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ABSTRACT

Implementation of competency-based education in Virginia career exploration and preparation programs has served as the basis for establishment of a paradigm for statewide implementation. Competency-based education in Virginia is defined as educational programs with required knowledges, skills, and attitudes based on role-relevant competencies and is further defined by four state standards. Six factors were found to enhance changes of successful implementation: developing course definitions or standards, developing plan of action, providing inservice education, securing administrator commitment, identifying and establishing format of material and product development, and identifying and using existing materials. Four deterrents to implementation were also identified: lack of coordination between state department and local supervisory staff, involvement of individuals not committed to competency-based education, failure to provide uniform inservice education information and materials, and involvement of too many individuals providing technical assistance. Based on Virginia experience, a nine-component competency-based education implementation framework has been proposed: (1) identify lifework domain, (2) review available resources, (3) identify competencies, (4) verify competencies, (5) identify competency standards, (6) develop objectives and criterion-referenced measures, (7) develop instructional activities and materials, (8) develop support plans, and (9) initiate the program. (Each component is described briefly.) (YLB)

A PARADIGM FOR IMPLEMENTING COMPETENCY-BASED CAREER EDUCATION[1]

Curtis R. Finch and Ralph A. Horne[2]

Competency-based education (CBE) has most certainly arrived. Several states have mandated CBE implementation. Projects have been funded from a variety of sources to identify competencies and develop objectives and related materials for programs. And, with such a flurry of activity, one might ask "what does CBE promise to bring that is different from our present educational system?", "where will CBE lead us?" or "how may CBE be implemented at the local level?" These and similar questions raised by educators reflect the pragmatic feelings and concerns which professionals have about CBE, feelings ranging from eager acceptance to outright rejection.

This paper focuses on one of the aforementioned areas of concern - implementation. It has as an overarching objective, the establishment of a meaningful paradigm or framework for the implementation of competency-based career education. Specific questions related to this objective are:

1. What strategies for change have a positive impact on CBE implementation?
2. What deterrents to the implementation of CBE may be identified.
3. How may CBE implementation strategies be synthesized into a meaningful framework?

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Method

In 1976, the State of Virginia established a mandate that by June 30, 1984 each school division shall have implemented competency-based education in all approved career exploration and preparation programs. This mandate was followed in 1979 with a set of operational standards for CBE programs. The mandate and related standards presented a unique opportunity to effect positive curricular change in numerous career education programs (Horne, 1981). The authors' involvement in this change process was extensive and, as such, enabled information to be gathered which has much applicability to other states and local school divisions contemplating CBE implementation. Initially, implementation strategies which effected positive change were identified and documented. This was accomplished via interviews with teachers and administrators in school divisions that were most advanced in the CBE implementation process. Concurrent with this, deterrents to the change process were identified. Teachers, administrators, and persons external to the various school divisions (eg. teacher educators, state staff) were asked to note items which inhibited the CBE implementation process. Examination and codification of gathered information served as a basis for development of a CBE implementation paradigm.

Competency-Based Education in Virginia

Competency-based education in Virginia focuses more directly on program content than on delivery of instruction by modules or other individualized materials. Thus, CBE is defined as "educational programs in which required knowledge, skills and attitudes are based on role-relevant competencies" (Virginia Department of Education, 1979). Competency-based education is further defined by four standards which provide a framework for developing and implementing CBE in secondary career exploration and preparation programs (Virginia Department of Education, 1980):

STANDARD I. ROLE-RELEVANT COMPETENCIES ARE IDENTIFIED AND STATED.

Requires:
1. A validated task/competency list for each vocational program.
2. A performance objective for each validated task/competency.

STANDARD II. COMPETENCIES ARE SPECIFIED TO STUDENTS PRIOR TO INSTRUCTION.

Requires:
1. A system for providing task/competency information to students prior to instruction.

STANDARD III. CRITERION-REFERENCED MEASURES ARE USED TO MEASURE ACHIVEMENT OF COMPETENCIES.

Requires:
1. A criterion-referenced measure for each validated task/competency.
2. A criterion-based testing and evaluation procedure which tests the performance objective.

STANDARD IV. A SYSTEM EXISTS FOR DOCUMENTING THE COMPETENCIES ACHIEVED BY EACh STUDENT

Requires:
1. A system that has task/competency records/profiles for student achievement in each vocational program, course, or unit.

After June 30, 1984, these standards will be used as criteria for evaluating compliance with the state mandate for implementing CBE in all vocational programs. Thus, the direction and scope of competency-based education is set by the CBE standards.

Competency-based education may include a host of characteristics. A cursory review of materials and information provided by states and organizations involved in implementation efforts supports this notion. In Virginia, the number of characteristics has been delimited with the following required as part of the state CBE standards.

1. Course content is based upon required competencies. This means that competencies for career exploration and preparation programs are determined by task analysis methods and verified by experts

and employees in the field. No longer are teachers the only determiners of program content and scope.

2. Performance objectives are developed for the program. The content of the program is defined by the development of measurable performance objectives. This means instruction and evaluation are based upon the objectives established for the program. Thus, there must be a performance objective for each competency identified in the program.

3. The required competencies are specified to the student prior to instruction. To facilitate learning, competencies for the program, course, or unit of instruction are provided to the student before learning activities began. This characteristic assists students in knowing the direction and purpose of the instruction.

4. Student achievement is based upon demonstrated competency. Whether the competency is a skill, knowledge, or attitude, the performance must be successfully demonstrated by the student. This helps ensure that the necessary skills are demonstrated at an acceptable level of performance required for employment and continued education.

5. Criterion-referenced testing procedures are used to evaluate student performance. There is a criterion-referenced measure developed for each competency in the career program, and student performance is compared to a set standard or criterion. This means the student's achievement is based on a pre-determined standard rather than other students' work.

6. Student achievement is recorded for purposes of articulation, pre-employment information, and permanent records. This requires a system for recording the competencies demonstrated by each

student in the vocational program. The information is used for a variety of purposes-articulation of students between programs, pre-employment activities, and permanent student record information. It is expected that the competency record will eventually replace the transcript as the permanent record for the vocational student.

In addition to the above, other characteristics such as the use of individualized materials and methods, open entry, and mastery learning techniques are optional. Their use is a local option, with application being dependent upon local resources available and the particular content to be taught.

Factors Enhancing CBE Implementation

The implementation of competency-based education requires a great deal of planning, organization, and commitment. Based on the authors' involvement in coordinating CBE implementation efforts throughout the State of Virginia and discussing program development with individuals in other states, certain factors emerge which have a positive impact on CBE implementation. Information obtained from teachers and administrators in school divisions that have successfully implemented CBE in career exploration and preparation programs serves to support these factors. With this in mind, six factors which enhance the chances of successful CBE implementing in career exploratory and preparation courses are presented.

1. Developing concise definitions or standards that describe precisely the direction and scope of competency-based education. Without agreement on what CBE is, or its characteristics, it is difficult to develop materials and implement programs. Thus, a set of definitions and characteristics are helpful in communicating implementation goals to the interest groups involved. These groups-teachers, administrators, teacher educators, consultants, and state staff members must have a mutual understanding of what

is to be realized by the implementation process. The effort to implement CBE on a statewide basis was far more successful in Virginia after the development and dissemination of a uniform set of standards for competency-based education.

2. Developing a plan of action for implementation. The process of affecting a change in curriculum within a program involves a coordinated effort. This process will require the integration of resources, materials, personnel, and funding to achieve the implementation of competency-based programs.

3. Providing inservice education to the groups involved in the implementation effort. It is important that the individual groups involved clearly understand the goals of the effort and their role in the implementation process. If the effort to implement CBE extends over several years, as is the case in Virginia, then provisions for an on-going inservice program should be planned.

4. Securing a commitment from those in positions of administrative leadership. Without the commitment of administration and those in charge of resources, the successful implementation of CBE in a program may not be realized. This commitment extends to management of the CBE program after implementation, which may require administrative policies to fully achieve the positive effect of the curricular change.

5. Identifying and establishing a uniform format for development of materials and products. When several groups of individuals are involved in the implementation process, agreement should be established as to the design and format of instructional materials. This is especially important when materials are to be shared or disseminated to others. In Virginia the effort to implement CBE is based on a

series of instructional resource guides which assist teachers across the state in implementing competency-based programs.

6. Identifying and using materials that have been developed by others. There are a vast assortment and collection of instructional materials and resources which have been developed by states and organizations. These materials should be reviewed and used to save time, effort, and expense in implementing CBE. Development of task lists and performance objectives that provide the basis for a CBE program involves a great deal of effort. There are few programs in which a validated task list is not available or performance objectives have not been developed. Implementation efforts in Virginia were expedited by using available task lists and materials.

Deterrents to CBE Implementation

The process of affecting a positive curricular change is not made always smooth. There are often certain factors which impede progress and success. The magnitude of and time frame for implementing competency-based education in career programs may determine the degree to which other factors may inhibit the implementation process. By interviewing teachers, administrators, and others involved with CBE in Virginia and elsewhere, the following were identified as deterrents to CBE implementation efforts:

1. Lack of coordination between state department and local supervisory staff. Perhaps one of the most perplexing problems in implementing CBE is ensuring that supervisory personnel at each level have a clear understanding of the goals and outcomes of the curricular change. During the early phases of CBE implementation in Virginia this aspect was a potential barrier. The problem was solved by providing information to state staff members and involving them in the planning and evaluation process phases of the effort.

2. Involvement of individuals not fully committed to competency-based educational philosophy. It is difficult to persuade teachers and administrators that a curricular change is warranted and will result in an improved program. This problem is further compounded when those involved do not share the belief that CBE is practical for career education. There are no simple solutions to this problem and the continued resistance by those who are less than fully committed can slow the implementation process.

3. Failure to provide uniform information and materials for inservice activities. It is essential that those providing inservice activities disseminate the same information concerning goals, objectives, requirements, and outcomes for the implementation effort. Providing workshops for the individuals responsible for inservice and consulting activities is helpful. In Virginia this factor was addressed by the development of an implementation guide (Horne, 1981) based on the state standards and the implementation paradigm presented in this paper.

4. The involvement of too many individuals providing technical assistance. It would seem that large efforts to implement CBE require the involvement of many people to facilitate the process. However, it has been the authors' experience that the reverse is true. Based on interviews with others involved in major implementation efforts, a small group of individuals provides for better coordination. The implementation effort in Virginia employs a centralized coordination project to provide technical assistance for 11 CBE projects and serves as liason between the state staff and school divisions provided.

If a plan to affect a positive change in curriculum is to succeed, these deterrents must be addressed by the implementation model. By recognizing the importance of the above factors and reviewing past curriculum development efforts there is greater chance for success in implementing CBE within a particular school division or on a statewide basis.

A CBE Implementation Framework

How then might one go about implementing CBE in career education areas? Realistically, there is no standard answer to this question. Each state, region, and locality may have its own unique concerns about problems which are taken into account whenever any educational innovation is proposed. Based upon experiences in Virginia and other states there do, however, appear to be several CBE implementation elements which align with most career curricula. These include:

1. Identify the life/work domain
2. Review available resources
3. Identify competencies
4. Verify competencies
5. Identify competency standards
6. Develop objectives and criterion-referenced measures
7. Develop instructional activities and materials
8. Develop support plans
9. Initiate the program

These elements, as applied to a CBE implementation framework, are presented in Figure 1. Note that the implementation process flows from left to right

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insert Figure 1 about here

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with some activities conducted in series and others in parallel. In this manner, later implementation activities will build upon a sound base. Additionally, program initiation serves as a logical starting point for refinement and renewal. If a CBE program is to improve, serious consideration must be given to formalizing feedback for refinement and renewal purposes.

Each of the various components is described briefly in the following paragraphs.

1.0. Identify Life/Work Domain

Initial aspects of CBE implementation focus on clarifying what the program's scope will be in relation to life and/or the work world. This must extend beyond general goals to specifications of what careers, jobs, job titles, businesses, and industries students are expected to enter upon graduation. Information of this type may be gathered through a variety of sources such as local businesses, industries, and advisory committees. Meetings with persons from these areas can yield much useful information. Government publications such as the Occupational Outlook Handbook and Dictionary of Occupational Titles may likewise be of much value to persons who are identifying the life/work domain.

2.0. Review Available Resources

Obviously, it is much easier to use previously developed resources or modify resources for use than to develop information from scratch. At this point in the implementation process, it is most useful to search for resources that will ease administrators' and teachers' time and fiscal burdens. Resources that should be examined include task inventories, modules (learning activity packages), textbooks, competency catalogs, and competency profiles. Criteria for the selection of these resources are presented in a number of publications (eg. Finch & Crunkilton, 1979).

3.0. Identify Competencies

Competency identification is a most crutial element in CBE implementation since competencies provide a foundation for subsequent activities. When considering which competencies to include in a program it should be kept in mind that competence has at least three dimensions: the task dimension, the human dimension, and the environment dimension. These three dimensions are

closely related and thus may not be considered in isolation. If, for example, an identified task is "complete a sale" we must also consider whether or not the salesperson was punctual, personable, and attentative (the human dimension) and the type of establishment the salesperson is working in such as a large department store versus a wholesale operation (the environment dimension). To consider only one dimension of competence would be doing a disservice to the school, students, and potential employers. It should be noted that many studies have already been conducted to identify competencies in various occupational areas (V-TECS, IDECC). Since most of these studies seem to have focused on tasks, one may find it more difficult to isolate the human dimension of competence. However, with perseverence and a liberal application of content determination strategies such as the critical incident technique, competencies in this area may be accommodated. Research of the type conducted by O'Neil and Nelson (1976) can have great impact on the human dimension. The environment dimension tends to be of a more localized concern and, as such, may not be well documented in the literature. In this case, it is best to obtain information from local sources such as businesses, industries, and advisory committees. A basic question asked in regard to the environment dimension is: In which type of life/work environments do we expect to find our graduates?

4.0. Verify Competencies

Even when a thorough effort has been made to identify competencies, each competency must be verified to ensure that it is indeed critical to success in life and/or earning a living. Many published competency listings have already been verified through worker surveys and interviews. If verification is sufficient, these competencies may be included in the program without further study. Competencies that have not been verified must undergo a close examination to confirm their utility. This might consist

of conducting formal surveys, task analyses, or interviews or otherwise establishing a data base for competencies. It must be recognized that overlap existsbetween components 3.0 and 4.0. Sometimes competencies are verified as they are being identified, whereas, in other cases competencies must undergo separate verification. At this point it is also useful to decide which competencies will actually be taught in the program. Given an array of competencies, decisions must be made as to what can be taught within various educational and fiscal contraints such as available time and money.

5.0. Identify Competency Standards

Competency statements serve to focus instruction, however, they are limited in detail. In order that sufficient detail may be provided to ensure competencies have been mastered properly by students, detailed standards or criteria must be developed. Even though standards may very in relation to specific competencies, it is important to answer the following question for each competency: To what extent do the standards for this competency represent functional criteria in the work/life setting? Standards flow from this question taking the form of explicit and relevant criteria. Some competencies have common standards (eg. safety related criteria) while others are unique to a particular setting, equipment items, and so forth.

6.0. Develop Objectives and Criterion Referenced Measures

Performance objectives aid in deliniating expected performance, conditions under which one is to perform, and standards by which the performance will be assessed. Based upon work conducted in components 4.0 and 5.0, the establishment of performance objective is a rather simple task. In the case of terminal performance objectives, the competency becomes the expected activity and identified standards become standards for the objective. Conditions may be drawn from the work setting (eg. What tools, equipment,

materials, supplies, and publications are normally made available to a person who performs this competency?). It is, likewise, important to develop enabling objectives. These objectives should serve as facilitators, aiding the student to ultimately achieve mastery of one or more terminal performance objectives. It may be necessary to begin sequencing objectives. One should keep in mind, however, that the inclusion and sequence of each enabling objective in a CBE program is based on its contribution to the attainment of terminal performance objectives. If an objective cannot meet this standard it should be deleted from the program.

At this time, it is also appropriate to develop criterion referenced measures. The criterion referenced measure (CRM) identifies a student's status with respect to a well-defined standard of performance or behavior domain. As with the performance objective, a CRM focuses on absolute, not relative, standards. However, since many performance objectives reflect generalized activities (eg. turn a piece of metal in a lathe, administer insulin, feed a baby) the CRM can serve to clarify this more broadly stated performance. Detailing may include the specific equipment and materials used when a student is being tested, directions to the test adminsitrator, and directions for the student taking the test. Of greater important is the selection of "items" which sample correctly the behavior domain. If, for example, an objective is to "type a letter," a CRM developer must be sure that the task represents the domain of typed letters. If it does not, other tasks using other letter formats must also be utilized. Of basic concern is that a CRM sample adequately the behavior represented in a domain. To do otherwise would result in students being able to meet standards in school which represent only part of life/work standards.

7.0. Develop Instructional Activities and Materials

Using objectives as a base, it is now appropriate to develop relevant

instructional activities and supporting materials. In some cases, instruction might be of a traditional nature; utilizing lectures, demonstrations, projects, and the like. Other possible activities may include individualized learning sequences, internships, role playing, and simulation. As with enabling objectives, the instruction must have a direct link to mastery of terminal objectives. While it may be nice to show interesting films every week, there is a professional obligation to ensure that these films will aid students in mastering specified terminal objectives. In terms of instructional materials, it may be useful to consider what resources were identified earlier in the implementation process (Component 2.0). If available materials will, in fact, assist students in their program, there is no need to develop additional items. Since greater numbers of publishers are now preparing materials for CBE, one should first see what is available and how well it aligns with stated terminal performance objectives.

8.0. Develop Support Plans

Plans which support CBE are often as important as the program itself. Even the best competencies, objectives, and content cannot be utilized unless they are fully integrated into the school setting. Support plans meet this need by deliniating specific processes and procedures related to recording student progress and managing records and resources. A recording plan may be as simple as a competency profile or it may include computerized records which are constantly being updated to reflect student progress toward program completion. Either approach is satisfactory with the key selection factors being cost and utility for an individual school.

A management plan focuses on areas of great concern in CBE: grading, scheduling, materials and resources management, and individualization. Although not a mandatory aspect of CBE, most schools find that proper management of these areas has a very positive effect on CBE programs. And, when

schools deal with a number of these areas, the specific focus of each may differ. For example, How will competencies be converted into grades? How may students be accommodated who do not "complete" a course on schedule because they have not demonstrated competence? How will resources be made available for individualized learning? What is the best means of systematizing the learning process? These and other questions are important since they reflect potential problems in the school environment. Plans should be developed based on extensive discussion and input from all levels from student to administrator. Each plan is then initiated on a small scale, tested, evaluated, and revised, before it is implemented on a grand scale. Even under the best conditions, a plan will have problems. It is better to resolve these problems before they cause teachers to become disillusioned with CBE.

9.0. Initiate Program

With components 1.0 through 8.0 in good order, the time has come to initiate the program. It may be better to implement on a pilot basis since various aspects of the program can be examined in a realistic school setting and refined as appropriate. If this is done, teachers who are positive toward CBE can be the first to initiate it. When this group demonstrates success, others will look more favorably on CBE implementation and, hopefully, be ready to convert their programs. Initiation also includes the responsibility to evaluate. If any program is to be improved, relevant feedback about CBE's successes and failures should be received. Feedback, in turn, serves as a meaningful basis for program refinement and renewal.

Persons engaged in implementation should recognize that local conditions and environments may affect the ways CBE is initiated. Budgets, personnel, resources, and even local philosophies toward change can have a major impact on the implementation process. It is, therefore, necessary to assess the local situation and make appropriate modifications to CBE

plans and procedures. This will help ensure that CBE is well accepted and utilized by administrators, teachers, and students.

Implications

The paradigm appears to serve as a useful means of organizing for and carrying out CBE implementation efforts in career exploration and preparation programs. Since the various components build upon successful change strategies and give consideration to various deterrents to change, the paradigm should have a reasonable validity base. It must be recognized, however, that factors enhancing CBE implementation may not show up as identifiable subsets of the frameworks. Likewise, deterrents to implementation may not surface within the framework per se. Those implementing CBE should, therefore, keep positive and negative influences in mind as various aspects of the framework are utilized. Local conditions may dictate the exact action to take in this regard.

Although much has been written about CBE, little consideration is given to CBE implementation, particularly as related to career education programs. Information provided in this paper should help to fill this void. Persons who anticipate establishing competency-based career education in their local school divisions should find the implementation framework to be most helpful.

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Figure 1

A Paradigm for Implementing Competency-Based Career Education