

**A Plan to  
Provide Technical Assistance  
to the  
Arizona Standards and Assessment System**

*Prepared by:*

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## BACKGROUND

On August 16-18, 2006, Dr. Ron McCage, Executive Director, VTECS; MS Brenda Hattaway, Assistant Executive Director, VTECS; along with Dr. Harvey Dean, CEO and Founder of Pitsco; and Dr. Mike Robinson, President of Technical Fluency Institute, a unit of Pitsco, traveled to Phoenix, Arizona to meet with Barbara Border, Helen Bootsma and others regarding the establishment of a Statewide Standards and Assessment System that meets or exceeds the accountability requirements of the recently adopted Carl D. Perkins Career and Technical Education Improvement Act of 2006 and the Arizona Joint Technical Education District (JTED) Requirements as specified in Arizona House Bill 2700. Essentially, the U. S. Department of Education has served notice that the new benchmark for technical proficiency will be the demonstration of knowledge and skills through assessments that certify that students are moving toward industry certification and/or post secondary standards. These requirements are very parallel to the JTED Requirements.

Specifically, the proposed ED/OVAE Secondary Career and Technical Skill Attainment Criteria as shared in the most recent ED/OVAE data quality institutes are:

<p><b>A. Alignment to Standards</b></p> <p>Attainment measures are based on assessment systems that are aligned to state-recognized employer and/or post-secondary validated standards.</p>	<ul style="list-style-type: none"> <li>▪ All state-recognized programs in all schools document and use state recognized employer and post-secondary-validated standards that are established consistent with national CTE guidelines on validation.</li> <li>▪ All state recognized assessment systems are valid assessments of these standards consistent with national CTE guidelines on validity and reliability.</li> <li>▪ National CTE guidelines for validating standards and recognizing assessment systems will be established in cooperation with states using professional experts and leading states practices.</li> </ul>
<p><b>B. Timing and Reporting of Attainment Measurement</b></p> <p>Attainment is measured concurrent with or after participation in career and technical education.</p>	<ul style="list-style-type: none"> <li>▪ Attainment can be measured during or after instruction (e.g., after each course or after completing the program).</li> <li>▪ States report student attainment for the entire state-recognized program/sequence after students leave the secondary education (exit reporting group).</li> </ul>
<p><b>C. Reliability of Assessment Systems</b></p> <p>Attainment is measured using reliable assessment instruments that are administrated consistently for all students.</p>	<ul style="list-style-type: none"> <li>▪ Attainment is measured by assessment systems that meet national CTE guidelines for validity and reliability.</li> <li>▪ National CTE guidelines for validating standards and recognizing valid and reliable assessment systems will be established in cooperation with states using professional experts and leading states practices.</li> </ul>
<p><b>D. Student Coverage in Attainment Measurement</b></p> <p>States reporting attainment data for all students in designated population.</p>	<ul style="list-style-type: none"> <li>▪ States report attainment data for a sufficient number/percentage of students from the designated population (e.g., concentrators) to ensure that reported data are representative of the population at the state and sub-state levels based on national CTE standards.</li> <li>▪ National CTE standards on student coverage will be established in cooperation with states using professional experts and leading states practices.</li> </ul>

In addition, the new Perkins Legislation requires that federally supported programs be taught as a sequence of courses that constitute a legitimate program of study for which evidence of the documentation of competence be provided which is a key consideration in the design concept.

Excerpts from the JTED Requirements, as per Arizona HB 2700:

- 3.d. ...“A program will be designed to lead the student toward certification that is accepted by a vocation or industry as a demonstration of skill or competency in that vocation or industry.
- 3.e. ...requires students to obtain a passing score on an examination that demonstrates a level of skill or competency for that program of study that is accepted by a vocation or an industry.
- 3.f. Meets the standards of a career preparatory vocational program as determined by the Career and Technical Education Division of the Department of Education.”

This means that through FY2006-07, Arizona CTE program completers must have achieved at least 80% of the competencies identified in a given industry cluster (established with industry) to be counted for funding purposes for the program and beginning in FY2007-08 Arizona CTE program completers must be assessed against industry competency standards that have been specified for inclusion in local CTE programs to be considered for funding.

To implement these directives, Arizona has decided to:

- Convene a group of high level CEOs, Union, Legislature, Education, and others to ask the group to determine the following:
  - Verify that standards exist and are valid.
  - Certify that an industry exam is available and equal to their needs.
  - Certify that the process being used is valid and consistent across districts
  - Provide students with certificates as evidence of competence
  - Work with the business community to make these certificates valued and provide students with added wages and incentives to stay on the career ladder in that occupation

The name for this group will be the *Arizona Skill Standards Board*, which will have similar functions as the recently sun set National Skill Standards Board.

- Establish a Stakeholders Group of Personnel from JTEDS, Comprehensive CTE programs and Administrators, and Others as needed to provide input for the system to identify the programs for which assessments will be needed, to identify problems in the system, and to ensure that equity and quality exist for the AZ Assessment System.
- Day to day work would be done through an assessment center with qualified personnel who have CTE background, assessment background, test and measurement background, web-based skills applicable to on-line systems, and the ability to work with local districts, JTEDS, and ADE, the Skill Standards Board, and the Stakeholders Group to establish the system as needed to meet the needs of Arizona. This group would receive technical assistance and support services from VTECS, TFI/Pitsco, and other entities as needed and requested.

Among other things, this center would be responsible for identifying, adapting, adopting, and/or developing standards and assessments for use in Arizona; specifically, they would:

- Identify assessments already available from industry that are consistent with the programs being offered by JTEDS and that also address Comprehensive High School CTE courses and programs.
- Identify the LEVELS of assessments that are to be made available depending on the type of institution and length of the program.
- Identify assessments not available that are potential candidates for use in Arizona
  - Analyze the assessments against the list of competencies/standards established by a specific AZ industry or business area
  - Validate assessment items with industry representatives in Arizona for required competencies and levels desired by industry in AZ
- Use the AZ CTE Curricula established and validated with AZ industries for the basis of judgments. Where curricula are not established an industry group is to be convened.
- Provide an on-line system that will ensure assessments are accessible to students in rural as well as urban areas.
- Provide an on-line system to serve secondary comprehensive CTE, JTEDs, CCs desiring to use, and through DES One-Stop Centers desiring to us
- System would be established using a group of resources including Federal Carl D. Perkins CTE Statewide Funding, Tech-Prep Funding; and Federal Incentive Monies to AZ for all Agencies (WIA, Adult Education, and CTE meeting performance measures). Continued funding for maintaining will be dependent on Carl D. Perkins CTE Statewide Funding, Tech-Prep Funding, and local JTEDS and Districts as they use the system. System will grow or diminish as it provides the services needed.

ASU has been selected as the site to house the operation, under the University Research College at the downtown campus. There will be an ISA between ADE and ASU, with ADE monitoring the ISA.

The Arizona endeavor is very ambitious in that the concept involves designing and implementing a comprehensive system for determining competence of all completers in CTE in less than 24 months. The work involved in developing industry identified and validated standards and criterion referenced assessment vehicles is very time consuming and resource intensive. Fortunately, it is not a totally new endeavor in that several other states and CTE related organizations (both public and proprietary) have addressed many of the 80 programs potentially involved and some of these resources can be brought to bear on the issue in Arizona. However, having said that the thing that makes this endeavor especially challenging is the new requirement of providing documentation at the end of a sequence of courses that constitute a program of study. In this context, there are several industry and association developed assessments with which ADE staff already familiar; however, many of them are either product specific or above the level of a person exiting a high school program. In addition, most of them cost too much for the purposes that drive this new requirement. So, the task is enormous and involves many intricate steps as illustrated in the following description of what is involved in implementing this concept.

To be successful the assessment center must be able to systematically:

### ***Collect and Analyze the Critical Elements***

- Collect existing information from Arizona entities, VTECS, other member states and national organizations representing business, industry, education, and labor.
- Conduct gap analysis to establish the need for new, revised, updated, and/or as currently stated competency lists, item banks, assessments, problem-based scenarios, and curriculum.

### ***Develop Competencies and Validate Standards with Business, Industry, and Labor***

- Identify and validate standards using business/industry/labor subject matter experts.
- Analyze standards to determine academic, technical and employability knowledge and skills for carrying out the work.
- Create standards for validation by business and industry.
- Establish a set of validated standards for each area that addresses academic, technical and employability skills in areas being addressed.

### ***Identify and Analyze Existing Item Banks and Assessment Instruments***

More detail is provided for this part of the concept since it is the most critical and least understood of the processes involved. Assessment instruments must be created around and linked to industry validated standards to ensure portability across the state. To achieve this ADE must:

- Collect existing assessment instruments and/or items using the following criteria:
  - Assessment components should be based on commonly agreed upon standards as established with industry.
  - Assessment components should address single standards or those assembled together as a homogeneous group in the form of power standards.
  - Assessment components should be related to written tests or performance assessment that can be used around independent and/or power standards, without destroying the integrity or original purpose of the item or instrument.
- Collect types of instruments, which include both criterion-referenced and performance-based assessments. Examples of types to be included are:
  - Criterion-referenced test banks are item banks related to performance standards and measure achievement against a set of criteria.
  - Written test banks include both criterion-referenced and performance-based and measure achievement against a set of criteria related to standards.
  - Scenario items are performance or authentic assessments that identify a problem to be solved, and are based on a limited number of standards that hang together as a power standard.
  - Actual or simulated performance is identified with standards along with the measurement criteria to be used to form the evaluation criteria.
- Analyze the instruments and/or items collected.
- Conduct a gap analysis to identify which of the existing competencies, standards, items, assessments, and/or scenarios meet the criteria and what else needs to be established.

### ***Develop Assessment Components as Needed Based on Gap Analysis***

A critical process in the development of this concept is the establishment of assessment components. These components will be the foundation for the development of the various types of assessments. The components must meet a rigorous developmental process in order to be useful across the range of assessments required to provide a valid, useful tool for all states.

- Establish processes for the development of assessment components including:
  - Timelines for development, validation, and reliability studies for what is to be developed and/or updated each year to include a process for states to select which priority assessment areas in which they want to be involved.
- Collect and analyze current standards and assessments for potential use in the establishment of assessment components for the system.
  - Conduct a gap analysis.
  - Monitor quality levels during development of standards and assessment components.
  - Develop assessment components that address performance measurement criteria and/or steps.
  - Develop assessment modules that can be utilized for written as well as performance instruments.

### ***Analyze Existing Assessment Instruments and Develop New Instruments***

Assessment instruments of various types can be identified from existing sources, if they meet the system criteria, or can be developed to meet the criteria as established by the participant.

- The following types of assessments can be identified or developed according to the needs of the states and their relationship to the priority industry sectors and levels being established:
  - Criterion-referenced written test banks and tests based on the VTECS processes.
  - Scenarios based on VTECS processes.
  - Existing Industry Certifications.
- Establish criteria for analysis as needed for written and performance or authentic assessments as needed:
  - Item analysis
  - Scoring rubrics
  - Cut scores
  - Other
- Prepare materials for field tests.
- Develop in-service plan for field test sites.
  - Materials
  - Validation and reliability processes
  - Inter-rater reliability study
  - Scoring
  - Other

### ***Establish and Monitor an Online Portal***

The management of the Multi-User System will require a state-of-the art online system that is capable of providing the services needed by states in a flexible and on-demand basis. This must be developed or acquired externally. TFI/Pitsco has developed a process that has already been successfully implemented in Alabama, South Carolina, and with FBLA-PBL and DECA which was demonstrated to the decision makers involved in the August meetings. It is assumed that this system will be leased through VTECS on the assumption that at least 18,000 student will be assessed during the first year.

The TFI Electronic Online Assessment System (E-SESS™) is an online toolkit for managing this system. It consists of a:

- Management component that enables users to:
  - o Enter any number of standards/objectives/competencies into the data base at a variety of levels
  - o Enter test items that are anchored to one or more employer validated standard/objective/competency
- Development component that enables the user to customize how
  - o Standards/objectives/competencies are entered.
  - o Items are entered.
  - o Items are edited.
  - o Items are assigned to standards.
- Delivery component that provides the user with the
  - o Ability to conduct test online.
  - o Score any way the user desires.
  - o Direct bill to any user to include purchase order processing/billing; credit card option to come soon.
- Validation component that is as sophisticated as the user's ability to pay for and provide the necessary expertise in support of:
  - o Item analysis
  - o Test analysis (criterion reference)

### ***Conduct Field Tests on Existing and New Assessment Instruments to Ensure Validity and Reliability***

The system administration and staff will oversee the field tests, validation, and reliability studies. The following processes will be administered for field test sites:

- Select field test sites to include a stratified sample. Initial criteria will address a variety of geographic locations, urban/rural districts, career and technical schools, comprehensive schools, business/industry sites, and all populations.
- Include field test sites in states involved in the development as well as states not involved.
- Provide field test sites processes for input through an online website. Interface with sites will be part of the continuous improvement process.
- Provide mandatory in-service for all field test sites.

Validation processes will be based on the following:

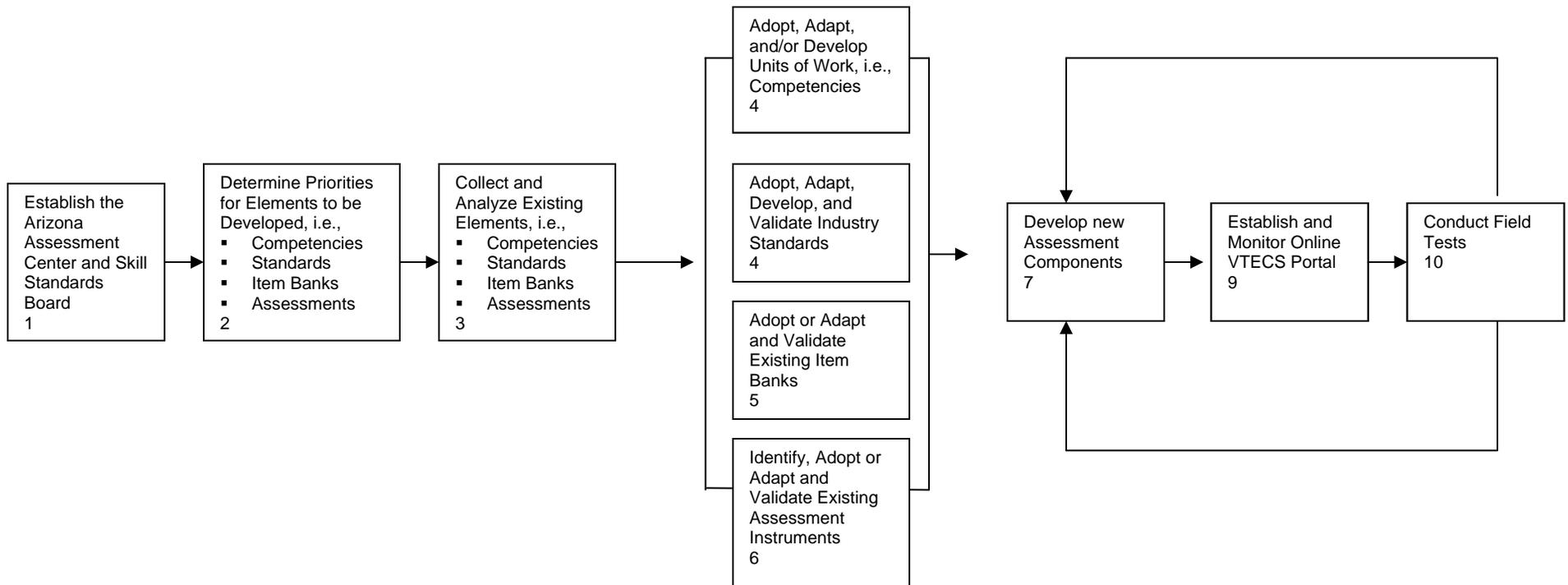
- Relationship to standards, performance elements, scenarios, measurement criteria/steps (face validity).
- Relationship to industry practices.
- Relationship of assessment measurements to the content of standards (content validity).
- Other elements as needed.

Reliability processes will be based on the following:

- Usability across various stratifications.
- Equivalence of results across stratifications.
- Inter-rater scoring results.
- Revise assessments based on field test results.
- Analyze data for revisions and documentation.
- Apply revisions as required and field-test a second time as required.
- Collect data from second processes.

The graphic on the following page shows how these elements relate to each other.

## THE PROCESS FOR PROVIDING INDUSTRY VALIDATED COMPETENCIES, STANDARDS, ITEM BANKS, AND ASSESSMENTS



## **THE VTECS ROLE**

Given this broad generic model and the other parameters involved, Arizona needs to understand that a contextually designed assessment is regarded as the most accurate instrument when measuring a person's attainment of skills and knowledge. Any assessment instrument must be valid and reliable or it is, by definition, unfair and its results are legally challengeable. An assessment instrument based upon a comprehensive analysis of a business/industry validated skill standards list and developed without discriminating against a race, color, religion, sex, or national origin meet these validity and reliability standards. The proposed developmental model shown below has been used by VTECS in at least three states on multiple occasions to address these important issues. (*Note: The steps are the same for each program area and process documents are available to carry out every step*)

### **Initial Organizational Steps**

1. Identify Arizona Assessment Liaison
2. Select a 3-6 member Business/Industry/Education Technical Committee (*The Technical Committee*) for each area.

### **Identify/Adapt/Develop/Validate Standards**

3. Obtain existing Arizona skill standards lists and all supporting documentation.
4. Identify skill standards lists to adapt for Arizona.
5. Develop skill standards lists for Arizona.
6. Validate (or confirm validation) of all skill standards lists.
7. Analyze each standard for type of performance or cognitive level required.

### **Item Development and Modification**

8. Determine the number of items to be written for each standard.
9. Identify existing items for potential inclusion in the item bank.
10. Review existing items using standard item writing guidelines.
11. Cross-reference existing items to the Arizona standards.
12. Develop new items using standard item writing guidelines.
13. Cross-reference new items to the standards.
14. Construct a bank of items using an online item preparation guide with an item preparation template.
15. Provide security during the item development process.

### **Validation of Assessment Items**

16. Review the business/industry-related accuracy and relevance of the items with the Technical Committee.
17. Review the items for grammatical accuracy, clarity, and adherence to standard item writing guidelines.
18. Review items for appropriate reading level.
19. Review items for bias related to race, gender, and socioeconomic status by bias experts.
20. Revise items based on the reviews.
21. Build a matrix of assessment items by skill standards.
22. Review the matrix with the Technical Committee.

### **Provide Technical Assistance**

23. Develop an *Arizona Assessment Administration Manual* which includes directions for the administration of the assessment.
24. Provide information to administrators and students in a *Technical Manual* which outlines the assessment process, how the assessments are scored, and how to use the assessment results.
25. Provide prototype assessments and reports to administrators and students.
26. Provide manuals and other material in electronic format (PDF file or MS Word document).

### **Assessment Development**

27. Develop the assessment blueprint based on the levels assigned to the standards during their review and analysis.
28. Determine final content for the assessment instrument.
29. Use an on-line assessment generator program that selects items in structured or random manner (based on the selected assessment blueprint).
30. Review a sample assessment instrument with the Technical Committee.
31. Develop and implement a plan to ensure equivalent assessment forms.
32. Establish the standard of mastery (cut score) for the assessment.
33. Retain documents supporting all assessment development activities.
34. Document the assessment administration procedures.
35. Provide security during the assessment development process.

## **Field Test Administration, Scoring and Reporting**

36. Publish assessment(s) via a web-based system.
37. Manage on-line administration of assessments.
38. Score the assessments.
39. Analyze and report the assessment results.
40. Maintain communication and documentation procedures.
41. Maintain security during assessment administration.

In the context of this project, VTECS has been asked to provide technical assistance and support to the development and operation of this system to include the identification and provision of a reliable web based on-line assessment delivery system.

Some of the primary services that VTECS will provide to Arizona are listed below; however the VTECS capabilities are not limited to this list:

1. Advising ADE and ASU on how to setup the assessment system conduct the processes.
2. Assisting ADE/ASU in determining priorities and linking existing standards and items.
3. Locating standards, item banks and assessments from other states and organizations based on an ADE/ASU/VTECS gap analysis of what exists versus what is needed.
4. Developing assessments as requested based on results of the gap analysis and priority setting outcomes.
5. Conducting on-site standards setting, item writing, and technical committee review and validation sessions.
6. Training of assessment system staff and technical writing teams regarding the identification, and or development and of assessment items and assessments.
7. Training and assisting with field testing and diversity accommodation issues as related to assessment construction and administration.
8. Provision of processes and materials for conducting assessment, technical reviews, validations process and field testing activities, etc.
9. Providing a web-based assessment system delivery partner.
10. Others as requested.