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Curriculum Development Model: Addressing a Need for Basic Windows Instruction at National College of Business & Technology in Knoxville, Tennessee

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Introduction

Instructors at the Knoxville campus of National College of Business & Technology (NCBT) have observed deficiencies among students in the skill areas of basic Windows graphical user interface and Windows-based file management techniques. NCBT must deploy a program that addresses the need for remediation to the level required for successful performance in NCBT's vocational college Microsoft Office Suite and Keyboarding courses. Unfortunately, there is no approved/accredited course, no money in the budget, and no support from campus administration for this training.

NCBT's Computer Department instructors wish to address the need by designing a self-paced, interactive, and readily available course for local students. The course must be designed for individualized, self-paced instruction for beginning to intermediate learners with no instructor, peer-tutor, or other administrative intervention. The course coordinator will be responsible for distribution of training materials (booklet) and evaluating students' performance based on their responses to

a pencil-and-paper test and the presentation of documents created and organized on a floppy disk.

Introduction of this course requires successful completion of the five steps of the Instructional System Design (ISD) Model: Analysis, Design, Development, Implementation, and Evaluation as shown in Figure 1 on page 4. Each of these steps will be discussed, with particular attention given to data-gathering, decision-making, and outcomes at each step. Additionally, points where the five steps overlap will be identified.

Analysis

The first action in the Analysis Phase of the ISD Model is to prepare a formal *Statement of the Problem* (Morrison, Ross & Kemp, 2001, p. 26). The problem that is the basis of this paper is as follows:

> Many new and established students at National College of Business & Technology's (NCBT) Knoxville, Tennessee, campus, do not possess sufficient essential skills in executing basic functions on computers using the Windows 2000 operating system, manipulating a mouse pointing device, or performing basic file management functions (distinguish among drives, directories, and files; save, send-to, move, copy, delete, print, open, and rename files).

Why is the foregoing situation a problem? Every degree and diploma track at NCBT requires students to display some level of proficiency in keyboarding and the

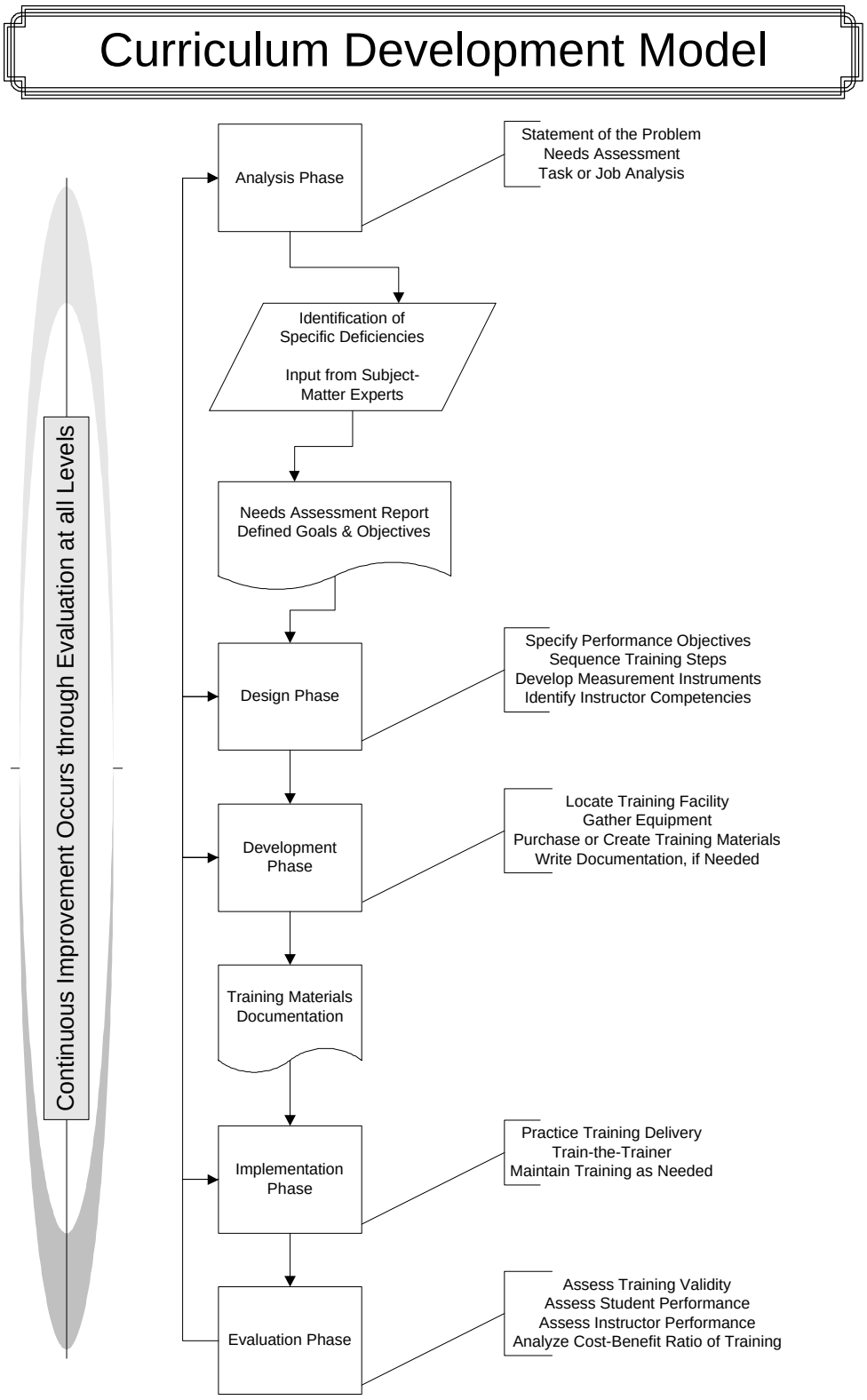
Curriculum Development Model
Continuous Improvement Occurs through Evaluation at all Levels
Analysis Phase
Statement of the Problem
Needs Assessment
Task or Job Analysis
Identification of
Specific Deficiencies
Input from Subject-
Matter Experts
Needs Assessment Report
Defined Goals & Objectives
Design Phase
Specify Performance Objectives
Sequence Training Steps
Develop Measurement Instruments
Identify Instructor Competencies
Development
Phase
Locate Training Facility
Gather Equipment
Purchase or Create Training Materials
Write Documentation, if Needed
Training Materials
Documentation
Implementation
Phase
Practice Training Delivery
Train-the-Trainer
Maintain Training as Needed
Evaluation Phase
Assess Training Validity
Assess Student Performance
Assess Instructor Performance
Analyze Cost-Benefit Ratio of Training

Figure 1

four components of the Microsoft Office Suite: word-processing, spreadsheets, presentations, and databases. Too often, students enter NCBT with only rudimentary, if any, skills in these required subjects.

The next step is a *Needs Assessment* to determine the extent of the problem, including both the number of students affected and the levels of their deficiencies (Craig, 1996, p. 271). A needs assessment qualifies and quantifies training by providing the basis from which curriculum developers identify specific goals and objectives that will be met by the proposed training (Morrison, Ross & Kemp, 2001, p. 27).

The needs assessment is not always completed by training experts; rather, it is often performed informally by managers, friends, co-workers, and other interested parties. When a training professional completes a needs assessment, data are collected while interested parties are interviewed and initial planning is done. The training professional then analyzes the data and compiles a report to identify the targeted student population (Morrison, Ross & Kemp, 2001, pp. 33-34).

The subject NCBT training problem was simple to qualify and quantify: students cannot progress in their degree or diploma programs without possessing basic skills required to prepare, store, and submit documents; perform research or complete forms on-line; and communicate by electronic mail with instructors or peers.

During the needs assessment, subject-matter experts provide essential details regarding necessary competencies for students' success. Their recommendations serve as a bridge to the next step, which is a *Job or Task Analysis*. Craig (1996) writes that job/task analyses "typically are conducted by observing expert performance, interviewing experts, and scrutinizing technical documentation (p. 274). Morrison, Ross & Kemp (2001) contend that performing adequate task analyses solves three major problems in curriculum development because the analyses:

- define content required to solve performance problems or alleviate performance need, a critical step since most curriculum developers work with unfamiliar content;
- force subject-matter experts to work through individual steps, thus identifying "subtle steps" in the training outcomes; and,
- allow curriculum developers to view training from the learners perspective to "gain insight into appropriate training strategies" (p. 64).

Task analyses are extremely detailed and address each process in the learning episode. Following is a sample of questions commonly asked during a task analysis[1], followed by answers relevant to the identified NCBT training problem:

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[1]This list is an anthology of questions compiled by the writer over a period of many years' experience as a teacher. The original source for each question can no longer be identified.

What is the specific task?	Ability to successfully perform a designated function related to the Microsoft Windows graphical user interface or Windows-based file management
Who performs this task?	Students in NCBT classes
How frequently is this task performed?	Multiple times each day
How long does it take to complete this task?	Completion time is dependent on students' prior knowledge and comfort level with technology, availability of instructor or tutor for problem-solving, and physical or mental disabilities that hinder students' progress
How complex is this task?	Simple, but students must complete steps in sequential order
Why is it important to perform this task?	For successful completion of most classroom assignments in nearly every NCBT course
How does this task relate to the student's overall progress?	Students must be able to utilize the Windows operating system and file management to successfully complete their courses of study
Is speed a factor in performing this task?	Generally not in a self-paced environment, but can be if required by instructors

Is it likely that the way this task is performed will change soon? If so, when?	No
Where is this task performed?	At any public computer workstation located on the NCBT campus
Physical environment	Good workspace with access to a functional computer
Initiating cue(s)	Self: Students recognize their own deficiencies Classroom: Instructors observe deficiencies and recommend participation
Terminating cues	Student responds correctly to instructions from instructors and/or textbooks.
Consequences of deficient performance	Devastating: Students are not able to function on computer workstations High: Students are not able to complete assignments Moderate: Students are unable to proficiently complete assignments Low: Students are unable to complete assignments independently
Tools, equipment, materials,	Computer workstation, removable storage media,

audio-visual aids and additional resources	instructional documents containing procedures
Reference procedures	Self-paced: no supplemental reference materials required Classroom: Instructor knowledge; on-line or printed instructions
Health and safety overview	Tasks are performed without risk
Prerequisite learner knowledge	Ability to correctly identify workstation components, including monitor, computer, keyboard, mouse, floppy drive

Once these questions are answered sufficiently, the curriculum designer can prepare a set of measurable goals and objectives for the training.

Design

After the *Needs Assessment* and *Job/Task Analyses* are completed and goals and objectives have been identified, curriculum development enters the second, or Design Phase of the ISD Model. The Design Phase focuses on strategies for achieving training goals and objectives (Morrison, Ross & Kemp, 2001, p. 124). During the Design Phase, curriculum developers "specify clearly the performance objectives" expected from the training (Craig, 1996, p. 274).

At this point in the ISD Model, curriculum developers isolate individual task-performance steps for presenting training, properly sequence and time each training step, match training aids to specific tasks, and develop quality standards – performance norms and grading scales – and methods for testing student competencies (Craig, 1996, p. 274; Morrison, Ross & Kemp, 2001, p. 112).

The Design Phase also addresses instructor preparedness and identification of any "Train-the-Trainer" needs (Craig, 1996, p. 274). NCBT is fortunate that most of its faculty, especially in the Computer Department, are proficient with manipulating the Windows operating system and navigating through Windows file management.

During the Design Phase, curriculum developers sometimes have to evaluate the outcomes of the *Needs Assessment* and *Job/Task Analyses* in relation to materials, instructor preparedness, and facilities access. Questions asked during the Design Phase may result in identification of goals and/or objectives that cannot be met as they are stated, so refinement is necessary.

Development

During the third, or Development Phase of the ISD Model, curriculum developers "translate the design plan into instruction" (Morrison, Ross & Kemp, 2001, p. 170). The developer chooses the delivery method, location, training aids,

and even identifies instructor competencies. Following are some functions of curriculum developers during the Development Phase:

- create actual training materials, such as handouts, resource guides, and audio-visual aids;
- if necessary, write documentation that is not already available;
- locate a suitable training facility, if required;
- purchase or gather necessary training equipment;
- identify the scope of desired training materials.

Development of training for the subject NCBT problem is fairly simple. Students have ready access to textbooks, handouts, on-line tutorials, and peer or instructor tutors. Quality standards are also expressed simply: there is either success or failure; students must repeat the tutorials until they are able to complete all assigned tasks with 100% accuracy.

Facilities and equipment are always available because NCBT is a college with classrooms and public computer workstations. NCBT instructors have access to a variety of published and downloadable training materials for use in a classroom setting, and students can be provided with adopted textbooks and/or existing handouts or directed to several on-line resources for self-paced training. Individual instructors are responsible for assessing students' success rate based on observation of students in class or during self-study periods.

Before moving to the next phase, curriculum developers should evaluate the outcomes of the Development Phase to ensure the outcomes meet the specifications identified in the Analysis and Design Phases. It is sometimes necessary to revise some segments of the Analysis and Design Phases' outcomes based on observations made during the Development Phase.

Implementation

At the Implementation Phase of the ISD Model, the curriculum is deployed to students using one of ten recognized instructional methods: presentation, demonstration, discussion, drill-and-practice, tutorial, cooperative learning, gaming, simulation, discovery, and problem solving (Heinich, Molenda, Russell & Smaldino, 1996, p. 9). Common issues in this Phase include previously unrecognized instructor inadequacies, insufficient materials preparation (Craig, 1996, p. 279), and improperly determined levels of students' prerequisite skills. If these issues arise, curriculum developers must re-evaluate outcomes from the Analysis, Design, and, especially, Development Phases.

During the Implementation Phase, curriculum developers may identify acceptable alternative procedures for achieving performance, such as

- study material in a traditional classroom setting;
- learn by demonstration from an experienced mentor; or,

- self-study from on-line demonstrations, alternative textbooks, or videotapes.

Long-term maintenance of the training program is a component of the Implementation Phase (Craig, 1996, p. 279), so curriculum developers must periodically review the outcomes from, and even repeat the procedures followed, during the Analysis, Design, and Development Phases.

Development of training for the subject NCBT problem is also fairly straight-forward. NCBT's Computer Department instructors do not have time to present in-depth teaching of Windows' graphical user interface and file management protocols in their classrooms; there is no provision for teaching it in other departments. In Medical Department classes where students are required to use computers to complete daily lessons, instructors are often frustrated by the requirement that they provide basic Windows and file management instruction to the detriment of their lesson plans.

Evaluation

Most experts on the ISD Model consider the Evaluation Phase to be the most important of all five Phases. Originally, Evaluation was the terminal point of the ISD Model (Clark, 2004). As time passed, however, a holistic approach to adult education developed. Simultaneously, educational and psychological journals

published innumerable studies of how adults learn, retain, and process information. The result: the Evaluation Phase itself was re-evaluated.

Currently, many training experts believe evaluation is not summative but must occur during each Phase of the ISD Model for successful curriculum development (Craig, 1996, p. 294; Morrison, Ross & Kemp, 2001, p. 206). This has led to adoption of the Continuous Improvement Model by an extraordinary number of institutional and workplace educational facilities (Google, 2005).

Evaluation requires, perhaps more so than the other Phases, systematic and quantifiable methods of determining the answers to questions asked during this Phase. Typical Evaluation Phase questions include the following:

- What did students learn as a result of the training?
- Did the students perform according to expected levels?
- Are students able to apply the new knowledge without constant reinforcement?
- Was the training efficient and cost-effective?
- Should the training be continued as is, revised, or terminated?

(Morrison, Ross & Kemp, 2001, p. 206; Craig, 1996, p. 314-316).

In addition to assessing student performance at the end of training, protocols employed in the traditional ISD Evaluation Phase are applied to the Analysis, Design, Development, Implementation, and even the Evaluation Phase itself to determine the validity of procedures, decisions, and outcomes at each step (Blanchard & Thacker,

2004, p. 25). Thus, modern-day ISD Models are more like models for continuous improvement expressed in Deming's Total Quality Management strategies (Shuler & Jackson, 1996, p.115) than the original linear design proposed by Robert Glaser in 1962 (as depicted by Clark, 2004). Today, continuous improvement is one of the most-popular topics in education (Google, 2005).

For the subject training problem at NCBT, evaluation occurs almost daily. Instructors discuss implemented training methods and their results. The instructors use these informal evaluation discussions to continuously improve their teaching styles and classroom teaching aids. Inadvertently, they have adopted the State of Tennessee's *Strategy for Program Evaluation and Continuous Improvement Program* developed specifically for adult education initiatives.

Because NCBT's instructors are keen to address the subject training need despite lacking funds, scheduling, and support of campus administrators, it is likely they will succeed in their informal approach if the ISD Model is followed and all instructors are comfortable with the outcomes of each Phase.

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