more rigorous academic courses in math, science, and languages rather than supporting CTE programs.

Other studies point out that enrollments in Tech Prep programs of study and in some career academies have shown positive results in other measures of student achievement, such as improved graduation rates, less tardiness and absenteeism in classes, improved grade point averages, increased matriculation of high school students into postsecondary education, and better engagement of students with school subjects. Thus, another trend calls for more integration of academic and vocational education—in the sense of more merging of the hand and the mind. Yet other groups seek the encouragement of both: some employment preparation in high school through CTE as well as rigorous academics whereby the students are prepared for postsecondary education while concomitantly acquiring job skills and work experience. A few suggest limiting high school CTE to those students who are economically, culturally, socially, or academically challenged.

No doubt the debates will continue, and federal and state legislative initiatives will favor one or the other of the dichotomies or find some compromise somewhere on a midpoint in the continuum.

### ***12.6.2 Teacher Preparation***

To teach in elementary education, high school academic subject areas, and several programs identified with CTE (e.g., agriculture, business, family and consumer sciences), a baccalaureate degree is almost universally a prerequisite to obtain a teaching license. However, in trade and industrial education and in the many specialties identified with health occupations, experience in industry or a medical field is often considered a sufficient prerequisite for teacher licensure. Even with a baccalaureate degree as a foundation and as an absolute requirement, the debate rages around alternative teacher preparation programs and their impact on teacher quality and student achievement. The most significant questions seem to be the following: Where do alternatively certified candidates come from and what knowledge and experience do they bring to teaching? Do they know enough and do they know how to teach it? How should they best be mentored and taught in the time given to teach them prior to licensure? What is critical to be taught in that short timeframe to prepare them to assume teaching responsibilities in real classrooms? In what types of schools and districts are they being placed? Are they being successful with students in teaching them high standards and in teaching the knowledge and skills students need for employment and/or entering into postsecondary education?

Within the traditional teacher preparation programs in colleges and universities, challenges also abound. Many colleges of education are cited as being poor of quality in student demographics (e.g., populated by students with low standardized test scores and/or who find the curriculum easier than that offered in professional schools or in colleges of arts and sciences); poor of quality in curriculum and instruction—often providing insufficient substance in the subject matter and insufficient clinical experiences with students; and often lacking in financial resources, equipment, technology, and inadequate depth and breadth of faculty to produce quality teachers. Many are accused of loading up teacher education students' programs of study with methods courses at the expense of solid academic, subject matter courses.

### ***12.6.3 Conditions of Teaching***

A final challenge is the prevailing perception that the conditions for teachers in many US public schools are less than exemplary. Studies show teachers are demoralized by large classes, students who are unmotivated to learn and frequently absent from classes, CTE courses that are often used as “dumping grounds” for low-achieving students, facilities and equipment that are just too outdated to be effective in teaching students appropriate job skills and knowledge, and poor salaries. Teacher turnover is high. Teachers complain of an overemphasis on standardized test scores which result in teaching by rote memorization exercises and drills to the exclusion of creative instructional methods that teach students to solve problems, collaborate with others to complete assignments, engage in work- and community-based learning activities, integrate knowledge from various disciplines and vocational fields, and have many samples of their work assessed through authentic means.



To bring about the initiatives proposed in various policy-influencing and legislative initiatives surrounding CTE, increased emphasis undoubtedly needs to be placed on improving professional development and overall working conditions for teachers. The challenge then becomes determining whether states and local school districts are willing to invest resources to ensure that quality professional development is available to CTE teachers on an ongoing basis and followed up with appropriate support to insure that the teachers are learning from it. And, of course, educators' claim that the continuing call to raise teacher salaries, provide adequate support in the classrooms—especially targeted at poor readers and students who are otherwise behind grade level, and generally improve the environment in schools has largely gone unanswered.

## References

- Barlow, M. L. (1976). 200 years of vocational education 1776–1976. *American Vocational Journal*, 51(5), 21–108.
- Bartlett, J. E., II (2002). Preparing, licensing, and certifying postsecondary career and technical educators. *Journal of Vocational Education Research*, 27(1), 105–125.
- Boesel, D., & McFarland, L. (1994). *Summary and recommendations. National assessment of vocational education* (Vol. 1). Washington, DC: Office of Educational Research and Improvement, U.S. Department of Education.
- Bruening, T. H., Scanlon, D. C., Hodes, C., Dhital, P., Shao, X., & Liu, S. (2001). *The status of career and technical education teacher preparation programs*. Columbus, OH: National Center for Career and Technical Education.
- Carnevale, A. P., & Desrochers, D. M. (2001). *Help wanted... credentials required: Community college in the knowledge economy*. Princeton, NJ: Educational Testing Service.
- Coley, R. J. (2000). *The American community college turns 100: A look at its students, programs, and prospects*. Princeton, NJ: Educational Testing Service.
- Educational Testing Services. (2003). Reference from the Internet [HTML Document]. Retrieved January 1, 2003, from <http://www.ets.org/praxis/index.html>
- Grollmann, P. (2005). *Professionelle Realität von Berufspädagogen im internationalen Vergleich. Eine empirische Studie anhand ausgewählter Beispiele aus Dänemark, Deutschland und den USA*. Bielefeld: Bertelsmann.
- Guarino, C. M., Brewer, D. J., & Hove, A. W. (2000). *Who's teaching and who will teach vocational education? (MDS-1302)*. Berkeley, CA: National Center on Research in Vocational Education.
- Interstate New Teacher Assessment and Support Consortium (INTASC). (1992). *Model standards for beginning teacher licensing and development: A resource guide for state dialogue*. Retrieved October 8, 2002, from <http://www.ccsso.org/intasc.html>
- Lynch, R. L. (1991). *A national data base on vocational teacher education (ED Department Grant No. V051A80004-89)*. Berkeley, CA: National Center for Research in Vocational Education, University of California at Berkeley.
- Lynch, R. L. (1996). Principles of vocational and technical teacher education. In N. K. Hartley & T. L. Wentling (Eds.), *Beyond tradition: Preparing the teachers of tomorrow's workforce* (pp. 73–89). Columbia, MO: University Council on Vocational Education.
- Lynch, R. L. (1997). *Designing vocational and technical teacher education for the 21st century: Implications from the reform literature* (Information Series No. 368). Columbus, OH: Center on Education and Training for Employment.

- Lynch, R. L. (1998). Vocational teacher education in U.S. colleges and universities and its responsiveness to the Carl D. Perkins Vocational and Applied Technology Education Act of 1990. In A. Gamoran (Ed.), *The quality of vocational education* (pp. 5–42). Washington, DC: Office of Educational Research and Improvement, U.S. Department of Education.
- Lynch, R. L. (2000). *New directions for high school career and technical education in the 21st century* (Information Series No. 384). Columbus, OH: Center on Education and Training for Employment.
- Lynch, R. L., & Ruhland, S. K. (2007). Career and technical teaching and teacher education in the United States of America. In P. Grollmann & F. Rauner (Eds.), *International perspectives on lecturers in technical and vocational education* (pp. 277–306). Dordrecht: Springer.
- National Board for Professional Teaching Standards (NBPTS). (2002). What teachers should know and be able to do. Retrieved January 8, 2003, from <http://www.nbpts.org/pdf/coreprops.pdf>
- National Council for Accrediting Teacher Education. (1997–2003). Reference from the internet [HTML Document]. Retrieved January 8, 2003, from [http://www.ncate.org/standard/m\\_std.htm](http://www.ncate.org/standard/m_std.htm)
- National Occupational Competency Testing Institute. (2002). Reference from the internet. Retrieved November 1, 2002, from <http://www.nocti.org>
- Pahl, J.-P., & Rauner, F. (2008). Research in the vocational disciplines. In F. Rauner & R. Maclean (Eds.), *Handbook of technical and vocational education and training research* (pp. 193–199). Dordrecht: Springer.
- Phillippe, K. A. (2000). *National profile of community colleges: Trends & statistics*. Washington, DC: American Association of Community Colleges.
- Prosser, C. A., & Quigley, T. H. (1950). *Vocational education in a democracy* (Rev. ed.). Chicago: American Technical Society.
- Roach, V., & Cohen, B. A. (2002). *Moving past the politics: How alternative certification can promote comprehensive teacher development reforms*. Alexandria, VA: National Association of State Boards of Education.
- Ruhland, S. K., & Bremer, C. D. (2002). *Alternative teacher certification procedures and professional development opportunities for career and technical education teachers*. St. Paul, MN: The National Research Center for Career and Technical Education.
- Scott, J. L., & Sarkees-Wircenski, M. (2008). *Overview of career and technical education* (4th ed.). Homewood, IL: American Technical Publishers, Inc.
- Stone, J. R. III, & Bae, S. (2002). *An analysis of the school administrator's survey 1996–2000: A special analysis for the National Assessment of Vocational Education*. St. Paul, MN: The National Research Center for Career and Technical Education.
- University Council for Workforce and Human Resource Education (UCWHRE). (2009). Reference from the internet. Retrieved November 11, 2009, from <http://www.hre.uiuc.edu/ucwhre/>
- U.S. Department of Education. (1999a). *Occupational programs and the use of skill competencies at the secondary and postsecondary levels (NCES 2000-023)*. Washington, DC: Office of Educational Research and Improvement.
- U.S. Department of Education. (1999b). *Participation in adult education in the United States: 1998–99 (NCES 2000-027)*. Washington, DC: Office of Educational Research and Improvement.
- U.S. Department of Education. (2001). *Public elementary/secondary school universe survey: 1999–2000 (NCES 2001-339R)*. Washington, DC: Office of Educational Research and Improvement.
- U.S. Department of Education. (2002a). *Digest of education statistics 2001 (NCES 2002-130)*. Washington, DC: Office of Educational Research and Improvement.
- U.S. Department of Education. (2002b). *Meeting the highly qualified teacher challenge: The secretary's annual report on teacher quality*. Washington, DC: Office of Educational Research and Improvement.
- U.S. Department of Education. (2002c). Reference from the internet. Retrieved January 8, 2003, from the World Wide Web: <http://www.ed.gov/offices/OUS/PES/NAVE>