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USING TECH PREP PRINCIPLES TO IMPROVE TEACHER EDUCATION

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Abstract

In response to the need for more active involvement by higher education in Tech Prep reforms, university researchers conducted four separate research and synthesis activities: (1) A synthesis of recent reforms in science, mathematics and English/language arts; (2) A survey of Tech Prep program administrators; (3) A focus group interview with Tech Prep teachers; and (4) An analysis of stakeholder perceptions of Tech Prep via concept mapping. Five major themes for teacher preparation emerged: (1) Teaching through application, (2) Student-centered/inquiry-based instruction, (3) vocational/academic integration, (4) collaboration and (5) real-world experience. Teacher education programs need to focus on developing these skills in prospective Tech Prep teachers. This entails making significant changes in the structure and delivery of teacher preparation, including interdisciplinary courses, requiring work experience of teacher

candidates and modeling applications-based teaching methodologies.

Many so-called educational reforms have emerged over the past decade. Their genesis can usually be traced to A Nation at Risk ([National Commission on Excellence in Education, 1983](#)), and they have taken on various forms: more stringent college entrance requirements, (which led to) heavier academic requirements for high school graduation, "back to basics," site-based management, outcome-based education, charter schools, schools-within-a-school, authentic assessment, and so on. One characteristic shared by most reforms is a concentration on secondary school education.

Likewise, several parallel reforms emerged from vocational/technical education, dating back to The Unfinished Agenda ([National Commission on Secondary Vocational Education, 1984](#)). Many of these were based on the concept of "vocational/academic integration" and, like those in general education, took on various forms and were focused at the secondary level.

The emergence of "Tech Prep" galvanized integration activities by providing a substantive framework for implementation. An additional feature was the linking of secondary and postsecondary programs. Most activity, however, has again concentrated at the secondary level and the burden for development and implementation has fallen on high school teachers, counselors, and administrators ([Boesel, Rohn, & Diech, 1994](#); [Bragg, Layton, & Hammons, 1994](#)).

To many, Tech Prep appears to provide a realistic vehicle for broad, cross-disciplinary reform. It is therefore incumbent on educators at all levels to explore the potential for these reforms and, if there, to develop and support it. More specifically, teacher educators need to be aware of the salient aspects of Tech Prep and their potential impact on teacher preparation. The purpose of the research and synthesis activities described in this article was to identify needs and priorities for teacher preparation in a "Tech Prep" mode.

Conceptual Background

Overview

Though the concept of Tech Prep can be traced back more than two decades ([Dornsife & Bragg, 1992](#)), it was not until the 1980s that Tech Prep gained national attention when [Dale Parnell](#) authored the book entitled *The Neglected Majority* (1985). In it, Parnell described the Tech Prep Associate Degree (TPAD) as a way to reform general education curricula by better serving the middle two quartiles of America's secondary school population, hence the "neglected majority".

1. Parnell believed Tech Prep should "blend the liberal arts with the practical arts without diluting the time-honored baccalaureate degree/college prep track" (1985, p. 140). Following in Parnell's footsteps, others have argued more recently for an educational approach that can begin to address the needs of a large proportion of youth that are not well served by the current process of American schooling ([W. L. Grant Commission on Work, Family, and Citizenship, 1988](#); [Commission on the Skills of the American Workforce, 1990](#)). Contemporary arguments made on behalf of Tech Prep include the following:
2. The United States has a failing system of school-to-work transition for most of America's youth and adults, especially those who have chosen non-college options ([Commission on the Skills of the American Workforce, 1990](#)). This argument suggests education is a responsibility of society (at least the entire community) and must involve schools as partners with business, industry and labor to prepare youth for the future.
3. The shortcomings of traditional instructional approaches and findings from cognitive psychology about individuals' preferred learning styles lend support to a Tech Prep approach. By providing a real-world context for learning, Tech Prep can engage students in learning a vast array of skills and knowledges, particularly those traditionally thought to belong in academic subjects (e.g., math, English, science). (For additional reading that supports this argument, the reader is referred to Educational Leadership ,

v.51, n.5.)

4. The overlap of educational services across levels of education, particularly between secondary schools and two-year postsecondary institutions, seems to be costly and unproductive use of resources (Dornsife, 1992). The argument for "smooth pathways" views Tech Prep as a means of supporting continued educational experiences for individuals who have gotten lost (dropped out) or trapped between systems and for better efficiency across systems as a means of better utilizing scarce resources (e.g., funds, personnel, facilities).

The importance of better educating youth and adults to be productive workers in a globally competitive workforce again supports a change in the way people are prepared for work. This argument recognizes that the United States is competing in a global marketplace where foreign competitors' workers are more highly trained and productive than her own (Commission on the Skills of the American Workforce, 1989; Secretary's Commission on Achieving Necessary Skills, 1991).

Federal Legislation

On July 1, 1991, Title III of the Carl D. Perkins Vocational and Applied Technology Education Act of 1990, The Tech Prep Education Act, came into being. This major piece of federal legislation for vocational education, which continued a long history of federal support for vocational education in the United States, indicated that Tech Prep education programs mean a combined secondary and postsecondary program which: (1) leads to an associate degree or 2-year certificate or formal apprenticeship; (2) provides technical preparation in at least 1 field of engineering technology, applied science, mechanical, industrial, or practical art or trade, or agriculture, health, or business; (3) builds student competence in mathematics, science, and communications (including applied academics) through a sequential course of study; and (4) leads to placement in employment (Title III, Tech Prep Education Act). Other required elements of the law include core preparation in mathematics, science, communication and technologies and articulation with postsecondary programs to provide a non-duplicative sequence of courses.

Critical Processes of Tech Prep

Given these federally-mandated components of Tech Prep, many unique but highly related processes define the Tech Prep approach. Bragg, Kirby, Puckett, Trinkle, and Watkins (1994) identify the following six core concepts as the basis for the Tech Prep approach:

1. Program articulation - linking courses, programs of study, and curricula within educational systems to create smooth transitions and reduce potential drop-out, failure, and costly inefficiencies for students and educational organizations.
2. Curriculum integration - blending or merging subject matter to create more "authentic" learning experiences, specifically the blending of academic subject matter (i.e., math, science, communications, social studies) with occupational/technical content to create realistic learning opportunities.
3. School-to-work transition - structuring in-school and out-of-school learning to enable youths to explore careers and make the transition from education to work. This may occur through structured career education classes, through work-based learning experiences such as youth apprenticeships, or through in-school experiences structured through curriculum organized around career clusters or school academies.
4. Outcomes- and performance-based system - establishing Tech Prep curriculum as a standards-driven, performance-based educational system. This core concept is intended to ensure graduates have the competencies to be successful in attaining their desired goals, whether they are linked to two-year or four-year college, or other options such as a formal apprenticeship, work, or military service.
5. Organizational and individual collaboration - facilitating shared responsibilities among all stakeholders (e.g., educators, students, parents, employers, community agencies) to increase ownership for an improved system of education. An active and on-going dialogue among the stakeholder groups is focused on enhancing all aspects of students' learning experiences.

6. Accessibility for "all" students - ensuring that Tech Prep is a viable option for all students. This core concept moves beyond the widely-held perspective that Tech Prep is designed for a previously overlooked group of students-the neglected majority. Rather, Tech Prep should be conceptualized in such a way as to enhance the entire educational system, increasing access, opportunity, and success for all students.

Research and Synthesis Activities

Overview

The purpose of this activity was to identify needs and priorities for teacher preparation in a "Tech Prep" mode. The previous section described a conceptual framework for Tech Prep which underlies teacher preparation issues. Four distinct research and/or synthesis activities were conducted to validate the critical processes of Tech Prep and relate them to teacher preparation: (1) an identification of recent reform efforts in science, mathematics and English; (2) a survey of administrators of existing Tech Prep programs; (3) a focus group interview with Tech Prep teachers; (4) an analysis of stakeholder perceptions regarding Tech Prep concepts. The following sections describe the procedures and findings of each activity.

Reform Initiatives in Science, Mathematics and English

Procedures

A review of relevant literature on science, mathematics and English education reform was conducted. The review concentrated on activities of the past 10 years to coincide with the period of reforms in vocational/technical education, focusing on the critical processes of Tech Prep identified in the conceptual background.

Findings

Reform in science education has tended to focus on what to teach rather than how to teach it, although instruction is gradually attracting more attention. The Project 2061 Report, published by the American Association for the Advancement of Science in 1989, presented goals for science, technology and math literacy. Science, Technology and Society (STS), as described by [Roy \(1985\)](#) has a somewhat different focus. Rather than centering on academic preparation and subject area content concerns, STS attempts to offer multidisciplinary instruction in the real world. Students use the discovery process to study issues that have many dimensions, to come up with alternative approaches, and to consider the positive and negative consequences of those paths.

Reform in mathematics education has been, in contrast to science education reform, somewhat more concerned with how to teach than what to teach. The National Council of Teachers of Mathematics (NCTM) detailed what students should learn in [Curriculum and Evaluation Standards for School Mathematics](#), published in 1989. In 1991, NCTM released [Professional Standards for Teaching Mathematics](#), which describes how mathematics should be taught. The thrust of both of these efforts is to teach students to solve non-routine problems in meaningful contexts. Major breaks with traditional instructional approaches in mathematics include seeing students as learning through induction rather than memorization; focusing the instructional process on guided inquiry rather than the didactic, tell-and-test approach; and espousing assessment methods that are open-ended rather than machine-scorable. An exploratory, real-world approach to teaching and learning mathematics is recommended throughout. The importance of applications in this approach is evident. Researchers have found that, using this approach, all students, not just those considered the brightest, can learn mathematics; that pure math is learned in concert with applied math; that more students can participate in mathematics activities; and that applications provide opportunities for teachers to extend instruction to include more abstract topics ([Usiskin, 1993](#)).

The Standards Project for English/Language Arts is a collaborative effort by the Center for the Study of Reading at the University of Illinois, the International Reading Association, and the National Council of Teachers of English. The goal of the project is to develop standards that promote equality of educational opportunity and higher academic achievement for all children. The developed standards will incorporate the best theory, research and practice in the field. The development of standards for any educational endeavor requires the co-development of accurate assessment measures. In a draft report on Standards for the Assessment of Literacy, the Joint Task Force on Assessment states that the basic purpose of schooling has shifted from knowledge transmission to nurturing independent learning and inquiry. This shift comes in response to an increased need for individuals in the workforce with strong problem-solving skills. Instructional issues include shared learning opportunities, group collaboration, peer mentoring, and the broad inclusion of diverse materials that increase awareness and provide relevance within the individual's context of learning. Assessment issues include authentic measures such as portfolios, extended oral and written responses to reading, extensive essay tests with multiple scoring means, and one-on-one or small group conferences.

Survey of Administrators

Procedures

Twelve Illinois secondary school administrators were identified through nomination by state education agency staff. The twelve administrators were experienced in Tech Prep and had the responsibility for leading the Tech Prep initiative in some way. Each administrator had knowledge of Tech Prep and had direct involvement with teachers of Tech Prep.

An instrument was mailed to each member of the sample. The instrument contained eight open-ended questions that addressed major performance or competence needs of tech prep teachers. The responses were summarized and grouped into broad categories. Responses which received multiple mentions are reported below.

Findings

An analysis of results of the survey indicate that the following are important characteristics which Tech Prep teachers should possess:

1. Collaborative Skills
 - Communication skills, both writing and verbal
 - Problem-solving skills, group decision making
 - Effective team participation, team building, leadership, participation
 - Flexibility, adaptability, especially with regard to change
 - Innovation and creativity
 - Respect and value for all disciplines
2. Technological Skills
 - Competence in multiple computer applications, more than surface knowledge, real competency
 - Ability to teach, model, demonstrate technological expertise
 - Experience in design, development, and use of various media, instructional technology
3. Diverse, Real-World Experience
 - Internships in business and industry
 - Experience in business and industry beyond educational roles
 - On-the-job (Work) experience in vocational education area
4. Integration Skills
 - Educational program which includes both vocational and academic curriculum.
 - Interdisciplinary knowledge, competency in related fields
5. Application Skills
 - Ability to design applied curriculum, realistic and relevant to students

6. Articulation Skills

- Ability to work with secondary and post secondary faculty and staff to develop and coordinate Tech Prep programs
- Thorough understanding of the conceptual framework of Tech Prep
- Ability to communicate (to sell) with outside entities about Tech Prep

7. Teaching Skills

- Knowledge of a variety of teaching methods based on learning theory
- Competence in using various teaching methods to appeal to a variety of learning styles

Focus Group with Tech Prep Teachers

Procedures

In early 1993 a focus group interview was conducted with a selected group of secondary Tech Prep practitioners. The focus group teachers all had extensive classroom experience and represented the following subject areas: English/ communications, business, physical science, technology, mathematics, and administration. The purpose of this interview was to identify both general and specific elements which should be included in a Tech Prep teacher preparation or inservice staff development curriculum. The general questions used to guide the interview focused on the teachers' roles in Tech Prep and their preparation to assume those roles. The two-hour discussion was recorded both on audio tape and with observer notes. Transcriptions of the tapes were content analyzed by tallying how often specific concepts, terms or issues recurred during the discussion. The transcription analysis was then compared to the observer notes which were taken during the session.

Findings

Analysis of the interview transcript revealed that the group's comments centered around three predominant themes: teaching techniques, content, and general (stakeholder) insights about teaching and teachers.

1. Teaching Techniques

- use of cooperative learning strategies
- use of experiential learning techniques
- willingness to relinquish total control of the learning environment
- collaborative and teaming approaches
- vocational/academic integration
- opportunity for prospective teachers to experience these methods

2. Content

- students must see present or future applications
- teachers need workplace experience
- emphasize affective domain
- communications skills
- computer skills

3. General Insights (characteristics needed by Tech Prep teachers)

- willingness to take risks
- energetic
- experienced in the workplace
- adaptability
- mentoring

Analysis of Stakeholder Perceptions

Procedures

The purpose of this study was to provide a clear operational description of Tech Prep in Illinois as perceived

by those who were involved with Tech Prep at various levels. This was accomplished through the use of a concept mapping procedure with administrators, teachers, counselors, state staff, and employers as participant/respondents. Ninety-seven statements related to Tech Prep were generated through document analysis, and individual and group interviews. Participants in the study were asked to sort the statements into meaningful, mutually exclusive categories. They were then asked to rate each statement on a scale reflecting its importance to Tech Prep. One hundred fifty-six responses representing all stakeholder groups were received. The sort data were analyzed using multidimensional scaling to plot the statements as points on a map, and cluster analysis to partition the statements into clusters. In a separate analysis, average importance ratings for each statement and for each cluster were computed. After the study was completed, the findings were reviewed to identify those which related to the critical processes for Tech Prep and which had implications for teacher preparation.

Findings

The following, listed in order of priority, were identified as important major elements of Tech Prep: (1) Appropriate Outcomes, including the ability of program completers to apply knowledge to the workplace; (2) Planning and Support, which speaks to the need for internal support structures; (3) External Involvement and Support, which addresses the need for business/industry involvement; (4) Articulation/Integration including collaboration across disciplines and educational levels; (5) Benefits, or what the students will get from the program (similar to outcomes); (6) Enrollment Incentives, or the types of student support provided within and ancillary to the program; (7) Staff Development, emphasizing the need for collaborative, interdisciplinary programs; and (8) Populations Served.

Throughout these major component areas, several themes emerged:

1. the importance of meaningful communication among all involved in planning and delivering Tech Prep
2. the absolute necessity of collaborative relationships between involved parties
3. expanding the repertoire of teaching techniques
4. application of academic knowledge and skills in occupational settings
5. curriculum grounded in mathematics, science and communications

Perhaps most importantly, the overriding theme which encompasses several clusters is collaboration between educators and employers and between educators and educators, collaboration for support, for developing articulation, for program delivery, and for staff development.

Implications for Teacher Preparation

Critical Themes

Several common themes emerged from the four research and synthesis activities. These themes, delineated below, form the basis for subsequent recommendations. Though they are discussed independently, these themes are truly interdependent.

Teaching/Learning Through Application

Tech Prep curricula must be grounded in the foundations of mathematics, science, and language arts. The traditional approach for delivering these skills (transmitting information from teacher to student via lecture) must be altered or even abandoned in favor of methodologies which allow students to learn needed skills in the context within which the skills are used in the real world. In Tech Prep, the workplace provides this context, providing an important differentiation between application and mere illustration. This theme represents simultaneously Tech Prep's greatest potential for broad reform and the most threatening aspect of carrying out that reform, because teaching through application requires each of the subsequent themes to be in place as well.

This theme has dual implications for teacher preparation. First, teachers must be able to apply their subject matter specialty in a real-world context. Second, preservice teacher candidates need more opportunities, prior to their first "real" teaching job, to apply the pedagogical skills they have learned.

Student-Centered/Inquiry-Based Instruction

This instructional approach goes hand-in-hand with teaching through application. While teaching through application addresses differences in student learning styles, using a student-centered/inquiry-based teaching approach enhances the students' ability to work cooperatively or independently, to think critically and to solve problems as they encounter them in various situations. It also emulates the climate of the workplace much more closely than traditional, teacher-centered instruction.

The implication is that prospective teachers need to (a) learn how to use this type of approach, (b) be taught using this type of approach, (c) have this type of approach modeled, and (d) practice using this type of approach. Obviously, this represents a departure from the dominant methodology which is modeled in many college and university courses, and demands that teacher educators move to an instructional delivery mode which they themselves may have little knowledge of or practice with. Adoption and use also require willingness on the part of teachers to relinquish some control of the learning situation. This is perhaps its most difficult aspect.

Vocational/Academic Integration

The so-called "vocational" and "academic" or "college preparatory" educational tracks have been separated by an ever-widening intellectual, philosophical and perceptual chasm. The status of "college prep" as the ultimate goal of secondary education has been implied for a long time and was reinforced by the reform rhetoric of the early 1980s. Unfortunately, traditional college preparatory instruction has failed a majority of secondary students (thus, a rationale for Tech Prep, and, at least in part, for many other recent reforms such as the Essential Schools movement). Meanwhile, vocational programming, through a continual narrowing of focus, suffered the image of the educational weak sister, preparing the least academically prepared students only for the most menial of jobs. A national "movement" for vocational/academic integration has grown over the past 10 years. Tech Prep provides a vehicle through which integration may be accomplished. Integration may happen without Tech Prep, but Tech Prep cannot happen without integration.

First, all teacher education programs should devote a significant portion of instruction to integration. A considerable body of knowledge has been accumulated on the subject (e.g., Beck, 1991; Grubb et al., 1991; Grubb & Kraskouskas, 1993; Kolde, 1991; Plihal et al., 1992; Roegge, 1994; Schmidt, 1992a, 1992b; Schmidt, Finch & Faulkner, 1992), resulting in products pertinent to curriculum development, instructional design and teaching methodology (e.g., curriculum materials created by the Center for Occupational Research and Development (CORD) such as Principles of Technology and others). In addition, university teacher educators should address policy issues which are beyond the scope of many practitioners but have great impact on integration, such as requirements for teacher certification and, perhaps most importantly, university admission.

Collaboration

Tech Prep absolutely requires one form of collaboration, that being articulation. Articulation entails collaboration between educators of different levels (most particularly, secondary and community college) and between educators and individuals/groups/agencies outside of education (e.g., employers, business leaders, labor).

To be effective, integration (and by extension, Tech Prep) also requires collaboration between peer educators within an institution or level. Simply put, an individual teacher cannot combine subject matter expertise, extensive knowledge of how his or her subject matter is applied in the workplace, technical expertise in an occupational field, and the ability to apply the latest pedagogical techniques, in a complete package. Among all of the resources available to classroom teachers, none is closer at hand or more easily accessible than the

knowledge, experience and skill of their peers.

University schools and departments of education are quite compartmentalized, yet the purpose is to prepare teachers, administrators and counselors to fulfill roles in a common setting. The role of teacher educators should include showing prospective teachers how their specialty connects and contributes to the overall educational mission and, perhaps more importantly, how schooling can and should be more purposefully connected to the community at large. The groundwork needs to be laid for teacher educators from different disciplines to collaborate in designing interdisciplinary courses.

Real World Experience

Many who are teachers have little, if any, experience outside of teaching. The only frame of reference they possess through which to relate knowledge and experience is the school culture. Unfortunately, it has been demonstrated that the school culture differs significantly from that of the workplace in which most students will eventually be required to function. The ability of a teacher to relate subject matter to their own work experience enhances their credibility inestimably in the eyes of their students. More importantly, cognitive science research has shown that people learn the "basics" more effectively in context than in isolation and that the application of knowledge and skills requires an understanding of the conditions and procedures for their use (Raizen, 1989).

Accelerated programming and alternative certification approaches for "second-career" teachers are being explored. For many years vocational teacher candidates have been required to possess 2000 hours of work experience in their area of specialty in order to be certified. Other options include summer workplace experiences for teachers. Related work experiences should be a criteria for selecting prospective teachers, or a component of their preparation, or both.

Recommendations for Action

The following list of recommendations reflects variation in scope and immediacy. Though short-term solutions will not sustain the meaningful reform potential of Tech Prep, there are strategies which can be initiated now. By doing so teacher education programs can demonstrate to the field commitment to reform and initiate longer-term visions (see next section).

1. In order to facilitate applications-based teaching, teachers could be trained to use and/or adapt commercial applications-based curriculum materials either as stand alone courses or to supplement self-developed courses. Further, in-field teachers could be assisted in converting their existing courses of study, where appropriate, to applications-based instruction via inservice workshops, summer courses, and the like. Beyond this, teachers need to be taught how to design and manage such curricula, as this type of program will require constant upgrading to keep current with the workplace.
2. Preservice field experiences should be of longer duration and should include experiences with mentor-teachers in disciplines other than (but related to) that of the teacher candidate. Mentor-teachers should be identified who exemplify the desired characteristics of Tech Prep teachers identified in this study. Student teaching and other early field experiences should be intensive and very closely supervised.
3. Student-centered, inquiry-based teaching methodologies should become the standard for Tech Prep teacher preparation, and should be an important component of the teacher's "tool box" regardless of subject area. One option is to adapt a specific, well-defined, well-researched student-centered teaching methodology (e.g., the Problem Solving Approach used in Agricultural Education) to other disciplines.
4. Preservice teacher education programs should contain a workplace (not in schools) experience component. This could either be a course in the required sequence of a teacher education program or a requirement that teacher candidates meet individually. For in-field teachers, summer work experiences could be combined with university instruction and they could be awarded graduate credit. Also, Masters degree/certification programs should be developed and other alternatives explored to facilitate efficient preparation and certification of second career teacher candidates.
5. Application and review processes for teacher candidates should be modified to allow candidates to

- emphasize, and place greater evaluative weight on, related work experience.
6. New teacher preparation courses should be developed, or existing courses modified, to include content such as developing integrated curricula, the change process and facilitating change in an institution, developing teams and working collaboratively, using cooperative learning techniques, and developing instruction to address differences in learning styles.
 7. Teacher educators specializing in different subject areas (particularly combining occupational and academic subjects) should cooperatively develop interdisciplinary courses which demonstrate the connections and applications of the content and skills. Further, teacher educator positions could be created which, for example, combine technology/ science/mathematics education or social studies/language arts/practical arts education.

All of this seems to indicate graduate-level teacher education programming designed to attract candidates already possessing a bachelor' degree with a content specialization, or second-career candidates with work experience, or both.

Long Term Vision: A Process of Continual Development

The precepts of Tech Prep represent the basis for a new way of viewing teaching and, therefore, the preparation of teachers. While it is important to initiate change within the existing sphere of influence, it is even more important to envision and plan for more far-reaching and inclusive reform.

The notion of pre- and in-service education which suggests a beginning and ending to phases of development of an educator is outdated and should be replaced with a process of continual development of all educational professionals (i.e., teachers, counselors, and administrators) at all levels of the educational enterprise. This continual training and development then needs to be linked to a meaningful career ladder for educational professions (at both the secondary and postsecondary levels).

Subject matter competence must be maintained throughout a career. This must be achieved through an approach that integrates theory and practice, but not just in the world of teaching, but also in the world of work. For example, for educational professionals to apply their subject matter to solve problems, specifically work-related problems exemplified by Tech Prep, then developmental experiences must ensure that educational professionals participate in problem solving in both work place and teaching, counseling, and/or administrative environments. Educators must practice transferring knowledge between work place and teaching environments; then, they must be rewarded for successfully developing and delivering instruction, counseling services, and educational programs that enable students to do so as well. In our highly technological world, this process must be on-going throughout an individual's career requiring formal partnerships between employers and educational organizations for teachers as well as their students.

The goal of any "continual" development process should be to facilitate mastery. For example, entry-level teachers must have a command of teaching methods, delivery strategies, educational technologies, student assessment, and so on. As individuals progress throughout a career, their expertise needs to broaden and deepen, enabling them to become "master teachers", again invoking the apprenticeship/master relationship. The same concept applies to counselors and administrators. Clearly, this process can best be facilitated if systematically considered over the span of a career rather than through a limited pre-service program.

The capacity to identify and meet the needs of an increasingly diverse student population is critical. It is central to developing and implementing Tech Prep where addressing the needs of students with a wide range of academic abilities, educational aspirations, motivational levels, and ethnic and cultural backgrounds is essential.

The development of educational innovators as leaders, empowering "front-line" educators to make decisions about educational purposes and processes for its citizens is the ultimate goal of any "continual" development model. It involves creating the capacity in individuals to work together (in teams) to conceptualize, design, develop, implement, evaluate, and improve educational initiatives--to manage change. This can begin with

Tech Prep, however it should be viewed as only one innovation in a continuum of innovations that can improve education.

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