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ABSTRACT

The development of curriculum and instructional materials for competency-based education (CBE) is a costly and complex process involving many critical tasks. Failure to carry out any of these tasks can jeopardize the entire instructional development effort. The importance of the process demands that appropriate and effective procedures be used so as to guarantee the production of relevant, high-quality materials. Further, the high costs involved require that the most efficient time- and money-saving approaches be used. To provide structure to the CBE curriculum development process, a model known as SCID--Systematic Curriculum and Instructional Development--has been devised. The model consists of five phases and 23 components. The five phases are as follows: (1) analysis, (2) design, (3) development, (4) implementation, and (5) evaluation. Each of the 23 components involves several steps. Educational and business and industry use of the SCID model to date has shown it to be practical and workable. (This report contains a flowchart and a graphic representation of the SCID model.) (KC)

Quality Instruction Requires High Quality Materials: SCID

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Quality Instructional Requires High Quality Materials: SCID

The development of curriculum and instructional materials for CBE is a costly and complex process involving many critical tasks. The failure to properly carry out anyone of these tasks can jeopardize the entire instructional development effort. The importance of the process demands that appropriate and effective procedures be used so as to guarantee the production of relevant, high quality materials. Further, the high costs involved require that the most efficient time and money saving approaches available be utilized.

To provide some structure to this very important process, an efficient and effective model has been devised. Known as SCID or the Systematic Curriculum and Instructional Development model, it consists of five phases and 23 components. The five-phases are (1) Analysis, (2) Design, (3) Development, (4) Implementation, and (5) Evaluation. Each of the 23 components involves several steps, some optional, but most required. Educational and business/industry use of the SCID model to date has shown it to be very practical and workable. See Attachments A for some graphic information about the model.

Analysis Phase

Analysis is where it all begins. The needs analysis component of this phase is where the actual need or needs are determined. The need may be a need for training, for a change in management or production procedures, for new equipment, updated technology, or a combination of these. If the need for training is confirmed, them some type of job or occupational analysis is called for. While the observation and interview techniques used to be extensively used to conduct job analysis, today we strongly recommend the DACUM approach to job analysis because of its many benefits and advantages over all other approaches for most situations. Using DACUM, a comprehensive and high quality analysis can be completed in two days rather than 30 or more days required by most methods.

Following the job/occupational analysis procedure, we highly recommend that task verification be conducted. Task verification can serve several important purposes. To describe two of them, verification can extend the involvement of a few persons in the job analysis to 50, 100, or more expert workers and/or immediate supervisors of the workers. It can also provide an opportunity to obtain valuable decision-making information such as ratings on the "importance" of each task, the "difficulty of learning to perform" each task, and the percent performing each task.

Given the information available from task verification, we are in a good position to select or deselect, as some industry trainers say, the tasks to be included in the education or training program. We also have valuable information which can guide both the instructional development and instructional planning process.

Last but not least, we are ready to conduct standard task analysis. Task analysis can take many forms, but when properly done, will yield the explicit and detailed information that is needed to develop relevant and technically accurate learning guides, modules, and other types of teacher and student materials. The task analysis of the selected tasks will serve to identify the steps involved in their performance, the knowledge and attitudes required for successful performance, the performance standards (criteria for success) expected by industry, the decisions the worker must make during task performance, and any safety concerns that may need attention. Such information, obtained from expert workers, is critical to successful curriculum and instructional development.

Design Phase

As the design phase is started, careful consideration must be given to the type of training or education program desired. What learning principles and concepts will be embraced, and what type of student and teacher learning materials (e.g., learning guides, modules, lesson plans, job aids) will be most effective and cost efficient?

In the design phase, the task performance information collected during analysis is used to specify, in measurable terms, the job skills, knowledge, and attitudes the educational or training program will develop in the learner. Decisions are also made about the type of instructional program to be developed; a fully competency-based one, a more traditional one, or perhaps something in between. Decisions also need to be made about the amount of individualization of instruction to be offered, the amount and type of supportive media to be developed.

Measurable learning objectives are developed for each task or group of clustered tasks. Job performance measures, sometimes called JPMs are developed for each task. Written tests and performance checklists are developed so as to allow for valid and reliable assessment of the learner's achievement.

During this phase decisions are also made regarding the training setting or settings most appropriate, student/trainee entry-level qualifications, and the sequencing of learning objectives. The design phase concludes with the preparation of a training plan. The training plan will include information about such things as: (a) the selection and recruitment of learners, (b) the selection and/or training of faculty, (c) instructional facility needs, and (d) the tool, equipment, supplies, and materials needed. The implementation of the training plan begins upon its completion so that the necessary preparations can be made concurrently with the development phase.

Development Phase

The development phase results in the production of whatever instructional materials, including media, were decided upon during the design phase. The materials must be developed so as to help the learners achieve the performance objectives in the most efficient, effective, and economical way possible. Emphasis should be on maximizing the use of existing materials and resources whenever possible. Teacher/instructor and student/trainee activities are designed using the learning objectives and performance measures developed during the design phase as a foundation to guide the process.

In competency and performance-based programs, the instructional materials typically take the form of competency profiles, learning guides, and/or modules. The more traditional education and training programs usually produce curriculum guides, courses of study, and lesson plans.

In most of the development work done for companies and government agencies, the sponsor has elected to develop learning guides. As compared with modules, learning guides are usually smaller, 15 to 30 pages versus 40-60 pages for modules, and therefore, much easier to develop. Learning guides usually refer to one or more external resources while modules are usually self-contained. Both types of learning packages contain performance and enabling objectives, and consist of learning experiences that present information, practice/application activities, self-check model answers, and conclude with a performance test. They are suitable for individual, small group, or classroom use. See Attachment B for a learning guide graphic illustration.

Whatever the type of materials being produced, it is usually most advisable to also produce some type of media. The type of media to be developed will depend on many factors including the resources available, the nature of the learning, the skills of the developers, and the equipment and time available. Some media such as overhead transparencies, poster, and 35mm slides are quite easily

produced at low cost. Other media such as videotapes and interactive videodiscs require more skills and time and are more expensive to produce. The production of appropriate media is strongly encouraged as they can add variety and clarity to the instructional process, serve to motivate the learner, and facilitate the explanation of complex and difficult to explain concepts and procedures.

The instructional materials produced should be reviewed for technical accuracy, edited, tried out with a group of learners, and revised as necessary. The pilot-testing and revision of newly developed materials is very important and should not be short changed for the sake of saving a little or a few dollars. A field review or critique by qualified persons may sometimes be substituted for the actual pilot or field-testing by students/trainees.

Implementation

Implementation involves putting the education or training program into actual operation. Work begins by activating the training plan developed in the design phase. Learners have been recruited, instructors selected and trained, and the availability of facilities, supplies, equipment, and other resources is confirmed.

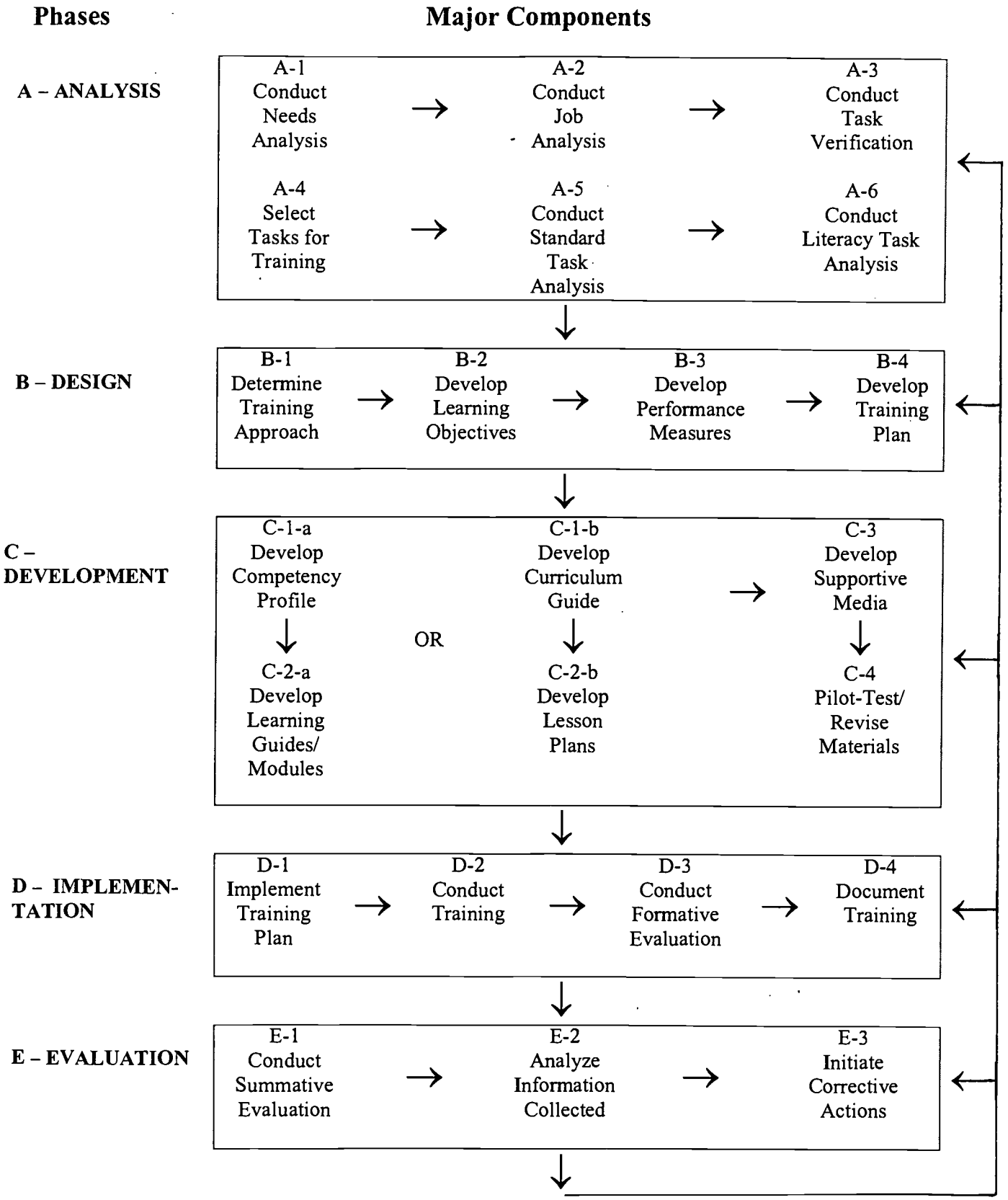
After pretesting, the training is conducted as planned and learner performance is evaluated with both progress and posttests. Instructor performance is also assessed. The evaluations serve to verify that the learners have achieved the performance objectives and to identify any instructor performance problems that need to be remedied. Formative evaluation data is collected from the students and the instructor and used to make in-course corrections as necessary. The results of instruction are documented in the form of student and instructor performance records. Student competency achievement profiles are used to report to parents and concerned others.

Evaluation Phase

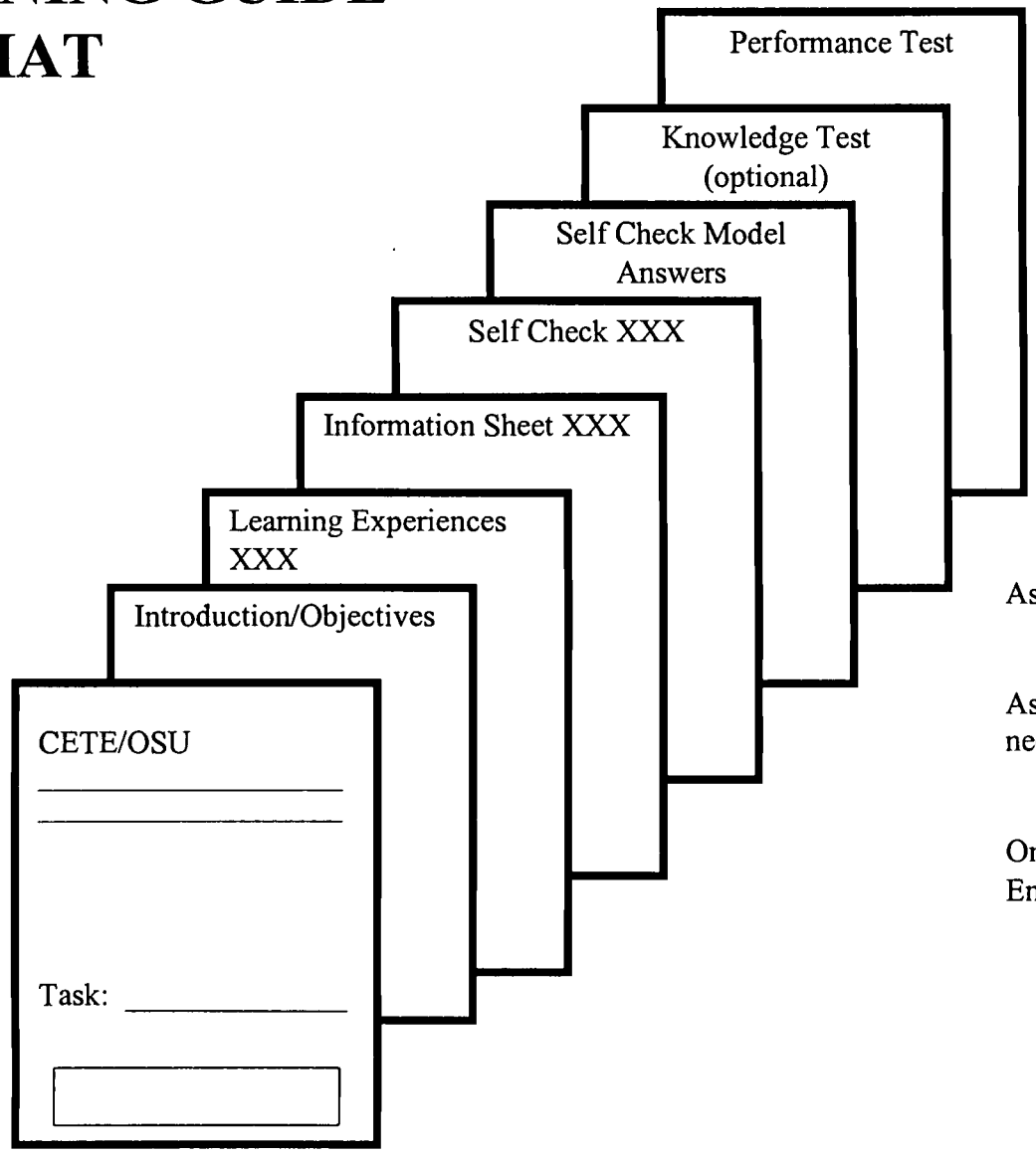
While formative evaluation was conducted during the course of the instruction, it is extremely important at this juncture to conduct summative evaluation. By gathering data on the overall instructional process, on the program outcomes, student follow-up data, worker productivity data, and cost effectiveness data; evaluation can generate decision-making data to help maintain and improve the education or training program. The summative data collected must be carefully and appropriately analyzed and interpreted. Recommendations regarding the program improvements needed then are made and decision-makers are encouraged to take any necessary corrective actions. Completing the evaluation phase produces the performance data and feedback vital to any education and/or training system concerned with quality management or justifying its existence to management.

Note: The Center on Education and Training for Employment, The Ohio State University, 1900 Kenny Road, Columbus, OH 43210-1090, periodically conducts workshops on the SCID model. If you are interested in such a training activity for yourself or your organization, please contact the Center (800-848-4815, Ext. 2-8481 or 614-292-8481 and ask for Bob Norton.

SYSTEMATIC CURRICULUM AND INSTRUCTIONAL DEVELOPMENT (SCID)



LEARNING GUIDE FORMAT



As many Self Checks as necessary

As many Information Sheets as necessary

One Performance and as many Enabling Objectives as necessary

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