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ABSTRACT

This document reports on three focus groups comprised of state officials, local practitioners and supporters, and researchers who were convened to provide input on strategies for assessing and validating the effects of tech prep. Part I provides a brief summary of the groups' discussions, including major points and broad themes in these four topic areas identified in a literature review: outcomes, measurement, how to define a tech prep student, and other design and data collection issues. The summary reports the following: (1) most agreed a national tech prep evaluation should focus on student outcomes but noted the program cannot impact students without first changing educational institutions; (2) a national evaluation should also consider these outcomes: participation and retention in secondary programs, transition to postsecondary education, and participation and retention in postsecondary programs; (3) measurement concerns included difficulty in tracking, delayed transition to postsecondary education, employer perspective in selecting student outcomes, and difficulty in defining a "program-related" career; (4) many believed a consensus definition for tech prep students that states could refine was reasonable; and (5) other design and data collection issues were the need to include input and contextual variables, how to coordinate a national evaluation with Perkins III requirements, relationship to state and local efforts, and state and local needs for technical assistance. Part II contains reports for each of the three focus groups, organized around the same four topics. (YLB)

RESEARCH TRIANGLE INSTITUTE

TECH PREP: BUILDING A FRAMEWORK FOR FUTURE RESEARCH, EVALUATION, AND PROGRAM PRACTICE

Focus Group Report

August 2000

Prepared by
Research Triangle Institute

Prepared for
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Introduction

Federal funding for tech prep programs began in 1990, under Title IIIE of the Carl D. Perkins Vocational and Applied Technology Education Act Amendments (Perkins II, P.L. 101-392). The federal appropriation for tech prep programs has grown from $63,000,000 in Fiscal Year (FY) 1991 to $106,000,000 in FY 2000. Yet relatively few data are available to document the effects of tech prep programs on students. Such documentation is of critical importance to policymakers responsible for decisions about the design, implementation, and funding of tech prep programs, especially in light of new legislative requirements concerning accountability. To obtain this information, the U.S. Department of Education's (ED) Office of Vocational and Adult Education (OVAE) is preparing for a future impact study of the federal tech prep program. OVAE is also interested in identifying the research and technical assistance needs of tech prep programs.

Research Triangle Institute (RTI) is supporting OVAE's efforts by:

- ***Building a framework for future tech prep research and evaluation;*** and
- ***Exploring future directions for program practice,*** in order to inform ED's leadership and technical assistance efforts.

To accomplish these goals, we undertook several activities, including:

- ***A review of the literature on tech prep***, including the current status of tech prep programs and a comparison of approaches to evaluating tech prep programs and their outcomes.
- ***Conduct of focus groups comprising state officials, local practitioners and supporters, and researchers,*** who will supplement information obtained through the literature review and provide input on strategies for assessing and validating the effects of tech prep;
- ***Preparation of a Focus Group Report*** that reviews the key issues identified by respondents; and
- ***Preparation of a "Framework for Future Tech Prep Research and Evaluation" and a comprehensive briefing.*** The research and evaluation framework will

review evidence on the effects of tech prep and provide recommendations regarding: (1) approaches to more rigorously assessing the student and program outcomes associated with the program; and (2) future directions for program practice, including suggestions for efficiently disseminating successful evaluation strategies and indicators. We will also present this information at a briefing for ED officials.

The first product of the study documented the results of our review of the literature on tech prep.[1] This document indicated that decisions would need to be made about several key issues before national, state, and local evaluations of the tech prep program could focus successfully on student outcomes. The literature review served as the basis for the focus groups' discussions, which are described in this document.

Selection of Focus Group Participants

ED's plans for the task order called for the focus groups to comprise a variety of individuals who were knowledgeable about issues pertaining to the evaluation of tech prep programs at the national, state, and local levels, including:

- ***State directors of vocational and technical education;***
- ***State tech prep coordinators;***
- ***Representatives of relevant national organizations;***
- ***Researchers*** responsible for national- and state-level studies of the program; and
- ***Representatives of local tech prep consortia.***

We selected focus group participants based on input from OVAE officials and findings from the literature review; nominees were subject to the approval of ED. While the individuals who attended the three sessions came from many parts of the country, the small number of sessions (and the limited size of each focus group) made it impossible to include a representative from each state. Instead, we selected participants because of their expertise in the evaluation of

[1]Elliott, B. G., and Statelman, T. M. (2000). *Tech prep: Building a framework for future research, evaluation, and program practice. Literature review. Revised draft.* Research Triangle Park, NC: Research Triangle Institute.

tech prep programs, including individuals who represented a variety of perspectives (i.e., local, state, and national). Consequently, with the exception of those who were themselves state administrators, participants' views do not necessarily represent those of vocational education or tech prep officials in their states.

Appendix A provides a complete list of focus group members, along with their affiliations. As shown in the appendix, a number of OVAE representatives also attended the session, primarily as observers.

Conduct of the Focus Groups

We convened the focus groups in Washington, DC, on March 29-30, 2000. Each of the three sessions lasted for one-half day, with the issues identified in the literature review serving as an organizing framework for the discussions. Those issues included:

- The ***outcomes*** that tech prep programs should produce. The level of flexibility that federal legislation affords to states and local consortia allows tech prep programs to address a wide variety of goals and objectives. It also complicates the task of evaluators, who will need to make choices about the student outcomes that the study should examine.

- ***Measurement*** issues surrounding selected outcomes. Researchers will also need to consider the feasibility of collecting data for particular outcomes of interest. For example, while entry into program-related employment after completion of an articulated secondary-postsecondary course of study will be an outcome of interest, some programs may not have been in existence long enough for students to achieve this outcome.

- ***How to define a tech prep student.*** Such decisions are critical to the conduct of an evaluation that accurately reflects the impact of the tech prep program. Understanding "who counts" as a tech prep student is the basis for examining differential effects of such programs under varying state and local conditions.

- Ways to address ***other design and data collection issues,*** including the need to include input and contextual variables (e.g., student characteristics, stage of implementation, local labor market conditions, and resources), coordination with Perkins III requirements and state and local evaluation activities, and ways to address data collection issues. Under this topic, group members also provided input concerning the types of technical assistance that would enable states and local programs to collect student outcome data.

To serve as a springboard for the groups' discussions, we provided members with:

- ***A list of possible outcomes suggested by Perkins III*** (see Exhibit 1). This exhibit was prepared by RTI for discussion purposes only.
- ***One definition of a tech prep student,*** developed by the National Association for Tech Prep Leadership (NATPL) on the basis of information furnished by about 20 states. NATPL provided this information for discussion purposes only, and has not endorsed the definition, which is shown in Exhibit 2.

Organization of This Document

This document is organized into two parts:

- Part I provides a brief summary of the groups' discussions, including major points and broad themes in each of the four topic areas (outcomes, measurement, defining a tech prep student, and other design and data collection issues).
- Part II contains reports for each of the three focus groups, organized around the same four topics.

Exhibit 1
Outcomes Suggested by Perkins III

Legislative requirement	Outcome
Combine minimum of two years secondary and two years postsecondary education	• Completion of articulated secondary/postsecondary program
Integrate instruction and utilize work-based or worksite learning	• Achievement of employability skills/work readiness
Provide technical preparation in a career field	• Placement in program-related career • Retention of, and advancement in, employment in program-related career
Build competence in academic areas and workplace skills	• Improvements in academic skills • Improvements in workplace skills
Lead to associate degree, baccalaureate degree, or postsecondary certificate in a career field	• Attainment of associate degree in career field • Attainment of baccalaureate degree in career field • Attainment of postsecondary certificate in career field • Attainment of postsecondary credentials in career field
Lead to placement in appropriate employment or to further education (Section 202(a)(3)	• Placement in program-related career • Transition to baccalaureate program in career field • Transition to additional postsecondary training in career field

Exhibit 2
One Definition of a Tech Prep Student

Tech prep secondary student

Has indicated an intent to pursue, and is enrolled in courses within, a recognized tech prep education plan that consists, at a minimum, of two years of secondary and two years of postsecondary study; is carried out under a written articulation agreement; may allow the student to earn postsecondary credit while in secondary school; and leads to a specific postsecondary two-year certificate, degree, technical diploma, or apprenticeship.

Tech prep postsecondary student

Has participated in the secondary portion of a recognized tech prep education plan that consists, at a minimum, of two years of secondary and two years of postsecondary study; is carried out under a written articulation agreement; and leads to a postsecondary two-year certificate, degree, technical diploma, or apprenticeship and has enrolled in the postsecondary portion of that education plan. The student may have transferred in college credit earned in the secondary school.

Source: National Association for Tech Prep Leadership, March, 2000.

Part I

Summary of Focus Group Discussions

Summary of Focus Group Discussions

Exhibit 3 shows some of the key issues in the design of a national evaluation, as identified by focus group participants. It also lists their recommendations for addressing these issues. The balance of this section provides a brief summary of participants' comments concerning:

- The ***outcomes*** that a national evaluation should examine, and their suggestions for additions to those shown in Exhibit 1;
- ***Measurement issues*** surrounding specific outcomes;
- The ***definition of a tech prep student*** shown in Exhibit 2, and the implications of evaluators' decisions about a definition; and
- ***Other design and data collection issues.***

Only major points from the discussions of individual groups, or themes that became apparent in more than one session, are presented here. The individual focus group reports in Part II provide complete details on each section.

Outcomes

While most participants agreed that a national tech prep evaluation should focus on student outcomes, they also noted that the program cannot impact students without first changing educational institutions; e.g., it must produce changes in staff development opportunities, instruction, guidance and counseling, and involvement of businesses, industries, and labor unions. Because these changes appear before student outcomes, it would be useful to identify institutional outcomes and to link those outcomes with particular effects on students. For example, an institutional outcome would be the presence of a comprehensive career development system; for students, the result of such a system would be an improved awareness of career options. Because states and local consortia place varying degrees of emphasis on particular

Exhibit 3
Key Issues in the Design of a National Evaluation and Focus Groups' Recommendations for Addressing Them

Issue	Focus Group Recommendations for Addressing Issues
The tech prep program cannot impact students without first ***changing educational institutions.***	**Identify institutional outcomes** and link those outcomes with particular effects on students.
The program is designed to ***permit multiple "exit points."***	Include a ***continuum of outcomes*** in the evaluation design.
Evaluation requirements should ***align with the Perkins III core indicators.***	Study outcomes for tech prep ***participants, concentrators, and completers*** at both the secondary and postsecondary levels.
An evaluation could ***identify tech prep students either on the basis of intent or retrospectively*** (i.e., after they complete the secondary portion of the program). Each approach has advantages and disadvantages.	Carefully consider the implications of ***decisions about how to identify tech prep students.***
If the evaluation adopts a retrospective definition, ***students will be identified in such a way that they are automatically likely to be the most successful academically*** (i.e., those who complete the program are likely to have higher academic ability than those who did not).	***Identify appropriate comparison groups*** and develop ways to control for differences in academic ability.
It is difficult to ***interpret outcome data*** without contextual information.	Use aggregate state- and consortium-level data to provide contextual information, or ***collect contextual information*** in a random sample of consortia within each state.
Because states and local programs place varying degrees of emphasis on particular elements of the program, ***they will not all be equally successful in producing specific outcomes.***	***Collect information concerning local implementation*** of the program.

(continued)

Exhibit 3
Key Issues in the Design of a National Evaluation and Focus Groups' Recommendations for Addressing Them (continued)

Issue	Focus Groups Recommendations for Addressing Issues
Ideally, a national evaluation should provide both student outcome data and ***contextual information that administrators and practitioners can use for program improvement.***	Include a ***supplemental "in-depth" study*** at a sample of sites.
There are several ***discrepancies between the Perkins III core indicators and the outcomes suggested by the tech prep legislation*** (see Exhibit 1).	***Align data collection requirements for Perkins III and the national evaluation to the extent possible,*** considering ways in which evaluation data could supplement data from the core indicators.
States are ***still in the process of developing data collection systems*** to comply with Perkins III requirements.	Decide whether OVAE should ***allow time for states to improve their data collection systems*** before conducting a national evaluation.
In anticipation of a national evaluation, ***some states and local programs might postpone their own evaluation activities.***	Design a national evaluation to ***build on, rather than duplicate, state efforts.***

elements of the program, they will not all be equally successful in producing specific student outcomes.

Perhaps, one participant suggested, it would be useful to think about a continuum of outcomes for tech prep students. Among the earliest outcomes might be retention in secondary school, attainment of state-defined academic skills, and receipt of a high school diploma. Later, a participating student might enter postsecondary education (possibly with advanced credit, and hopefully without the need for remediation). Finally, a tech prep student would complete an articulated two-year postsecondary program, and perhaps enter a baccalaureate program.

Group members suggested that, in addition to examining the outcomes shown in Exhibit 1, a national evaluation should also consider:

- ***Participation and retention in secondary programs.*** Retention in secondary school is an extremely important outcome to parents and legislators.

- ***Transition to postsecondary education, particularly without the need for remediation.*** Tech prep's emphasis on transition to postsecondary education, group members noted repeatedly, is a unique feature that distinguishes the program from other forms of vocational education. Inclusion of this outcome would enable evaluators to document the program's effect on students who enter postsecondary education but do not complete an articulated program: a group that may nevertheless benefit from participation in tech prep.

- ***Participation and retention in postsecondary programs.*** Since most community colleges have open entry policies, it is also important to examine student *persistence* in postsecondary education.

They also identified two measures for inclusion in the study design:

- ***Attainment of state-established academic skills*** as a measure of achievement of academic skills. Local principals and superintendents are extremely interested in tech prep's role in improving student test scores.

- ***Earnings*** as a measure of retention and advancement in program-related careers. Congress has made it clear that it not only expects vocational programs to improve academic achievement and college-going rates, but also to increase earnings. Consequently, a national tech prep evaluation should collect information on students' initial and later earnings. The program's impact on earnings may become apparent while students are still in college, since tech prep students are often able to obtain high-paying part-time jobs before they complete their studies.

Measurement

Focus group members identified a number of measurement issues surrounding individual outcomes. Exhibit 4 summarizes their concerns about each outcome, and shows possible strategies for addressing these concerns, as suggested by the groups' discussions. It also identifies the individual focus group reports that provide full details about specific points.

Defining a Tech Prep Student

Many participants believed that it was reasonable to talk about developing a consensus definition for tech prep students; states could refine this definition so long as the one they employed contained, at its core, the consensus definition. Most also believed that the definitions currently used by their own states were reasonably consistent with the one developed by NATPL. However, they also expressed concerns about particular components of that definition, which are outlined in Exhibit 5. The exhibit also shows possible strategies for addressing each concern, as suggested by the groups' discussions.

Group members suggested that a national tech prep evaluation must either: (1) identify tech prep students based on their *intent* to pursue a tech prep program; or (2) wait until individuals have completed the secondary portion of the program to determine who is a tech prep student (i.e., retrospectively). This decision has important implications for the design of the study. Identifying students on the basis of intent would allow evaluators to administer assessments as students progress through high school. However, since students' intentions frequently change over time, such a definition might hold states and local programs accountable for individuals who leave the tech prep program in order to pursue other options. If, on the other hand, an evaluation identifies students retrospectively, it will be more difficult for researchers to collect information about students' performance in secondary school. Further, since those with the highest academic ability would be most likely to complete the program, evaluators would need to control for academic ability when identifying comparison groups.

Exhibit 4
Measurement Concerns and Possible Strategies for Addressing Them*

Outcome	Measurement Concerns	Possible Strategies for Addressing Concerns	For Details, see Report for Group Number(s):
Outcomes Shown in Exhibit 1			
Completion of articulated secondary/ postsecondary program	• In some states, tracking students from the secondary to the postsecondary level can be quite difficult. • Students do not always make the transition to postsecondary education immediately after high school. • Some institutions will not release data to help states and local programs track students because of concerns about compliance with the Family Educational Rights and Privacy Act (FERPA).	• Develop software that links secondary and postsecondary records. • Offer financial incentives to local consortia that monitor progress between levels. • Track students for several years after high school graduation. • Obtain waivers from students and their parents to address institutions' FERPA concerns.	1, 3
Achievement of employability skills/work readiness	• It is important to consider the perspective of employers in selecting student outcomes, especially in identifying employability skills. • Not all states assess achievement of employability skills. Among those that do, the definition of "employability skills" may vary.	• As new skill standards and certification processes are developed, consider using them to help document attainment of this outcome. • Measure employer satisfaction by surveying a national sample of employers to assess students' achievement of employability skills.	1, 2

* As suggested by the focus groups' discussions.

(continued)

Exhibit 4
Measurement Concerns and Possible Strategies for Addressing Them* (continued)

Outcome	Measurement Concerns	Possible Strategies for Addressing Concerns	For Details, see Report for Group Number(s):
Placement, retention, and advancement in program-related careers	• It can be difficult to define what counts as a "program-related" career. • Students may achieve desirable outcomes even if they do not complete articulated programs or enter program-related careers. • It may not be to the program's advantage to link it too narrowly with specific occupations.	• Use the Classification of Instructional Programs (CIP), Higher Education General Information Survey (HEGIS), or Occupational Employment Statistics (OES) system to categorize secondary and postsecondary courses. • Study placement in both program-related careers and unrelated careers without making a judgment that one is better than the other.	1, 2, 3
Improvements in academic skills	• This outcome should measure achievement, rather than improvement, of academic skills.	• Use state assessment data, which are of great interest to state and local administrators, to measure student achievement of state academic standards. • Consider administering a 12th grade assessment of academic skills, since much tech prep activity occurs in the 11th and 12th grades. • Employ Grade Point Average (GPA) as a measure of academic skills.	1, 3
Improvements in workplace skills	• This is an important outcome, but one that is difficult to measure.	• Use employer surveys to measure attainment of this outcome.	3
Attainment of associate degree, baccalaureate degree, postsecondary certificate, or postsecondary credentials in career field	—	—	—

* As suggested by the focus groups' discussions.

(continued)

Exhibit 4
Measurement Concerns and Possible Strategies for Addressing Them* (continued)

Outcome	Measurement Concerns	Possible Strategies for Addressing Concerns	For Details, see Report for Group Number(s):
Transition to baccalaureate program or additional postsecondary training in career field	—	—	1
Additional Outcomes Identified by Focus Groups			
Institutional outcomes that produce particular effects on students	• Because states and local consortia place varying degrees of emphasis on particular elements of the program, they will not all be equally successful in producing specific institutional or student outcomes.	• Document the contribution of tech prep to school change, rather than trying to show how program funds (which account for only a small portion of school budgets) affect student outcomes.	—
Participation and retention in secondary programs, including both tech prep and other programs	—	—	1
Transition to postsecondary education, particularly without the need for remediation	See "Completion of articulated secondary/postsecondary program."	—	1, 2, 3
Persistence in postsecondary programs, including both tech prep and other programs	—	—	2

* As suggested by the focus groups' discussions.

Exhibit 5
Concerns About Particular Components of the NATPL Definition and Possible Strategies for Addressing Them*

Component	Focus Group Concerns	Possible Strategies for Addressing Concerns	For Details, see Report for Group Number(s):
Intent to pursue	• Even where there is a statewide definition, some local programs may not adopt it. • Not all state definitions depend on intent; those that do may define the term in various ways. • Since students' intentions frequently change over time, identifying students on the basis of intent might hold states and local programs accountable for individuals who leave the tech prep program in order to pursue other options.	• In states that employ written education plans, these documents will help to identify tech prep students. • School officials who conduct annual reviews of students' education plans will identify individuals who leave the tech prep program. • One alternative to identifying students on the basis of intent is to classify those who take particular courses, or combinations of courses, as tech prep students. • Another alternative is to identify students *retrospectively;* i.e., after they complete the secondary portion of the tech prep program.[2]	1, 2, 3
Enrolled in courses within a recognized tech prep education plan	• Not all states have recognized education plans. • The word "recognized" could raise concerns about whether the plan is to be approved at the local, consortium, or state level. • "Enrolled" may have a different meaning in various states (e.g., one day, completion of two courses).	• Allow states to develop their own definitions of what counts as a "recognized tech prep education plan." • States may need guidance about what education plans should include. • States will have an incentive to define "enrolled" carefully, in order to avoid being held accountable for individuals who do not participate fully in, or complete, the program. • In order to align with Perkins III, it might be desirable to identify tech prep participants, concentrators, and completers.	1, 2

* As suggested by the focus groups' discussions.

(continued)

[2]However, this approach would make it more difficult for evaluators to collect information on students' performance in secondary school. Since students with the highest academic ability would be most likely to complete the tech prep program, it would probably be inappropriate for a national evaluation.

Exhibit 5
Concerns About Particular Components of the NATPL Definition and Possible Strategies for Addressing Them* (continued)

Component	Focus Group Concerns	Possible Strategies for Addressing Concerns	For Details, see Report for Group Number(s):
Carried out under a written articulation agreement	• Not all articulation agreements pertain to tech prep programs. • The definition might need to refer to program, rather than course, agreements. • The term "articulation agreement" could refer to either a broad statewide agreement or a specialized local initiative.	• Allow states to define what is meant by a "written articulation agreement" (e.g., program vs. course agreements, broad statewide or specialized local initiative).	1, 3
May allow the student to earn postsecondary credit while in secondary school (secondary definition) OR The student may have transferred in college credit earned in the secondary school (postsecondary definition)	• These statements should be deleted because they do not add to the definition.	—	1, 2, 3
Leads to a specific postsecondary two-year certificate, degree, technical diploma, or apprenticeship	• Wording does not correspond exactly to that of Perkins III, which refers to an associate degree, postsecondary certificate, or baccalaureate degree.	• Modify wording to correspond to that of Perkins III. Also add apprenticeship. • Add employment to the postsecondary definition.	1

* As suggested by the focus groups' discussions.

Other Design and Data Collection Issues

Under this topic, focus group members discussed several issues, including: (1) the need to include input and contextual variables in the design of a national evaluation; (2) how a national evaluation should be coordinated with Perkins III requirements; (3) its relationship to state and local efforts; and (4) state and local needs for technical assistance.

Input and Contextual Variables

Ideally, participants suggested, a national tech prep evaluation should provide both student outcome data to support funding requests at the federal, state, and local levels, and programmatic information that administrators and practitioners can use for program improvement. To accomplish the latter purpose, its design might include a supplemental "in-depth" study at a sample of sites.

Focus group members identified a number of input and contextual variables that might be relevant, including:

- The ways in which ***discontinuation of federal funding for school-to-work programs*** affects tech prep programs.
- ***The level of state and local funding for tech prep programs.***
- ***The statewide context*** within which tech prep programs operate; e.g., whether the state has its own legislation governing tech prep, and where within state government the program is housed.
- ***Issues concerned with leadership;*** e.g., the level of support that tech prep receives from the state director of vocational and technical education and how activities funded by the basic state grant and tech prep are coordinated.

Coordination with Perkins III Requirements

As an OVAE representative pointed out, there are several discrepancies between the Perkins III core indicators and the outcomes shown in Exhibit 1.[3] States may use a variety of measures to comply with the Perkins III requirements; a national evaluation, however, could

[3]For a complete listing, please see Exhibit 6 in Part II.

employ a single measure. Perhaps more importantly, it would permit researchers to supplement the core indicator data with additional information that might be more pertinent to the tech prep program. For example, instead of relying on state assessment data, tech prep evaluators might decide to administer an assessment of academic skills at the 12th grade level (since most state assessments are administered at the 10th grade level, while many tech prep activities do not take place until the last two years of high school).

Some states have indicated to OVAE that they will not be able to provide the performance data required by Perkins III for several years. Consequently, Department representatives wondered whether it would be wise to wait until 2002 to undertake a national tech prep evaluation, in order to give states time to improve their data collection systems.

Coordination with State and Local Efforts

Federal officials should educate state officials about the importance of conducting their own tech prep evaluations. ED should also indicate that a national study will build on, and not replicate, state efforts, and encourage states to share evaluation data with federal administrators responsible for tech prep.

Technical Assistance Needs

States would benefit from technical assistance to help them collect comparable data for both tech prep and other vocational education students. OVAE might also help states and local programs address the confidentiality concerns created by the Family Educational Rights and Privacy Act (FERPA).

Conclusions

Focus group participants provided a wide range of ideas and recommendations concerning:

- Methods for addressing ***key issues*** in the design of a national evaluation, which include—

- The importance of ***recognizing the connection between implementation of particular program components and specific student outcomes;***
- The need to include ***a continuum of outcomes*** in the evaluation design;
- The desirability of ***aligning evaluation requirements with the Perkins III core indicators;***
- The implications of ***evaluators' decisions about how to identify tech prep students;***
- The importance of contextual information for ***interpretation of outcome data;***
- ***Appropriate timing*** for a national tech prep evaluation; and
- The importance of ***building on, rather than replicating, state evaluation efforts.***

- The ***outcomes*** that a national evaluation should examine.
- ***Measurement issues*** surrounding specific outcomes.
- ***Ways to define a tech prep student,*** and the implications of evaluators' decisions for the study.
- ***Other design and data collection issues.***

Their suggestions should be helpful not only to researchers responsible for a national study, but also to evaluators and administrators at the state and local levels, who struggle with many of the same issues as they work to evaluate and improve their own tech prep programs.

Based on input from the literature review and the focus groups, RTI researchers will develop a *Framework for Future Tech Prep Research and Evaluation* that provides recommendations regarding: (1) the design of a future evaluation of tech prep; (2) ways in which research can support program implementation; and (3) OVAE's technical assistance activities. This document will assist ED in preparing for a future impact study of the program, which will provide information of critical importance to policymakers responsible for decisions about the design, implementation, and funding of tech prep programs.

Part II

Focus Group Reports

Group 1

Group 1 included one state director of vocational technical education and one state tech prep coordinator. Two participants were selected for their expertise in state-level evaluation of tech prep programs, while one represented a national organization. The remainder were staff of local tech prep consortia. This group was concerned primarily with:

- ***The addition of several outcomes,*** including retention in secondary school and transition to postsecondary education;
- The importance of ***state assessment data*** to a national tech prep evaluation;
- Issues that ***tech prep's connection with education reform*** raises for evaluators;
- ***The importance of contextual information*** for interpretation of outcome data.

Outcomes

Participants identified several additional student outcomes, including:

- ***Dropout prevention,*** which parents and legislators consider extremely important. To incorporate this outcome, we could modify the first bullet in Exhibit 1 to refer to participation and retention in secondary programs.
- ***Transition to postsecondary education,*** especially without the need for remediation. The link to postsecondary education is a feature that distinguishes tech prep from other forms of vocational education, although the transition does not always occur immediately: some participants reported that their states track students for several years after high school graduation. Some individuals, however, may not enter college until they are in their 20s.
- ***Qualitative outcomes;*** e.g., changes in attitudes toward learning.

Most group members agreed that any national tech prep evaluation should include state assessment data. They recommended, however, that the outcome of "improvements in academic skills" be restated to refer to meeting or exceeding state academic standards. This outcome, like

dropout prevention, is very important to parents and legislators; state assessment results are also useful for program improvement purposes. One state, Texas, has been able to show that its tech prep students have a higher passing rate on the state competency test (the Texas Assessment of Academic Skills, which students take at the end of grade 10). The individual responsible for the state's evaluation activities noted, however, that analysts are not able to identify specific aspects of the program that account for this success: in theory, it is even possible that higher-achieving students are more likely to enter tech prep programs. The state does not attempt to draw conclusions about the reasons for the difference in test scores; it simply reports the results.

Group members questioned whether OVAE intended to examine only student outcomes. An OVAE representative indicated that the department did not want to exclude other types of outcomes from discussion, although it would be necessary to prioritize outcomes in designing an evaluation. Participants suggested that it might be useful to study the effect of the program on the entire school, rather than just on tech prep students. Many aspects of tech prep have the potential to impact all students: these include increased availability of staff development opportunities, integration of academic and vocational instruction, and expanded preparatory services at both the secondary and postsecondary levels. Because tech prep funding accounts for only a small portion of school and college budgets, it might make more sense to consider how those dollars contribute to school change over time than it does to try to show the funding's effect on student outcomes. If ED decided to broaden the scope of the study, it should be possible to present results in a way that educates Congress about the program's broader impact. Measuring changes in the school environment, however, can be difficult. Further, because schools that do not offer tech prep programs may also participate in staff and curriculum development activities, it might be difficult or impossible to identify a comparison group of schools.

Students are more likely to succeed in tech prep programs if they receive appropriate counseling to help determine whether the program is right for them. Consequently, one participant recommended, a national evaluation should examine the issue of whether they are receiving the necessary guidance. This is also an area in which states and local programs might benefit from technical assistance.

One group member suggested that, especially since multiple exit points may help in marketing the program, it might be useful to think about a "continuum" of outcomes. Ideally, a

tech prep student should earn an associate's degree. But, before obtaining a degree, he must enter a postsecondary program (perhaps with advanced credit, or at least without a need for remediation); prior to that, he would receive a high school diploma. Other early outcomes might include retention in secondary school, improvements in academic achievement, and changes in course-taking patterns.

Participants also discussed the connection between tech prep and education reform which, although positive, raises concerns for evaluators. Where the program is conceived as a school reform activity, it may not be possible to identify "tech prep" students or to specify a comparison group (except, perhaps, dropouts). Although schools without tech prep programs might provide a comparison group, they too may have benefitted from staff and curriculum development activities. The link with education reform can also affect the identification of outcomes: one participant noted that, in his state, the program emphasizes improved academics rather than career-related goals.

One group member was particularly concerned about the difficulty of studying the program's impact on a limited subset of students. In her state, she explained, administrators are interested primarily in tech prep's impact on the school as a whole, and on school restructuring (e.g., reductions in school size and changes in student counseling practices). Where curricula for all students are similar (as is the case for this state's math instruction), identification of tech prep students may be difficult.

Participants suggested that, in keeping with the Perkins core indicator framework, OVAE might wish to study outcomes for tech prep participants, concentrators, and completers at both the secondary and postsecondary levels. We might find, for example, that outcomes for the "casual" participant are not as good as those for the concentrator, which in turn might not be as good as those for the secondary completer; those for the postsecondary completer might be best. The definition of "participant," however, may depend upon the requirements of state graduation plans.

Finally, one participant offered a suggestion pertaining to the outcome of "completing an articulated secondary/postsecondary program." Her state, she reported, examines outcomes for both tech prep students who enter articulated postsecondary programs and those who enter other postsecondary programs.

Measurement

In this section, we present the group's concerns about measurement issues surrounding particular outcomes, following the order in which those outcomes appear in Exhibit 1. We also discuss general themes concerning measurement that emerged from the focus group's discussions.

Measurement Issues for Particular Outcomes

Completion of articulated secondary/postsecondary program. The feasibility of collecting data for outcomes related to both the secondary and postsecondary levels will depend to some extent upon the type of data collection system that the individual state has constructed. Some states have a system that links secondary and postsecondary data for all schools and colleges; e.g., North Carolina is developing software that utilizes electronic high school transcripts and identifies tech prep completers through a computerized analysis of course-taking patterns. In Illinois, on the other hand—although the postsecondary data system identifies tech prep students—secondary school records are on paper. To identify tech prep participants who enter college, secondary personnel must manually enter data for individual students.

Achievement of employability skills/work readiness. Group members expressed considerable concern about the feasibility of measuring achievement of employability skills/work readiness. While some states (e.g., Illinois) have statewide tests of workplace readiness skills, others do not. Some administrators might argue that a student has demonstrated achievement of employability skills by completing a course that meets state curriculum standards, and that there is no need for additional testing. Further, the definition of "employability skills" will vary from one state to another, and perhaps even among consortia within a state.

The political support of employers, one participant noted, is critical for tech prep programs. Consequently, it is important to consider their perspectives in selecting outcomes and measures: input from employers would be essential in identifying employability skills. Measurement of this outcome may become more feasible in the future with the development of skill standards and certification processes.

Measuring employer satisfaction might be another way to monitor achievement of employability skills/work readiness. Some participants reported that local consortia in their states already surveyed employers, although response rates were sometimes low. Perhaps, group members suggested, employer satisfaction could be measured through a survey of a national sample of employers.

Placement in program-related career and retention of, and advancement in, employment in program-related career. Society may have a legitimate interest in knowing whether tech prep students enter and advance in "program-related" careers: for example, state officials may need to know how well tech prep programs address workforce development needs. Nevertheless, most group members agreed, measurement of these outcomes may be problematic because of the difficulty involved in determining what counts as a "program-related" career. Although the Classification of Instructional Programs (CIP) provides a way to categorize secondary and postsecondary courses, it is difficult to link those codes with particular programs and occupations. These difficulties are illustrated by the problems that Texas, which uses Unemployment Insurance (UI) wage data to monitor students' employment and earnings, has encountered. As a result, participants suggesting deleting the phrase "program-related" in all outcomes. Instead, it might be preferable to say "in a career field," in order to correspond with the legislation. It would still be necessary, however, to define what counts as a "career," rather than a job.

At the secondary level, analysis of course-taking patterns may be required in order to identify a student's "program." At the postsecondary level, it can be difficult to determine what kind of employment counts as "program-related." One participant reported that students from his community college, which offers 60 majors, enter between 800 and 900 different occupations. Sometimes, students may use the skills they acquire in school in seemingly unrelated careers.

Linking tech prep programs with narrowly defined occupations may not be in the program's best interest. Since students are advised that tech prep programs will prepare them for a variety of careers, it may not be appropriate to evaluate the program by their entry into a single occupation. Instead, students may achieve desirable outcomes in a variety of ways. For example, some may raise their expectations and enter four-year programs; others who were at

risk of dropping out may become interested in postsecondary education, but enroll in unarticulated programs.

Participants agreed that employment outcomes were of interest only if they followed postsecondary education. Employment directly from high school should count as a successful outcome only if it is in a recognized apprenticeship.

Improvements in academic skills. This outcome should measure attainment, rather than improvement, of academic skills, which implies pre- and post-testing (unless evaluators are considering student-level aggregates).

Transition to baccalaureate program in career field and **transition to additional postsecondary training in career field.** Participants wondered if we should clarify whether these two outcomes refer to transition to a baccalaureate program or additional training only after completion of a two-year program, or whether they also include transition directly from high school. One group member noted that her state does permit students to go directly from high school to a four-year program, partially as a marketing tool, although it does not promote this option.

Changes in attitudes toward learning. Although it would be interesting to know whether participation in tech prep programs causes students to change their attitudes toward learning, measuring progress toward this outcome would require the collection of survey data for a random sample of students. These data would be expensive and time-consuming to obtain; further, since they would be based on self-report, their validity might be questionable. Perhaps, one respondent suggested, states could consider monitoring this outcome through their own evaluation activities. In fact, researchers responsible for a national evaluation might be able to recommend additional ways in which state activities could complement the national effort.

General Themes

The following general themes concerning measurement also emerged from the focus group's discussions.

Timing of a national evaluation. OVAE representatives noted that most states chose to submit transitional, rather than five-year, plans under Perkins III; some indicated that they would not have performance data for several years. They wondered whether it would be wise to wait

until 2002 to undertake a national tech prep evaluation, in order to give states time to improve their data collection systems.

Data collection issues. One participant reported that, in her state, some districts do not receive any tech prep funds, although they do participate in staff development. Especially since no district staff member is assigned to the tech prep program, these districts may be reluctant to provide evaluation data. The state will have to address this issue, however, in order to meet Perkins III requirements.

Identification of students. In some states, students do not realize that they are enrolled in tech prep programs. Tech prep, one participant explained, is "invisible to them; an educator's term, not a kid term." In Maryland, for example, students may see themselves only as having met two sets of graduation requirements, in preparation for either a college or career. Some administrators may emphasize transition to postsecondary education rather than participation in a specific program. In other cases, school officials prefer not to "label" students in order to avoid concerns about tracking.

School outcomes. As noted earlier, tech prep programs may impact the whole school by increasing the availability of staff development opportunities, integrated instruction, and preparatory services. An evaluation could monitor these changes, although data might not be comparable among districts, consortia, or states. For example, a staff development activity might be a one-day workshop in some areas, while it is a monthly meeting in others. Further, these data would probably not be useful for program improvement purposes. Information on career development interventions will come from OVAE's two-year project with the National Research Center for Career and Technical Education, in which Oregon State University will examine the impact of various strategies. The study will provide a comprehensive taxonomy of career development interventions.

Defining a Tech Prep Student

Asked whether they thought it was reasonable to talk about developing a single definition for tech prep students, some members of the group expressed the belief that it was. If ED is to conduct an evaluation, it must establish such a definition in order to be able to collect outcome

data. States can refine the definition if necessary, so long as the resulting definitions do not conflict with the consensus definition.

While most participants believed that the definition of a tech prep student developed by NATPL (shown in Exhibit 2) would work in their states, they mentioned a number of concerns about particular aspects. In this section, we describe those concerns.

Intent to Pursue

Not all state definitions depend on student "intent"; those that do may define the term in various ways. For example:

- ***New York*** asks students to sign a registration form, and counts them as tech prep students after they complete two technical courses.
- ***Illinois*** counts high school students as tech prep students if they have a written career plan indicating that they are preparing to enter what the state defines as a tech prep *occupation:* i.e., one that (1) has an associate's degree, a two-year certificate, or a two-year apprenticeship following high school completion as the predominant method of entering the occupation; (2) has opportunities for above-average entry wages and career advancement; and (3) requires advanced technical skills.

As a group member from the latter state remarked, the phrase "intent to pursue" indicates that the student has received counseling and understands that he is preparing for entry into an career that meet the state's definition of a tech prep occupation. This participant suggested that it might be useful to define not only a tech prep student, but also a tech prep program and a tech prep occupation.

Texas—which has a statewide approval process for tech prep programs—does not include "intent" in its definition, but simply counts individuals as tech prep students when they enroll in the first of a sequence of career/technology courses approved as tech prep. In this state, which uses a 4+2 model, individuals can be counted as tech prep students as early as grade 9, and may be enrolled under any of the state's three graduation plans. In their reports, evaluators compare the performance of three groups, including: (1) tech prep students; (2) students participating in career/technology courses that are not state-approved as tech prep; and (3) all other students.

Another concern related to inclusion of "intent to pursue" in the definition is that students' intentions change over time. Unless school officials review students' plans each year, they may not be able to accurately identify tech prep students.

Enrolled in Courses Within a Recognized Tech Prep Education Plan

Most participants indicated that their states employed some type of written education plan, which might be called a Career Development Plan, Education Learning Plan, Individualized Education Plan, or other type of plan. Some expressed concerns, however, about the definition of a "recognized tech prep education plan."

The word "recognized" could raise concerns about whether the plan is to be approved at the local, consortium, or state level. The real issue, participants agreed, is whether or not students are participating in a planned sequence of courses. As long as the definition of a recognized plan is left to the individual states, this is probably an acceptable term. Since not all states currently have recognized education plans, they may need guidance about what such plans should include. One participant suggested that they should incorporate the philosophy of "Breaking Ranks," which calls for each secondary school student to have an individualized learning plan.

States also make different decisions about the point at which a student is considered to be "enrolled" in a tech prep program. Some may define them as tech prep students on the first day of their enrollment under a written plan. In New York, students sign registration forms in the 8th grade; their plans are reviewed annually. In Texas, which uses a 4+2 model, high school students may be classified as tech prep in any of grades 9 through 12, so long as they participate in a single course within an approved tech prep program. Illinois, however, does not designate students as tech prep until the 11th grade. Participants observed that states will have an incentive to define tech prep students carefully, so that they will not be held accountable for individuals who do not participate fully in, or complete, the program. They also noted that in order to align with Perkins III, it might be desirable to identify tech prep participants, concentrators, and completers.

Carried Out Under a Written Articulation Agreement

One focus group member noted that some high schools in her state participated in local articulation agreements that did not pertain to tech prep programs; further, not all articulated programs are tech prep programs. Another suggested that it might be desirable to refer to program, rather than course, agreements; the group, however, agreed to maintain the term "written articulation agreement" and allow each state to determine what that means.

May Allow the Student to Earn Postsecondary Credit While in Secondary School (secondary definition)

The Student May Have Transferred in College Credit Earned in the Secondary School (postsecondary definition)

These statements do not necessarily add to the definition; without them, it would still define a tech prep program. A community college representative noted, however, that advanced credit is often the most practical approach to eliminating duplicative courses for individual students. The majority of community college students no longer enroll directly after high school. Therefore, it is difficult to set up courses to accommodate only those who do.

Leads to a Specific Postsecondary Two-year Certificate, Degree, Technical Diploma, or Apprenticeship

This wording does not correspond exactly to that of Perkins III. Participants suggested using the exact legislative wording, which refers to an associate degree, postsecondary certificate, or baccalaureate degree; Perkins II also referred to apprenticeship. They also suggested adding employment to the postsecondary definition, since enabling students to hold high-paying jobs while enrolled in postsecondary education would be a desirable outcome.

Other Design and Data Collection Issues

Under this topic, participants discussed several issues, including: (1) the need to include input and contextual variables in the design of a national evaluation; (2) how a national evaluation should be coordinated with state and local efforts; and (3) state and local needs for technical assistance.

Input and Contextual Variables

An OVAE representative explained that, while the next national evaluation will not be restricted entirely to examining student outcomes, descriptive work will be secondary. Participants noted, however, that it is difficult to interpret outcome data without contextual information. For example, it may not be reasonable to expect students in states with high unemployment rates to achieve the same outcomes as those in states with low unemployment; or, those in areas where employment is primarily in agriculture to earn as much as others who have access to jobs in high-tech industries. Similarly, programs that benefit from high levels of state funding might produce better outcomes. To determine what input and contextual variables should be included, it would be useful to know how evaluation data will be used at the federal level; e.g., whether they will be employed in funding decisions.

One way to obtain contextual information would be to use aggregate state- and consortium-level data, which some—but not all—states could provide. Even this information does not necessarily "tell the whole story"; for example, it does not reflect local labor market conditions or how much emphasis individual schools place on contextual teaching and career guidance. Local coordinators, however, cannot be expected to collect such information.

Qualitative studies, like Debra Bragg's current work, provide information that helps to inform state and local evaluation practices, and that is useful for program improvement. Perhaps, participants suggested, a national evaluation could collect contextual information in a random sample of tech prep consortia within each state. Another approach would be to gather these data at a small number of selected sites through a supplemental "in-depth" study.

Coordination with State and Local Efforts

To coordinate state and local evaluation activities, one group member recommended that OVAE could find out more about the data that states already collect on a regular basis through:

- ***A survey of states;*** or
- ***A review of state plans,*** which describe accountability systems.

These activities would give ED a better idea of what data elements it could expect to collect, at what expense. Such a survey, or review, might be consistent with OVAE's work in developing

the Perkins III core indicator framework, which includes identifying common measurement approaches and definitions.

Technical Assistance Needs

Participants' suggestions concerning technical assistance needs pertained primarily to the image of the tech prep program. Local programs, one suggested, desperately need high-quality public service announcements to which they can attach their own identifying information. To improve the program's image, tech prep should be linked with other initiatives such as ED's New American High Schools and Small Learning Communities, as well as those of High Schools That Work.

Group 2

Group 2 included one state director of vocational technical education and one state tech prep coordinator, along with two researchers and one representative of a national organization. The remaining participants were staff from local tech prep consortia. Like the individuals in the first focus group, Group 2 recommended the addition of transition to postsecondary education as an outcome. Participants also discussed:

- The possibility of ***identifying intermediate institutional outcomes*** for each legislative requirement, and linking those outcomes with particular effects on students;
- Difficulties involved in ***monitoring students' placement, retention, and advancement in program-related careers;***
- Advantages and disadvantages of ***identifying tech prep students on the basis of intent or retrospectively*** (i.e., after they complete the secondary portion of the program; and
- Issues concerning ***coordination with Perkins III requirements.***

Outcomes

Participants identified one additional student outcome:

- ***Transition to and persistence in postsecondary education.*** Tech prep's emphasis on transition to postsecondary education is a unique feature that distinguishes it from other forms of vocational education. Since most community colleges have open entry policies, it is also important to examine student *persistence* in postsecondary education.

While they agreed that a national evaluation of tech prep should examine student outcomes, group members also pointed out the importance of understanding the ways in which the program produces those outcomes, and the reasons why some states and consortia are more successful than others. Before tech prep can impact students, it must first bring about changes in educational institutions; e.g., changes in guidance and counseling, instruction, staff development,

and involvement of businesses, industries, and labor unions. These changes take time to occur (particularly when the school is implementing a comprehensive program), but will become apparent before student outcomes. Consequently, it might be useful to identify intermediate institutional outcomes for each legislative requirement and to link those outcomes with particular effects on students. For example, an intermediate institutional outcome would be the presence of a comprehensive career development system; for students, the result of such a system would be an improved awareness of career options.

For each element of the program, an evaluation should examine corresponding student outcomes. However, because states and local consortia place varying degrees of emphasis on particular elements of the program, they will not all be equally successful in producing specific outcomes. A more thorough understanding of local implementation would help to inform our interpretation of outcome data.

Tech prep programs, one participant noted, prepare students for a wide variety of high-tech and "low-tech" jobs; some emphasize specific occupations, while others target clusters of careers. Evaluators should consider whether all of these programs can be expected to produce the same outcomes.

Measurement

In this section, we present the group's concerns about measurement issues surrounding particular outcomes, following the order in which those outcomes appear in Exhibit 1.

Transition to, and Persistence in, Postsecondary Education[4]

In some states, it will be difficult to track tech prep students from the secondary to the postsecondary level. Because of concerns about compliance with the Family Educational Rights and Privacy Act (FERPA), many postsecondary institutions will not provide the data that local consortia need to monitor this outcome, or to help them determine how many tech prep students

[4]Additional outcome identified by the group.

enter postsecondary schools without the need for remediation.[5] States will have to deal with this issue, however, in order to comply with the Perkins III performance requirements.

Improved Awareness of Career Options[6]

As a result of institutional changes, one group member observed, tech prep students are often more career-oriented, and have a stronger sense of self-efficacy, than other students. Although these outcomes would be difficult to measure, a national evaluation could conceivably include measures of self-esteem and locus of control for a sample of tech prep students and a comparison group. Alternatively, it might be possible to simply measure how much access students had to career development activities.

Achievement of Employability Skills/Work Readiness

While this is an important outcome, it will be difficult to document since few states use appropriate assessments. This outcome does not pertain to the integration of instruction, as suggested by the exhibit, but only to the use of work-based or worksite learning. (Integrated instruction might be linked, instead, with improvements in academic skills.)

Placement in Program-Related Career and Retention of, and Advancement in, Employment in Program-Related Career

These outcomes are designed to monitor the effect of Perkins III's requirement that tech prep programs "provide technical preparation in a career field." The legislation does not specify, however, what level of competence students must achieve. Further, "technical preparation" can be difficult to define.

Several group members reported that their states (including Illinois and Arizona) either were currently attempting, or had previously attempted—with considerable difficulty—to monitor students' entry into program-related careers. They recommended, and other group members concurred, that a national evaluation should not attempt to track placement, retention,

[5]Please see "Other Design and Data Collection Issues" for a discussion of technical assistance needs in this area.

[6] Additional outcome identified by the group.

or advancement in *program-related* careers. Another reason for deleting this phrase is that federal policy is now promoting the development of broad career clusters; consequently, it is not desirable to select outcomes that focus too narrowly on specific occupations. Finally, because so many changes are taking place in the world of work, students may have good reasons to change their career goals.

In the current economy, employers may hire tech prep students as soon as they have entry-level skills, even if they have not completed their course of study. These individuals often continue to attend school part-time and may eventually complete the program; the most immediate benefits for them, however, will be in the form of employment, job retention, and earnings. Perhaps, participants suggested, a combination of educational and employment data would help to "tell the story" of the program's impact.

Group members agreed that entering employment immediately after high school should not be counted as a successful outcome. Perkins III, they noted, refers to only one option for employment after high school: placement in military service.[7]

Defining a Tech Prep Student

Participants noted that a single definition of a tech prep student would have to be somewhat vague in order to allow room for interpretation by individual states and consortia. This lack of specificity, however, creates difficulties for evaluators.

In this section, we describe group members' concerns pertaining to specific aspects of the definition developed by NATPL, which is shown in Exhibit 2. We also present general themes concerning the definition of a tech prep student that arose from the group's discussions.

According to focus group members who are also involved in NATPL, the association does not endorse the definition, but merely offers it for discussion. It is based on an identification of common elements in definitions submitted by about 20 states that responded to a request for information (including some that did not have, or were in the process of developing, definitions). In a few cases, different entities in the same state submitted conflicting information.

[7] Perkins II also referred to placement in a two-year apprenticeship program.

Concerns Pertaining to Specific Aspects of the Definition

Intent to pursue. Only one participant indicated that her state (Maryland) relied on "intent" to identify tech prep students: in this state, 10th grade students indicate their intent to participate in a tech prep program by signing a five-year education plan. Maryland has found that—while students may change from one area within a career cluster to another—they do not usually change from one cluster to another. Other group members, however, believed that secondary students frequently changed course sequences; consequently, they expressed concern about the feasibility of relying on intent to identify tech prep students.

Enrolled in courses within a recognized tech prep education plan. Focus group members observed that the phrase "recognized tech prep education plan" might mean something in some states, but not in others. About half reported that their states required students to have some sort of education plan: South Carolina, Illinois, and West Virginia do, while California, Washington, and Arizona do not. The existence of such a plan depends to some extent upon the availability of counseling and guidance services: if the state does not require the development of education plans, or if insufficient numbers of counselors are available, some students may "fall through the cracks."

Asked whether ED should recommend that states require such a plan, one respondent remarked that states might welcome guidance in this area. Such a recommendation might be controversial, however, if federal guidelines concerning education plans also established minimum standards for academic and vocational coursework.

May allow the student to earn postsecondary credit while in secondary school (secondary definition) and **The student may have transferred in college credit earned in the secondary school** (postsecondary definition). Transferring credit from high school to college, one participant observed, is not sufficient to define a tech prep student. In some states, local districts have numerous articulation agreements; sometimes, however, relatively few students take advantage of them. Consequently, we should remove the above phrases from the secondary and postsecondary definitions.

General Themes

The following general themes concerning the definition of a tech prep student also arose from the group's discussions.

Options for identifying tech prep students. Most group members indicated that their states and local consortia could identify tech prep students, although they use a variety of definitions. Another possible approach for a national evaluation would be to identify tech prep students as they complete the secondary portion of the program. This approach would allow for the application of a more uniform definition; e.g., students could be identified based on course-taking patterns. The disadvantage of this strategy is that it would make it impossible to examine the impact of tech prep on student retention. Further, some might argue that a tech prep student who completes the secondary portion of the program is only a concentrator, rather than a completer, since the program encompasses both the secondary and postsecondary levels. Instead of identifying students retrospectively, one participant suggested, a national evaluation that included a longitudinal component could identify them based on intent early in their high school careers, and then track individuals over time to see whether they actually completed the program.

Many students who complete only part of a tech prep program, focus group members pointed out, still benefit. Evaluators might be able to document these benefits by studying outcomes not only for participants and completers, but also for tech prep concentrators. Students who drop in and out of the program over time may also benefit; however, states may have limited ability to track these individuals.

Other Design and Data Collection Issues

Under this topic, participants discussed several issues, including: (1) the need to include input and contextual variables in the design of a national evaluation; (2) how a national evaluation should be coordinated with Perkins III requirements; and (3) state and local needs for technical assistance.

Input and Contextual Variables

Tech prep programs are being implemented in an economic context that differs from the environment in which the program was first conceived. Most community college students now work while attending school; as a result, they often take longer to complete their studies. With unemployment rates low, job seekers may be able to obtain employment with fewer educational credentials than were required in the past. Finally, because individuals who are qualified to teach technical courses can frequently obtain more lucrative jobs in business and industry, postsecondary institutions may have difficulty in attracting and retaining qualified instructors.

According to focus group members, to assist evaluators in interpreting outcome data, a national evaluation should examine—perhaps through case studies—the extent to which states and local programs have implemented particular program elements, as well as the characteristics of the communities in which tech prep programs operate. Researchers would also benefit from access to information collected by other education reform initiatives, including school-to-work and High Schools That Work (HSTW).

When school-to-work funds became available, one participant observed, some tech prep programs "literally changed their names" because of similarities between the two initiatives; in other cases, they continued to operate as they had in the past. Similarly, the discontinuation of federal funding for school-to-work programs in 2001 is also likely to impact tech prep programs. Evaluations of the school-to-work program might also provide data on tech prep students, as would data from HSTW evaluations. West Virginia, for example, obtains science, math, and reading scores for its tech prep students from the latter source.

Coordination with Perkins III Requirements

An OVAE representative identified a number of discrepancies between the Perkins III core indicators and the outcomes shown in Exhibit 1, including the following:

- Exhibit 1 refers to:
  - *Improvements* in academic skills, while Perkins refers to skill *attainment.*
  - *Advancement* in career, while Perkins III looks only at placement and retention.

- *Workplace skills*, while Perkins III refers to technical skills.
- Attainment of *associate degrees, baccalaureate degrees, and postsecondary certificates and credentials.* The Perkins III core indicators will monitor attainment of postsecondary degrees and credentials, perhaps without distinguishing what type of degree or credential the individual earned. Evaluators responsible for a study of the tech prep program should consider whether the core indicators will track students for a sufficient length of time to document their entry into four-year programs.

- Perkins III does not refer to:
  - Completion of *an articulated* program;
  - *Employability skills and work readiness;* or
  - *Program-related* careers.

Exhibit 6 provides a side-by-side comparison of the Perkins III core indicators and the outcomes discussed by the focus group.

States must provide core indicator data for all vocational education students, including a separate report for tech prep students. They may, however, use a variety of measurement approaches; for example, to measure attainment of academic skills at the secondary level, states may employ their own or national standardized assessment systems, grade point average, program completion, high school graduation, or another specified measure. Participants agreed that it would be desirable to align data collection requirements for Perkins III and a national tech prep evaluation to the extent possible, in order to permit comparison of tech prep students and vocational education students in general. In a national evaluation, however, all states could be required to employ a single measure.

Perhaps more importantly, an evaluation would allow researchers to supplement the core indicator data with additional information that might be more pertinent to the tech prep program. For example, states may measure attainment of academic proficiencies by using 10th grade assessments that monitor achievement of minimum standards. Tech prep programs, however, emphasize transition to postsecondary education, often through activities that take place during the last two years of high school. As a result, a more appropriate assessment for tech prep

Exhibit 6
Comparison of Core Indicators and Exhibit 1 Outcomes*

Perkins III Core Indicators	Exhibit 1 Outcomes
Student ***attainment*** of challenging state-established academic, and vocational and ***technical,*** skill proficiencies	• ***Improvements*** in academic skills • ***Improvements*** in ***workplace*** skills
Student attainment of a secondary school diploma or its recognized equivalent, a proficiency credential in conjunction with a secondary diploma, or a ***postsecondary degree or credential***	• Attainment of ***associate degree*** in career field • Attainment of ***baccalaureate degree*** in career field • Attainment of ***postsecondary certificate*** in career field • Attainment of ***postsecondary credentials*** in career field
Placement in, retention in, and completion of postsecondary education or advanced training, placement in military service, or placement or retention in employment	• Completion ***of articulated*** secondary/postsecondary program • Transition to baccalaureate program in career field • Transition to additional postsecondary training in career field
Student participation in and completion of vocational and technical education programs that lead to nontraditional training and employment	—
—	• Placement, retention, and ***advancement*** in ***program-related*** career
—	• Achievement of ***employability skills/work readiness***

* Emphasis added.

students might be one that is administered at the 12th grade level, and that monitors attainment of skills necessary for entry into college (e.g., attainment of requirements for entry into state-supported colleges). Completion of an articulated program and achievement of employability skills/work readiness might also be good measures to include for tech prep.

Technical Assistance Needs

States would benefit from technical assistance to help them collect comparable data for both tech prep and other vocational education students. Perhaps, participants suggested, OVAE should consider a pilot test similar to the one that it is conducting for the Perkins III core indicators.

As one participant suggested, another important role for OVAE would be to help address educational institutions' concerns about compliance with FERPA. One focus group member indicated that her state had recently received federal guidance in this area that caused some community colleges to refuse to release the names of students who were enrolled in secondary tech prep programs. One way to address these concerns, according to an OVAE representative, is to obtain a waiver from each student (and from parents, in the case of minors).

ED should also educate state officials about the importance of conducting their own tech prep evaluations. In anticipation of the Mathematica study, one participant noted, some states postponed their own activities; yet that study had only limited utility at the state and local levels. Federal officials should indicate that a national study will build on, and not replicate, state efforts, and encourage states to share evaluation data with them. One way to promote the importance of state activities would be to distribute the focus group report to state directors of vocational technical education and state tech prep coordinators.

Focus group members identified two additional areas in which OVAE might be able to assist state and local tech prep programs: (1) by helping states build their capacity to conduct research; and (2) by encouraging collaboration between tech prep and other educational initiatives such as school-to-work, HSTW, and New American High Schools. In the latter area, states and local programs would benefit from case studies that showed where the initiatives are coordinated, and are part of a true "system."

Group 3

Group 3 included three state tech prep coordinators and an equal number of individuals selected for their expertise in the conduct of national- or state-level evaluations of tech prep programs. One participant represented a national organization, and one a local consortium. Among the major points of the group's discussions were:

- The possible ***addition of other outcomes,*** including transition to postsecondary education without the need for remediation, and earnings data;
- The need to conduct an evaluation that would provide both ***data to support funding requests and information useful for program improvement;***
- Variation among state and local ***definitions of a tech prep student;*** and
- ***Appropriate timing*** for a national tech prep evaluation.

Outcomes

Focus group members agreed that—although not every tech prep consortium can implement all elements of the program—all of the outcomes shown in Exhibit 1 could help to reflect the overall impact of tech prep. Among the most critical are: improvements in academic skills, placement in program-related career, achievement of employability skills/work readiness (including "soft" and SCANS skills), and improvements in workplace skills (including technical skills).

Additional outcomes identified by group members include:

- ***Transition to postsecondary education,*** which is an important emphasis of the tech prep program.
- ***Entry into postsecondary education without the need for remediation.*** An evaluation should investigate the question of whether—as proponents of tech prep believe—participants are well prepared for postsecondary education. One way to do this would be to compare their performance on postsecondary placement tests to that of other students (as Florida has recently done). However, because individual institutions and states employ a wide variety of placement tests, entry into postsecondary education without the need for remediation might be a better indicator.

- ***Earnings.*** Congress has made it clear, one participant observed, that it not only expects vocational programs to improve academic achievement and college-going rates, but also to increase earnings. Consequently, a national tech prep evaluation should collect information on students' initial and later earnings. Earnings data might also improve the "marketability" of the program.

- ***Employment and earnings in combination with postsecondary education.*** The technical skills that many tech prep students (especially those in fields such as Information Technology) acquire allow them to obtain high-paying jobs while they are still enrolled in community colleges. This is an important outcome, especially since students' earnings enable them to complete their postsecondary education. Unemployment Insurance wage data might help in monitoring this outcome, although some students are self-employed entrepreneurs.

Focus group members noted that a study of the tech prep program should provide both student outcome data to support funding requests at the federal, state, and local levels and contextual information that administrators and practitioners can use for program improvement. They disagreed, however, about what type of study, or studies, would best accomplish these dual purposes.

One option would be to conduct an outcome evaluation that also included in-depth case studies at about a dozen sites. Still, one participant argued, it would be impossible to say that individual program elements produced particular student outcomes. There is, however, some evidence to suggest that certain combinations of program elements are more effective than others. To examine the link between student outcomes and program elements, OVAE could design a demonstration program involving consortia that emphasized different approaches to tech prep implementation. In such a study, students could be randomly assigned to tech prep or other programs at each site.

In order to identify appropriate student outcomes, researchers must develop hypotheses about how particular program elements impact students. Individual consortia may not be able to implement all elements of the program, especially given current funding levels; and, in the absence of all program elements, it may not be appropriate to expect certain student outcomes. For example, a national evaluation that relies on a random sample of local programs will undoubtedly include some consortia that use their tech prep funds solely for staff development. Since students at those consortia may not achieve the same academic outcomes as those in more

comprehensive programs, it is important to have contextual information that facilitates accurate interpretation of data for those sites.

Measurement

In this section, we present the group's concerns about measurement issues surrounding particular outcomes, following the order in which those outcomes appear in Exhibit 1. We also describe one general concern, pertaining to the timing of a national evaluation, that emerged from the focus group's discussions.

Measurement Issues for Particular Outcomes

Completion of articulated secondary/postsecondary program. A national evaluation may not be able to track all students who eventually complete tech prep programs. Although many students "drop in and out" of postsecondary education, only those who are enrolled at a particular point in time will be counted. Students who move from one college to another may be hard to locate. Finally, because many individuals require more than the scheduled length of time to complete their studies, evaluators may need to track students for an extended period of time.

Most group members indicated that monitoring entry into postsecondary education was not a simple process in their states. Secondary and postsecondary systems may not be linked, or may provide only aggregate data. At the secondary level, data systems often do not include social security numbers.

Two participants reported that their states (Arizona and Ohio) provide financial incentives to local consortia that monitor progress from the secondary to the postsecondary level.[8] Tech prep personnel in Arizona have tracked students by hand in the past, but are now investigating a computer program that would facilitate their work; in Ohio, tech prep consortia use a web-based system. Local programs in the latter state receive $250 for each tech prep student who enters postsecondary education, with a $250 bonus if the student does not need

[8]Arizona's incentive also applies to students who enter employment or the military within two years after high school graduation.

remediation. The state is also undertaking a study to investigate the reasons why some tech prep students do not go on to college.

Placement in program-related career and **retention of, and advancement in, employment in program-related career.** One participant expressed concern about attempting to monitor placement, retention, and advancement in *program-related* careers. Individuals may have several "careers" during their lifetimes; further, a nonrelated career may sometimes represent a better career choice, or indicate that students' skills are transferable. Another group member suggested that an evaluation could study placement in both program-related and unrelated careers without making a judgment that one was better than the other.[9] This information might be useful for program improvement, since it could impact counseling practices.

Improvements in academic and workplace skills. At the postsecondary level, evaluators could employ Grade Point Average (GPA) as a measure of academic skills. At the secondary level, however, improvements in academic skills might be more difficult to measure. While most states test at the 10th grade level, many tech prep activities do not take place until the last two years of high school. Consequently, one participant argued, evaluators responsible for a national study of the tech prep program could not make use of existing assessment data in most states, and would have to administer their own pre- and post-tests. These data could be quite informative; test administration, however, would consume a considerable amount of resources.

Several other participants, however, disagreed strongly with this argument. "Only at the point that our tech prep initiative became a part of our statewide accountability (system)," North Carolina's state tech prep coordinator pointed out, "did my phones start ringing." Because tech prep completers in the state had posted above-average scores on the HSTW National Assessment of Educational Progress mathematics and reading assessments, principals in the state believed that the program could help improve test scores. Similarly, an individual from New York reported that interest in tech prep ". . .is absolutely driven by superintendents saying tech prep helped (students pass the state's Regents exams). Otherwise, you're out of the game."

[9]Consequently, outcomes should include not only "placement in *program-related* career," but also "placement in career."

Improvements in workplace skills are an important outcome, but one that is difficult to measure. While some states have appropriate assessments (e.g., Ohio uses Work Keys), others do not. The best way to measure this outcome might be through employer surveys, which not all states currently do at both the secondary and postsecondary levels. Survey results, however, would need to be linked to individual students, rather than aggregate data. In a demonstration program, researchers could administer an appropriate assessment to a sample of 9th grade students, and then compare the performance of 12th grade tech prep students with that of other seniors.

Timing of a National Evaluation

A national tech prep evaluation, one focus group member argued, should be completed before the next reauthorization of the Perkins legislation. Student outcome data could help to ensure that the legislation governing vocational education remains separate from that of other programs: a major concern among state directors of vocational education.

Evaluation results, however, will not be available by that time (2002). State performance reports and the National Assessment of Vocational Education (NAVE) may provide useful information; or, OVAE may wish to consider whether it can design a study that provides interim products that would be useful in the reauthorization process.[10] In any event, the evaluation is designed not only for legislative, but also for program improvement, purposes.

Defining a Tech Prep Student

Several members of the focus group provided their states' definitions of a tech prep student for discussion; these are shown in Exhibit 7. Some believed that the definition of a tech prep student developed by NATPL would be applicable in their states; however, participants mentioned a number of concerns about specific aspects. In this section, we describe those concerns. We also present general themes concerning the definition of a tech prep student that arose from the group's discussions.

[10]For a discussion of NAVE activities pertaining to tech prep, please see "Other Design and Data Collection Issues."

Exhibit 7
State Definitions of a Tech Prep Student

Arizona. A tech prep student is any student enrolled in one or more occupationally based secondary and/or postsecondary programs in an identified Career Pathway. Students must be enrolled in one of 43 state-approved vocational areas.

Florida. A student enrolled in an articulated, sequential program of study, at grade level or above, by grade 11, in mathematics, science, and communications, including a technical component, which leads to a minimum of a two-year postsecondary certificate or degree, and/or apprenticeship program.

New York. A tech prep student:

a. Receives academic content through applied learning;

b. Completes a sequence of two or more standards-based, career-oriented courses that provide technical skills;

c. Is enabled to be employed in skilled entry level jobs and completes the postsecondary portion of a secondary/postsecondary program;

d. If a postsecondary student, has completed the secondary portion of secondary/postsecondary program and has enrolled in an articulated, state registered postsecondary tech prep program; and

e. Is a completer of a two-year associate degree program, or a two-year certificate program, or a two-year apprenticeship program that follows secondary tech prep instruction.

North Carolina. North Carolina identifies tech prep completers through a computerized analysis of course-taking patterns. Requirements for the state's College Tech Prep Course of Study include: (1) four units of credits in career/technical courses, including an advanced course; and (2) three credits of mathematics, including either Algebra 1, Algebra 2, and Geometry; Algebra 1, Technical Math 1, and Technical Math 2; or Integrated Mathematics 1, 2, and 3. Mathematics requirements are very similar to those for students in the state's College Prep Course of Study.

Ohio. Students in state-approved tech prep programs in grades 11 or 12, and those students who have matriculated from a high school tech prep program to one operating at the college level.

Concerns Pertaining to Specific Aspects of the Definition

Intent to pursue. None of the definitions used by participants' states depended upon a student indicating an intent to pursue a tech prep program. In fact, two (New York and North Carolina) do not identify tech prep students until they have completed secondary school. This approach, one participant suggested, may be preferable, since students' intentions often change (particularly at the 11th grade level, which seems to be a "defining moment" in their high school careers).

Whether a national evaluation depends on a definition that includes intent, or identifies tech prep students retrospectively (i.e., after they complete the secondary portion of the program) has major implications for the design of the study. Identifying students on the basis of intent would allow researchers to administer assessments as the students progressed through high school. The disadvantage of this approach is that such a design might hold states and local programs accountable for students who did not complete the program.

If, on the other hand, an evaluation identifies students retrospectively, it cannot track their progress over time in secondary school. Further, students would be identified in such a way that they were automatically likely to be the most successful academically (i.e., those with the highest academic ability would be most likely to complete the program). To address these issues, researchers might need to select appropriate comparison groups, while controlling for academic ability.

Carried out under a written articulation agreement. Participants noted that the term "written articulation agreement" could refer to either a broad statewide agreement or a specialized local initiative.

May allow the student to earn postsecondary credit while in secondary school (secondary definition) and **The student may have transferred in college credit earned in the secondary school** (postsecondary definition). In some places, one participant noted, individuals who earn postsecondary credit while in secondary school are Advanced Placement students enrolled in dual credit programs. Rather than focusing on postsecondary credit, she suggested, a definition should emphasize participation in an articulated program.

General Themes

The following general themes concerning the definition of a tech prep student also arose from the group's discussions.

Desirability of identifying tech prep students. Through a representative of their association, some state directors of vocational education suggested that, while it might be necessary to identify tech prep students in order to study the impact of the program, it was not necessary to "label" individuals as tech prep students. Tech prep is a part of vocational education, and in some cases can be difficult to distinguish from other forms of vocational education.

Variation in local definitions. Even where state definitions do not rely on student intent, local consortia may depend partially upon intent to identify tech prep students. In Florida, for example, only about 20 percent of the state's 28 local consortia have adopted the statewide definition. In other cases, local definitions may depend on a formal application process or on a student's being enrolled in particular courses.

Other Design and Data Collection Issues

Under this topic, participants discussed several issues, including: (1) the need to include input and contextual variables in the design of a national evaluation; and (2) how an evaluation of the tech prep program should be coordinated with other national activities, including the NAVE and data collection requirements for the Perkins III core indicators.

Input and Contextual Variables

Among the most important contextual variables for a national evaluation to consider would be the level of state and local funding for tech prep programs. Perkins funds, one participant noted, are discretionary and thus can be extremely valuable at the local level. Program success, however, may depend partially upon the level of state and local cash and in-kind support leveraged by the federal funds. Evaluators could also examine the way in which tech prep funds are allocated at the statewide level.

An evaluation might also collect information on the statewide context within which tech prep operates; e.g., whether the state has its own legislation governing the program and where within state government the program is housed. Researchers could also investigate issues concerned with leadership, such as the level of support that tech prep receives from the state director of vocational and technical education and how activities funded by the basic state grant and tech prep are coordinated.

Coordination with Other National Activities

Evaluators responsible for a national tech prep evaluation may want to consider how their activities complement those of the NAVE, which is to report to Congress by 2002. As part of this assessment, ED will receive extensive data for all public school students (including participants in tech prep, vocational education, and other programs) in three states. This information—which will include transcript data and assessment data, secondary school records, two-year and four-year college records, and UI wage data—will allow researchers to examine program effectiveness using a variety of outcome measures. ED personnel will also conduct site visits to the three states and to several local sites within each of the states, in order to obtain contextual information. Researchers do not yet know whether the three states have statewide definitions of a tech prep student.

The focus group also discussed the need to align evaluation requirements with data collection requirements for the Perkins III core indicators. Although the legislation requires states to monitor the same outcomes for tech prep and other vocational education students, some measures may be more appropriate for the tech prep program than others (and thus more likely to be useful for program improvement). North Carolina, for example, uses a community college placement exam (rather than state academic assessments) to document academic achievement. Some educators, however, might not be comfortable with the notion of "rank-ordering" outcomes with preparation for college as the most desirable.

Appendix A

Participants

Appendix A: Focus Group Participants

Ms. Linda Avelar, Dean, Business Division, Skyline College, San Bruno, CA

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Ms. Bonnie Bensonhaver, Sinclair Community College, Dayton, OH

Mr. David Bond, Vice President, Education/Employer Partnerships, Center for Occupational Research and Development, Waco, TX

Ms. Debra Bragg, Associate Professor, University of Illinois, Champaign, IL

Dr. Carrie Brown, Director, Tech Prep Statewide Leadership and Evaluation Project, Beaumont, TX

Dr. Jerry Ciesla, Senior Partner, MGT of America, Inc., Tallahassee, FL

Ms. Diana Crowley, Tech Prep Coordinator, Rhode Island Department of Education, Providence, RI

Ms. Nancy Dillon, State Board of Directors (State Tech Prep Coordinator), Community Colleges of Arizona, Phoenix, AZ

Ms. Kathy D'Antoni, West Virginia Joint Commission for Voc Tech (State Tech Prep Coordinator), Charleston, WV

Dr. Margaret Ellibee, Field Service Coordinator, Oklahoma Department of Vocational and Technical Education, Stillwater, OK

Ms. Kimberly Greene, Executive Director, National Association of State Directors of Vocational Technical Education, Washington, DC

Dr. Frank Hammons, Associate Professor and Director, Institute for Workforce Competitiveness, Florida International University, Miami, FL

Ms. Arlene McCollum, Director, Tech Prep Consortium, Green River Community College, Auburn, WA

Dr. Bernie McInerney, State Tech Prep Coordinator, New York State Education Department, Albany, NY

Dr. Jim McKenney, Director of Economic Development, American Association of Community Colleges, Washington, DC

Ms. Debbie Mills, Tech Prep Director, Danville Area Community College, Danville, VA[11]

Ms. Kathy Oliver, Assistant State Superintendent (State Director of Vocational Technical Education), Maryland State Department of Education, Baltimore, MD

Mr. Wofford O'Sullivan, Education Associate, South Carolina Department of Education (representing State Director of Vocational Technical Education), Columbia, SC

Mr. Gerald Pumphrey, Vice President for Instruction, Guilford Technical Community College, Jamestown, NC

Dr. Marsha Silverberg, Planning and Evaluation Service, U.S. Department of Education (on loan from Mathematica Policy Research)

Mr. Kenneth Smith, State Tech Prep Coordinator, Department of Public Instruction, Raleigh, NC

Ms. Connie Spohn, Coordinator, Greater Capital District Tech Prep Consortium, Albany, NY, and Director, Two-Year College Development Center, University at Albany

Unable to Attend:

Dr. Joseph Crossen, Curriculum Development, Delaware Department of Education (State Director of Vocational Technical Education), Dover, DE

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Ms. Gisela Harkin, Division of Vocational-Technical Education, Office of Vocational and Adult Education, U.S. Department of Education

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[11] After participant selection, Ms. Mills accepted a position with CORD.

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