Journal of Vocational and Technical Education

Editor:
Kirk Swortzel: kswortzel@ais.msstate.edu

Volume 13, Number 2 **Spring 1997**

DLA Ejournal Home | JVTE Home | Table of Contents for this issue | Search JVTE and other ejournals

TECH PREP PROGRAMS: THE ROLE AND ESSENTIAL ELEMENTS

Bob R. Stewart
Professor & Chair
Practical Arts and Vocational Technical Education
University of Missouri-Columbia

Don H. Bristow
Director of Vocational and Adult Education
Columbia Missouri Public Schools

The purpose of this study was to gain consensus from a panel of experts on the role and the essential elements for high quality Tech Prep programs. A modified Delphi process was used in this study. According to the magnitude of round-three group mean and median responses, the panel was judged to have "strong agreement" with 28 and "some agreement" with 5 items. The panel strongly agreed Tech Prep programs will: include junior or community colleges, area vocational technical schools, and comprehensive high schools; have a role in helping reshape outcomes of schools districts; have a role in refocusing the need for career exploration and counseling; eliminate or blur the lines between college prep and vocational programs with the elimination of the general track; provide time for collaborative planning and development between the academic and vocational staff; include summer teacher internships with business for both vocational and academic teachers.

The current call for school reform seems to have begun with the 1983 A Nation At Risk report which also triggered a re-evaluation of the vocational education system. "More and more young people emerge from high school ready neither for college nor for work. This predicament becomes more acute as the knowledge continues its rapid expansion, and the number of traditional jobs shrinks, and new jobs demand greater

sophistication and preparation" (National Commission on Excellence in Education, 1983, p. 32).

During the last decade, American educators have been struggling to find an effective means to prepare all students for their appropriate roles in life. The issue was addressed in the following publications: The Neglected Majority (Parnell, 1985); The Forgotten Half (William T. Grant Foundation, 1988); America's Choice: High Skills or Low Wages (Commission on Skills, 1990); What Work Requires of Schools (SCANS, 1991); and America 2000 - An Education Strategy (U. S. Department of Education, 1991). Each of these reports and many others drew two parallel themes. First, the education levels of our citizens and how well they are prepared for today's labor market will have a direct relationship to this country's economic vitality. In addition, our current K-14 system is inadequately meeting the needs of a majority of our students.

Tech Prep

The need for improved educational experiences for all students continued to be sounded through studies, professional journals, and from individuals calling for school reform. Tech Prep has been a concept which has emerged during this search. As a concept, it is still being defined; however, certain principles are emerging. A key element relates to learning in context, either in the school "house" through better integration of vocational and academic curriculums or through "on-site" experiences which move learning outside of the school and into the community. The development of integration models and articulated programs have opened dialogue among curriculum areas, levels of educators, and educational institutions. The focus on youth internships is moving the same type of dialogue into the community and workplace. Although the elements of Tech Prep were being implemented at isolated areas across the country, Tech Prep's inclusion in the 1990 Carl D. Perkins Vocational and Applied Technologies Act brought it to the forefront for those involved in improving education.

Tech Prep programs have been designed and structured specifically to forge strong and comprehensive links between secondary and post-secondary educational institutions. Programs within these institutions lead to the completion of associate degrees or two-year certificates; provide technical preparation in specified fields; build student competence in mathematics, science and communications; and lead to placement in employment. Specific program goals set forth in the Act include the development of articulation agreements, a core of required courses, curriculum, in-service teacher and counselor training, equal access for special populations, and preparatory services.

Tech Prep programs include provisions for 2+2, 2+2+2, 4+2, and 4+2+2 configurations (Hull and Parnell, 1991). Within these configurations, articulation agreements are developed and implemented among the educational agencies involved. Articulation links two or more educational agencies and enables students to move from one level to the next without delay or duplication of courses. Tech Prep programs also provide secondary students the opportunity to enter directly into the workplace. This is done by developing applied academic and technical course work for students at the secondary level. Thus it is clear that Tech Prep is comprehensive and ambitious in terms of both goals and scope. There is tremendous potential for spanning the boundaries between vocational and academic education, and making education more efficient and meaningful for students.

Context for Learning

An emphasis on context as it relates to facilitating student learning is supported by cognitive theory. Recent sources provide information about cognitive theory and its impact on learning (Raizen, 1989; Thomas, 1992; Jones, 1992; Thomas, Johnson, & Anderson, 1992; Royer, 1986). Cognitive science has suggested that intelligence, as the cognitive capacity for learning, is much broader than traditional theories of intelligence measurements indicate. Cognitive science now addresses concerns with "practical", "contextual", "spatial", and "physical" intelligences. Contextual learning theory follows from this aspect of cognitive science by suggesting that learning environments must take into account the multiplicity of intelligences among diverse populations of students. Contextual learning, therefore, provides the cognitive foundation on which Tech Prep is based (Sadler, 1993). Resnick and Klopfer (1989) suggested that skill and content should be taught at

the same time and that students should be provided experiences using real tasks to provide an opportunity for contextualized practice. The applied academics approach developed and delivered as a part of Tech Prep has the potential to be one of the primary educational reform efforts which will enhance learning outcomes for many students.

Articulation

The National Council for Occupational Education (NCOE, 1989) defined articulation as: "A planned process linking two or more educational systems to help students make a smooth transition from one level or program to another without experiencing delays or duplication of learning," (p. 3). The term associated with articulation in Tech Prep became known as two-plus-two or a competency-based, technical-vocational curriculum jointly designed by business, secondary institutions, and post-secondary institutions. Two-plus-two links the last two years of secondary education with two years of post-secondary education to produce a strong curriculum containing competencies not possible to achieve in a two-year program.

Two models of articulation have evolved. Advanced placement or "time-shortened" is the most common and least complicated form of articulation activity because fewer curriculum changes are required. A survey (NCOE, 1989) found that 82% of the responding institutions had time-shortened agreements. A second approach to articulation is referred to as advanced skills or skill enhanced programs. The approach is designed to develop a greater technical competence by providing an opportunity for specialization in the technical area, more breath or cross-training from one specialization to another, and stronger preparation in the scientific and mathematical foundations underlying the technology. The goal is to provide the student greater problem-solving skills and the ability to create and innovate.

Even before the influx of articulation efforts prompted by Tech Prep, the NCOE study (1989) found that "85% of respondents acknowledge that their articulation efforts had improved student and program outcomes. Sixty-seven percent noted an improvement in faculty cooperation, 34% reported a reduction in overall operating costs and 12% had received additional funding for existing programs" (p. 6).

Career Paths

Tech Prep challenges those involved to make career paths and career guidance an integral element of school so students will have the information to know what is relevant to them and what will satisfy them in their quest to prepare themselves for the future. This dialogue and interaction have created a realization that students cannot take advantage of a restructured system unless they have insights about themselves and knowledge of their career opportunities.

Tech Prep should prepare students for highly skilled, technical careers that allow for either entry into the workplace qualified technicians or continuation of education leading to baccalaureate or advanced degrees. It is a new approach for students that keeps options open. Warnat (1992) suggested that much of the future success of Tech Prep depends on the involvement of counselors as well as teachers and administrators.

Summary

With the availability of a funding base distributed to each state through the Carl Perkins legislation s, Tech Prep has the potential to be a major element of school reform. For example, Tech Prep has become an avenue to incorporate contextual learning through an integration and collaboration of vocational and academic education. As schools enter this area of reform, there is a need to identify the role and elements for an effective and successful Tech Prep program. A more clearly defined operational statement needs to be developed which will produce a general model of Tech Prep. This information should provide guidance for policy makers and administrators responsible for the development of Tech Prep programs. Therefore, the focus of this study was to provide information from national and state leaders about the role and elements of effective Tech Prep programs.

Purpose of Study

The purpose of this study was to gain consensus from panels of experts on the role and the essential elements for high quality Tech Prep programs.

The study was framed to answer the following questions:

1. What should be the role of Tech Prep?
2. What should be the key elements of a Tech Prep program?

Procedures

A modified Delphi technique was used to collect data for this study. The "Delphi Technique" was the name given to the method of obtaining the most reliable consensus of opinion from a group of experts. This research approach was developed at the Rand Corporation by Dalkey and Helmer (1963). They expanded and refined a process that had been used previously.

Basically, the Delphi technique consists of a series of questionnaires, of which the second and subsequent rounds feed back information to the participants (who remain anonymous to each other) while giving them the chance to rethink and, if necessary, to restate their opinions in light of the feedback from the entire panel. The pioneers of the Delphi technique, Dalkey and Helmer (1963), claimed that this type of controlled interaction avoided many of the disadvantages common to the more conventional use of round table discussions. The Delphi technique does not force the participant to take the "group" response, but instead provides a "statistical argument" for consideration. It does not always produce a consensus on every point of investigation. The Delphi technique is a procedure that relies on the opinions or estimates of experts in the field.

This modified Delphi study used a pre-established set of Delphi statements, a procedure which is consistent with the research findings of Judd (1972). If statements are poorly formulated or badly interpreted the quality of the study is degraded. The development of the questions used in the study was based on a review of Tech Prep literature and interaction with those currently involved with Tech Prep on the state and national levels.

A scale, in accordance with the research findings of Brooks (1979), of 0-100 was used for the panel of experts to rate the desirability that the prediction described in the Delphi statement should occur. Those who participated in the field test were also asked to make additions or deletions to the pre-established statements.

A part of this study included a review of the instrument by a national panel of experts. The initial questionnaire was mailed to 34 national experts in Tech Prep as identified by surveys submitted to vocational directors, vocational deans, and Tech Prep coordinators at the 1993 Missouri Vocational Association Convention.

Twenty-two of the 34 questionnaires were returned. The feedback from this national panel prompted some minor grammatical editing, but did not change the content or focus of the 33 items. Since each of the national panelists completed the survey in the same manner as the Missouri panel, the results of the national panel responses were analyzed with the same statistical procedures as was used with the Missouri panel.

Invitations were sent to representatives of the 12 Missouri Tech Prep consortiums and to other persons identified by a peer survey as having expertise in Tech Prep. Experts invited to participate included: community college deans, Tech Prep consortium coordinators, secondary school principals, superintendents and assistant superintendents of schools, area vocational school directors, State Department of Elementary and Secondary Education personnel, and university faculty. The final panel consisted of 29 members of whom 28 completed all three rounds of the study. This number of panel members was congruent with Anderson's (1970) findings that handling data will be cumbersome when the number of experts exceeds 25 to 30.

Upon receipt of confirmation from those experts invited to serve on the panel, a packet for the first Delphi

round was mailed to each panel member. The packet included an introductory letter, a brief explanation of the Delphi method, and the instrument. The panel participant was asked to complete the survey questionnaire and return it in the enclosed self-addressed, stamped envelope. Panel members were encouraged to make comments to support their responses and opinions regarding each Delphi's statement. A space was provided for comments directly under each Delphi statement.

A three-round Delphi process was utilized to move the panel towards consensus. The literature indicated that consensus is usually reached within the third round. Cyphert and Gant (1971) found that 99% of the respondents reached their opinions by the third round.

After the questionnaires were returned, the responses were analyzed and summarized. A scale of 0-100 was used to gather the desirability scores for each Delphi statement. The intervals of "10s" could be interpreted as percentages of desirability.

In preparation for the second-round mailing, the mean score, median score, interquartile range, and the individual's score as well as a summary of the comments from the previous round were noted on each participant's questionnaire. The written comments were typed in summary form for each Delphi statement and provided as a part of the feedback.

The same process was followed after receipt of the second round questionnaires in preparation for the third-round mailing. Upon receipt of the completed third-round questionnaires, consisting of the same questions as rounds one and two, the responses were summarized and analyzed.

The median has been found to be the most accurate statistical descriptor of the group's response. In Delphi studies the median better reflects the opinion of every member (Dalkey, 1968). The mean or average score is, however, the most commonly used statistical calculation. Therefore, both the median and mean group response scores of the panel were calculated for the desirability scale for each of the Delphi statements.

To explain the movement of a group response toward consensus, the quartile deviation and interquartile range are often calculated to show the spread of opinions by each panel member for each question around the median. The standard deviation has been used to describe the distribution and arrangement of individual scores in relation to the mean. Since interquartile ranges are more commonly associated with medians and standard deviations are more commonly associated with means, all four measures were calculated in this study.

The Delphi statements were placed in rank order by the magnitude of their median and average desirability response scores after round three. The statements were then categorized into four groups according to their relative position: strong agreement with the Delphi statement, some agreement with the Delphi statement, some disagreement with the Delphi statement, and strong disagreement with the Delphi statement.

Findings

This section presents a summary of the findings as analyzed from the data collected from the three-round modified Delphi technique with the Missouri panel of experts. In the additional related findings, data from the national review panel were presented. The basis for these findings was the consensus of the perceptions of the panels of experts regarding the role and essential elements for high quality Tech Prep programs in Missouri.

According to the magnitude of round three group mean and median responses for each Delphi item, the Missouri panel of experts was judged to have "strong agreement" with 28 of the 33 items and "some agreement" with the remaining 5 items. Therefore, round three group mean and median response scores of 50.00 or greater on the desirability scale of 0-100 indicate that both the panel of Missouri experts and the national panel judged all 33 items to be desirable.

Table 1

Statistical Summary of Measures of Convergence and Consensus of Desirability Scores for each Delphi Statement Round 1 and 3 Missouri Panel, National Review Panel

	Round 1	Round 3	National Panel Response

Delphi Statement 1: Each Tech Prep consortium will consist of the following institutions.

A. Junior/Community College

Mean	94.48	98.57	98.18
Standard Deviation	8.27	3.56	5.01
Median	100.00	100.00	100.00
Interquartile Range	100.00-100.00	100.00-100.00	100.00-100.00

B. Area Vocational Technical Schools

Mean	93.79	97.86	96.81
Standard Deviation	11.77	4.99	10.86
Median	91.86	100.00	100.00
Interquartile Range	91.81-91.92	100.00-100.00	100.00-100.00

C. Comprehensive High Schools

Mean	93.79	99.29	97.72
Standard Deviation	10.49	2.62	5.28
Median	100.00	100.00	100.00
Interquartile Range	100.00-100.00	100.00-100.00	100.00-100.00

D. 4-Year College/University

Mean	72.41	72.50	79.54
Standard Deviation	23.55	14.56	15.27
Median	77.00	77.19	81.50

Interquartile Range	61.49- 92.51	70.49- 83.89	72.87- 90.13

E. Union/Other Formal Apprenticeship Organizations

Mean	77.93	78.57	82.72
Standard Deviation	15.44	11.77	18.56
Median	88.28	83.35	89.50
Interquartile Range	72.01- 92.55	77.67 89.63	80.05- 98.95

F. Private Educational Institutions

Mean	58.97	58.57	65.45
Standard Deviation	20.41	14.58	26.49
Median	57.48	59.50	69.50
Interquartile Range	44.67 70.29	53.29 65.76	52.00- 86.75

Delphi Statement 2: State grant recipients will be structured and organized by State Department of Education or similar State agencies.

Mean	65.35	63.93	72.27
Standard Deviation	27.68	21.83	30.06
Median	75.50	73.94	89.50
Interquartile Range	57.00- 94.00	63.94- 83.94	68.70- 100.00

Delphi Statement 3: Federal money will be supplemented by a significant increase in funds from:

A. State of Missouri

Mean	79.31	84.64	85.45
Standard Deviation	18.70	9.62	22.40
Median	87.00	87.83	96.11
Interquartile Range	73.77- 100.00	80.51- 95.15	90.75- 100.00

B. Local School District

Mean	66.55	70.36	83.64
Standard Deviation	22.72	15.27	21.50
Median	72.00	75.75	91.72
Interquartile Range	56.84- 87.16	66.25- 85.25	86.03- 97.41

C. Business/Industry

Mean	75.17	76.79	83.18
Standard Deviation	19.93	13.07	19.12
Median	81.64	81.32	92.00
Interquartile Range	65.05- 98.20	73.66- 88.98	85.69- 98.31

Delphi Statement 4: The Tech Prep focus will broaden from the middle two quartiles of students to include a significant number of the upper quartile.

Mean	80.00	83.93	68.64
Standard Deviation	19.27	12.86	33.28
Median	88.88	90.92	89.50
Interquartile Range	80.96- 96.80	84.93- 96.91	65.08- 100.00

Delphi Statement 5: Tech Prep is going to evolve from a 2 + 2 program to a 4 + 4 program.

Mean	73.10	78.57	78.18
Standard Deviation	20.19	11.77	24.23
Median	80.33	84.04	89.50
Interquartile Range	65.02 97.76	77.28 92.37	73.25 100.00

Delphi Statement 6: Site based learning i.e., youth apprenticeship, internships will be a component of every Tech Prep program.

Mean	76.89	80.36	87.27

Standard Deviation	19.10	11.38	19.80
Median	83.39	84.95	100.00
Interquartile Range	69.02-97.76	72.28-92.62	93.29-100.00

Delphi Statement 7: The implementation of Tech Prep will help define and reshape the outcomes of school districts as they move toward outcome based practices and performance standards.

Mean	90.68	91.42	91.36
Standard Deviation	9.97	6.51	16.42
Median	96.72	95.82	100.00
Interquartile Range	93.95-99.49	91.38-100.00	98.59-100.00

Delphi Statement 8: Tech Prep will refocus the need for career exploration and counseling on the K-8 curriculum.

Mean	85.86	95.00	95.00
Standard Deviation	19.55	6.94	9.63
Median	97.36	100.00	100.00
Interquartile Range	90.52-100.00	100.00-100.00	100.00-100.00

Delphi Statement 9: "Skill enhanced" rather then "time shorten" will emerge as the preferred model of Tech Prep programs to meet the advanced technology needs of business/industry.

Mean	82.07	87.14	85.45
Standard Deviation	16.34	10.13	26.67
Median	91.00	92.58	100.00
Interquartile Range	82.66-99.33	86.69-98.48	97.49-100.00

Delphi Statement 10: The major focus of the secondary vocational/technical network will shift from entry level skills to preparation for associate degree programs.

Mean	74.13	76.07	79.09
Standard Deviation	21.80	14.49	27.06
Median	83.07	83.35	93.50

Interquartile Range	70.52- 95.57	76.73- 89.97	84.19- 100.00

Delphi Statement 11: The advanced technical curriculum of post-secondary institutions will greatly expand the market demand for continuing education at these institutions.

Mean	80.69	84.64	87.27
Standard Deviation	15.34	6.93	12.41
Median	86.00	89.50	92.00
Interquartile Range	76.31- 95.69	83.89- 95.11	87.38- 96.62

Delphi Statement 12: Applied Math will evolve from an Algebra based curriculum to one of logic, statistics, probability and measurement systems.

Mean	80.69	86.43	6.36
Standard Deviation	14.86	6.21	4.16
Median	87.63	90.92	79.50
Interquartile Range	78.50- 96.76	85.62- 96.22	59.43- 99.57

Delphi Statement 13: Principle of Technology/Applied Physics will be required for (one, two, or three) years at the secondary level for all technical students, i.e., Automotive Technology.

A. One year

Mean	85.52	86.43	3.63
Standard Deviation	15.94	6.78	22.47
Median	92.00	90.33	7.00
Interquartile Range	87.50- 96.50	84.69- 95.97	88.66- 100.00

B. Two years

Mean	75.52	78.21	77.76
Standard Deviation	12.70	9.05	22.02
Median	81.58	83.07	86.17
Interquartile Range	73.56-	77.35-	74.29-

	89.60	88.79	98.04

C. Three years

Mean	49.31	52.14	2.27
Standard Deviation	20.86	14.49	28.94
Median	55.93	55.65	56.17
Interquartile Range	48.74-63.12	49.61-61.69	34.17-78.17

Delphi Statement 14: Applied communications will be developed to include individual courses, i.e., technical reading, technical writing and oral communication/listening skills.

A. Technical Reading

Mean	73.79	82.50	64.09
Standard Deviation	28.08	12.36	36.08
Median	87.63	87.19	76.17
Interquartile Range	80.25-94.98	80.49-93.89	50.61-100.00

B. Technical Writing

Mean	73.44	83.21	61.36
Standard Deviation	28.19	13.62	36.81
Median	87.63	89.50	74.50
Interquartile Range	70.29-100.00	82.82-96.18	41.93-100.00

C. Oral Communication/Listening Skills

Mean	78.28	86.43	63.63
Standard Deviation	28.54	10.26	37.74
Median	93.00	92.36	82.83
Interquartile Range	80.53-97.47	86.56-98.16	50.26-100.00

Delphi Statement 15: The move towards contextual learning will greatly broaden the current applied

curriculum to include collaboration such as: Marketing-Economics, Computer Software-Advanced Communications, Health Occupations-Anatomy and Physiology, Conversation of Natural resources-Earth Science.

Mean	82.76	85.00	92.35
Standard Deviation	15.09	7.45	13.00
Median	88.88	89.50	100.00
Interquartile Range	79.21-98.55	83.82-95.18	98.33-100.00

Delphi Statement 16: The move toward Tech Prep will result in curricula outside the vocational arena (core academics) to also incorporate the concepts of workplace readiness, SCANS, new workplace skills and all aspects of industry.

Mean	85.86	86.43	97.14
Standard Deviation	13.50	7.80	6.43
Median	92.63	91.64	100.00
Interquartile Range	87.45-97.82	85.58-97.43	100.00-100.00

Delphi Statement 17: Successful implementation of Tech Prep will eliminate or blur the lines between the traditional college prep and vocational programs with the elimination of the general track.

Mean	88.28	92.86	90.48
Standard Deviation	13.65	10.13	22.90
Median	97.00	100.00	100.00
Interquartile Range	91.10-100.00	98.92-100.00	100.00-100.00

Delphi Statement 18: Tech Prep consortiums need to begin with better baseline data and assessment tools to be able to demonstrate student progress and effectiveness of integration of academics.

Mean	83.79	86.43	90.00
Standard Deviation	18.98	8.70	20.97
Median	92.63	92.17	100.00
Interquartile Range	88.01-97.25	86.63-97.71	100.00-100.00

Delphi Statement 19: Successful integration models will provide time for collaborative planning/development

between the academic and vocational staff.

Mean	85.96	91.43	96.36
Standard Deviation	20.27	7.05	6.58
Median	95.13	95.97	100.00
Interquartile Range	90.83- 99.43	95.67- 96.27	100.00- 100.00

Delphi Statement 20: An expansion of the school year will result from summer on site learning experiences for students , i.e.,. Job shadowing, mentoring, cooperative learning, internships, apprenticeships, etc.

Mean	85.52	88.57	84.55
Standard Deviation	16.57	8.48	20.17
Median	93.39	93.79	99.50
Interquartile Range	89.48 97.30	88.31 99.26	92.37 100.00

Delphi Statement 21: The development of problem solving practicums will evolve from business involvement/collaboration.

Mean	80.00	84.29	91.82
Standard Deviation	14.40	8.36	12.59
Median	85.86	88.73	100.00
Interquartile Range	78.71- 93.00	82.93- 94.53	99.46- 100.00

Delphi Statement 22: Summer teacher internships with business will become common for both vocational and academic teachers.

Mean	86.78	91.78	92.73
Standard Deviation	16.58	8.19	10.77
Median	96.17	97.00	100.00
Interquartile Range	90.04- 100.00	95.77- 98.13	97.73- 100.00

Note N = 29, 28, and 22

A comparison of responses of the Missouri panel and the national panel indicated that the rating was very similar for all but three items. The national panel ratings were lower for "Tech Prep will broaden...to include

a significant number of the upper quartile," "applied math will evolve from an algebra based system," and "applied communications will...include courses in technical reading, technical writing..." Both panels identified junior or community colleges, area vocational technical schools, and comprehensive high schools as essential elements for high quality Tech Prep programs in Missouri.

Both panels had strong agreement with the role Tech Prep will have in helping define and reshape outcomes of school districts as they move toward outcome-based practices and performance standards. Both panels strongly supported Tech Prep's role in refocusing the need for career exploration and counseling in the K-8 curriculum. This statement was also strongly supported by the national review panel.

Both panels concurred in their strong agreement with Statement 17 related to a role of Tech Prep, "Successful implementation of Tech Prep will eliminate or blur the lines between the traditional college prep and vocational programs with the elimination of the general track."

Both panels expressed strong agreement for the following essential element of Tech Prep, "Successful integration models will provide time for collaborative planning and development between the academic and vocational staff."

Both panels agreed on the essential element of business industry involvement in Tech Prep programs, but none more strongly than, "Summer teacher internships with business will become common for both vocational and academic teachers."

Conclusions

On the basis of the data compiled and interpreted through the use of the modified Delphi technique, review of the literature, and the discussion of these within the limitations of this study, the following conclusions appear to be warranted:

1. Efforts should be made to assure that community colleges, area vocational-technical schools, and comprehensive high schools are involved in the implementation of Tech Prep.
2. A strong program of career awareness and career exploration should be provided for all students within the K-8 curriculum.
3. Courses which do not contribute to students' progress on their chosen career paths should be eliminated from the curriculum.
4. Adequate collaborative planning and development time must be a part of all curriculum integration models involving academic and vocational staff.
1. Teacher internships with business and industry must be developed for both academic and vocational teachers.

Implications

The varied aspects of Tech Prep have the potential to significantly impact how well students are prepared for the future. Even though strides are being made for Tech Prep to play an enlarged role in schools and some of the essential elements from the philosophy of Tech Prep are being implemented in the form of programs and services, much remains to be done.

Although there is much dialogue regarding articulation of secondary and post-secondary vocational technical programs, only modest curriculum changes were documented in the literature. The time-shortened articulation agreements are most common, although the panels in this study advocated skill-enhanced programs as more desirable. If articulation agreements fail to lead to significantly increased technical skills of students, then Tech Prep will fail to meet the anticipated potential for graduates.

Much of the impetus for Tech Prep came from the expressed concerns of business and industry. The majority of Tech Prep efforts are reportedly school-based with limited business involvement. The panels in this study advocated effective, continued involvement of the business community. These could involve them in the

planning, implementation, and assessment of not only the process and program, but of student performance. An expansion of the school year to include internships for both students and teachers would facilitate a strong tie to business and industry.

The students to be enrolled in the applied academics courses should gain foundation skills to strengthen their ability to pursue technical careers. Baseline data are needed for the students being served, to assess their level of prior skills so that the gains achieved as a result of completion of the applied courses can be documented. The successful integration of academic and vocational education, including the delivery and assessment of applied courses, was judged to be a desired and integral part of the Tech Prep initiative.

Leadership must emerge to help refocus the educational enterprise. The panels noted that the concepts associated with Tech Prep have great potential to foster changes in our schools. Although the finding for Tech Prep may be shifted to block grants or coupled with other initiatives, it remains important to build upon these positive concepts. There is a need for strong leadership at the state as well as local levels to help provide continued direction and encouragement as well as leadership for school restructuring. Initial leadership can come from guidance counselors, principals, vocational directors, college presidents, or superintendents of schools -- anyone who has the vision for what Tech Prep can be and the commitment to push that vision to reality. Every part of the school and community must be involved. We must face the tough decisions and look less at what it takes to protect individual turf and more at what must be done collectively to better serve the individual student. The panels agreed that the philosophy and concepts of Tech Prep are sound. The implementation of Tech Prep's full potential will require the collaborative efforts of dedicated leaders, including teachers, counselors, administrators, and partners from the business community.

References

Anderson, D. P. (1970, March). Ohio state study: Clarifying and setting priorities on an intermediate school district's objectives utilizing the Delphi technique. Paper presented at the meeting of the American Educational Association, Minneapolis.

Brooks, K. W. (1979). Delphi technique: Expanding applications. The North Central Association Quarterly, 53, 377-385.

Commission on the Skills of the American Workforce, (1990, June). America's choice: High skills or low wages? Report of National Center on Education and the Economy. Rochester, NY.

Cyphert, F., & Gant, W. L.(1971). The Delphi technique: A case study. Phi Delta Kappan, 52, 272-273.

Dalkey, N. C. (1968). Predicting the future. Santa Monica, CA: The Rand Corporation.

Dalkey, N. & Helmer, O. (1963). An experimental application of the Delphi method to the use of experts. Management Science, 1, 458-467.

Hull, D. & Parnell, D. (1991). Tech prep associate degree--A win/win experience. Waco, TX: Center for Occupational Research & Development.

Jones, B. F. (1992). Cognitive designs in education. In M. Aitkin (Ed.) Encyclopedia of educational research (pp. 166-178). New York, NY: Macmillan.

Judd, R. C. (1972). Forecasting to consensus gathering, Delphi grows up to college needs. College and University Business, 53, 35-43.

National Commission on Excellence in Education (1983). A nation at risk: The imperative for educational reform. Washington, D. C.: U. S. Department of Education.

National Council for Occupational Education (1989). Occupational program articulation. El Paso, TX: El Paso Community College.

Parnell, D. (1985). The neglected majority. Washington, D. C. The Community College Press.

Raizen, S. A. (1989). Reforming education for work: A cognitive science approach. Berkeley, CA: National Center for Research on Vocational Education.

Resnick, L. & Klopfer, L.(Eds) (1989). Toward the thinking curriculum: Current cognitive research. Alexandria, VA: Association for Supervision and Curriculum Development.

Royer, J. (1986). Designing instruction to produce understanding. In G. D. Phye & T. Andre (Eds) Cognitive classroom learning, understanding, thinking, and problem solving (pp. 83-117). New York: Academic Press.

Sadler, S. (1993, March). Contextual learning - Tech prep's cognitive foundation. Tech Prep Connections. Waco, TX: National Tech Prep Network.

Secretary's Commission on Achieving Necessary Skills (SCANS), (1991, June). What work requires of schools'--A SCANS report for America 2000. Washington, D. C.: U. S. Department of Labor.

Thomas, R. G.(1992). Cognitive theory-based teaching and learning in vocational Education. Columbus, OH: Center on Education and Training for Employment.

Thomas, R., Johnson, S. & Anderson, L. (1992). Alternative perspectives on instruction and cognitive theory: Implications and proposals. Berkeley, CA: National Center for Research on Vocational Education.

U. S. Department of Education. (1991). America 2000 - An education strategy, sourcebook. Washington, D. C.: Author.

Warnat, W. I. (1992). Tech prep and education reform: Opportunities for career counseling. Unpublished paper. Washington, D. C.: U. S. Department of Education.

William T. Grant Foundation Commission on Work, Family and Citizenship, (1988, January). The forgotten half: Non-college youth in America. Washington, D. C.: Author.

URL: http://scholar.lib.vt.edu/ejournals/JVTE/v13n2/Stewart.html
Last modified: 12/10/09 10:47:21 by SS