



NEW YORK CITY COLLEGE OF TECHNOLOGY

# CITY TECH

Department of  
Career and Technology  
Teacher Education

PROFESSIONALISM IN CAREER AND TECHNOLOGY TEACHER EDUCATION

NATIONAL, STATE, AND LOCAL CONTENT STANDARDS AND BEST PRACTICES

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## INSTITUTIONAL MISSION

New York City College of Technology (City Tech) is the designated technical college of The City University of New York, currently offering baccalaureate and associate degrees, as well as specialized certificates. New York City College of Technology serves the city and the state by providing proficient in the technologies of the arts, business, communications, health and engineering; human services and law-related professions; career and technology education; and liberal arts and sciences. The college provides access to higher education for New York City's diverse population and assures high quality in its programs by a commitment to outcomes assessment. The college also serves the region by developing partnerships with government agencies, business, industry and the professions, and by providing technical and other services.

Education at New York City College of Technology provides students with both a command of skills necessary in their respective career areas, and the educational foundation for lifelong learning. All degree programs are built upon a liberal arts and science core curriculum designed to foster intellectual curiosity, an appreciation for the aesthetic dimension of life and work, and a respect for cultural diversity. Students obtain practical experience in their chosen fields in a variety of settings. The College further encourages student growth and development through academic and student support services and a wide array of student activities.

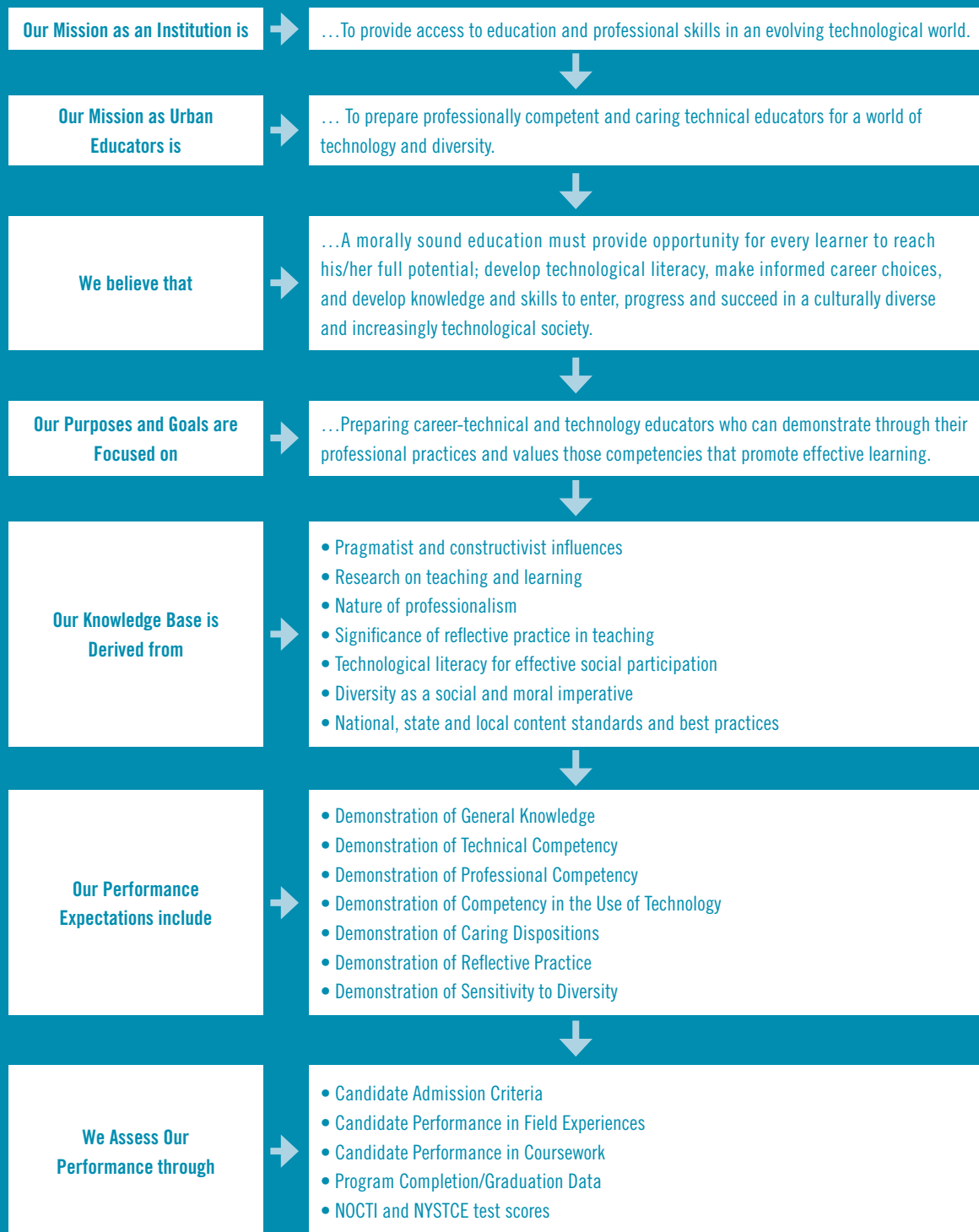
## UNIT VISION AND MISSION STATEMENT

At City Tech, we envision career and technical education (CTE) and technology education programs of the 21st century in which all students have access to qualified, competent, caring and reflective teachers. Our mission, therefore, is to prepare professionally competent and caring technical educators for a world of technology and diversity.

This mission reflects the core values of the unit in the preparation of teacher candidates. The P/T/D conceptual framework dictates and harnesses the necessary general education, content, and pedagogical core knowledge and skills that candidates must develop and translates these into competencies for each candidate's successful program completion. This is accomplished through the integration of technology, diversity, and professional and subject matter knowledge, skills and dispositions into professional education courses, field experiences, and the assessment system.

# P/T/D: Conceptual Framework for Preparing Reflective and Caring Technical Educators for a World of Technology and Diversity

The conceptual framework of the professional education unit at New York City College of Technology is grounded on the underlying themes of **Professionalism, Technology** and **Diversity (P/T/D)**.



# UNIT PHILOSOPHY, PURPOSE, AND GOALS

## Unit Philosophy

A morally sound education in a democratic society must provide favorable environments in which every learner has an opportunity to develop to his/her full potential, regardless of cultural background or personal dispositions. Such education must enable the learner to develop technological literacy, make informed choices about careers, and develop the required knowledge and skills to enter, progress, and succeed in a culturally diverse and increasingly technological society.

Schools, as agents of society, cannot adequately meet the challenges posed by technology or take full advantage of the opportunities it creates without teachers who possess strong academic, pedagogical and technical knowledge and skills. Technology teachers, as facilitators of technological literacy, have a moral obligation to help students understand the connection between technology and their role in the democratic process. An individual's ability to fully and freely participate in social and civic activities depends not only on an understanding of the importance of such activities but also on access to participation. In a technological society, technology increases the opportunities for every member to participate in the democratic process, thus ensuring the realization of the goal of social justice.

## Unit Purpose

The purpose of the unit is to prepare career-technical and technology educators who can demonstrate through their professional practices and values those competencies that promote effective learning.

## Unit Goals

**Our teacher candidates will be able to**

1. demonstrate knowledge and skill in their career or technical content areas to enable students to achieve high standards of learning and performance.
2. demonstrate knowledge and understanding of the students they teach and create learning environments that support and foster learning, taking into account each student's abilities, needs, interests, and socio-economic and cultural background.
3. design, plan, implement, and manage the instructional process in a safe and nurturing environment, using a variety of methods, assessment techniques and resources, including modern technology, to engage students in meaningful learning.
4. communicate and collaborate with other teachers and school personnel, parents, and the larger community in order to create a safe and healthy learning environment.
5. demonstrate sensitivity to the diversity that characterizes urban classrooms and awareness of the teacher's professional responsibility toward special populations including students with disabilities, gifted and talented students, adult learners, women, and language and ethnic minorities.

## Candidate Performance Expectations

Our graduates are prepared to demonstrate the following:

### General Knowledge:

- strong foundation in the liberal arts and sciences that form the basis for our shared values, understandings, and responsibilities in a democracy;
- basis for creating learning environments that promote intellectual curiosity, inquiry and independent thinking;
- knowledge and understanding of the students and ability to create learning environments that support and foster learning, taking into account each student's abilities, needs, interests, and socio-economic and cultural background.

### Technical Competency:

- core knowledge about the world of work in general and the skills and processes that are transferable across industries;
- knowledge of specific career-technical areas and experienced-worker level competencies in specific career technical subjects;
- knowledge of the subject matter of technology and skill in the development and utilization of a wide range of technological systems and resources;
- knowledge and skill in career and technical content areas to enable students to achieve high standards of learning and performance.

### Professional Competency:

- knowledge of students and competence in designing instruction appropriate for their developmental levels and needs;
- ability to provide environments that are learner-friendly and support high levels of learning and performance;
- proficiency in designing, planning, implementing, and managing the instructional process in a safe and nurturing environment, using a variety of methods, assessment techniques and resources, including modern technology, to engage students in meaningful learning.

### Competency in the Use of Technology:

- ability to use modern computer technology and the Internet to facilitate and enhance the instructional process and student learning;
- broad knowledge about technology issues and trends to improve practice in schools and classrooms.

### **Caring Dispositions:**

- personal and interpersonal characteristics that build upon and enhance dispositions so that they are caring professionals who have respect for learners of every age and background;
- model of sound moral character and leadership as well as example of personal, social and civic responsibility;
- disposition to communicate and collaborate with other teachers and school personnel, parents, and the larger community in order to create a safe and healthy learning environment.

### **Reflective Practice:**

- opportunities for critical analysis, evaluation, and continuous improvement of professional practice and life-long learning.

### **Sensitivity to Diversity:**

- awareness of the diverse cultures that make up our urban schools, communities and our global society;
- understanding of the backgrounds of students as a basis for practices that support and meet students' learning needs;
- ability to foster collaborative relationships with the communities that we serve including K-12 students, colleagues, parents, business and industry, and other agencies in the larger community;
- awareness of the teacher's professional responsibility toward special populations including students with disabilities, gifted and talented students, adult learners, women, and language and ethnic minorities.

## **Knowledge Base**

Our knowledge base is informed by the following:

- Pragmatist and constructivist philosophies and influences represented by the works of John Dewey (1916, 1938), Charles Prosser (1949), and Miller (1996);
- Research on teaching and learning including the works of Piaget (1952), Vygotsky (1978), and Tiene & Ingram (2001);
- Nature of professionalism, especially the views of the Holmes Group (1995, 1986), John Goodlad (1994), Linda Darling-Hammond (1997), and Miller & Miller (1998);
- Significance of reflective practice in teaching including the works of Goodlad (1994), Yoo, (2001), Chester (2001); and Collier (1991);
- Technological literacy for effective social participation, represented by Goodlad (2004), Martin (2002), Israel (1995), and the International Technology Education Association (ITEA, 1996);
- Diversity as a social and moral imperative, such as the works of Goodlad (1994, 2004), Darling-Hammond (1997), and Larke & Larke (1995);
- National, state and local content standards and best practices including the New York State Standards for Preparing Classroom Teachers (NYSED), Standards of the National Council for Accreditation of Teacher Education (NCATE), the New York State Learning Standards (NYSED), the International Technology and Engineering Education Association (ITEEA) Standards for Technological Literacy, and the National Board for Professional Teaching Standards (NBPTS) Vocational Educational Standards for Board Certification.

## PRAGMATIST-CONSTRUCTIVIST THEORIES

Rapidly changing technology and global economic competition have caused fundamental shifts in the nature of work and the workplace. The concern in the late 1980s that America was losing its competitive edge in the global economy led a number of national and regional commissions to direct public attention to the relationship between the nation's economic competitiveness and its system of workforce preparation. The reports of the Commission on the Skills of the American Workforce (1990), and the Secretary's Commission on Achieving Necessary Skills (SCANS, 1991), both criticized the nation's system of preparing its workers and called for changes in the structure of American education and particularly the high school. These reports maintained that the content and instructional strategies of high school education did not provide students with the necessary skills to obtain and hold decent jobs.

The Carl D. Perkins Act of 1990 and its support for dismantling the wall that separated vocational and academic education, in favor of integrating academic and vocational curricula, was a significant development in career and technical (vocational) education reform. It represented a shift from the essentialist philosophy of Charles Prosser that guided the development and practice of vocational education from the early part of the 20th century to the 1980s (Lynch, 1996). Prosser believed that vocational education should provide an educational path that is separate from the path of general education (Prosser & Quigley 1949). John Dewey's progressive philosophy, on the other hand, was against separate systems of vocational and general education. Dewey believed that the purpose of education was to develop an informed citizenry for a democratic society. The current movement toward the integration of vocational and academic education reflects Dewey's pragmatist views (Gray and Walter, 2001).

Although Dewey saw the value of vocational education as a means of teaching about the culture, he did not believe in teaching specific skill training (Dewey, 1916, cited in Lynch, 1996). Rather he advocated an education that prepared students in broad problem solving skills, experimentation, and full participation in democratic processes. In many respects, these are the same approaches that are being advocated in the present-day constructivist instructional approach.

Following his analysis of research and practice in vocational and technical teacher education Miller (1996) concludes that pragmatism and constructivism are the dominant philosophical and theoretical underpinnings of the preparation of teachers for work-based education programs. Miller suggests that the pragmatist/constructivist teacher views reality as constantly changing. Teachers must, therefore, acknowledge the unique and diverse experiences students bring to the learning situation and help students draw upon and reconstruct their experiences, create meaning and change in order to reach their full potential. The pragmatist/constructivist teacher sees his/her role as one of providing opportunities that will enable students to build upon their experiences, make connections, and construct new meanings (Lynch, 1996).

## RESEARCH ON TEACHING AND LEARNING

The works of cognitive psychologists of the 20th century like Jean Piaget (1952, 1966), and Vygotsky (1978) focused on human thought processes. But they also provide valuable insights into how learning occurs and how it could be most effectively promoted. Perhaps even more importantly, they highlight the critical role of the teacher in the learning process. Cognitive theory views the human mind as a dynamic set of cognitive structures through which we make sense of what we perceive. Piaget (1966), for example, observed children learn through play and suggested that learning occurs when individuals interact with objects (e.g., material things, concepts or relationships) in their environment and construct knowledge and meaning in their heads.

This interpretation of how people learn (constructivism) and the research it generated has led to a greater understanding of the social nature of learning and the belief that learners construct their own understanding of the topics they study (Eggen & Kauchak, 1996). Constructivist theory emphasizes the importance of the learner's initiative in the educational process. Constructivists believe that people's understanding of any



concept depends entirely on their mental construction of that concept, that is their experience in deriving that concept for themselves. The role of the teacher shifts from that of provider of information to one of facilitator who asks questions, suggests resources and learns alongside the students (Tiene & Ingram, 2001).

Brooks & Brooks (1993) make a strong case for learning experiences and environments in which students are not just passive recipients of information but active participants who are capable of defining their own problems, generating their own solutions, demonstrating their own understandings of concepts and principles. In this new paradigm, learners and teachers together become a community of learners. The teacher is not the sole source of knowledge; students also generate and share their own knowledge and understanding.

Constructivism as an approach to teaching and learning has important implications for career and technical educators. One of the fundamental principles of constructivism is that the best learning is situated learning; that is learning where learners solve problems, perform tasks and learn new material in a context that makes sense to them (Tiene & Ingram, 2001). The constructivist emphasis on experiential learning validates this basic and dominant instructional approach used in career and technical education programs. John Dewey (1938) long saw the educational soundness and value of experiential learning. Although Dewey's primary interest was in education for a democracy, he believed that individuals create new knowledge and transform themselves through a process of learning by doing. He warns that experience does not always result in learning. For learning to occur, it must include two key dimensions—continuity and interaction.

Another principle of constructivism with implications for career and technical educators is that learners must be supported throughout the learning process using scaffolding (Tiene & Ingram, 2001). This is the process in which the teacher or another student assists the learner in developing a new understanding or a new skill. As the student develops, the supports are removed so that the learner can stand on his or her own.

Based on their work on brain-based learning, Caine & Caine (1991, 1997) propose that teachers “need to orchestrate the immersion of the learner in complex, interactive experiences that are both rich and real” (1991, p.104). Teachers must provide opportunities for intensive analysis so that the learner gains insight into the problem or engages in active processing of experience. Caine and Caine (1997) suggest that this active processing of experience includes thinking critically, asking probing questions, exploring alternative perspectives “and searching for big ideas and broad implications” (1997, p. 122).

## NATURE OF PROFESSIONALISM

For the past two decades, virtually every major reform proposal in education has offered suggestions on how to move teaching to a status comparable to the highly regarded and recognized professions such as law and medicine (e.g., The Holmes Group, 1986, 1995; Goodlad, 1990, 1994; Carnegie Forum on Education and the Economy, 1986). In its 1986 report “Tomorrow's Teachers,” the Holmes Group advocated making the education of teachers intellectually solid and rigorous and called on member institutions to establish professional development schools which would connect education schools with K-12 schools and make schools better places for teachers to work.

John Goodlad (1994, 1990) called for a redesign of teacher education that will take place in a —center of pedagogy—that brings schools and universities together in a close renewing relationship. As one of the conditions for reform in teacher education, Goodlad (1990, 1994) insists that “there must be a school or center of pedagogy committed to solely to advancing the art and science of teaching and immersing educators in it” (1990, p.278). Like the Holmes Group, Goodlad (1994) proposes replacing the four-year undergraduate teacher education model with a five-year model.

Danielson (1996) identified aspects of a teacher's responsibilities that have been shown through empirical studies to improve student learning. These responsibilities define what teachers should know and be able to do in the exercise of their profession. Danielson's framework identified 22 components of a teacher's responsibilities. These components are in turn clustered into four domains, namely, planning and preparation,

the classroom environment, instruction, and professional responsibilities. Danielson suggests that professional educators must assume responsibility for understanding content, the cultural environments from which their students come, and the design of coherent instruction.

Caldwell (1999), Darling-Hammond (1997), Goodlad (1994) The Holmes Group (1995) and NCATE (2000) have all identified elements that should be integral to any viable program of teacher preparation. These include (1) higher entry criteria, (2) core of liberal arts and sciences courses, (3) major in an academic subject, (4) core curriculum in pedagogy, and (5) clinical experience. Caldwell (1999) explains that in the environment of this new professionalism,

- teachers must continue to acquire new knowledge and skill in the subject area that they are already qualified to teach;
- they need to be skillful in using an array of diagnostic and assessment instruments to identify what entry levels and needs exist among their students;
- each child is treated as an individual, in reality as well as in rhetorical terms;
- teachers work as part of a team and they devote much time out of class to preparation;
- cross-cultural communication and effective involvement of parents as partners in the educational enterprise are required.

Lieberman and Miller (1999) suggest that teachers need to make various transitions as they develop professionally. Among other things, teachers must make the transition from a weak and narrow knowledge base to a stronger, broader one; from seeing teaching at the center to seeing learning at the center; from individualism to professional community; and from teachers of technical work to facilitators of inquiry.

## PROFESSIONALISM IN CAREER AND TECHNOLOGY TEACHER EDUCATION

Traditionally, trade and industrial vocational trade and industrial (T&I) teachers have been hired primarily on the basis of their occupational experience and thereafter required to take some course work to make them “professional” teachers (Gray and Walter, 2001). This tradition that dates back to the Smith-Huges Act of 1917 is continually being challenged. In reviewing the impact of the Carl D. Perkins Act of 1990 including the reforms supported by the legislation, the National Assessment of Vocational Education (NAVE) (U.S. Department of Education, 1994) investigated the preparedness of vocational and academic teachers to provide high quality education and to integrate vocational and academic curricula. The NAVÉ report found the academic preparation of vocational teachers at both the secondary and postsecondary levels to be inadequate and recommended that vocational teachers must be required to possess at least a baccalaureate degree prior to taking up their first teaching job.

Most reform proposals in CTE teacher education (e.g., Lynch, 1996; Gray & Walter, 2001; McCaslin & Parks, 2002) have identified key components that must be part of any CTE teacher preparation program. These include (a) general education in liberal arts and sciences, (b) subject matter knowledge including general workforce education and specific occupational knowledge and skills, (c) pedagogy including knowledge of the learner, instructional planning and implementation, and use of instructional technology, (d) clinical experience that includes classroom experience and industrial work-based experience.

## GENERAL EDUCATION

The competent CTE educator must have a solid grounding in the liberal arts and sciences. This provides the basis for the educator's shared values, understandings, and responsibilities in a democracy. The importance of a solid liberal education for all teacher candidates has been emphasized in numerous teacher education proposals (e.g., The Holmes Group, 1986, 1995; Goodlad, 1990, 1994, Lynch, 1996, Gray & Walter, 2001). With the increasing emphasis on the integration of academic and vocational education, Gray and Walter (2001) went further to recommend that all future CTE teachers need training in teaching academic subjects such as mathematics, science, and communications. McCaslin and Parks (2002) also note that career and technical teachers today, unlike those of the 20th century, are faced with additional expectations and demands including preparing students for high achievement in mathematics, science, and communication and demonstration of higher order skills in reasoning, problem-solving and collaborative work.

This paradigm shift in CTE teacher education dictates that technical educators must prepare students for effective participation in a democratic society. They must provide learning environments that promote intellectual curiosity, inquiry and independent thinking. These values and abilities come only from a strong foundation in a coherent and meaningful liberal education.

## TECHNICAL COMPETENCY

Technical teachers must possess broad knowledge about the world of work in general and specific knowledge and skill of the career-technical subject matter they teach. As the saying goes,—"You cannot teach what you don't know."—Technology educators develop technical competency through the study of and laboratory experiences in the subject-matter content of the various technological systems, including but not limited to construction, manufacturing, communications, and transportation systems (Bensen, 1995; Wright, 1995).

For career-technical educators, the development of technical competency and, in fact the path to teaching is not as direct as in any other teaching field. Historically, the occupational experience of CTE (T&I and health occupations) teachers has been used to verify their technical competence for purposes of licensure and entry into teaching. But as Miller and Miller (1998) point out, occupational experience is no longer sufficient evidence of technical competency. Gray and Walter (2001) found that many states now require occupational competency testing, in addition to work experience. At New York City Technical College, for example, a national occupational competency examination that includes both written and performance assessments is used to verify that teacher candidates possess the technical competency required in their teaching subjects.

## PROFESSIONAL COMPETENCY

Professional competency focuses on the professional role of the technical educator as it relates to instructional planning, instructional delivery, and instructional evaluation (Miller & Miller, 1998). Technical educators must be able to demonstrate not only general and specific knowledge and skill of their technical specialty, they must also demonstrate ability to translate the knowledge and skill into pedagogy. Thus, knowledge of students, their age and developmental characteristics, knowledge and skills, approaches to learning, cultural backgrounds, needs and interests are essential elements of the teacher candidate's professional competency. The competent technical educator is one who can set meaningful and realistic instructional goals for his/her students, design coherent instruction, identify and utilize instructional resources, and implement instruction and assess student outcomes.

## COMPETENCY IN THE USE TECHNOLOGY

A critical component of the CTE teacher's professional competency is the ability to use computer technology and the Internet to facilitate teaching and learning (Gray & Walter, 2001). McCaslin and Parks (2002) note that technology is having significant impact on CTE teacher preparation and professional development, by enabling teachers who are hundreds or thousands of miles apart to share their knowledge and practice.

Barab, Hay, and Duffy (2002) contrasted traditional uses of technology in the classroom including word processing and computer-assisted instruction with a model that uses technology to support and promote situated learning. The authors proposed the notion of grounded construction in which technology provides the grounding of the learning context. In this model, the authors emphasize the facilitating role of the teacher with technology serving as:

1. information resource—provide information to support learner inquiry, e.g., WWW, hypermedia, and interactive CD-ROMs;
2. content contextualization—situate the material to be learned within an authentic context, e.g., experiential simulations, problem-based instruction;
3. communication tool—facilitate collaborative learning, e.g., asynchronous conferencing, e-mail;
4. construction kit—provide concrete tools for building understandings, e.g., LOGO, HTML and VRML editors;
5. visualization tool—present phenomena for students to visualize and manipulate for scrutiny and insight e.g., CAT scans in medical research, 3D modeling in CAD.

There is research evidence that shows a direct link between student use of computers and academic achievement. For example, Halpert (2002) found that students who used computers in class outperformed those taught without computers by a margin of 25 to 41 percentage points. Halpert's research also showed that students whose teachers received professional development showed significantly higher achievement gains than those students whose teachers did not engage in technology-related professional development. This underscores the important role of the teacher as facilitator in any use of technology to promote learning (Barab, Hay, and Duffy, 2002).

Teacher candidates must be able to use modern computer technology not only as tools for teaching, inquiry and instructional management but also as a means to reflect on their own practice (for example, with the use of video tapes and CD-ROMs). It is equally important that teacher candidates be prepared to make critical judgments about which technologies are appropriate and which ones are not in given any given instructional situation.

## CARING DISPOSITIONS

Technical educators possess certain personal characteristics and behavioral patterns that have direct influence on student learning (Miller & Miller, 1998). An important element in an educator's personal and social development is his/her interpersonal skills. The ability to interact in positive ways with students, colleagues, administrators, parents and other people in the community is vital to an educator's instructional effectiveness. Teacher candidates who develop habits of cooperation, friendliness, respect for and sensitivity to diversity, and willingness to compliment the accomplishments of students and colleagues, among other social qualities, are more likely to foster environments that support learning.

# TECHNOLOGICAL LITERACY AS A BASIS FOR EFFECTIVE SOCIAL PARTICIPATION IN A DEMOCRACY

We live in an age of unprecedented change—change brought about by technology. Technology has changed life in modern society in ways perhaps never imagined at the beginning of the 20th century. As society becomes more and more dependent on technology, technological literacy for every citizen becomes increasingly imperative. Martin (2002) notes that

**“In a democratic society, technological literacy has individual, societal, and environmental implications....As individuals, people need (a) to develop technological abilities so they will better know how to use products; (b) to assess the impacts of technological actions; and (c) to develop better decision-making abilities in order to determine which technological system or process to use or not use (p.52).**

The technologically literate person recognizes the possibilities advances in technology create and the choices society makes in adopting them (International Technology Education Association, ITEA, 1996).

In his Report on American Secondary Education, Ernest Boyer (1983) advocated the study of technology by all students. To insure that people do not confuse technological literacy with computer literacy Boyer explained: The great urgency is not “computer literacy” but technological literacy;” the need for students to see how society is being reshaped by our inventions, just as tools of earlier eras changed the course of history. The challenge is not learning how to use the latest piece of hardware, but asking when and why it should be used” (p.304).

As part of the school curriculum, technology education teaches students to understand, use and control technology. Students learn about the development of technology and its effect on people, the environment and society. They also gain insights into the application of technological concepts, processes and systems. Israel (1995) asserts that a student who has completed a technology education program should be able to participate as an active citizen by expressing their positions on technological issues, making wise consumer choices such as selecting, using, and disposing of technical artifacts, and making informed career choices. Technological literacy, according to Wiens (1995), is essential to the political and economic empowerment of the citizen.

## SIGNIFICANCE OF REFLECTIVE PRACTICE

The value of reflection on the educator’s performance is well documented in the literature (e.g., Yoo, 2001; Chester, 2001; Collier; 1999; Borko, Michalec, Timmons, & Siddle, 1997; Goodlad, 1994). By observing a video tape of one’s own teaching or documenting one’s experience in a journal as a part of a teaching portfolio, beginning (and even experienced) educators can enhance their practice by reflecting on their experience, and discussing it with peers, or mentors. Insights gained from such reflection can and does help educators change and improve their instructional strategies (Yoo, 2001).

Chester (2001) notes that reflectivity is a key component of the clinical experience in teacher preparation and cites research that suggests that establishing reflective practice early in the first years of teacher preparation promotes better reflective practice and is a significant factor in the development of “thoughtful and conscientious practitioners” (p.34). Munby and Russell (1994) warn that the development of reflective skills should not be left to chance and suggest that student teachers need training on observation as well as significant periods of time to adjust to the daily events that occur in the classroom.

Collier (1991) describes strategies that help in developing the habit of reflection including developing a teaching portfolio and maintaining a reflective or teaching journal. The value of the teaching journal in aiding personal reflection is supported by Borko, Michalec, Timmons, & Siddle (1997) and Chester (2001). Some of the benefits of the journal, according to these writers, include providing a link between research-based knowledge and classroom practice and stimulating higher order learning through the process of evaluating personal beliefs and concepts and developing personal theories of teaching (Chester, 2001).

Perkins (1998) proposes a framework that identifies three dimensions to the development of cognitive and intellectual ability, namely, the neural or genetic dimension, the experiential dimension that comes from experience, and the reflective dimension. Perkins suggests that the reflective dimension comes from thinking about thinking patterns. He concludes that the reflective dimension offers the best opportunity for education because “reflective intelligence is the most learnable of the three” (quoted in Williams, 1999, p. 96).

## DIVERSITY AS A SOCIAL AND MORAL IMPERATIVE

The National Center for Education Statistics (2001) reports that, in 1999, 38 percent of public school students in the United States were considered minority, up 16 percentage points from 1972. The challenge of racial and cultural diversity to society and education institutions has been stressed by many influential voices in contemporary American education (e.g., Goodlad (1994; Darling-Hammond, 1997). Darling-Hammond cautions that this “nation’s ability to embrace and enhance the talents of those who have struggled for voice and educational opportunity will determine its future...” (1997, p. 30).

“Individual differences—is a concept that educators have long recognized and are continually challenged to provide for in the classroom. Students bring to the learning environment not only differences in their abilities, interests, and learning styles but also in socio-economic, linguistic, and other cultural differences that influence learning and performance. Chisolm (2001) notes that diversity in a typical urban classroom is not limited to race or linguistics. —You have to consider religious differences, gender-equity issues, children who have disabilities, children coming from single parent or same-sex households and others...” (p.3).

Diversity in student backgrounds can be seen as a rich resource by the creative teacher to enrich the educational experience of his/her students (Franklin, 2001). Diversity could also become a major challenge for the inexperienced teacher. In a search of strategies that support learning necessary for populations of socio-economically, linguistically and culturally diverse students, Williams (1999) explored the role of culture and social processes in the development and transmission of intellectual abilities, language and communication. Among her findings was that socio-economically disadvantaged students often thrive academically, in spite of the odds, because they devise their own means of insuring their own success. For students to develop this resiliency, Williams concludes, certain facilitating conditions including caring and support, high expectations, and opportunities for participation in the learning process must be present.

One of the troubling issues in career and technical education especially in urban communities is the disproportionate representation of minority teachers (African American, Hispanic, Asian, and Native American). (Larke & Larke, 1995). According to the U.S. Department of Education figures, although minority students make up about 33 percent of the school age population, only 10.3 percent of the teaching population are minorities. It has been suggested that it is difficult to obtain an ethnically representative teaching force in

the public schools because only very few middle and upper class minorities are encouraged to pursue teaching as a career after graduation from high school. For example, Klamer (1995) reviewed the problems that historically constrained the recruitment of minority students into career and technical programs and cited lack of role models as one of the reasons many minority students are not attracted to technical careers.

For teacher candidates to develop competency in and sensitivity to diversity both inside and outside the classroom, especially when dealing with students, parents, and the larger educational community, a conscious effort on the part of the teacher preparation program to foster these qualities. Equally important is the need for a teaching corps that is also diverse and broad in its general and content knowledge. It is only through a broad knowledge and philosophical base that teacher candidates can demonstrate practices that reflect an understanding of the diverse needs and learning styles of K-12 students and be able to relate effectively with students, parents and the larger education community.

## **NATIONAL, STATE, AND LOCAL CONTENT STANDARDS AND BEST PRACTICES**

### **New York State Learning Standards for Mathematics, Science, and Technology (MST)**

In 1996, the New York State Board of Regents adopted sweeping reforms aimed at raising the standard of education in the State. Among other things, the Regents raised graduation requirements and adopted new standards of what students should know and be able to do by the time they are ready to graduate from high school. In all, a total of 28 standards were set in seven academic subject clusters including one cluster for Mathematics, Science and Technology (MST).

The standards of what students should know and be able to do in technology are described in the document Learning Standards for Mathematics, Science and Technology (New York State Education Department, 1996a). The subject matter content of the technology teacher education curriculum is based on the technological systems of manufacturing, construction, communication, and energy and transportation and aimed at preparing technology education teacher candidates to teach to the MST standards.

#### **Standards for Technological Literacy**

At the national level, the International Technology Education Association (ITEA) Standards for Technological Literacy: Content for the Study of Technology document (ITEA, 2000) describes the essential core of technological knowledge and skills that all K-12 students should acquire. The ITEA standards focus on technological literacy with emphasis on the nature of technology, technology and society, design, abilities for a technological world, and the designed world. Dugger (2002) elaborates on the Standards for Technological Literacy and outlines strategies for implementing the standards in technology teacher education programs.

#### **New York State Learning Standards for Career Development and Occupational Studies (CDOS)**

What students enrolled in career-technical programs are required to know and be able to do is described in the Learning Standards for Career Development and Occupational Studies (CDOS) document (New York State Education Department, 1996b). Among other things, students in K-12 career-technical programs are expected to be knowledgeable about the world of work and demonstrate academic knowledge and skills as well as mastery of foundation skills and competencies essential for success in the workplace. Career-technical education teacher candidates must demonstrate content knowledge and skills as evidence of their ability to prepare K-12 students to meet the learning standards in career development and occupational studies.

## **New York’s Commitment: Teaching to Higher Standards**

To insure that the higher standards set in K-12 education are not undermined by inadequately prepared teachers, the New York State Board of Regents in 1998 adopted new standards for teacher preparation and certification (New York State Board of Regents and New York State Education Department, 1998). The policy also specified requirements for teacher certification and licensure including preparation in three core areas, namely, general education, subject matter content and pedagogy as well as in field experiences. These requirements are aligned with other professional teaching standards, notably, the standards of the National Board for Professional Teaching Standards (NBPTS, 1997) and the standards of the National Council for Accreditation of Teacher Education (NCATE, 2000).

## **National Board for Professional Teaching Standards (NBPTS) Vocational Education Standards for National Board Certification**

The NBPTS Vocational Education Standards (1997) identified four core areas of the knowledge base that vocational (including career-technical and technology) educators who seek National Board Certification should know and be able to do. These include:

- Creating a productive learning environment
- Advancing student learning
- Providing transition to work and adult roles
- Providing professional development and outreach.

By incorporating the various standards into the framework and curriculum, we can be assured that CTE teacher candidates are committed to student learning, know their teaching subjects, can reflect upon their experience, and work effectively as members of diverse learning communities.

From this knowledge base, a number of significant themes and factors emerged and became the basis for the resulting conceptual framework. The first of these is the recognition of the specialized nature of the subject matter content that teacher candidates are being prepared to teach, namely, career and technical education (CTE) and technology education (TE). Until recently referred to as occupational education, CTE is the broad term for the diverse group of educational programs that have different purposes in the public schools. In a very narrow sense, CTE programs provide students in CTE high schools with the required knowledge and skills for gainful entry-level employment in skilled occupations. In a broader sense, CTE includes programs that serve both employment purposes and those that serve general education purposes such as technology education, family and consumer sciences, and general agricultural education.

New York City College of Technology (City Tech) is the recognized senior college of technology of the City University of New York CUNY). The Career and Technical Teacher Education and Technology Teacher Education programs are unique to City Tech and to the CUNY system. They are the only such programs for preparation of CTE and technology education teachers within the CUNY system; they are also the only such programs in a public university south of Albany. Against this background, it was considered essential for the conceptual framework to reflect the technology focus of the content that the teacher candidates are being prepared to teach.



The second factor that was considered in developing the conceptual framework is the necessary professional qualities and competencies that this group of teachers must possess. We believe that teaching is a caring profession and that any public school teacher who is worth the name must have a sound knowledge of the developmental needs of children and must possess a caring disposition. In addition, we believe that reflective practice is an essential ingredient of effective teaching. Finally, we believe that, in the age of digital technology, effective teachers must be competent in the use of modern computer technology to facilitate and improve teaching and learning.

The third and final factor in the development of the conceptual framework is the recognition of the diverse, social environment of urban classrooms of today and the future. We believe that teacher candidates must be aware of the diversity that characterizes not only our urban classrooms where they work but also the diverse nature of the communities that they serve.

## OUR COMMITMENTS

### Our Commitment to Professionalism

The purposes and goals of the P/T/D conceptual framework, as well as candidate performance expectations, emphasize a commitment to preparing teacher candidates who are caring and can help all students learn. Candidates learn the developmental needs of the students they teach and create classroom climates that support effective learning. Candidates are prepared to learn to adjust their instructional strategies to meet the learning needs and interests of all students, including those with exceptionalities. These professional commitments which are articulated in the conceptual framework are further emphasized and evident in the progressively challenging coursework, field experiences, and assessment system. The overarching purpose is to ensure that candidates acquire the necessary knowledge, skills and dispositions to create challenging but caring learning environments for all students.

### Our Commitment to Technology

A critical element of the P/T/D conceptual framework is the unit's commitment to enabling every teacher candidate to develop competency in the use of technology. Recognizing the enormous potential of modern computer technology as a tool for teaching, research, instructional management, and self-reflection, the requirement of the use of computers in instructional planning and implementation by both faculty and students has almost become standard practice at City Tech. Teacher candidates are provided opportunities in virtually every teacher education course to design instructional activities, present independent and group projects, and make lesson presentations both in the field and on campus using the variety of technologies available. To support its commitment to technology, the lecture room for most teacher education courses was upgraded in the summer of 2004 to a "Smart Room", enabling candidates and faculty to have instant access to technology during every class session. This is in addition to a portable state-of-the-art, multimedia cart, that includes a PC, digital projector, and digital still and video cameras available to candidates and faculty to present their lessons and to record and reflect upon their presentations. Since the spring of 2003, teacher candidates are being required to develop electronic portfolios (e-Portfolios) as part of the professional portfolios required during the semester of student teaching.

## Our Commitment to Diversity

The “D” in the P/T/D conceptual framework underscores the commitment of City Tech, as an institution, as well as that of the teacher education unit, to the phenomenon of diversity in our schools and in our society. An understanding of the diverse backgrounds of all learners enables the teacher candidate to acquire the necessary dispositions and to engage in professional practices that will support and meet the learning needs of all students. This understanding is also important in dealing with all the partners in the education community, namely, parents, other teachers, administrators, and school staff as well as business and industry groups. The commitment to diversity articulated in the P/T/D conceptual framework is reflected in various course syllabi, field placements and experiences, and the unit assessment system. It is also amply reflected in the student and faculty populations at City Tech. The Professional Development Advisory Council (PDAC) of the College sponsors a wide range of workshops for faculty to insure that teacher candidates are exposed to experiences that will sensitize them to diversity issues and enable them to work more effectively with students and the larger education community.

## Our Commitment Candidate Proficiencies Aligned with Professional and State Standards

The candidate performance expectations that are articulated in the P/T/D conceptual framework are based upon state and national professional standards established by the New York State Education Department (NYSED) and the National Council for Accreditation of Teacher Education (NCATE). Candidate performance expectations are also aligned with the professional standards of the specialty professional associations including the International Technology and Engineering Education Association/Council on Technology Teacher Education (ITEEA/CTTE), the National Board for Professional Teaching Standards (NBPTS), and Vocational Education Standards for National Board Certification. Teacher candidates must demonstrate competencies in their specific content areas to ensure that they can help P-12 students achieve the content standards established by NYSED and ITEEA/CTTE in career and technical education and in technology education. These standards form the bases for lesson plans, lesson presentations, and other instructional activities that candidates undertake both in teacher education classes and during field experiences. The candidate performance expectations reflected in the P/T/D conceptual framework and their alignment with professional and State standards are shown in the following chart:

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