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ABSTRACT

One of a series of papers on critical issues in vocational-technical education, this paper discusses four aspects of Competency-Based Vocational Education (CBVE): What is CBVE?, Why CBVE?, V-TECS (Vocational-Technical Education Consortium of States)--A System of Curriculum Development, and Problems--Issues. Focus is on Kentucky program development as an outgrowth of involvement in the 7-state V-TECS project. (HD)

# COMPETENCY-BASED VOCATIONAL EDUCATION

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## COMPETENCY-BASED VOCATIONAL EDUCATION

The emerging concept of competency-based curriculum has become of increasing concern to vocational educators across the nation. In this paper, four aspects of Competency-Based Vocational Education (CBVE) will be discussed:

What is CBVE?

Why CBVE?

V-TECS--A System of Curriculum Development

Problems--Issues

### What is Competency-Based Vocational Education?

Competency-based vocational education programs are programs in which performance objectives specify the competencies or skills necessary for successful job performance, and criterion-referenced measures are applied to assess student competency. The objectives are based on tasks actually performed by workers in the occupation. The objectives state the performance to be demonstrated by the student, the conditions under which the tasks will be performed and the minimum acceptable standards of performance. The student is held accountable for attaining at least the minimum level of competency, stated in the objective(s). Students in competency-based vocational education programs know exactly what they are expected to do in order to complete the program, and what standards of performance will be required of them.

Competency-based curriculum necessitates individualized instruction. Instruction is personalized and self-paced through the use of student learning packages, called instructional modules, which are designed so that

each student can progress at his own rate. A module provides the student with the objective he is expected to achieve, the sequence of learning activities he will need to complete in order to achieve the objective, and the checkout activities by which the instructor will evaluate his performance. Immediate feedback is provided so that the student will know how well he is progressing throughout the program--the sequence of learning activities. If the student feels he is already competent in the particular task specified, he is given the option of doing the checkout activity without completing the learning activities.

While the module is the basic component of the competency-based curriculum, it does not preclude the use of traditional instruction. Some programs use group instruction or a combination of individual and group instruction, but the emphasis is on achieving the competency described in the objective.

In a fully individualized program, time is a variable. The amount of time a student is enrolled in the program is not the standard by which he is judged ready to enter an occupation. Students move at their own pace and are not required to complete a given number of class hours. Students may enter and exit the program at any time. Performance is evaluated in terms of the competency developed by the individual stated in the objective, not by comparing student performance with that of other students. Theoretically, implementation of this program means there will no longer be A students, B students, C students, etc.

In summary, competency-based vocational education has several characteristics which distinguish it from traditional programs:

(1) The curriculum is based on performance objectives.

(2) The objectives are measurable and are based on actual worker tasks.

(3) Student achievement is based on demonstrated competency.

(4) Instruction is individualized and self-paced.

(5) The student is accountable for performance of the competency.

(6) Immediate feedback is provided for the student.

(7) Time is a variable.

(8) Students may enter and exit the program at any time.

## Why Competency-Based Vocational Education?

Competency-based vocational education has emerged out of the need to meet individual differences in the learning abilities and interests of students. Most educators have always given at least lip service to individualized instruction. All too often, this means on a one-to-one basis, and is almost impossible to implement, except in small groups. Competency-based curriculum provides the vehicle for individualizing instruction with large groups of students, and, at the same time, allowing opportunity for the student to participate in the design of his personal learning plan.

The changing demands of society is another factor which has led to competency-based curriculum. The increasingly complex technology of the world of work makes it essential that curriculum be consciously designed to insure that students will learn the knowledge, skills, and attitudes essential for successful job performance.

The need for competency-based programs is also reflected in the increasing emphasis on accountability. With instruction based on performance objectives, and student achievement evaluated in terms of criterion-referenced measures, the potential for accountability is greatly increased.

## A System of Curriculum Development--V-TECS

Merely accepting the concepts of CBVE is not enough. If improved, flexible, student-centered vocational programs are to be offered, it is

essential that the best curriculum vehicle possible be identified and implemented. The term "curriculum" is defined as those variables that can be manipulated to span that great gulf between where one is upon entering a given program and where he should be upon exiting from that program. These variables include: facilities, organizational structure, staff performance, content, and instructional materials.

All these variables must mesh to produce a totally competency-based curriculum. Kentucky's concern with the instructional materials variable has led to participation in V-TECS.

V-TECS stands for Vocational-Technical Education Consortium of States. Seven southern states joined together in 1973 for the purpose of developing validated catalogs of performance objectives and criterion-referenced measures in vocational education. The group has now grown to 13 states reaching as far north as Michigan.

Through participation fees paid by the member states, a central staff is provided to coordinate, manage and provide technical assistance to all states developing V-TECS materials for common use by the members. V-TECS is an operating unit of the Commission on Occupational Education Institutions of the Southern Association of Colleges and Schools.

Although the V-TECS process is being explained here today, it should be recognized that the steps and principles used could be adapted by anyone desiring to produce validated objectives and measures for occupational education.

What is the developmental model of V-TECS and how does it operate?

1. First is the identification of priority occupations for which CBVE is needed. In identifying needs, opinions must be eliminated and areas must be determined based on statistical data. Manpower data must be analyzed in terms of present and future needs.

Instructional programs and the curriculum needs of those programs also need to be taken into consideration. Curriculum materials cannot be developed in all areas, so priority designations must be made. Additional identification may be needed. If, for example, secretary is the occupation selected, one may need to narrow it to "legal" or "medical" secretary. V-TECS serves as a clearing house. States indicate their priority of occupations and V-TECS prevents duplication of efforts.

2. The second step is conducting a task or an occupational analysis. If the priority area is dental assisting, then the curriculum must be based on what the dental assistant actually does.

The initial step in the task analysis is the development of a task booklet. This consists of two aspects: (1) a review of the literature related to the occupation including such literature as curriculum materials, studies, books, and articles; and (2) observation of the on-the-job processes. Once the initial task booklet is developed, it is analyzed by a small sample of persons currently employed in the occupation. These incumbent workers examine the tasks in terms of face and content validity.

Next comes one of the most difficult and time-consuming tasks. However, it is perhaps one of the most important steps in the process. The task booklet is analyzed by a random or stratified sample of the state's total population of the incumbent workers from the occupational area. These workers are asked to identify those tasks they perform, the relative amount of time spent on each task, and to add tasks which do not appear in the task booklet. Once this data is computerized and analyzed, tasks can be selected

for which performance objectives and criterion-referenced measures are written based on the number of workers performing the task and the percentage of time spent on the task.

3. The third step in the V-TECS process is developing performance objectives, criterion-referenced measures, and performance guides. These components are written by a team of people with expertise in two areas: (1) expertise in writing objectives and (2) technical expertise in the occupational area.

   The important tasks identified in the occupational analysis are converted to performance objectives with measurable minimum standards. The writers develop criterion-referenced measures which become the evaluation instruments which identify the specific actions and activities to be performed by the student in order to "check out" a performance of that particular objective. The performance guides developed are a series of steps or procedures which students go through in order to meet the standard specified in the objective.

4. The fourth and final step in the V-TECS model is the field review and revision of objectives, criterion-referenced measures and performance guides. The purpose of this step is to insure the quality of the performance objectives, criterion-referenced materials, and performance guides. Teachers, teacher educators, and incumbent workers and their supervisors review for clarity, accuracy, and logic. On the basis of their comments, curriculum writers make the necessary revisions. The product is a catalog of performance objectives and criterion-referenced measures.

   Who has had the responsibility of implementing V-TECS? This differs from state to state. In Kentucky, the coordinating

agency is the Curriculum Development Center at the University of Kentucky. The Center has curriculum specialists in six vocational program areas. Working along with these specialists there has been a person from each of the services of the Program Development Unit of Kentucky Bureau of Vocational Education. These co-directors have spent much of their time over the past two years in implementing the process just described.

Kentucky, however, desired to go farther than the V-TECS model. Leaders in the state felt the need for objectives to be moved from the catalog to instructional modules for individualized instruction. And so, Kentucky implemented the next step of preparing instructional materials. At a series of workshops, teams of writers developed student modules which are units of study used in the classroom on an individualized basis. These materials also include teacher materials and audio-visuals needed to support the student modules.

Taking a closer look at the student modules one sees that a standard module format has been adopted for use in all occupational areas. By following the module format, the writer will have fewer routine decisions to make and can concentrate on the instructional content of the modules. Each module contains instructions, objectives, learning activities and special learning materials such as instruction sheets, student self checks, and an instructor's final checklist. The modules are designed to be as self-instructional as possible so the student should have little need to ask the instructor for help on routine details.

Kentucky's CBVE plan includes a step for field testing and revising the instructional materials. Each program is field tested in actual school settings in an effort to improve the module. Curriculum writers and teachers

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use the field test results to revise the materials before quantity production is undertaken. Also, demonstration sites provide an opportunity for vocational educators to observe the programs in action.

The next step is a giant one. It involves: 1) implementing the CBVE program statewide, 2) quantity production of modules, materials, and media and distribution to local schools, 3) assisting local school districts in purchasing equipment and organizing learning centers, and 4) revising the existing curriculum and adjusting to the flexibility of this concept.

The last step is providing professional in-service and pre-service preparation of teachers and administrators. Regardless of the quality of the materials or the need for them, success of CBVE lies in teachers and administrators accepting the concept and knowing how to implement it.

What are some of the implications of V-TECS and the Kentucky plan?

The V-TECS model demands that instructional materials be developed under stringent guidelines. ~~We~~ Curriculum developers must eliminate producing materials based on the opinions of people as to what is needed. ~~We~~ They must stop disseminating materials to teachers and students which have not been validated for use through a comprehensive field test. Greater emphasis on research in the area of evaluation will be needed.

Teacher-~~training~~ education programs must become competency-based. Research indicates that teachers tend to teach the way they have been taught rather than the way they were taught to teach. This ~~calls~~ indicates as that prospective teachers must be trained in a competency-based setting if ~~we expect them~~ they are expected to implement this type of instruction on the job.

Based on the information provided through the V-TECS model, ~~we will~~ there will be have a basis on which to select the facilities and equipment for various programs. As the curriculum for a program changes, the facilities and equipment needed for that program likewise may change. ~~We~~ present guidelines

for facility construction specifies one resource center for every two shops. With changing teaching methodology, these guidelines may have to be altered. Greater numbers of certain items of equipment to include specialty types of equipment may also be needed.

Vocational educators are excited over the possibilities of V-TECS and a competency-based curriculum. They see in it a way to improve the quality of programs both in terms of the process (a better motivated and gratified student) and the product (a person who has demonstrated that he can perform tasks that are actually performed by workers on the job).

## Problems-Issues

Any educational movement as complex as competency-based vocational education is certain to raise a great many questions and criticisms. In this section an attempt is made to summarize some of the most controversial issues that are of concern to educators involved in developing and implementing competency-based programs.

1. Does the fact that the student demonstrates competency in the classroom guarantee that he will be competent on the job?
2. Is CBVE really individualized when every student is required to perform the same competencies?
3. What provision, if any, is made for students with poor reading skills?
4. CBVE emphasizes cognitive learning and psychomotor skills. What about the affective domain of values, attitudes, and human relations skills?
5. Most models of competency-based curriculum development take from 18-32 months to complete. Will the materials be out-of-date before the development process is completed?
6. Can students be properly motivated to work "on their own?"
7. How expensive will it be to implement competency-based in all program areas?

The answers to these and other questions will necessitate a strong, continuing research and development program.

## GLOSSARY OF TERMS

Competency. A skill, either cognitive or psychomotor, which is required in the vocation and which the student is expected to demonstrate in the vocational education program.

Competency-based education. A performance-based education program in which the competencies to be acquired and demonstrated by the student, as well as the criteria to be applied in assessing student competency, are made explicit, and the student is held accountable for meeting those criteria.

Performance objective. A statement which specifies a competency a student is to acquire and demonstrate; it states the performance to be demonstrated, the conditions under which the task will be performed, and the minimum acceptable standard of performance.

Criterion-referenced measure. A statement which describes the performance required by the student to demonstrate his competency in a particular task.

Instructional module. A set of learning activities in organized form, intended to facilitate the students' acquisition and demonstration of a particular competency or group of related competencies.

Feedback. Procedures by which the student is informed as to his progress, areas of weakness, or his level of success in demonstrating the desired competencies.

V-TECS. Acronym for Vocational-Technical Education Consortium of States. Its primary purpose is to develop validated catalogs of performance objectives and criterion-referenced measures in vocational education.

Task analysis. A break-down of an occupation into the specific tasks which are performed by workers employed in the occupation.

Incumbent worker. Person currently employed in a particular occupation.