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ABSTRACT

The handbook is designed to help vocational instructors develop articulated vocational programs for secondary and post-secondary students.The handbook recommends a competency based approach which personalizes instruction for students and which emphasizes performance of job related tasks. The handbook's first chapter is a general introduction to its focus and use. Chapters 2 and 3 address the organization of the local program and the content, organization, and instructional sequence of a single occupation within the local program. They consider the first four steps of the recommended six-step procedure for curriculum articulation: listing the occupations, deciding which occupations to teach, drawing the worker mobility chart, and outlining the occupational curriculum. Chapter 4 discusses guidelines for developing instructional modules and describes the fifth step in achieving articulation: writing teaching modules. Chapter 5 suggests a system for teachers to use in monitoring student's progress through modules toward their occupational goals and covers the last articulation step: developing a record-keeping system. Five appendixes provide a glossary, a sample task inventory, guidelines for constructing task inventories, measures to determine learner achievement, and advantages and limitations of some classroom media. A three-page bibliography is included. (JR)

HANDBOOK FOR VOCATIONAL INSTRUCTORS INTERESTED IN COMPETENCY-BASED EDUCATION

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THE MINNESOTA RESEARCH COORDINATING UNIT FOR VOCATIONAL EDUCATION performs the following four functions in behalf of the State and national systems of vocational education:

1. Stimulate, facilitate and coordinate innovative research and development efforts.

2. Disseminate research-related information to assist research and development efforts and to speed the implementation of worthy educational innovations.

3. Increase the number and improve the competence of producers and consumers of vocational research-related materials.

4. Create knowledge and useful products that have potential for making long-range and general qualitative improvements in vocational education.

Please note that this is a WORKING COPY. Revisions are expected after the Handbook is field tested.

Laura Burger, Research Director
Curriculum Articulation Project

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HANDBOOK

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CHAPTER I

INTRODUCTION TO THE HANDBOOK

The Handbook is designed to help vocational instructors develop valid, articulated vocational programs for secondary and post-secondary students who are seeking occupations in agriculture, business and office, distributive, health fields, home economics, or industrial fields.

When a curriculum is articulated, each student has the opportunity to obtain the occupational competencies that he/she needs at the lowest possible cost (in terms of time, energy and money expended by the student). The student is not required to repeat the learning of those tasks which he/she can already perform. The student has the opportunity to master those tasks which he/she has not learned previously, but now desires and needs for occupational competence.

The Focus of the Handbook

The Handbook recommends a competency-based approach to education which personalizes instruction for students. Emphasis is upon student performance of specific job related tasks. Psychomotor (skills), cognitive (knowledges) and affective (feelings) learnings are demonstrated by students when they perform those tasks which are required of the worker-on-the-job.

In developing the Handbook it has been assumed that: (1) the vocational instructor has or can develop a task inventory for each occupation he/she teaches, (2) secondary and post-secondary vocational instructors at the local level can make a list of the occupations taught in their local program, (3) instructors will use the Handbook as a guide for building articulated curriculum in a single local program, (4) instructors will be using the Handbook during scheduled workshop time (except section IV which can be used independently by teachers as they develop and package the necessary instructional materials).

The Organization of the Handbook

The Handbook presumes that the reader is not familiar with many of the terms and concepts associated with competency-based instruction. Therefore, a brief discussion of competency-based instruction which is personalized for students is offered in this first chapter of the Handbook, and a glossary of terms is included in Appendix A, page 82.

Chapters II and III address the organization of the local program and the content, organization and instructional sequence of a single occupation within the local program. Chapter IV includes guidelines for developing instructional modules. Chapter V suggests a system for teachers to use in monitoring students' progress through modules toward their occupational goals.

What is Competency-Based Instruction?

A vocational program is a competency-based instructional program when: (a) the instructional content is based upon student performance of significant tasks which are actually performed by workers on-the-job, (b) the learning achievement of students is measured by satisfactory student demonstration of effective and efficient performance of actual or simulated job tasks, and (c) the instructional strategies are available to the student for attaining necessary skills, knowledges, and attitudes to perform occupational tasks.

In a competency-based instructional program, the tasks which students are expected to be able to perform, along with supporting affective (feelings) and/or cognitive (knowledge) behaviors necessary for task performance, are made public to students in advance of instruction, together with the level of performance and the conditions under which students are expected to perform the job-related tasks.

Students are responsible for demonstrating that they have attained

each competency by performing specific tasks (which require psychomotor, affective and/or cognitive achievement). When a student has demonstrated that he/she can perform satisfactorily, then his/her record shows that he/she has a given competency. The record of competencies then becomes part of the student's credentials when he/she seeks a job.

This Handbook recommends a competency-based, personalized instructional program. That is, personalized instruction allows students alternative ways in which they might learn to perform those tasks necessary for their chosen occupations. The teacher may suggest alternative ways (group activities, independent study, simulated or real practice) in which a student can learn to perform the task(s), or the student may be permitted to make the selection. Students are then responsible for demonstrating that they have attained each competency by adequate performance of specified task(s), but students are not responsible for "how", "when", or "where" they learned to perform the tasks.

As is true of any vocational instructional program, a competency-based, personalized instructional program has both advantages and disadvantages.

Advantages of the Competency-based Personalized Instructional Program

1. Instructional objectives are made clear to students, teachers, and the public.
2. Student's progress is monitored closely in relation to the stated objectives, especially in the early stages of learning to perform a task, and continuous diagnosis of difficulties and opportunities for remedial instruction are possible.
3. There is an opportunity for variation among learners with respect to the objectives they may pursue at a given time, the mode of instruction used, and the materials used for learning.
4. Time may be allowed to vary among students for the attainment of certain objectives, thus permitting slower students to take more time to reach the stated objectives and for faster students to proceed more quickly.
5. Different instructional goals may be set for different learners depending upon their occupational interests and abilities within the program area.

6. Emphasis is placed on the development of minimal levels of competency by all students in job tasks, thus promoting the acquisition by students of marketable job skills. Opportunity is provided for students to develop their competencies beyond minimal levels so they may optimally utilize their individual potential.

7. The relationship of identified competencies to job requirements is more easily depicted when the job itself has been the source of the task identification.

8. Opportunity is greater for variation within the instructional program, thus promoting the likelihood of meeting differing student interests, needs, and capabilities.

9. Students may play a larger role in selecting their instructional objectives in that they may specify particular occupational roles for which to prepare.

10. Students may be encouraged to assume more responsibility for their instructional progress when the completion of a program is dependent largely on the demonstration of specified competencies and greater latitude is permitted with respect to the means used to attain these competencies.

Disadvantages of the Competency-based Personalized Instructional Program

1. Competency-based instruction is dependent upon valid indentification of tasks performed in entry-level occupations and the availability of such task inventories to curriculum developers.
   Comment: At the present time task inventories of varying quality are available for many different occupations. The Minnesota RCU at the University of Minnesota is currently involved in collection of task inventories. It is hoped that task inventories can be processed into a consistent format and provided to each vocational instructor upon request at some future date.

2. Some competencies desirable for certain occupations may be difficult to identify explicity from inventories of tasks performed.
   Comment: Task inventories are only the starting points for identifying job competencies. It is recommended that teachers use task inventories as tools, adding to them and refining them according to their judgment. Enabling objectives may be added to support the competencies needed for the various occupations.

3. Time may not be available for teachers to develop alternative instructional materials appropriate for learning the tasks which have been identified.
   Comment: Time must be provided in the form of workshops and release time for development of materials. This is an administrative decision.

4. Several alternative testing instruments which are both valid and reliable measures of the instructional objectives may not be available.
   Comment: Alternative testing instruments are to be developed by the vocational instructors at the present time. It may be desirable at some point in time to make available to instructors the tasks, the objectives, and sample test items for occupational curriculum.

5. Unrestricted student-pacing of instruction may lead to an inefficient use of time by some students and, thus, may adversely affect the level or the number of competencies attained.
   Comment: Teachers may select with the student appropriate learning activities from the alternatives suggested. Teachers may also establish a pace of instruction when it is reasonable and necessary.

6. The identification of mastery levels of performance of occupational tasks, or minimum performance standards, is very difficult for many tasks.
   Comment: The instructors in any given occupation are encouraged to interact with employers, and past students, and reflect upon their own work experience as mastery levels of performance and minimum performance standards are determined for various tasks.

7. The establishment of minimal performance levels for students may not provide sufficient encouragement for students to attain more advanced performance levels.
   Comment: Encouragement to students who are capable of attaining more advanced performance levels can be included in three ways. First, teachers can, in praising students, reward excellence. Second, enrichment activities and avenues for attaining higher levels of proficiency can be elected by the student after minimal performance levels are reached. Third, a student can elect to demonstrate optional competencies.

Assumptions of the Competency-based Personalized Instructional Program

There are some assumptions which underlie any instructional program. In deciding upon an instructional program, the persons involved (teachers, administrators, and students) need to agree that those assumptions state the view which correctly supports their approach to education. If you agree with the assumptions stated below, then you may wish to use this Handbook to develop a competency-based, personalized instructional program:

1. Students differ from one another in goals, aptitudes, abilities, needs, motivations, aspirations, and job or career preferences.

2. The public schools have responsibility for providing vocational instruction for the large proportion of youth who will enter the work force with less than a bachelor's degree.

3. The identification of the tasks performed in occupations is the initial step in developing efficient vocational education curriculums.

4. Occupational tasks can be identified.

5. The efficiency of learning can be increased by designating as flexible a sequence of occupational competencies as possible which will lead the student to his/her occupational goal and then allowing, where possible, the student to proceed through the sequence at his/her own rate.

6. Efficient progress of students toward occupational competencies may be facilitated by permitting student-pacing through segments of their instruction.

7. A curriculum must be defined in terms of its goals as they apply to students.

8. Behavioral objectives identification must follow task identification in curriculum development. The existence of behavioral objectives then facilitates the development of evaluation instruments and the identification of learning activities appropriate to teach those objectives.

9. Time and personnel can be made available for the preparation of the necessary task inventories, instructional objectives, instructional materials development, and test development.

Directions For Using The Handbook

At the beginning of the curriculum development effort, local secondary and post secondary teachers from the same program area will need to work together in a workshop where consultants are available. This Handbook suggests six (6) steps for articulating curriculum at the local level. The first four (4) steps, and the last step should be accomplished during workshop time. To complete the fifth step, which is the most time consuming step, each teacher can work somewhat independently of the group. The individual teacher should be given released time or extended contract time, however, to work on Step 5, because it requires that he/she develop instructional materials. Chapter V of this Handbook supplies the guidelines for developing the materials. The time required for group work and individual work is an important consideration which you, as teachers, will need to discuss with the administration at your school.

II. ORGANIZATION OF THE LOCAL VOCATIONAL EDUCATION PROGRAM

Step 1: List the Occupations

Step 2: Decide Which Occupations to Teach

Step 3: Draw the Worker Mobility Chart

Basic Definitions

CHAPTER II

ORGANIZATION OF THE LOCAL VOCATIONAL EDUCATION PROGRAM

Six basic steps are needed to articulate curriculum within a vocational education program area. They are as follows:

(1) List all of the occupations that could be offered within a given program area;

(2) Decide whether instruction for each listed occupation, within the program area, can be and will be offered in your local program;

(3) Draw a Worker Mobility Chart to show the basic hierarchy of occupations (beginning level to advanced level occupations) within the program area;

(4) Outline the specific curriculum for each occupation within a program area through the use of task inventories;

(5) Write instructional modules for each occupation within a program area; and

(6) Develop a record keeping system to monitor the progress of students through occupational instruction.

The first three of these steps are discussed in this chapter. Step four, outlining the specific curriculum for an occupation through the use of task inventories, is discussed in Chapter III. Step five, writing individual instructional modules, is discussed in Chapter IV. Step six, developing a record keeping system, is discussed in Chapter V.

Step One: List the Occupations

The first step toward curriculum articulation for secondary and post secondary instructors from the same local area is to make a list of all the occupations that could be offered within their program area. (Two examples are given on the following pages.) It is not necessary in making this first list to think in terms of certain occupations being taught at the secondary level and other occupations being taught at the post-secondary level; just make the list contain all the occupational titles that fall under your program area.

It may be helpful to refer to the Dictionary of Occupational Titles (DOT) and Vocational Education and Occupations as you make this list of occupations.

Step #1: (Example) A List of All of the Occupations That Could Be Offered Within the Program Area of Hospitality

Hospitality Industry

1. General Administration
   - Executive Manager
   - Assistant Manager
   - Personnel Manager
   - Secretary

2. Front Office
   - Front Office Manager
   - Assistant Manager
   - Night Manager
   - Senior Desk Clerk
   - Desk Clerk
   - Front Office Cashier
   - Switchboard Operator
   - Switchboard Supervisor
   - Reservations Control Clerk
   - Reservations Clerk
   - Reservations Typist
   - Bell Captian
   - Bellman
   - Doorman
   - Parking Lot Attendant
   - Parking Lot Chaffeur
   - Front Office Secretary

3. Back Office
   - Comtroller
   - Purchasing Agent
   - Receiving Clerk
   - Night Auditor
   - Bookkeeper
   - Chief Clerk
   - Credit Manager
   - Accounts Payable Clerk
   - Accounts Receivable Clerk
   - Payroll Clerk
   - Timekeeper

4. Sales
   - Sales Manager
   - Convention Coordinator
   - Sales Representative

(continued on the next page)

5. Housekeeping
   - Executive Housekeeper (Director or Services, Housekeeping Manager)
   - Housekeeper
   - Assistant Housekeeper (Head Houseman, Inspectress)
   - Supervisor
   - Senior Housekeeper
   - Floor Supervisor
   - Section Supervisor
   - Linen Room Clerk
   - Linen Room Maid
   - Linen Room Attendant
   - Housekeeping Clerk
   - Housekeeper's Secretary
   - Seamstress
   - Maid
   - Section Housekeeper
   - Public Space Maid
   - Houseman
   - Vacuum Man
   - Linen Man
   - Public Space Porter
   - Night Cleaners
   - Laundry Manager
   - Laundry Supervisor
   - Laundry Forman
   - Laundry Operator
   - Machine Operator
   - Laundry Worker
   - Laundry Sorter
   - Laundry Folder

6. Maintenance & Grounds
   - Chief Engineer
   - Maintenance Man
   - Maintenance Helper
   - Electrician
   - Carpernter
   - Plumber
   - Painter
   - Maintenance Mechanic
   - Tool Room Supervisor
   - Tool Storage Attendant
   - Head Groundskeeper
   - Groundskeeper
   - Yard Man
   - Gardener

7. Special Services
   - Trout Fishing Guide
   - Stable Man
   - Trail Guide
   - Ski Lodge Manager
   - Shuttle Driver
   - Ski Patrolman
   - Snow Cat Operator
   - Ticket Taker/Salesman
   - Ski Lift Operator
   - Snow Gun Operator
   - Golf Pro
   - Recreation Director

Step #1: (example) A List of All of The Occupations That Could Be Offered Within The Program Area of Graphic Arts.

Composition-Makeup-Typesetting

DOT-OOH-VEO	1.	Linotype Operator (650.582-14)
DOT-OOH-VEO	2.	Monotype-Keyboard Operator (650.582-018)
DOT-OOH-VEO	3.	Phototypesetter Operator (650.582-022)
DOT-VEO	4.	Photocomposing-Machine Operator (650.782-010)
DOT-VEO	5.	Typesetting-Machine Tending (650.885-010)
DOT-VEO	6.	Matrix Inspector (650.688-010)
DOT-OOH-VEO	7.	Casting-Machine Operator (654.782-010)
DOT-VEO	8.	Ludlow-Machine Operator (654.782-014)
DOT-VEO	9.	Pager (type founding) (654.887-010)
DOT-VEO	10.	Commodity-Plate Equipment Operator (659.782-010)
DOT-VEO	11.	Foreman, Composing Room (973.138-010)
DOT-OOH-VEO	12.	Compositor (973.381-010)
DOT-OOH-VEO	13.	Compositor Apprentice (973.381-014)
DOT-OOH-VEO	14.	Correction Man (973.381-018)
DOT-VEO	15.	Imposer (973.381-022)
DOT-VEO	16.	Job Printer (973.381-026)
DOT-VEO	17.	Job Printer Apprentice (973.381-030)
DOT-OOH-VEO	18.	Make-Up Man (973.381-034)
DOT-VEO	19.	Line-Up Man (973.381-022)
DOT-OOH-VEO	20.	Paste-Up Man (979.381-030)
DOT-OOH	21.	Tape-Perforating Machine Operator (659-885)
OOH	22.	Bankmen
OOH	23.	Stonehands (lockup and make-up)
DOT	24.	Typographer-referred to as Compositor I (973.388)
DOT	25.	Typographer, apprentice-referred to as compositor apprentice (973.388)
DOT	26.	Typographer-Proofer (973.388)

Photgraphic Lab and Darkroom Procedures

DOT-VEO	1.	Photograph Retoucher (970.281-026
VEO	2.	Colorist, Photography (970.381-014)
VEO	3.	Film Technician (976.131-010)
DOT-VEO	4.	Photographic Foreman (976.131-018)
VEO	5.	Developer (976.381-010)
VEO	6.	Photographic Sensitometrist (976.381-014)
VEO	7.	Projection Printer (976.381-018)
VEO	8.	Reproduction Technician (976.381-022)
VEO	9.	Photo Checker and Assembler (976.687.010)
DOT-VEO	10.	Color Printer Operator (976.782-010)
VEO	11.	Multiple-Photograph-Printer Operator (976.782-022)
VEO	12.	Rectification Printer (976.782-026)
VEO	13.	Carbon Printer (976.884-010)
VEO	14.	Contact-Frame Operator (976.884-018)
VEO	15.	Film Cutter (976.884-022)
VEO	16.	Negative Cutter and Spotter (976.884-034)
VEO	17.	Splicer (976.884-042)
VEO	18.	Mounter Color Film (976.885-022)

DOT-VEO	19.	Printer Developer, Machine (976.885-030)
DOT-VEO	20.	Photograph Finisher (976.886-010)
VEO	21.	Film Loader (976.887-010)
VEO	22.	Film Numberer (976.887-014)
DOT-VEO	23.	Photographer Helper (976.887-018)
VEO	24.	Print Washer (976.887-022)
VEO	25.	Copy Cameraman (976.381-010)

Supervision

DOT-VEO	1.	Foreman, Printing Shop (659.130-010)
DOT-VEO	2.	Production Supervision (979.138-010)

Commercial ART Occupation

DOT-VEO	1.	Director Art (141.031-014)
DOT-VEO	2.	Color Expert (141.051-010)
DOT-VEO	3.	Art Lay-out Man (141.081-014)
DOT-VEO	4.	Cover Designer (141.081-034)
DOT-VEO	5.	Bank-Note Designer (142.081-010)
DOT-VEO	6.	Commercial Design (142.081-022)
DOT-VEO	7.	Sign Designer (142.08.-118)
DOT-VEO	8.	Cartoonist (144.081-014)
DOT-VEO	9.	Air-Brush Artist (970.281-010)
DOT-VEO	10.	Delineator (970.281-014)
DOT-VEO	11.	Engrosser (970.381-018)
VEO	12.	Lay-Out Man (970.381-026)
DOT-VEO	13.	Painter, Sign (970.381-046)
DOT	14.	Airbrush Operator (970.884)
DOT	15.	Ben-Day Artist (970.381)

Silk Screen Making and Printing

VEO	1.	Screen Maker, Photographic Process (971.381-042)
VEO	2.	Silk Screen Cutter (979.381-046)
VEO	3.	Screen Printer (979.884-030)
VEO	4.	Silk Screen Machine Operator (979.884-034)
VEO	5.	Silk Screen Printer (979.884-038)

Graphic Arts - Other

VEO	1.	Production Superintendent (183.118-014)
VEO	2.	Estimator (219.388-118)
VEO	3.	Serviceman, Electrotype (659.468-010)
VEO	4.	Dre-Mounter (659.781-010)
VEO	5.	Cut-and-Print-Machine Operator (659.782-014)
VEO	6.	Embosser (659.782-018)
VEO	7.	Embossing-Press Operator (659.782-022)
VEO	8.	Ruling Machine Operator (659.782-030)

VEO	9.	Sign Writer, Machine (659.782-034)
DOT-VEO	10.	Engraver (979.781-010)
	11.	Printing Technician
	12.	Mailer
	13.	Computer Programmer
	14.	Computer Typist
VEO	15.	Offset-Duplicating Machine Operator (207.782-026)
VEO	16.	Newspaper Inserter (249.887-018)

Bookbinding

DOT-VEO	1.	Foreman, Bindery (653.131-010)
DOT-VEO	2.	Collator (653.687-010)
DOT-VEO	3.	Casing-in-Line Set-Up Man (653.780-010)
DOT-VEO	4.	Folding Machine Set-Up Man (653.780-014)
DOT-VEO	5.	Gathering Machine Set-Up Man (653.780-018)
DOT-VEO	6.	Perfect-Binder Set-Up Man (653.780-022)
DOT-VEO	7.	Stitching Machine Set-Up Man (653.780-26)
DOT-VEO	8.	Covering Machine Operator (653.782-010)
DOT-VEO	9.	Folding Machine Operator (653.782-014)
DOT-VEO	10.	Head-Bander-and-Liner-Operator (653.782-018)
DOT-VEO	11.	Saddle Stitching Machine Operator (653.782-022)
DOT-VEO	12.	Side Stitching Machine Operator (653.782-026)
DOT-VEO	13.	Book Sewing Machine Operator (653.885-010)
DOT-VEO	14.	Collating Machine Operator (653.885-014)
DOT-VEO	15.	Rounding and Backing Machine Operation (653.885-018)
DOT-VEO	16.	Spiral Binder (653.885-022)
DOT-VEO	17.	Casing-in-Line Feeder (653.886-010)
DOT-VEO	18.	Folding Machine Feeder (653.886-014)
DOT-VEO	19.	Gathering Machine Feeder (653.886-018)
DOT-VEO	20.	Perfect Binder Feeder (653.886-022)
DOT-VEO	21.	Stitching Machine Feeder (653.886-026)
DOT-VEO	22.	Perforating Machine Operator (659.885-014)
DOT-VEO	23.	Sample-Book Maker (659.885-018)
DOT	24.	Bindery Superintendent (183.118)
DOT	25.	Bindery Worker (643.885)
DOT	26.	Liner, Looseleaf Binder (641.885)

Printing Press Occupations

VEO	1.	Foreman, Press Room (651,130-010)
VEO	2.	Experimental Pressman (651.280-010)
VEO	3.	Overlay Cutter (651.381-010)
VEO	4.	Lithographic-Plate Inspector (651.687-010)
OOH-VEO	5.	Cylinder-Pressman (651.782-010)
DOT-VEO	6.	Cylinder-Pressman Apprentice (651.782-014)
DOT-VEO	7.	Engraving Press Operator (651.782-018)
OOH-VEO	8.	Flexographic-Press Man I (651.782-022)
DOT-VEO	9.	Flexographic-Press Man II (651.782-026)
DOT-VEO	10.	Lithographic Proofer (referred to as proof pressman (651.782-030)
DOT-VEO	11.	Lithographic Proofer Apprentice (referred to as proof pressman apprentice) (651.782-034)

DOT-VEO	12.	Offset-Duplicating Machine Operation (651.782-038)
OOH-VEO	13.	Offset-Press Man (651.782-042)
DOT-VEO	14.	Offset-Press Man Apprentice (651.782-046)
DOT-VEO	15.	Offset Proof Press Operator (651.782-050)
DOT-OOH-VEO	16.	Platen Press Man (651.782-054)
DOT-VEO	17.	Platen Press Man (651.782-058)
DOT-VEO	18.	Printer Slotter Operator (651.782-062)
DOT-OOH-VEO	19.	Printing Press Operator (651.782-066)
DOT-VEO	20.	Proof Pressman (651.782-070)
DOT-OOH-VEO	21.	Rotograveure Press Man (651.782-074)
DOT-VEO	22.	Steel-Die Printer (651.782-078)
DOT-VEO	23.	Striper Man (651.782-082)
DOT-VEO	24.	Tab-Card-Press Operation (651.782-086)
DOT-VEO	25.	Transfer Operation (657.782-090)
DOT-OOH-VEO	26.	Web-Press Man (651.782-094)
DOT-VEO	27.	Web-Press Man Apprentice (651.782-098)
OOH-VEO	28.	Offset Press Operator (651.885-014)
OOH-VEO	29.	Cylinder Press Feeder (651.886-010)
OOH-VEO	30.	Lithographic Press Feeder (651.886-014)
OOH-VEO	31.	Press Man Helper (651.886-018)
DOT	32.	Press Maintenance Man (627.281)

Photoengraving

VEO	1.	Ben-Day Artist (970.381-010)
VEO	2.	Retoucher, Photoengraving (970.381-058)
VEO	3.	Sketch Maker Photoengraving (970.381-062)
DOT-VEO	4.	Etcher, Hand (971.281-010)
VEO	5.	Lighographer (971.281-014)
DOT-VEO	6.	Etcher Apprentice, Photoengraving (971.381-010)
DOT-VEO	7.	Etcher, Photoengraving (971.381-014)
DOT-VEO	8.	Photoengraver (971.381-018)
DOT-VEO	9.	Photoengraver, Apprentice (971.381-022)
DOT-VEO	10.	Photoengraver, Finisher (971.381-026)
DOT-VEO	11.	Photoengraver, Printer (971.381-030)
DOT-VEO	12.	Photoengraver, Proofer (971.381-034)
DOT-OOH-VEO	13.	Stripper (971.381-044)
DOT-VEO	14.	Photoengraving Proofer Apprentice (971.381-038)
DOT-VEO	15.	Stripper, Apprentice (971.381-046)
OOH-VEO	16.	Photographer, Photoengraving (971.382-010)
VEO	17.	Blocker (971.684.010)
VEO	18.	Stencil Operation, Photographic (971.782-010)
VEO	19.	Stoger (971.884-010)
VEO	20.	Copyman (971.885-010)
DOT-VEO	21.	Etcher Helper, Hand (971.887-010)

Lithography-Photography-Platemaking

DOT-VEO	1.	Plate Finisher (659.380-010)
DOT-VEO	2.	Printed Circuit Technician (electronics) (729.381.018)
DOT-OOH-VEO	3.	Process Artist (972.281-010)
DOT-OOH-VEO	4.	Process Artist Apprentice (972.281-014)
OOH-VEO	5.	Sketch Maker (972.281-010)
DOT-VEO	6.	Transferrer I (972.381-014)
DOT-VEO	7.	Transferrer I Apprentice (972.381-016)

DOT-VEO	8.	Transferrer Apprentice Hand (972.381-018)
DOT-VEO	9.	Transferrer Hand (972.381-022)
DOT-OOH-VEO	10.	Photographer, Lighographic (972.382-010)
DOT-OOH-VEO	11.	Photolithographer Apprentice (972.382-014)
OOH-VEO	12.	Xerography-Machine Operator (972.382-018)
OOH-VEO	13.	Transferrer II (972.781-010)
DOT-VEO	14.	Plate Grainer (972.782-010)
DOT-VEO	15.	Plate Grainer Apprentice (972.782-014)
DOT-VEO	16.	Plate Setter (972.887-010)
OOH-VEO	17.	Electrotyper (974.381-010)
OOH-VEO	18.	Electrotyper Apprentice (974.381-014)
DOT-VEO	19.	Printmaker (979.081-010)
VEO	20.	Sidergrapher (979.381-038)
VEO	21.	Blocker (979.782-010)
VEO	22.	Clamper (979.782-018)
DOT-VEO	23.	Engraver, Machine (979.782-022)
DOT-VEO	24.	Pantographer (979.782-026)
DOT-VEO	25.	Impression Man (Pantograph Operation II) (979.884-022)
DOT	26.	Pantograph Operator I (979.781)
DOT	27.	Engraver, Block (979.281)
DOT	28.	Roller Engraver (704.281)

Step Two: Decide Which Occupations to Teach

The second step toward articulation of secondary and post-secondary programs is for instructors from the AVTI and "feeder" secondary schools and/or Centers to look at the list made in Step One and reduce it down to those occupations which (a) Can be taught
(b) Will be taught
in their local program.

You can decide which occupations (a) Can be taught, by referring to the task inventory for each occupation.[1] Look over the task inventory for each occupation paying particular attention to the number of tasks which you think can be taught (that is, it is economically possible and have you the equipment, the time, and the instructors to teach most of the tasks for the occupation?). Save those task inventories which are for the occupations that can be taught; you will be using them again.

Now, go through the occupational task inventories which you have saved and decided whether or not each occupation (b) Will be taught (that is, will students enroll in the occupational program for this occupational program and can they obtain jobs in this occupation when they have graduated?).

Complete Step Two by making a listing of only those occupations which <u>can be</u> taught and <u>will be</u> taught in your local program. Think about what is offered in your secondary and post-secondary institutions now. It may be that in your program area a general offereing is listed (such as electronics, auto mechanics, etc.). If only the title of the general offering appears, then identify some specific occupations (refer to the list you made in Step One) which are appropriate for students who have completed the general offering. If the occupations that are offered in your local program have specific titles, then check the task inventories to make sure that you are using the title that describes those tasks which are to be preformed.

[1]The definition of a task inventory is given on page 20 of this <u>Handbook</u>. Examples of task inventories for two different occupations are included in Appendix B, page 87.

Step #2: Occupations Which (a) Can Be Taught and (b) Will Be Taught In The Local Hospitality Program (example)

1. Front Office Occupations
   1. Assistant Front Office Manager
   2. Senior Desk Clerk
   3. Desk Clerk
   4. Front Office Cashier
   5. Reservations Clerk
   6. Switchboard Operator

2. Back Office Occupations
   1. Purchasing Agent
   2. Night Auditor
   3. Bookkeeper
   4. Credit Manager
   5. Accounts Payable Clerk
   6. Accounts Receivable Clerk
   7. Payroll Clerk

3. Housekeeping Occupations
   1. Executive Housekeeper
   2. Inspectress

4. Sales Occupations
   1. Convention Coordinators
   2. Sales Representative

Step #2: Occupations Which (a) Can Be Taught and (b) Will Be Taught in the Local Graphic Arts Program (example)

1. Layout and Design Occupations
   a. Layout Person
   b. Estimator
   c. Artist (Graphic)

2. Composition Occupations
   a. Compositor
   b. Linotype Operator
   c. Phototypesetter
   d. Photo Composer
   e. Paste Up Man/Woman

3. Copy Preparation Occupations
   a. Process Artist
   b. Stripper
   c. Developer, Machine
   d. Camerman/woman
   e. Projection Printer

4. Platemaking Occupations
   a. Lithographer
   b. Transferer
   c. Pantographer
   d. Plate Grainer

5. Press Occupations
   a. Letter Pressman/woman
   b. Offset Pressman/woman
   c. Web Pressman/woman
   d. Duplicating Machine Operator

6. Bindery Occupations
   a. Bindery Worker
   b. Collating Machine Operator
   c. Saddle Stitching Machine Operator
   d. Book Binder

At this point, an answer is needed for the question of what occupations are to be taught at only the AVTI or only the secondary institutions and what occupations are to be offered at both the AVTI and the secondary school and/or centers. The actions suggested below will help you answer that question:

1. Select all the occupations within each program area that will be collectively offered in the local AVTI and at the secondary schools and centers that contribute students to the AVTI. Establish the list as though all occupations would be available at each institution.

2. Rely upon the task inventory to establish the content to be taught in each occupation. The instructors at both secondary and post-secondary levels will be able to communicate about the competencies needed by any person aspiring to a given occupational title.

3. Make as many copies as needed of the list made in Step #1. (You will need as many copies as institutions.) Use one copy of the list to show which occupations within the given program area will be offered at each institution. Eliminate from the list those occupations which will not be offered at that institution because of 1 or more of the reasons below:

   A. Students will never have time to acquire the lengthy list of competencies needed for that occupation in the amount of time they can attend.

   B. Students at that level do not aspire to the occupation.

   C. Equipment, materials, and instructor time needed to teach the occupation is to expensive to warrant duplication of program offerings.

Fourth: Make known to students the total list of occupations offered at these various institutions and the ways in which tasks learned for one occupation prepare the learner for other occupations within the same program area. (Occupational Mobility, see Step #3 which follows.)

Step Three: Draw the Worker Mobility Chart

Using the list of occupations that will be offered in your program area (from Step Two), make a Worker Mobility Chart that shows which of the occupations are pre-requisite to other occupations. During the workshop, you will probably want to break up into small groups at this point, making each group responsible for drawing a Worker Mobility Chart for the occupations in one occupational area within the broader program area. If there is worker mobility between occupational areas, then the charts made by those groups will need to be merged.

Beginning level occupations should be placed near the bottom of the chart, and advanced occupations should be placed closer to the top of the chart. Connect those occupations which are pre-requisite to other occupations with lines (examples are given on the following pages). To be a pre-requisite occupation, students do not necessarily have to be employed in the occupation; it is only necessary that the tasks learned in the lower level (pre-requisite) occupation be needed also for competence in the higher level occupation.

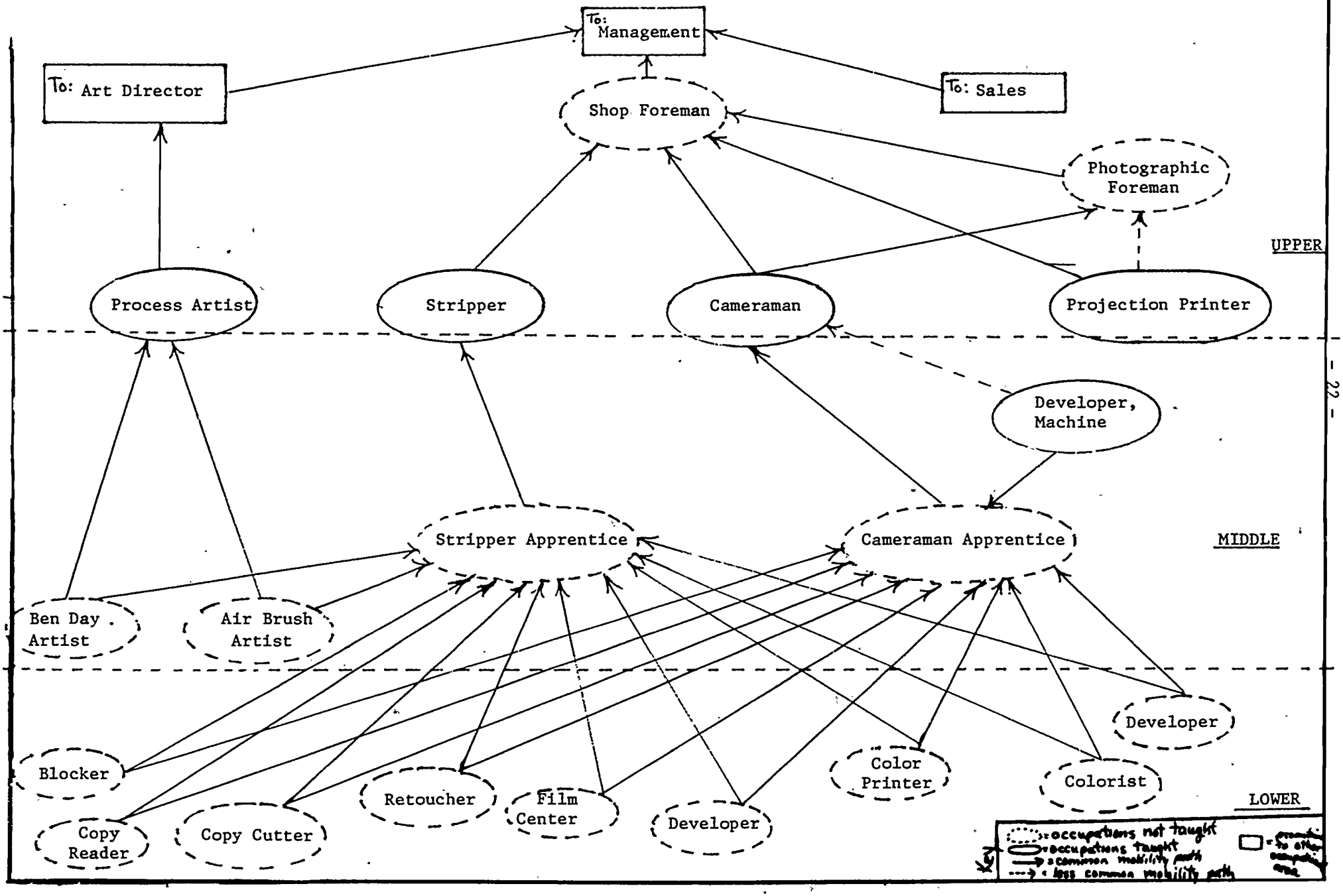
After you have placed all the occupations which will be offered in your program area on the chart, illustrate (with broken lines) those occupations which are not offered at the present time in your vocational program, but students may wish to consider them beacuse

(a) They only require him/her to learn a few more tasks; or

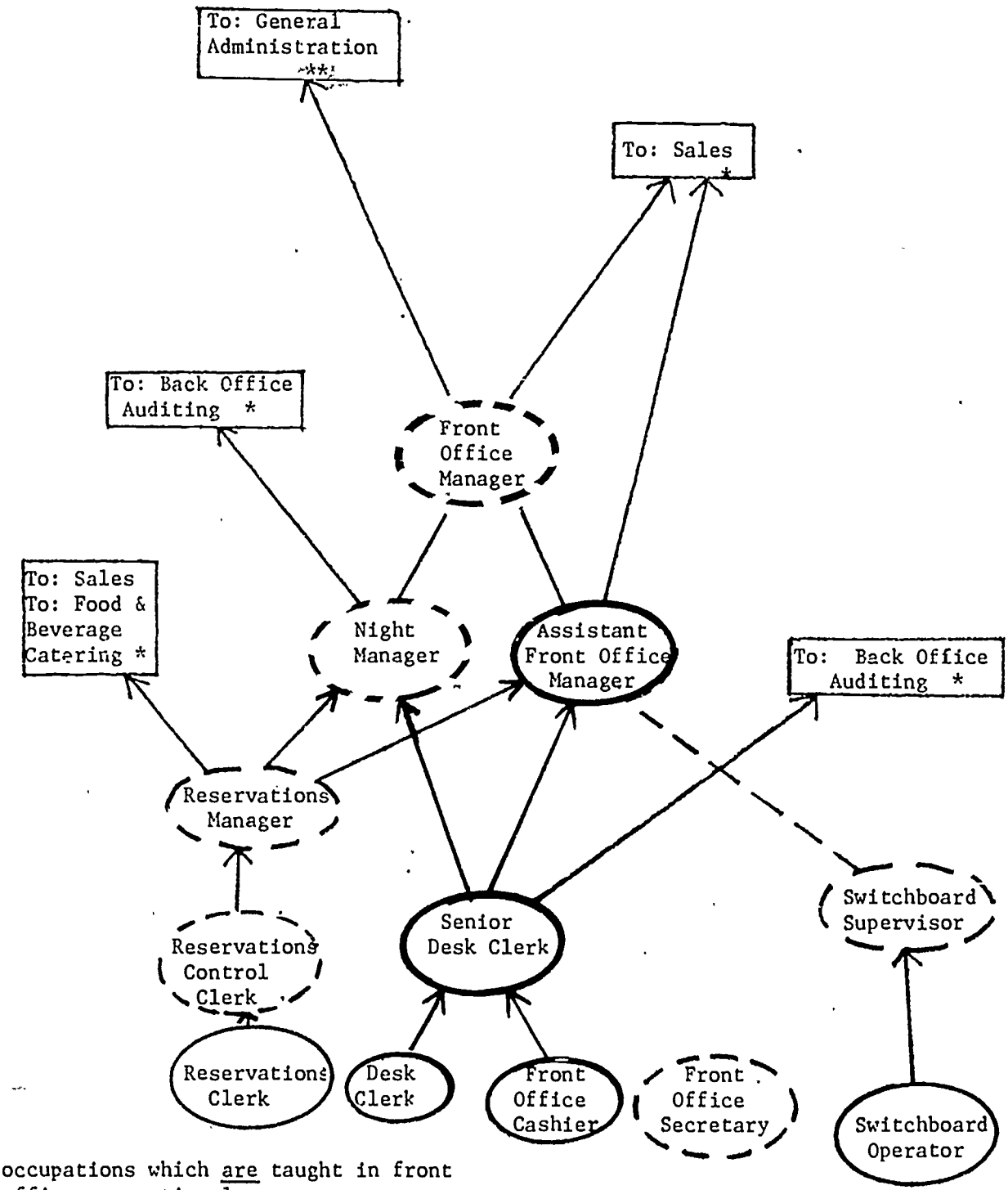
(b) They are the missing links which could allow workers mobility to advanced level occupations.

Those occupations which appear on the chart, but which are not offered at the present time, represent one important piece of information which administrators in your local area may wish to consider as they make program planning decisions.

Step #3: The Worker Mobility Chart for the Occupational area: Copy Preparation
(Example) within the Program Area: Graphic Arts



Step #3: The Worker Mobility Chart For the Occupational area:
(Example) Front Office Occupations within the Program Area:
Hospitality



occupations which are taught in front office occupational areas

occupations which are not taught in front office occupational areas

* indicates that some occupations in this occupational area are taught

** indicates that occupations in this occupational area are not taught

Common Mobility Patterns

Less common Mobility Patterns

TO: Promotion or transfer to another occupational area

Once the Worker Mobility Chart is made, show it to your advisory council and make the necessary modifications. The advisory council members may need to review the task inventories for the occupations that appear on the chart so that everyone will have a common understanding of what tasks are performed by workers having various occupational titles.

The Worker Mobility Chart helps instructors define various occupations in terms of beginning versus more advanced levels, which in turn has implications for which occupations may need to be offered at both secondary and post-secondary institutions. Also, the Worker Mobility Chart, when shared with students, helps them understand the range of occupations within a program area. With this kind of information, a student is able to aspire to a more advanced-level occupation at the same time that he/she makes progress toward learning a beginning-level occupation.

Basic Definitions

The next few pages of this Handbook contain some definitions. These are important because they tell you what kind of information is necessary and what information you will be using as you develop curriculum for each of the occupations which you have just placed on the listing of occupations to be taught in your local program.

A. The Task Inventory

The Task Inventory is a listing of those tasks performed in a specific occupational role. During the past two or three years, task inventories have been compiled by many agencies. Therefore, the text of this Handbook does NOT suggest procedures for compiling your own task inventory. Rather, it suggests how you might USE an existing task inventory to outline the content which you need to teach in your vocational program. (Refer to Appendix C, page 91 if you have no task inventory and need to make one of your own for a given occupation.)

What is a Task? The verbal expression of a task typically includes a specific action verb and the brief identification of what is acted upon. A task is a group of work activities which are associated for a common purpose or end, and those work activities taken together have meaning or use to the job.

(Example)

Task: Determine the emulsion side of the negative

Work activities: Hold negative toward light; the emulsion side is the duller of the two sides.
Scratch a small area of negative, the emulsion on the emulsion side will be scratched away, leaving clear acetate.

Work activities which make up a task usually occur at the same time or in close sequence to one another, and they are usually performed by the same person. The task statement qualifies a definite beginning and end of the task.

A task is the basic element for curriculum development because it constitutes a sufficiently large act to be meaningful in itself. Sometimes tasks are combined to form a larger whole, or Duty. You will probably find both tasks and duties listed on the task inventories for various occupations you teach.

What is a Duty? A Duty is comprised of one or more tasks and is a large segment of work performed by an individual. Tasks may be grouped together to form a duty because they all have a common purpose. An example follows.

Tasks, Duties, and Work Activities

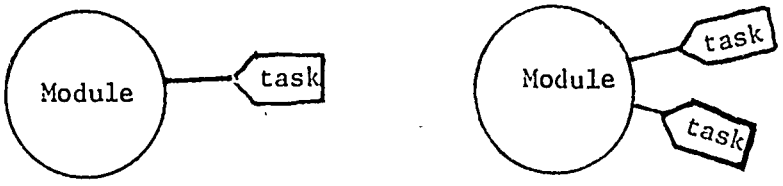
Occupation: Lithographic Stripper

Duties:	D_1 Preparing to strip the flat		D_2 Stripping the flat
Tasks:	T_{01} Prepare stripping table for Black & white work	T_{02} Select stock for black & white work	T_{03} Arrange black and white negatives in order
Work Activities	1. Remove all traces of tape from the glass to table 2. Wash glass top with glass cleaner 3. Dry glass top thoroughly 4. Place all required tools and supplies on the table	1. determine the type of stock to be used 2. cut stock to proper size	1. examine negatives for proper size 2. examine negatives for quality 3. trim negatives to proper size

(example)

B. The Instructional Module

Tasks are the most basic part of the occupational instructional program. One or more tasks which are closely associated for instructional purposes may be contained in what is called an Instructional Module.



You, the instructor, make the decision of which tasks should be taught together in the same Module. Chapter III of this Handbook will provide guidelines for making this decision.

The actual writing of instructional modules is discussed in greater detail in Chapter IV of this Handbook. At this point, an Instructional Module can be described as a set of materials which is designed to help students learn to perform occupational task (or tasks) which students need to know to be competent workers on the job.

C. Terminal Performance Objectives

The Instructional Modules which are comprised of one or more Tasks, are also associated with one or more Terminal Performance Objectives. These Terminal Performance Objectives are statements of the specific task, knowledge, skill or ability which a student is to acquire and demonstrate under certain conditions and according to predetermined minimum standards. Performance Objectives are discussed more thoroughly in the section of Chapter IV entitled, "How to Write Module Objectives", page 53 . Each performance objective should receive its justification for inclusion in the Module on the basis of an identified occupational task. One or more tasks form an instructional module.

III. DECISIONS ABOUT CONTENT ORGANIZATION AND SEQUENCE FOR A GIVEN OCCUPATION

Step Four: Outline the Occupational Curriculum Organization of the Complete Occupational Program

CHAPTER III

DECISIONS ABOUT CONTENT, ORGANIZATION AND SEQUENCE FOR A GIVEN OCCUPATION

At the conclusion of Step Three in the procedures for developing an occupational instructional program, it is assumed that the local instructors have this information available to them:

(1) the list of occupations they can and will teach to students in their local schools (from Step Two);

(2) a Worker Mobility Chart which shows lower-level occupations which may be pre-requisites to higher-level occupations (from Step Three); and

(3) task inventories which will help them outline the content to be taught for each of the occupations included in their program.

The next step, Step Four, is to actually outline the curriculum for each occupation that appears on the list. The sections which follow suggest that you as a group utilize the task inventories to decide: (a) which tasks for each occupation can be taught and will be taught in your program, (b) how to group those tasks into instructional modules for each occupation, and (c) how to sequence the instructional modules for each occupation within the entire program. All instructors will need to work together to make this outline so that articulation of occupations offered at the secondary and post-secondary institutions is realized.

Step Four: Outline the Occupational Curriculum

There are four basic decisions which must be made as you outline the curriculum to be offered to students. These four decisions are necessary before you can begin Step Five, actually writing the instructional modules for your program.

Decision #1: Which occupational tasks are you going to teach for each occupation in your program? (These become the terminal performance objectives.)

Decision #2: What enabling objectives need to be included in the modules so that occupational tasks can be performed by students.

Decision #3: How should tasks be grouped into instructional modules?

Decision #4: What sequence of modules should you suggest to students? (Which module should be done first, second, third, etc.?)

Each of these decisions is discussed as a separate section of this Chapter of the Handbook.

A. Decision #1: Which occupational tasks are you going to teach?

The first source of information to use in deciding what the content of the instructional modules will be is the task inventory. While it is not expected that teachers themselves will collect the task data, you should look on the task inventories for answers to basic questions. If the answers to these questions are not available, then you will have to use your best judgment in deciding whether or not to teach a certain task in your program.

For each task that appears on the task inventory for the occupation you teach, ask yourself these three questions:

(1) SHOULD I teach this task?

(2) CAN I teach this task?

(3) WILL I teach this task?

If the answer is "Yes" to the first two questions, then you should have a very good reason for any answer other than "Yes" to the third question.

Several considerations go into the answer to this first question (Should I teach this task?) "Yes" answers to the following questions will indicate whether you Should teach a task:

Should I teach the task?

(1) Do the majority of the workers in the occupation perform the task?

(2) Is the task performed fairly frequently, say once a day or once a week?

(3) Is a fairly large amount of time devoted to the task?

Should I teach the task?

(4) Is the task generally considered of moderate or more importance in the occupation?

(5) Is it necessary for workers to be competent in this task when they are first hired?

The second question (Can I teach this task?) can be answered by thinking about your own local program and the resources that you have available. Consider these questions as clues:

Can I teach the task?

(1) Is the cost of in-school instruction justifiable when compared to the importance of the task for entry-level workers and the cost of providing this instruction on the job?

(2) Can the school duplicate through simulated work conditions on-the-job training the actual working conditions of the task?

(3) Are instructors available to teach this task?

The third question (Will I teach this task?) requires that you make a value judgment. Think of these questions below as clues to what is the right answer for you as the teacher of a given occupation.

Will I teach the task?

(1) Is the task of at least moderate difficulty for most students or is it so simple it does not need to be taught?

(2) Is there time for me to teach this task?

(3) Do I need to teach this task because it is required to learn other tasks already in the curriculum?

Construct a checklist like the examples shown on the next page so that you can answer the three questions suggested. (You may wish to merely draw in the appropriate columns on the task inventories which you have, and respond right on the same copy.)

Decision #1: A Checklist To Show Which Occupational Tasks
(example) You Are Going To Teach

Occupation - Lithographic Stripper

TASK	Should I? Yes	Should I? No	Can I? Yes	Can I? No	Will I? Yes	Will I? No	If no, give reason
1. Interpret instructions for stripping	X		X		X		
2. Select stock for flat	X		X		X		
3. Prepare Stripping table	X		X		X		
4. Arrange negatives in proper numerical order	X		X		X		
5. Interpret imposition layout	X		X		X		
6. Layout the flat	X		X		X		
7. Layout the flats for Color work	X			X		X	no time & too expensive

Occupation - Desk Clerk

TASK	Should I? Yes	Should I? No	Can I? Yes	Can I? No	Will I? Yes	Will I? No	If No,give Reason
1. Takes reservation request	X		X		X		
2. Confirms reservation	X		X		X		
3. Types reservation confirmation	X			X		X	Do not have necessary skills.
4. Welcomes guests	X		X		X		
5. Sells rooms to guests in person	X		X		X		
6. Obtains information for registration card	X		X		X		
7. Fills out room slip	X		X		X		

If you answer "No" to the first question, cross the task off your list. If you answer "Yes" to the first question and "No" to the "Can I?" question, then try to think of what you could do so that you would be able to teach the task. If there is no way to teach it and the answer under the column "Can I?" is still "No", then cross that task off your list. For those tasks that received "Yes" checks in the first two columns, decide whether or not you will teach that task. If the answer in the "Will I?" column is "No", then specify the reason why. If the reason is justifiable, then cross the task off the list.

You have now finished making Decision #1: Which Occupational tasks are you going to teach in your occupation program? Those tasks which received "Yes" answers across the three columns of the checklist are the tasks that are to be taught. You have just decided upon the content which you are going to teach. These are the tasks which you have decided that your students should be able to perform if they are to be competent workers-on-the-job. Number the tasks in sequence. Precise directions for numbering tasks appear on page 76 of this Handbook. Number the tasks which you are going to teach.

B. Decision #2. What enabling objectives need to be included in the modules?

When you have decided which tasks should be included in your program, one more area of thinking is necessary before you can identify the modules which you will want to develop. Some tasks may require that students first acquired other knowledges, skills, or attitudes. These are the enabling objectives which preceed the learning of a given task. You can identify important enabling objectives for a task by asking these two questions: (1) What must a student already know how to do in order to learn this task? and (2) What must a student know about in order to learn this task? These are the kinds of competencies you might think of as becoming enabling objectives:

(a) Work steps involved in doing the task

(b) Terminology

(c) Concepts important in understanding the task

(d) Rules or conventional ways of doing things

(e) Precautions necessary in doing the task

(f) Other basic skills that will be part of doing the complete task

Reasons for including enabling objectives within task modules. There are several reasons for identifying enabling objectives for individual occupational tasks and including these enabling competencies right within the same module as the occupational task.

First, a meaningful and work-related context will be provided when a student needs to learn new (and maybe abstract) material. When a student can see the relationship between new concepts and terminology and actual job tasks, you will have a sequence of instruction that permits students to learn new ideas when they can use them.

Second, by including those basic skills or knowledges with the tasks for which they are required, you will have more flexibility in the ordering of the modules themselves. (More about sequencing of the modules in the last section of this chapter.)

Third, more theoretical and perhaps difficult enabling objectives can be postponed until they are needed for more complex tasks.

Fourth, the use of job-related tasks as the basis for teaching will permit students the chance to apply their newly acquired knowledges and skills soon after each is learned.

Other factors affecting the identification of enabling objectives.

Two basic considerations will affect your placement of the enabling objectives into the related instructional modules. One consideration

is the characteristics of the students for whom you are preparing the instructional modules. The other consideration is the possible desirability of designating pre-requisite competencies for modules rather than repeatedly incorporating enabling objectives within the modules themselves.

(1) Students Characteristics. The following are some of the general student characteristics you will want to consider when deciding what background competencies you need to teach before students can learn occupational tasks:

(a) Physical characteristics. The physical nature of your students may influence the equipment and procedures that can be included in the instruction. Any handicaps as well as assets should be considered.

(b) Education. The kind of education your incoming students have had in the past will have a good deal of influence on the length of the program, examples you can use, vocabulary that will be understood, previous experiences that can be taken advantage of, and previous information or abilities related to the instruction you want to give.

(c) Motivation. Are the students generally eager to learn the occupation you are teaching, or is motivation something of a problem? The less motivated you feel they are, the more you will have to concern yourself with keeping students interested at every step of the program.

(d) Interests. What kinds of things are the students interested in, knowing their interests will help keep them motivated. What are their special skills or aptitudes? What causes students to enter your program?

(e) Attitudes, biases, and prejudices. Does your group of students consist primarily of one ethnic group? What are their strong convictions and biases? Like yours or different? This information may also influence the kind of examples you can effectively use and may provide other clues to student motivation.

(2) Module Pre-requisites. There may be justification for separating certain kinds of instruction from the module directed specifically toward teaching students to perform a task. Before looking at these possible circumstances, though, it is strongly recommended that those enabling objectives which you identify as being necessary to perform a task be included as part of the module designed to teach the task itself. This linking of

the basic knowledges and skills required for a task with the task itself will help motivate students. It also helps them associate the knowledge needed to perform task with the task itself so it will be easier for students to remember what they learn. Those occasions when module pre-requisites should possibly be separated from the related tasks are the following:

(a) Breadth of Preparation Needed. The prerequisite competencies thought desirable to perform one or several tasks may be broader than you wish to teach in a single module. By "breadth of preparation" is meant either the amount of materials which must be learned or the amount of time necessary for the instruction. Basic arithmetic skills, reading skills, typewriting skills, or writing skills could be such broad enabling competencies.

(b) Enabling Competency Required for Several Different Tasks. Further, if the knowledges or skills are first requirements for several tasks, such as typewriting keyboard skills, or using basic equipment, it may be practical to make a separate "module segment" for teaching these skills as part of several modules. The same "module segment" should then be labeled or linked to the modules for many different tasks.

(c) Special Expertise Needed. As an instructor in a particular occupational area, you may not wish to consider yourself qualified to prepare instructional activities in content areas outside of your field, even though you have identified enabling objectives in these areas for the tasks in your occupation. Certain health occupations, for example, may require instruction in chemistry. Business report writing may be necessary in several technical fields, and like chemistry, might be better taught be persons possessing the appropriate teaching skills.

In all three of the circumstances above, the number of objectives in the pre-requisite areas may make it reasonable to label the group of competencies as "Units" or "Components" in their own right.

C. Decision #3. How should tasks be grouped into modules?

An instructional module is a package of materials for the student which is designed to help the student learn to perform the tasks which workers do on the job. As a general rule, each module is built to teach students to perform one or more tasks. A module has at least one performance objective associated with each occupational task. The module may also contain several

subordinate enabling objectives for that task, which are necessary for the student to learn, before he/she learns to do the task itself.

Two basic guidelines are suggested for deciding how many tasks to include in a single module: (1) the relationship between tasks in an occupational area, and (2) the length of the module.

Relationships of Tasks. Several factors could cause tasks to be related to each other and, therefore, encourage teachers to place the tasks together in one module. This decision is largely a matter of judgement; the same tasks could be grouped differently by different teachers in different schools with different students. Any one of the following characteristics could cause you to think that two or more tasks are related and to place them in one module:

(1) The tasks are usually performed sequentially by a worker, such as preparing a stencil master and then running it off on a mimeograph machine.

(2) The tasks use the same equipment, such as using the sorter on data processing for block sorting, numeric sorting, and alphabetic sorting.

(3) The task is a more complex application of the skills used in another task, such as centering typewritten copy on standard sized paper and on odd sized paper.

(4) One task includes pre-requisite skills or knowledges also used in another task, such as answering telephone calls and transfering calls to other telephone extensions.

(5) Two tasks require the same enabling objectives, such a discounting bonds and discounting loans in an accounting application.

(6) Two or more tasks have a common purpose, such as collecting overdue accounts through the use of telephone calls, written communications, and credit agencies.

(7) Several tasks may require the use of the same skills, such as using shorthand for recording conference notes and using shorthand for recording verbal directions.

Length of the Module. A second consideration which will determine the number of tasks that should be taught within a single module is the length of module. "Length" may refer either to the amount of time required to

complete the module, or to the physical size of the module.

For younger students or for those who have not used modules before, shorter modules are likely to be more motivating. A 40-page manuscript could be very discouraging to someone seeking some sign of progress. Likewise, spending three or four weeks on the same module could look like very little progress.

On the other hand, more mature students, or those having previous experience with modules often prefer longer sets of instructional materials because they can see more of their program at one time and do not need the more frequent reinforcement of finishing a smaller segment at a time.

If small sets of materials are desired, a module may contain instructional activities for a single task. If that is still too large in those situations where a task has several enabling objectives, the module can be broken into segments or module parts, each having a single enabling objective.

Likewise, if larger modules are appropriate because the learning activities take very little time to complete, several tasks can be combined. Older students may also prefer to learn several related tasks as one larger package.

D. Decision #4. What sequence of modules should you suggest to students?

Before talking about the actual writing of a module, one more "organizing" kind of decision needs to be made--that is the sequencing of the modules, or deciding the order in which you want students to complete the instructional modules. You need to decide this before writing the modules because the order will affect what you can assume students will know when they use a certain module.

You would like to make it possible for students to proceed as quickly

as possible through the modules so that they can learn what they need to know to be workers on the job. In some instances a student may need to go through one module before working on the next. In other cases, it may not matter which module the student does first. Whatever the case, the student must be told which modules should be done in what order. This can best be done by giving him/her a "road map" to follow. The illustration below shows a student's "road map" through various modules within a given Unit. Such a "road map" appears on the cover of each module.

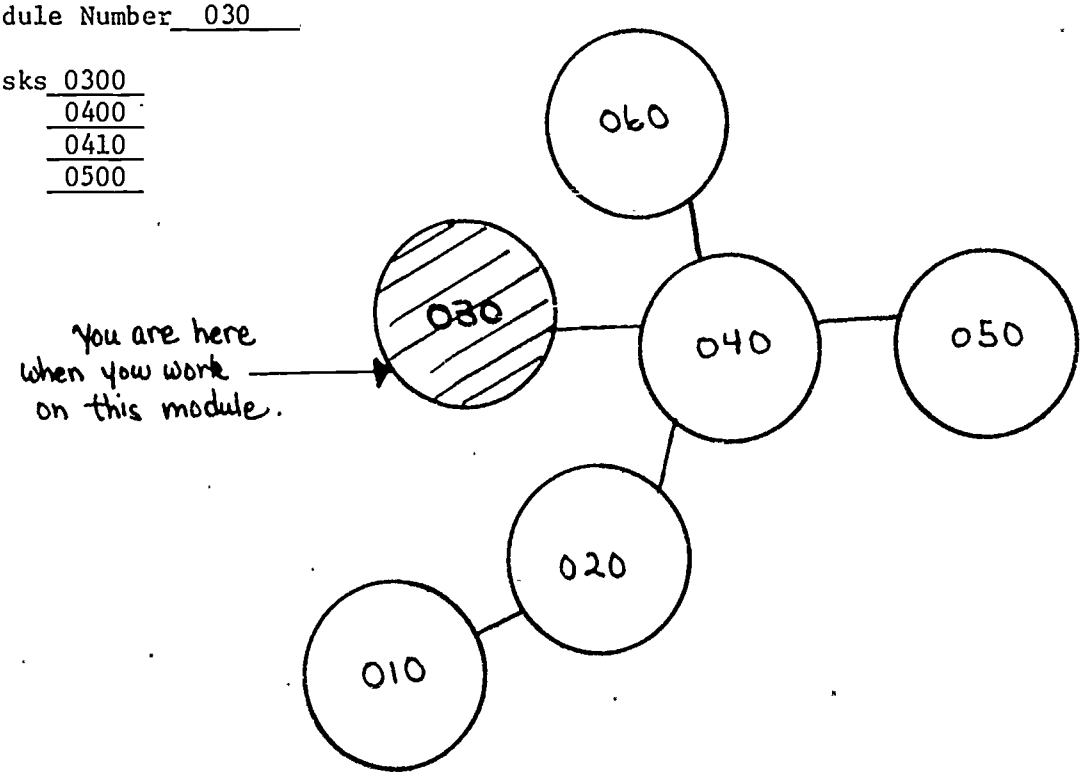
TITLE OF MODULE

Occupation
Lithographic Stripper

Unit Number 01

Module Number 030

Tasks 0300
0400
0410
0500



To the student: Remember, work from the bottom of the map up. All objectives (modules) on a lower level must be met before you move to the objectives (modules) on the next higher level. If two or more modules are on the same level, you may do them in any order, but complete all the modules that are on the same level before moving to the next higher level.

Considerations Affecting Sequence. The decision you will have to make as a teacher is whether or not you want to tell students that certain modules must be done before others or whether they can pick the modules in any order. The following considerations will indicate to you when you may want to specify a certain order for students:

(a) When ability to perform a simple task is necessary before learning a more complex task.

(b) When learning to perform a more general task, such as operating a machine, before learning a more specific task, such as making adjustments or repairs on the machine.

(c) When certain tasks are performed so frequently or are so important that a student should learn to do these first; in case he does not complete the entire program, he/she can still use the preparation.

(d) When certain tasks can be easily forgotten if they are not used and should, therefore, be taught just before a student is ready to use them on the job.

(e) When certain tasks should be organized according to the order in which they are encountered on the job in order to create a more meaningful context for learning for the beginning student.

(f) When tasks included at the end of a sequence offer students the opportunity to practice an entire job rather than isolated parts. Simulated job experiences or actual on-the-job work can allow for this.

When the above considerations do not cause you to decide to state a certain sequence of modules for a student to complete, a good plan would be to permit him/her to decide independently which modules to do first, second, etc. This will permit student interest to dictate what to learn. It may even be that several modules within the same unit can be worked on by a student at the same time. Even more flexibility is offered to the student when he/she can work within several units simultaneously.

If some modules require group activities for which many students must be available at one time, then again it is a good idea to have other modules

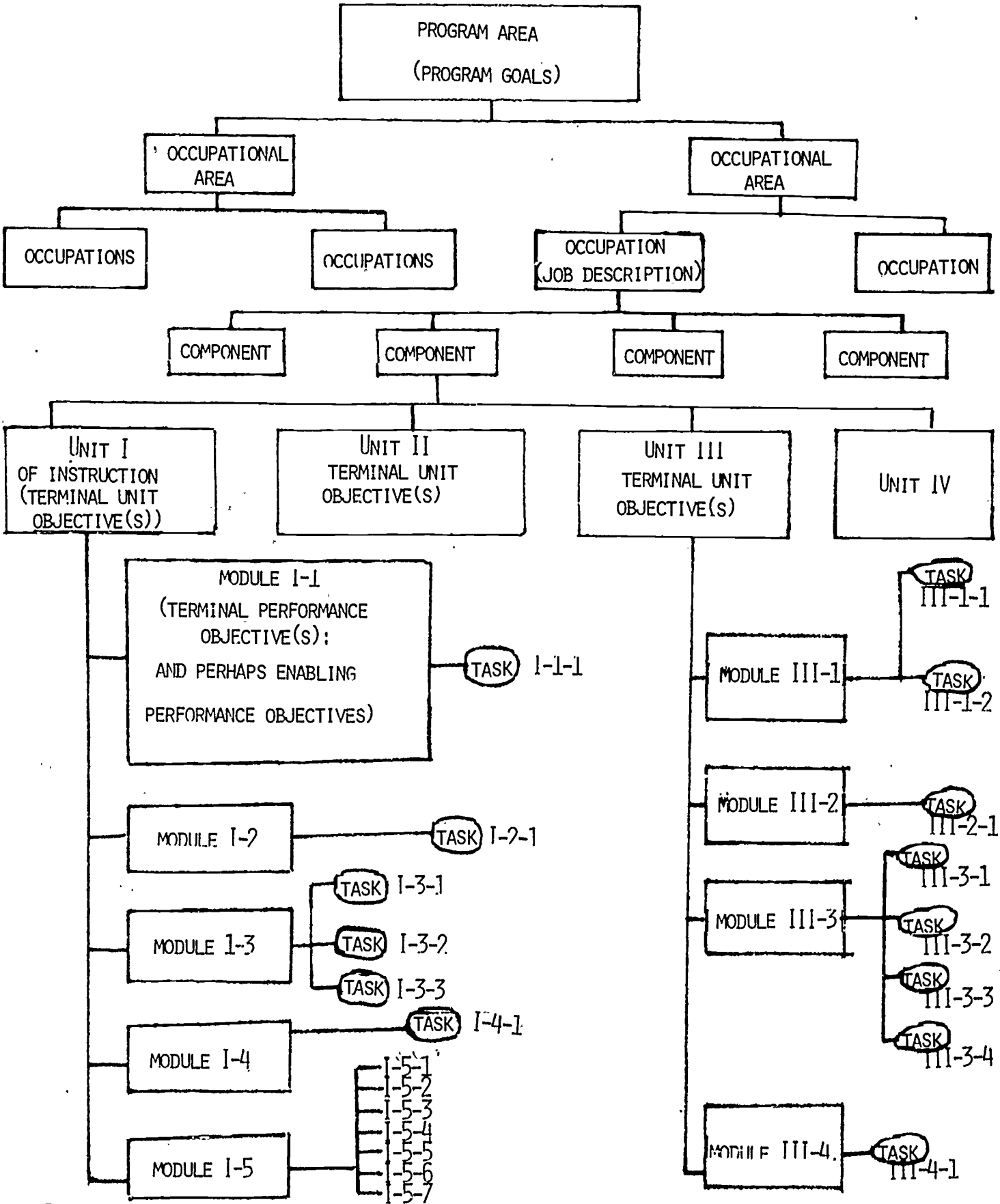
available for students to pick from in any sequence if they must wait for these group modules. This instructional methods you wish to use in the modules may place restrictions on the options which you can make available to students. The important thing, though, is to let students know what decisions they must make for themselves and what sequencing decisions have already been made for them.

Each student should have an outline of modules which gives him/her an explanation of how the modules fit together to teach him/her the tasks required in an occupation. The general outline may be supplemented with the "roadmap" which appears on the cover of each module. This "roadmap" shows the student how to progress through several modules. It will be necessary for each teacher to explain to the student--when he/she enters the program--how to use this "roadmap" and how to read the general outline so he/she will know what progress has been made and what to do next.

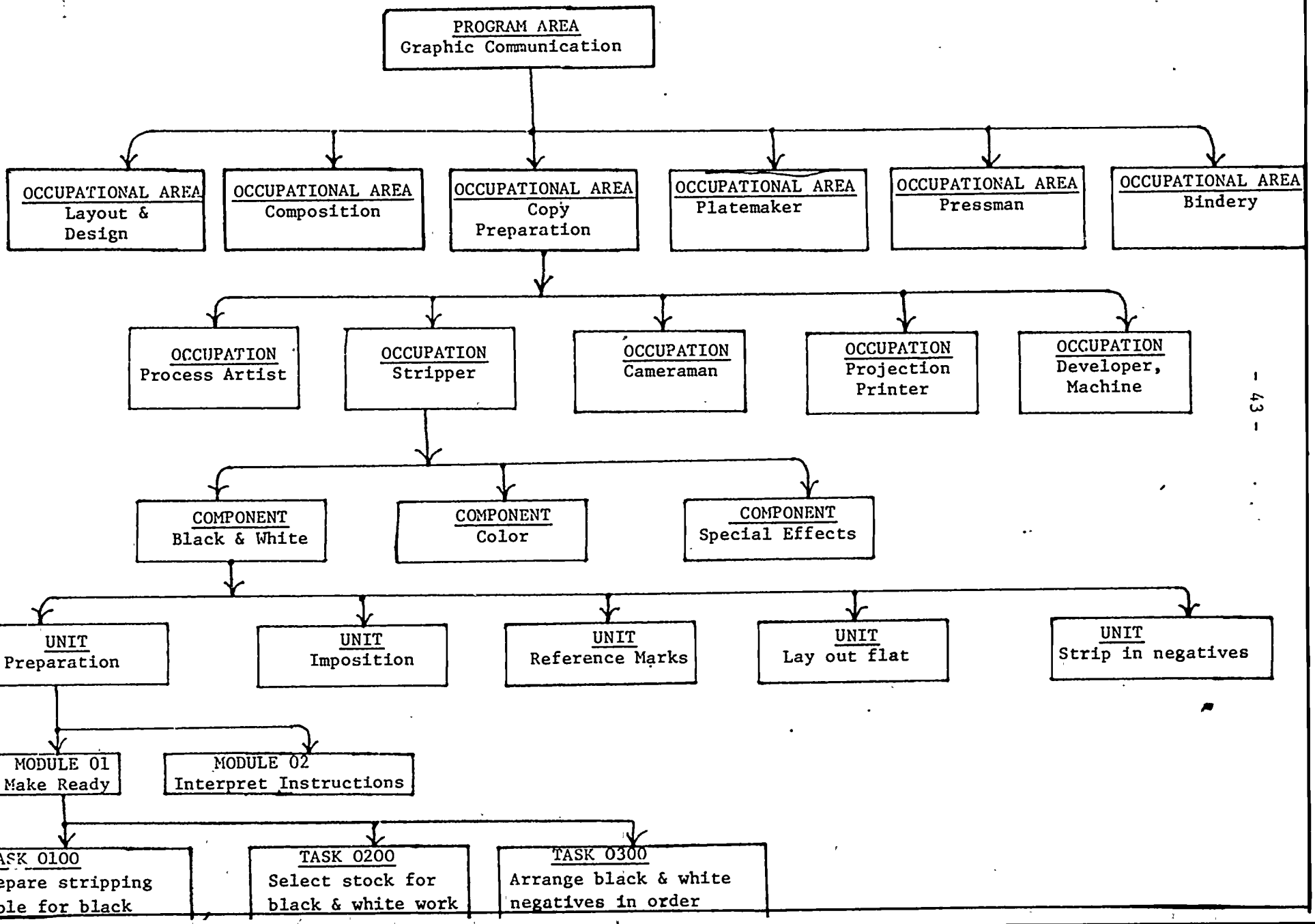
Organization of the Complete Occupational Program

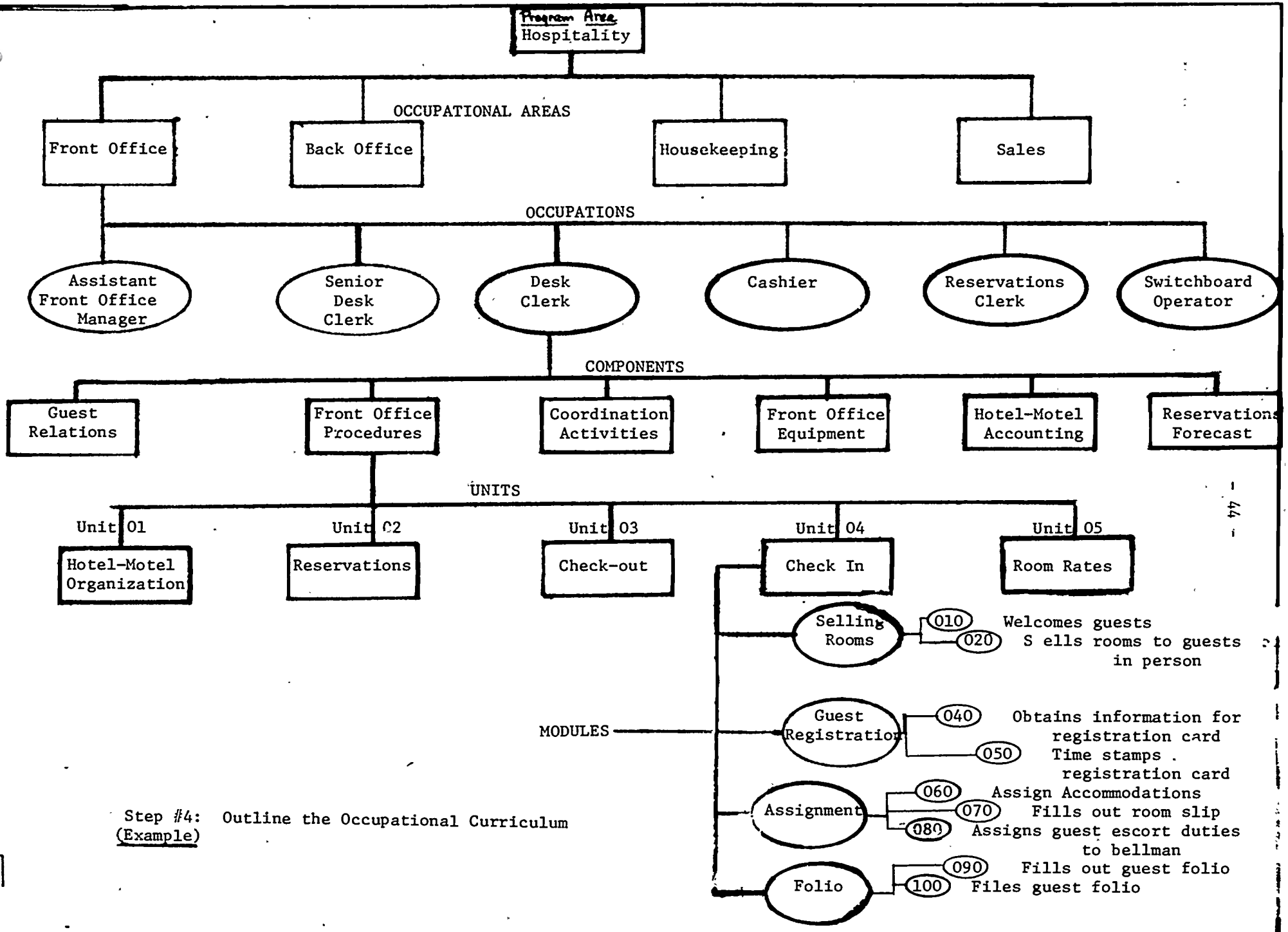
When you have decided upon the modules which you wish to include in the occupational instructional program and have determined the appropriate sequencing for each module, it may be that the large number of modules will make further grouping necessary. You are now at the point where you will see the need for an organization of the complete occupational program such as is shown in the following outline:

Outline: a classification of tasks, modules, units, components, occupations, and program areas for the purpose of articulating vocational programs



Step #4: Outline the Occupational Curriculum
(Example)





Step #4: Outline the Occupational Curriculum
(Example)

A. Building the Outline

Look first at the bottom of the outline. Notice that tasks are the most basic parts of the curriculum. One or more tasks which are closely associated for instructional purposes may be contained in a single module. Proceeding to the next higher level of the outline, several modules which can be identified as being directed toward a common occupational purpose (perhaps a duty) are collectively termed a unit for instructional purposes. A combination of units has been designated a component of a vocational education program which prepares students for a particular occupation. Another way of describing a component might be to say that it could be what has traditionally been called a "course" or "block" or instruction. One or more components, in turn, comprise the occupation.

At the top of the outline, just described, is the program area. Organization of occupations into 15 clusters[2] has been suggested by the U.S. Office of Education. Within clusters, there may still be considerable diversity of occupations; and therefore, it is suggested that instructors group related occupations into program areas such as office occupations, graphic arts, marketing occupations, food service occupations, etc.

You will find it necessary to fill-in the outline with more accurate descriptions than just one word listings of units, modules, etc. That is, you may need to write an objective or several objectives to describe more completely either the broader goals of the instructional program or more specific information about what you intend students to accomplish at the end of instruction. These description are known as the terminal objectives.

[2]Agribusiness and natural resources, business and office communication and media, construction, consumer-homemaking, environment, fine arts and humanities, health, hospitality and recreation, manufacturing, marketing and distribution, marine science, personal services, public service, transportation.

B. Terminal Objectives for an Occupation in the Program

Within a competency-based curriculum, several levels of instructional objectives are appropriate. Some convey the broader goals of the instructional program, and others provide more specific information about students' intended accomplishments.

Program Goals. The broadest goals within the occupational program structure are those designating the occupational areas of preparation. Within given occupational areas, larger components (courses) should be identified by general descriptions of their content. This content summary may describe the units which comprise the components and the goals of these instructional units. These general statements are not intended to be directly useful for teaching and learning, but rather give direction and emphasis to the instructional planning. Eventually such statements must be translated into detailed behavioral terms for which learning experiences can be planned.

Terminal Unit Objectives. The objectives of the instructional units themselves are more specific than the goals which describe either components of an instructional area or the occupational area itself. The terminal unit objectives of an occupational area describes the behavior known to be in the student's repertoire at the time the student is certified by the institution as having completed the program of preparation for specified occupational duties. The student's performance of all the tasks in a given instructional Unit is the evidence of his/her acquisition of those knowledges, skills and abilities which comprise the carrying out of job duties.

IV. GUIDELINES FOR HOW TO WRITE A MODULE

The Rationale

The Module Objective(s)

The Tests (pre-test and post-test(s))

The Learning Activities

IV. GUIDELINES FOR HOW TO WRITE A MODULE

Every module that you write will have the same basic parts. Those parts are as follows:

The Rationale
The Module Objective(s)
The Pre-Test
The Learning Activities
The Evaluation of the Module Objective

This section of the Handbook is written to give you very specific directions about what to do to write each of the parts of the module. Read all of section IV so that you will understand what to do and how the parts of the module fit together. Then, try writing a module for your occupational program. This may require some practice. The first module you write should be done in a workshop where consultants can be available to help you when you have questions.

Step Five: Write each of the Modules shown on the OUTLINE

Once you have learned how to write a module, the next step is to write each of the modules shown on the outline (page 42 of the Handbook). When you have written all the modules for each occupation that you teach in your local program, you have accomplished five of the six steps needed for curriculum articulation. The sixth step, which is covered in the last section of this Handbook, will discuss how to keep records of student progress through the modules.

How to Write the Rationale for a Module

The rationale is a short explanation which is given to the student at the beginning of the module. The rationale generally serves two purposes: (1) it describes the reasons that the student needs to learn what is contained in that particular module, (2) it explains to the student how this module fits into the set of modules which teaches him the occupation. How to write a rationale which serves both purposes is described in more detail below.

Purpose #1: The Reasons

In writing the rationale for a module you should describe the reasons that the student needs to learn what is contained in that particular module by offering a typical situation which he/she will encounter when he/she becomes a worker on-the-job. Essentially, this description provides the student with an answer to the question "but why do I have to know about_____ when I'm going to be a _____."

The example below illustrates the typical situation approach to writing the rationale for a module.

Occupation: Desk Clerk
Unit: 04 (check-in)
Module: 010 Selling Rooms

The Rationale

The front office area of a hotel/motel is the central point for guest service and contact. All individuals employed in this area must be sales-persons for the hotel/motel; however, the desk clerk is the primary contact between the guest and the hotel/motel. He/she must not only sell directly when providing the guest with a room, but must also sell the benefits that make the room or hotel desirable to the guest. The success of the desk clerk is largely dependent upon the friendliness and hospitality he/she exhibits towards the hotel guests and upon the sales technique employed when dealing with guests in daily situations.

(Example)

Occupation: Lithographic Stripper
Unit: 01
Module: 001

The Rationale

Prior to performing any work activity, or starting a project it is necessary to insure that the work area is properly prepared and the equipment necessary to perform this work is available. The purpose of this module is to provide these guidelines for preparation of stripping black and white negatives.

(Example)

In both of these examples of a Rationale the student is provided with information that tells him/her why the learnings contained in the module are important. There is also a second reason for including a rationale statement at the beginning of each module. It is described below.

Purpose #2: How This Module Fits In

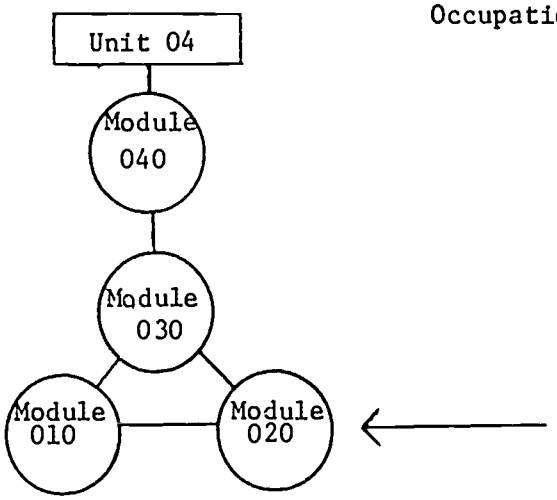
In writing the rationale for the module that you develop use a diagram (or roadmap) to show the student how this module fits into the set of modules which teach him/her to be a competent worker on-the-job. The diagram will probably need to be supplemented with a short written explanation of how the student is to use the "roadmap" to complete modules in the correct order. (Or, it may be an explanation to the student that he/she can complete certain modules in whatever order he wishes.)

The following two examples[4] illustrate the use of such a roadmap, accompanied by an explanation to the student regarding how he/she should proceed in completing modules for that unit. This roadmap can be the cover page of the module, as discussed previously.

Module title: Guest Registration

Unit Number: 04
Module Number: 020
Tasks: 030
040
050

Occupation: Desk Clerk



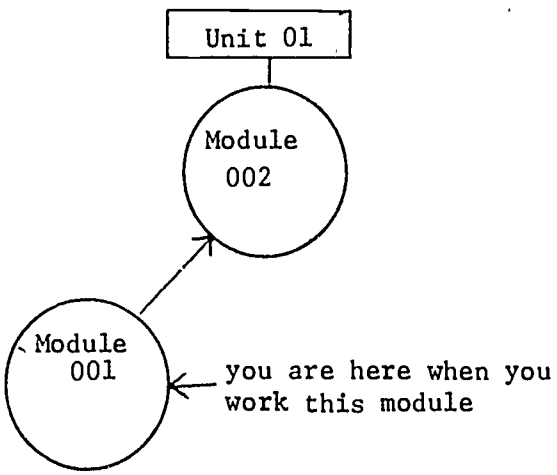
To the Student: Remember, work from the bottom of the map up. All objectives (modules) on a lower level must be met before you move to the objectives (modules) on the next higher level. If two or more modules are on the same level, you may do them in any order, but complete all the modules that are on the same level before moving to the next higher level.

[4]The procedure for numbering modules is discussed in Section VI: The Management of Instruction for an Occupation. Page 76.

Module title: Make Ready For Stripping

Unit number: 01
Module number: 001
Occupation: Lithographic Stripping

Tasks: 0100
0200
0300



To the student: Remember, work from the bottom of the map up. All objectives (modules) on a lower level must be met before you move to the objectives (modules) on the next higher level. If two or more modules are on the same level, you may do them in any order, but complete all the modules that are on the same level before moving to the next higher level.

How to Write the Module Objective(s)

A module always has a minimum of one performance objective.[5] A performance objective is a statement of what the learner is supposed to be able to do. There are two kinds of performance objectives that may be used in a module. They are: (1) terminal performance objective(s) and (2) enabling performance objective(s).

When you write the performance objective(s) for your module (whether it is a terminal performance objective or an enabling performance objective) it should contain the following three elements:

1. A statement of performance which lets the student know how he is to show (demonstrate) what he has learned.
2. A statement of the conditions which will surround the student's performance.
3. A statement of the minimum level of acceptable performance.

Objectives which contain these three elements are helpful to the student because he/she knows what is expected of him/her. An objective which contains these three elements is also helpful to you, as you continue to develop this module, because the objective will help you to (a) decide upon learning experiences which will teach students to perform those tasks that will be required of them on-the-job, and (b) build a test that will determine whether or not students have learned what the objective stated that they need to be able to do.

[5] There may be more than one objective per module if, from an instructional point of view, it makes sense to acquire learnings for both objectives at the same time.

Further guidance for including each of the three elements: 1. The statement of performance, 2. the statement of conditions, 3. the minimum level of acceptable performance (extent) in the performance objective(s) you write is given below.

Element #1

Conditions: Include in the objective a statement of conditions which will surround the student's performance.

Consider the amount of time, the place of performance, the materials or equipment needed and additional specifications such as prompts given to the student, special conditions of the environment, etc. Note: Instructional methods are not to be included as conditions (e.g. "After viewing the filmstrip entitled..." is not an appropriate statement of conditions).

GIVEN THESE CONDITIONS:

1. a hotel/motel guest without a reservation who desires a room
2. a dirty stripping table
3. no stripping equipment at clean position
4. a registration card

(statement of conditions) examples

Element #2

Performance: Include in the objective a statement of performance which will let the student know how he is to show (demonstrate) what he has learned.

Use action verbs and specify the ability, skill, or attitude that is to be achieved. See the list of words on the following page of this Handbook for action verbs that specify measurable performances.

YOU WILL BE ABLE TO:

a. select stock
b. arrange negatives
c. welcome guest(s)
d. fill-in the registration card

(statement of performance) examples

Types of Learning - Reference Sheet[11]

Recall - The ability to know that to do, what to use and the order in which to perform various activities.

remember	recall
know	understand

Discrimination - The ability to distinguish one thing from another; to tell when an operation needs to be done. It is also the ability to see the difference between that which is correct and that which is not. Discrimination may be determined by sight, sound, smell, feel, taste of remembrance of a correct situation.

choose	compare	contrast
couple	decide	detect
differentiate	discern	distinguish
divide	isolate	judge
pick	recognize	select
interpret	associate	recognize
identify		

Communication - The ability to express your knowledge to others. When a student is required to communicate what he knows to others, he must often do this quickly and accurately as possible.

cite	copy	inumerate
letter	list	quote
recite	record	reiterate
repeat	reproduce	re-state
transcribe	type	label
indicate	name	describe
write	pronounce	give a word for
reply	respond	say

Manipulation - The ability to know how to do what needs to be done. The student must know how to perform each manipuative skill required to complete an operation.

grasp	hold	lift
locate	loosen	move
pick up	place	press
pull	push	rotate
set	slide	signal
tighten	touch	turn
twist	activate	adjust
align	close	disassemble
insert	load	measure
open	operate	remove
replace	stencil	trace
tune	construct	turn off-on
order (arrange)	typewrite	demonstrate

[11] District #287 - Curriculum Book

Problem solving - The ability to find a solution or answer to a problem. The student needs to be taught the procedure which will help him determine the nature of the problem and what should be done to correct the situation in the most efficient and effective manner.

solve	find	figure out
work through		decide

Element #3

Extent: Include in the objective a statement of the minimum level of acceptable performance.

Consider both the quality and the quantity that should be achieved. When important to "acceptable performance" you may wish to state: (a) The time allowed to complete the activity called for in the outcome statement, (b) the number, percentage or proportion of successful attempts required, and (c) the results that will be considered acceptable.

ACCORDING TO:

1. work order specifications

SO WELL THAT:

1. all tape and dirt is removed
2. your manner is courteous, friendly, and not offensive to the guest

(extent)
examples

Three Examples of TERMINAL PERFORMANCE OBJECTIVES which contain all three elements are shown below.

GIVEN THESE CONDITIONS:

upon receiving a work order for black and white stripping

YOU WILL BE ABLE TO:

prepare stripping table, select stock, and arrange negatives

ACCORDING TO:

work order specifications

(terminal performance objective)
example

1) GIVEN THESE CONDITIONS:

hotel/motel guest approaching front desk

YOU WILL BE ABLE TO:

welcome guest

ACCORDING TO:

a manner that is courteous, friendly and not offensive to the guest.

2) GIVEN THESE CONDITIONS:

hotel/motel guest without a reservation who desires a room

YOU WILL BE ABLE TO:

sell room(s) to guest in person

SO WELL THAT:

the guest and the hotel/motel management will be satisfied with the transaction

(Terminal performance objectives)

A terminal performance objective is a statement of a job-related task(s) which the learner is to be able to do to be a competent worker on-the-job. Refer to the task inventory for the occupation as you write the terminal performance objectives for a given occupation.

Sometimes the terminal performance objective requires that the learner already know certain concepts or possess certain skills or attitudes. When an instructor finds that his/her students do not know the concepts or possess these skills or attitudes then they must be taught to the student. These pre-requisite learnings are included in the same module, (they relate directly to a particular terminal performance objective) and they are called ENABLING PERFORMANCE OBJECTIVES. The examples on the next page show some enabling performance objectives.

(1) GIVEN THESE CONDITIONS:

Dirty stripping table

YOU WILL BE ABLE TO:

remove tape, wash table, dry table

SO WELL THAT:

all tape and dirt is removed

(2) GIVEN THESE CONDITIONS:

no stripping equipment at clean position

YOU WILL BE ABLE TO:

place tools and supplies on table (transparent tape, stripping knife, steel T square, steel straight edge, steel triangles 30^{o}, 60^{o}, 45^{o}, set of scribbing tools)

(3) GIVEN THESE CONDITIONS:

a need for stripping stock

YOU WILL BE ABLE TO:

select goldenrod stock or orange plastic, or other commercial stock available.

(enabling performance objectives)
examples

(1) GIVEN THESE CONDITIONS:

a hotel/motel guest without a reservation who desires a room; actual room; picutures of room

YOU WILL BE ABLE TO:

develop a sales pitch

SO WELL THAT:

you incorporate the five basic steps in the sale of rooms

(2) GIVEN THESE CONDITIONS:

The student is presented with a variety of situations that may be encountered in selling a room(s)

YOU WILL BE ABLE TO:

acting in the role of desk clerk,and react to a situation

SO WELL THAT:

you adequately overcome customer objections, and incorporate into the reaction the appropriate techniques of selling

(enabling performance objectives)
examples

As you can see in the previous examples, it may not be necessary for you to write-down the statement of conditions and the minimum level of acceptable performance for every ENABLING PERFORMANCE OBJECTIVE. Use your own judgement. In some cases, it may be obvious to both you and your students and, therefore, not necessary for you to specify in writing the exact conditions and performance levels.

It is highly recommended, however, that all three elements be included in TERMINAL PERFORMANCE OBJECTIVES because you will need to refer back to the three elements you specified as you (a) decide upon learning activities which are realistic and will be useful in teaching students to perform tasks required of them on-the-job, and (b) build a test that will determine whether or not students have learned what the TERMINAL PERFORMANCE OBJECTIVE stated that they need to be able to do.

How To Develop The Test

There are two kinds of tests which you will need to develop. The first kind of test is called the pre-test. It is a self-evaluation for the student. The pre-test is included within the module and the student scores it according to the key that is provided. The second kind of test is called the post-test. The teacher keeps the post-test and administers it to students when he/she thinks they are ready to pass it. Usually there are alternative forms of the post-test so that a student who fails the first time can take another test after additional study. You, as the instructor, can construct both the pre-test and the post-test(s) at the same time because both kinds of tests are designed to do the same thing. That is, they are designed to see whether or not the student has reached the terminal performance objective(s) which you have stated that he/she must master to be a competent worker on the job.

There are several points at which it makes sense to post-test students' progress and/or give credit to the student on his/her school record. Three possible places to give a student a post-test are:

1) at the end of a module
2) at several places within a module, if the module consists of many tasks or includes many enabling objectives
3) at the end of a unit which is comprised of one or more modules

The Tests

A pre-test is included in a module (or unit) for these reasons:

(a) it helps the student realize what he/she knows and can do at the present time and what he/she needs to learn. (It tests the students' ability to perform the task stated in the terminal performance objective.)

(b) it tells the students whether or not he/she should take the post-test without going through the learning activities, thereby "testing-out" of that module or unit.[9]

[9] It may be the policy of the school system to accept the student achievements in a comparable program and automatically release him/her from the obligation to "test-out" of a module. Find out what the policy is for "transfers" into your program.

Pre-tests are directly related to the terminal performance objectives and should not be confused with "diagnostic tests".

You as the instructor, must decide whether or not you want to provide diagnostic tests for the pre-requisite learnings associated with a module. These examinations are diagnostic because they check to see whether or not students might fail to reach the terminal performance objective. They may fail because they don't have certain basic skills that they either should have learned earlier, or they did learn the skills, knowledge, or attitudes earlier, but forgot them. Rather than making diagnostic tests for all of the pre-requisite learnings, you may wish to merely state the pre-requisites (such as being able to type 40 words per minute or make a flaky pie crust) and beside each pre-requisite specify the modules or courses in which students can gain these competencies.

In some cases, students may realize that they do not know how to perform the task(s) which are referred to in the terminal objective(s). In these cases, there is no need for them to take the pre-test. If they feel they have the necessary pre-requisites, they can begin the learning activities immediately. If after completing the learning activities they pass the post-test, they are ready to begin the next module on the "roadmap". If, after completing learning activities they fail the post-test, you, as the instructor, can help students decide what to do. Talk to the student after the post-test and help him/her decide whether to select additional learning activities or to go back to the pre-requisites and learn them better.

Building the Tests

There are three issues that you will need to consider as you begin to develop the pre-tests and post-test(s) for a module or unit. The first

issue focuses on showing consistency between the performance objective(s) and test item(s). The second issue is concerned with the specification of realistic test conditions. The third issue concerns how to set appropriate standards of performance.

ISSUE (1) - Showing consistency between performance objective(s) and test items.

The first question to ask yourself is:

On this pre-test (post-test), how can I ask the student to do the same kinds of things that I said in the performance objective he/she should be able to do if he/she is to be a competent worker on the job?

Look at the terminal performance objective that you want to test. Is the behavior stated in the performance objective a process or a product?

If the behavior is a process, evaluate it directly during the performance of the task. For instance, evaluate a student as he/she sets up, uses, and shuts-down a particular machine; or observe a student as he/she works with customers or other persons in providing a service. Rating scales are typically used to assess a student's capabilities in these situations. Rating scales take time to develop, but when the process is important, then it is the process that should be directly evaluated.

It is possible for the behavior to be a process, but one that cannot be directly evaluated. This might be because (a) the specific equipment or job circumstances are not available, (b) the task it too time consuming for complete performance by the student, or (c) costly equipment or materials require that initial understandings be assessed before the student uses the actual equipment or materials. and (d) the process is performed mentally by the student and cannot be observed directly. In these cases, some other performance must be selected to indirectly measure the behavior of interest. That is, it may be necessary to give an objective test which asks the student what particular actions to take, given possible circumstances, when performing a task. Other indirect measures of a process include the use of case studies or the use of simulated job conditions. A product may also be considered an indirect measure of a process if it can be assumed that the proper steps must have been taken to complete a satisfactory product.

If the behavior stated in the performance objective calls for the student producing a product, then student performance can be directly evaluated by asking the student to produce the same product. For example,

these products could be written reports, correspondence, exhibits, repaired equipment, or prepared food. (To be a good test, remember, variations are necessary. For instance, the student would be asked to type a different business letter than the one he/she typed as part of the learning activity. But none of the letters typed by the student at any time would be unlike those actually typed by workers on-the-job.)

If the behavior stated in the performance objective calls for the student producing a product, then student performance can be indirectly evaluated by representations of a product (for instance, a barn built to scale) or products made under simulated conditions (hairstyles given to maniquins rather than actual persons). Unless the product asked for in the performance is a written one, then it is not appropriate to evaluate the production of a product by a written examination. (That is, don't evaluate the student's ability to change a tire by asking him/her to write about how to do it - ask the student to actually change the tire.)

Some more of the different kinds of criterion measures which can be used to determine student achievement are listed in Appendix D, page 102. The important guideline to follow in construction of your tests is to see that the behavior asked for matches the behavior identified in the performance objective. Also, try to find the simpliest way possible to determine whether a student knows what you want him/her to know or can do what you want him/her to do.

ISSUE (2) - Specifying realistic conditions

As was mentioned earlier, there are three issues that you need to consider as you develop the pre-test and post-test(s) for a module. The first issue (which we have just dealt with) is that of showing consistency between the performance objective(s) and the test items. The second issue concerns the specification of realistic conditions.

When you ask your students to perform a task, with the intent in mind of finding out whether or not they will be competent workers on-the-job, it is important to evaluate the performance of the task under circumstances that are like those encountered on-the-job. The more realistic you can make the conditions, the greater the chance that students will actually be "competent" when they take a job. The examples below illustrate the importance of realistic conditions. As you read the examples, imagine the dilemma of the student who was deemed "competent" under the unrealistic conditions and expected to adjust to the real conditions his/her first day on-the-job.

Given a rough draft, hand written copy of a letter of average length and containing a short table, within 15 minutes, the typist will type an original and one copy of the letter. (standards omitted here)

realistic conditions
(example)

Given invoices as source documents and the format of the inventory maintenance data card with field lengths identified, the keypunch operator will, within 15 minutes, punch a program card. (standards omitted here)

realistic conditions
(example)

ISSUE (3) - Setting appropriate standards of performance

Consider both the quality of performance and the quantity of tasks performed that students should achieve as beginning workers on-the-job. If information such as this is not included on the task inventory for the occupation you teach and you are in doubt as to what appropriate standards of performance are, then consult with employed graduates, employers, and other instructors to find out such things as these: (a) the amount of time it should take a new worker on-the-job to complete the task, (b) the number or proportion of attempts that are reasonable demonstrations for successful performance of a task, and (c) the criteria for results for new workers that are considered acceptable when a task is performed.

It is important that students know what a satisfactory performance looks like so that they understand what is expected of them. You should realize, however, that specific quantity or quality scores cannot really be provided for your tests until you have used them and know what kind of performance is reasonable to expect. You will need to use your best judgement to establish your standards the first time you use your materials.

How To Specify Learning Activities

Once you have written the performace objectives for a module and prepared the necessary pre-test and post-test(s), the next concern is planning what students will do in order to learn to perform the task(s). A few basic guidelines are described below which will help you decide what kinds of learning activities to include in the module.

Basic Guidelines

The learning activities which you include in the module must be linked directly to the performance objective(s) for that module. Learning activities are included in a module so that

(a) students can learn what to do (this might involve the pupil being presented some basic information)

(b) students can practice a task after they have learned what to do

When you specify the learning activities for the module, it is a good idea to let students "practice" as soon as possible after they have learned what to do. Try not to always give students the same options for learning what to do (e.g. lecture or reading) or how to practice. There are many ways that students can learn to perform most tasks. See if you can make available to students several alternative learning activities in the module you are developing.

The checklist, which follows, specifies some learning activities which can be used to help students learn what to do and how to practice. Now, think about the module you are developing. Go back to the Rationale which you wrote for the module. Select the learning activities which you can use in the module to help a student learn what to do and place a check (✓) beside those activities.

CHECK LIST OF LEARNING ACTIVITIES			
Learning Activities			
A. Group Activities 1. Large group lecture a. with media * b. without media * 2. Small group discussion 3. Small group demonstration 4. Oral reports to a group 5. Committees and panels		C. Simulated or Real Practice 1. Practice sets 2. Case studies 3. Games 4. Role playing 5. Projects and special assignments 6. Simulated model work stations 7. Cooperative work experience	
B. Self-Directed Activities 1. Reading assignments 2. "Problem" exercises 3. Programmed books 4. Slide-tape or film-loop presentations 5. Job information sheet (see example Appendix F) 6. Tape recordings			

* Media can be considered to be broader than such things as "slides", "film loops", etc.; it can mean whatever device is being used to present information or directions to students. A cassette tape might also be used to say the same things that you say.

The characteristics of the various media available and their advantages and disadvantages are important to consider as you make activity decisions. For your assistance, a summary of this information is included in the APPENDIX E , page 94 .

After you have chosen some learning activities which can be used to help a student learn what to do, you are ready to choose some ways for a student to practice what he/she has learned. If your answer to the questions below is "yes", the the practice activity you have in mind is

probably a good one.

a. Can CONDITIONS be set up in the learning activities that match as closely as possible the conditions on the job? (e.g. equipment; references available; tools; raw materials that you have to work with; sources of directions; persons to work with; time limits.)

b. Can the student ACT the same way in this learning activity as he/she acts when performing on the job?

c. Can the learning activity allow the student to participate as much as possible -- performing the task as many times as possible while he/she is engaged in the activity?

Place a crossmark (X) beside those "practice" activities on the checklist which you will incorporate in the module you are developing.

Once you have selected the learning activities you wish to use, you will need to be specific about exactly what they are. For instance, you will need to state the name of the filmstrip. In some cases, you will be able to use materials that have already been developed (e.g. a filmstrip, a chapter of a book, etc.) and in other cases, the learning activities which you offer students may require that you develop materials (the job information sheet as shown in Appendix F , a case study, or a series of sketches which show how to do something step-by-step.). Whether they are materials that you have developed or ones that you have gathered together so your students can use them, you will need to tell students in the learning activities section of the module what he/she is expected to do and where to obtain the supplies. Give specific directions to students so that you won't be using valuable instruction time answering questions like "Where do I find _____?"

The example below shows a format which could be used to communicate to students the learning activities for the terminal objective(s) of a given module which they need to reach. After the student has completed

the learning activities he/she should be able to demonstration performance of those task(s) which you told him/her were necessary for workers on-the-job.

Learning Alternatives

given these conditions - a work order for black and white stripping

you will be able to - interpret stripping instructions (printer symbols, diagrams and directions)

so well that - you follow exactly the instructions for the stripping assignment

In order to be able to interpret stripping instructions you will need to be able to:

#1 performance - Determine the basic layout of the flat

A. Required activity choose one - attend a group demonstration by the instructor

- view the film entitled "How to Lay Out the Flat" (20 min.) (check out the film from the reference room, return it when you have finished)

The following activities should be done after you have attended the group demonstration or viewed the film

B. Not required - read pp. 237-242 in your text. The chapter is entitled "Photo Offset".

C. Required practice activity - from the stripping cabinet located in the reference room, select stripping packet "B". Using the 5 work-order samples provided, determine the layout diagram for each.

As you can see in the example, some learning activities are group activities and some are self-directed activities. You, as the instructor, may wish to make the decision that either a GROUP ACTIVITY or a SELF-DIRECTED ACTIVITY will be used by students who are trying to reach a particular objective.

There are some circumstances under which GROUP ACTIVITIES and/or SIMULATED or REAL PRACTICE ACTIVITIES are appropriate.

1. Experience in working with other people in necessary on the job.

Small group demonstrations to provide an introduction to and familiarity with other functions of printing. Development of a sales pitch in a role-playing situation. (examples)

2. Discussion and experience with many different opinions is necessary.

Handling guest's complaints using case studies. Oral reports to present the many alternate ways of stripping a flat in printing. (examples)

3. Awareness of other people's feelings and reactions is necessary.

Working with office co-workers on a rush job in which working through lunch and coffee breaks may be necessary. Selling room(s) to guests in a model work station. (examples)

4. A group presentation is the quickest and most effective way to present new information.

Demonstrating the operation of a stencil duplicating machine. Small group discussion to present the correct procedure for preparing stripping area in printing. (examples)

Likewise, there are some conditions under which SELF-DIRECTED ACTIVITIES are very appropriate.

1. The tasks and the associated performance objectives are NOT likely to change quickly over time.

Review and practice of basic arithmetic operations. The principles of debit and credit in accounting and the journalizing of transactions. (examples)

2. Self-instructional materials are available.

Film loop presentation to familiarize students with stripping techniques in printing. Identification of the typical rooming situation to which each assignment code applies through the use of a program text. (examples)

3. Checking the work can be done quickly for the student, in most cases without constant need to see the teacher.

Learning how to time stamp the hotel registration card by viewing a film loop in which a model registration card is included. Review of printing language presented by programmed materials. (examples)

4. It makes sense for the student to learn the task alone, by himself/herself.

> Reading assignments used to present materials needed for stripping operations in printing.
>
> Identification of the two main purposes of the room slip in a hotel through reading assignments.
>
> (examples)

5. The sequence in which the content is learned is very important, and, therefore, student-pacing of the instruction is necessary to insure mastery of basic information before trying to apply it in a more complicated situation.

> The learning of shorthand theory to a sufficient level before participating in new-matter dictation.
>
> Learning the step-by-step procedure for setting up a machine correctly can be presented by a job-information sheet. This knowledge is necessary before operation of the machine can be carried out on simple and then complex tasks.
>
> (examples)

Because there is a large number of possible combinations of learning activities that might be included in a module (e.g. required and/or optional activities for enabling objective(s) which help students reach the place that they can begin learning the terminal objective(s) for a module), no fixed format can be suggested in this Handbook. Whatever format is chosen by a teacher or by a school, it should include the following information for students:

1. the performance objective (either terminal or enabling)
2. alternative learning activities, or in some cases, a single learning activity. For each alternative learning activity specify
   (a) whether the activity is required or optional
   (b) complete directions to the student as to how to proceed through learning activity(ies).

(c) physical location in the school or classroom of the equipment, tools, or materials to use, if any. (This may include such things as locations on a shelf, pages in a book, and assignment numbers.)

(d) complete directions to the student as to what he/she is to do when the activity is finished.

3. Procedures for certain kinds of learning activities. Many procedures could become routine, such as equipment location, book titles, procedures to follow when completed with assignments, taking tests, or checking out materials. If this is the case, it would be a good idea to write this up as separate introduction sheets for students. These procedures can then be labeled in the module as part of an established routine and do not have to be repeated over and over again.

VI THE MANAGEMENT OF INSTRUCTION FOR AN OCCUPATION

Step Six: Develop a Record-Keeping System

Assigning Grades

CHAPTER V

THE MANAGEMENT OF INSTRUCTION FOR AN OCCUPATION

As you develop the modules for your vocational program you will soon ask yourself the question "How am I going to keep track of where all of my students are?" After you have taken steps one through five toward curriculum articulation, you are ready to work on a system for keeping track of students who are progressing through modules toward their occupational goals. A numbering system is suggested in this chapter which will help you keep records.

Step Six: Develop a Record Keeping System

First, record on the top of the outline for the occupation you teach the U.S. Office of Education Classification number. It can be obtained from the publication entitled Vocational Education and Occupations which is available from the Superintendent of Documents (Catalog No. FS 5.280:80061) U.S. Government Printing Office, Washington: 1969 ($2.25).

Second, record on the top of the outline, for the occupation you teach, the occupational title and the DOT Number. It can be obtained from the same publication as mentioned above.

Third, record the number that is used to designate the program area for the occupation you teach. This number will probably be unique to your school. Generally, 5 digits are used for the program area.

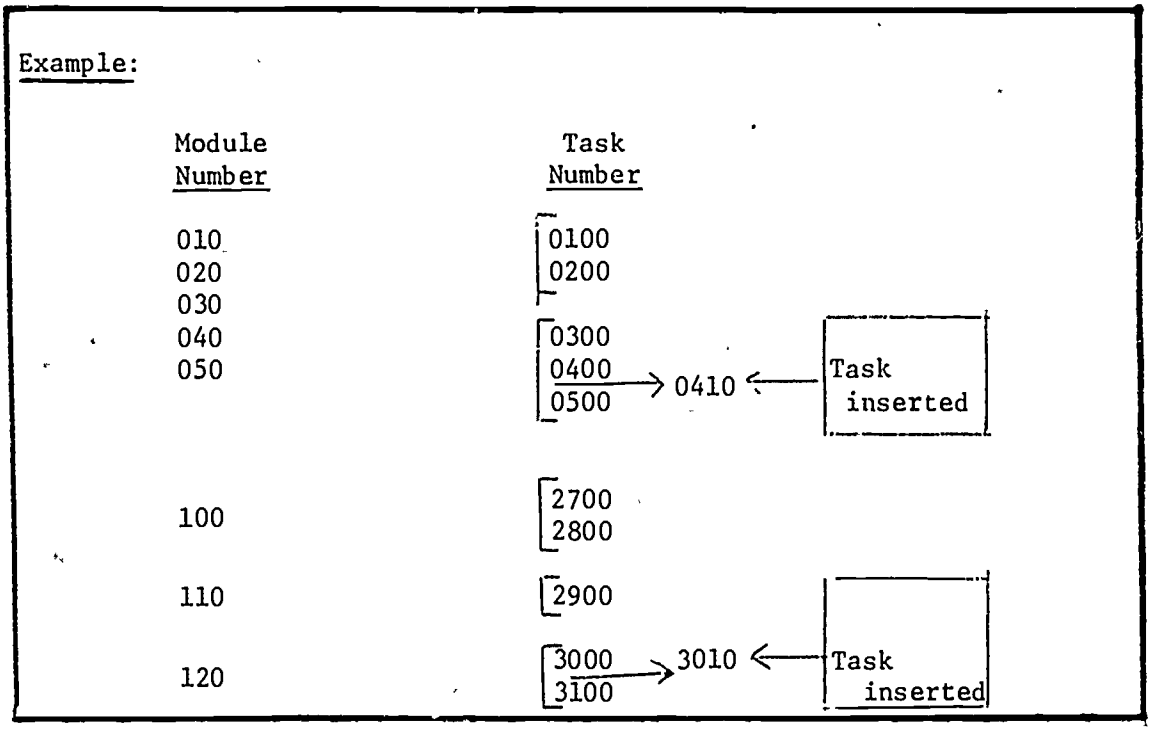
Fourth, assign each Unit on the outline (page 42) a two digit number.

Fifth, assign each Module a three digit number (see example below). Number the modules in the sequence that you wish students to complete them. (You have already decided this and specified it on the road map for each unit.)

Sixth, assign a four digit number to the task(s) within each of the modules. (You did this earlier, as suggested on page 33 of this Handbook.)

When you begin numbering the tasks and modules use the first two places of the four digit number (use the first three digits when the tasks or modules exceed 99 and leave just the last digit a zero). See the example on the following page.

Example:



If you follow this procedure for numbering tasks and modules then you can easily insert tasks or modules into the existing sequence if you should determine that student's needs warrant additional instruction. Sometimes, it is necessary to teach something that is a pre-requisite that all students lack. You will find out whether or not additional tasks or modules need to be added when your students go through the sequence of modules. If you leave the last digit a zero when you initially number the tasks and modules then you can insert additional tasks or modules without having to re-number everything in the sequence.

The example on the next page shows the numbering system suggested. All of the numbers shown would be recorded on the outline which you made in Step Four. It is not necessary to write all of the numbers on the cover page ("road map") for each module, just record the module numbers in the circles and the other information in the box at the top of the cover page.

Information Needed	Number	Title
USOE Code	17.19	Graphic Arts Occupations
DOT Number	971.381	Lithographic Stripper
Program Area	50-501	Graphic Arts
Unit	04	Preparation
Module	010	Make-ready
Task(s)	0100 0200 0300	prepare stripping table for black & white select stock for black & white work arrange black & white negatives in order

After you have a numbering system, it is possible to use a computer to keep a record of students enrolled and the progress each has made toward his/her occupational goal.

A computer can be used to keep records of students' progress toward their occupational goals. If you, as a vocational teacher, have no access to a computerized system for record-keeping, you can keep the necessary records for competency-based personalized instruction by making appropriate checklists.

Record #1

Each time that a student completes a module, by passing the post-test, the student competency must be recorded. Construct a checklist which specifies each competency needed for the occupation you teach. Keep a separate checklist for each student and record the competency by checking the appropriate columns each time that student passes a post-test. Those competencies listed, but not yet checked-off are the on-going record of what competencies the student has left to demonstrate. Elective competencies should be listed in a separate section of the checklist. See next page for an example.

Checklist of Competencies

Program area _____ Student No. _____

Occupation Stenographer

Name _____

Unit and Task No.		Hours	Final Rating	Instructor
04.	TYPES BUSINESS COMMUNCATIONS			
04.010	Type interoffice memorandums			
04.020	Center vertically and horizontally.			
04.030	Convert rough draft work to usable typed copy			
04.040	Type letters in block, modified block, and AMS styles			
05.	MANAGES AND FILES RECORDS			
05.010	File alphabetically			
05.020	Control filed records			
05.030	File numerically			

Rating Scale

6 - Can perform this task with more than acceptable speed and quality, with initiative and adaptibility and can lead others in performing this task.

5 - Can perform this task with more than acceptable speed and quality and with initiative and adaptability to special problem situations.

4 - Can perform this task satisfactorily without supervision or assistance with more than acceptable speed and quality of work.

3 - Can perform this task satisfactorily without assistance and/or supervision.

2 - Can perform this task satisfactorily but requires periodic supervision and/or assistance.

1 - Can perform this task, but not without constant supervision and some assistance.

0 - Cannot perform this task satisfactorily for participation in a work environment.

P - Task accomplished by Challenge Test. Student had previous training or experience.

Record #2

Another record which you may wish to keep is the amount of time that it takes each student to complete each module. Students, when provided the forms to fill-in, can do this themselves. Whether or not you wish to have students keep a record may depend upon the use you make of the information they supply (e.g. is time spent per module going to affect their "grade").

From the records of time spent per student on each module, you may wish to compute the average amount of time it takes students to acquire various competencies. The following questions may then be asked:

- If students are spending a questionably long time in learning how to perform a given task, could it be that the learning activities suggested are not appropriate?
- Does the time it takes a student to learn, when compared to the average learning time for most students, have any implications for the employer who is screening applicants?
- Do regular students learn to perform certain tasks in less time than disadvantaged or handicapped students?

Assigning Grades

The assignment of grades, in addition to listing the competencies mastered by students, is an issue which must be resolved by the school system. If grades are to be assigned they can be based on any one or all of the following pieces of information gathered about the individual student.

1. The level of performance is higher than the minimum specified in the module objective(s) in terms of (a) the time taken to complete the activity called for in the outcome statement, (b) the number or proportion of successful attempts, and (c) the quality of the results that are considered acceptable.

2. The amount of time taken by the student to complete all of the modules in the instructional program is less than the amount of time required by the average student.

3. The high number of optional activities elected and completed by the student. (List as optional competencies on the students report card.)

Another way of indicating how well students do in relationship to one another is to rely on teacher recommendations as a supplement to competency listings.

APPENDIX A

GLOSSARY

Adult Vocational Education: a vocational education endeavor designed for the adult who has a job or who is in need of retraining. Emphasis is placed upon upgrading or preparation in relation to employment and/or family-consumer roles.

Affective Learnings: those learnings which involve feelings and personal judgments (opinions, attitudes and values) about knowledge needed and behaviors demonstrated during the performance of job tasks.

Articulation: arrangement of components of various levels of vocational education in a connected sequence so individuals choosing more than one level of instruction can move to the next level without either gap or overlap in curriculum.

Cluster: groupings of several program areas which are enough alike to be grouped together. The following clusters have been suggested by the U.S. Office of Education and have been adopted by the State of Minnesota: 15-Agribusiness and natural resources, business and office communication and media, construction, consumer-homemaking, environment, fine arts and humanities, health, hospitality and recreation, manufacturing, marketing and distribution, marine science, personal services, public service transportation.

Cognitive Learnings: those learnings which refer to the knowledge students acquire prior to being able to perform job tasks.

Competency: satisfactory performance of one or more tasks by the student. Satisfactory performance depends upon psychomotor, affective and cognitive achievement which collectively are measured when the student is evaluated as to his/her ability to perform a specified job-related task(s) under certain specified conditions to a specified level of performance. Generally, there is one competency recorded per module performance objective, or there may be one competency recorded for each terminal unit objective if it makes more sense.

Competency-Based Vocational Education Programs: a program in which the tasks that students are expected to be able to perform, along with supporting affective and/or cognitive behaviors necessary for task performance, are made public to students in advance of instruction. Students are responsible for demonstrating that they have attained each competency by performing the tasks at a specified level of performance and under the conditions designated.

Component: a group of related units which complement each other and form the basis for what might be termed courses in a more traditional program.

Criterion Level: the level of performance which represents acceptable evidence that a student has learned a task.

Curriculum: all activities which are planned, carried out and/or evaluated by the instructor of an occupation for the purpose of teaching students to be workers on the job.

Duty: a large segment of work, comprised of one or more tasks, which is performed by an individual.

Enabling Performance Objective: is a statement of the knowledges, skills and/or attitudes which the learner must have if he/she is to reach a particular terminal performance objective. Enabling performance objectives which are necessary for a student to attain before the terminal performance objective(s) can be reached are contained within or identified with the same module as the terminal performance objective(s).

Entry-level Job: one that employers offer, in fact, to persons lacking/on the job experience or to persons who have received some training experience outside of the hiring firm. Then those potential employees of interest are those completing high school or post secondary instructional program.

Independent Study: learning activities in which students can engage by themselves without interacting with other students (e.g. watching a filmstrip, reading a book, interviewing a worker on the job).

Learning Alternatives: instructional experiences which are made available to a student with the intent that they would help that student master an objective or set of objectives.

Mastery: the level of performance or achievement which consistently meets occupational standards or standards set by vocational teachers responsible for a specific vocational program.

Module: a package of materials for the student which consists of a statement of rationale, objective(s), pre-test, learning alternatives and post-test. The package is intended to help the student acquire and then demonstrate the performance of tasks done by workers on the job.

Personalized Instruction: a program in which different learning alternatives are made available to individual students on the basis of an evaluation of their interests, needs, or preferences for learning in a certain way. The available alternative may be selected for the student or he/she may be permitted to make the selection. The content to be learned for occupational competence is relatively fixed because it is based upon tasks performed by workers on the job, but individual students have an opportunity to test-out of those job tasks which they can already perform. The time it takes for different students to master the required competencies varies because the option to repeat small or large group activities as well as activities involving independent study is available.

Post-Secondary Vocational Education: a full-time vocational education endeavor for the student who has left secondary school. Emphasis is placed upon preparation or upgrading in relation to employment knowledge, skills, and attitudes.

Post-Test: a performance examination taken by the student to determine whether or not he/she is capable of performing the tasks specified in the terminal performance objective for that module.

Pre-requisites: knowledge, skills or behaviors which students are expected to demonstrate prior to beginning work on a particular module.

Pre-Test: a student's self examination which can be taken by the learner at the beginning of a module. The pre-test gives the learner the opportunity to diagnose what he/she knows and then decide whether or not to select learning activities before attempting to pass the post-test.

Program Area: a group of related occupations which are enough alike to be listed together. (e.g. food service is a program area which is part of the Hospitality and Recreation cluster of occupations.) Sometimes it is called the occupational field.

Psychomotor Learnings: those learnings which require physical performance by the student. Such learnings are usually acquired by practicing a skill-oriented task.

Rationale: a short explanation at the beginning of a module which tells the student (1) why he needs to learn what is contained in that particular module, (2) how that particular module fits into a set of modules which together teach him the occupation.

Secondary Vocational Education: a vocational education endeavor available to secondary students with the primary purpose of vocational exploration, career preparation, or prepost-secondary education.

Task: a group of work activities which are associated for a common purpose or end and those work activities, taken collectively, have meaning or use to the job. The task statement qualifies a definite beginning and end of the task.

Task Inventory: a list of task statements and/or duties performed by workers in an occupation.

Terminal Performance Objective: a statement of job-related task which the learner is to be able to do to be a competent worker on-the-job. Contained in the terminal performance objective is (a) a statement of performance which lets the student know how he is to show (demonstrate) what he has learned; (b) a statement of the conditions which will surround the student's performance; (c) a statement of the minimum level of acceptable performance. There is at least one terminal performance objective at the beginning of each module.

Terminal Unit Objective: an objective which describes the behaviors which a student can demonstrate at the time he or she is certified by the institution as having completed the program of preparation. The student's performance of all the tasks in a given unit of instruction is the evidence that he/she has acquired cognitive affective and psychomotor learnings which are necessary for carrying out of job duties.

Unit: a group of related modules which represent tasks in a single occupation and directed toward a common purpose.

Vocational Education: a course or option designed to directly assist an individual in career exploration, preparation, upgrading, or retraining. It is organized into single occupations, clusters of occupations or seguential programs. Each may lead to entry-level employment, post-secondary education or prepare for the role of a consumer or family member.

Vocational Program: a group of related occupations which make up the local offerings in a single content area (e.g. local program titled foold service consists of perhaps these occupations: cook, bus boy, waitress, etc.)

APPENDIX B

Task Inventory
(example)

OCCUPATION: DESK CLERK
(N=10)

ESSENTIAL TASKS
****

Code	Name of Task	Number Performing	Mean Importance	Mean Performance Rating
7010.01.108	Maintains proper dress and appearance	10(100%)	3.0	2.7
.104	Maintains room rack	10	2.9	2.4
.104	Registers guests	10	2.8	2.8
.103	Maintains key rack	10	2.5	2.2
.015	Answers phone	9(90%)	3.0	2.4
.016	Answers inquiries	9	3.0	2.2
.167	Takes room count	9	2.9	2.3
.144	Receives complaints	9	2.8	2.9
.160	Sells rooms by phone	9	2.8	3.0
.161	Sells rooms to guests in person	9	2.8	3.0
.052	Controls keys	9	2.8	3.1
.165	Takes messages for guests	9	2.8	2.8
.038	Checks out guests by check	9	2.7	2.5
.037	Checks out guests by cash	9	2.6	2.2
.101	Maintains keys	9	2.6	2.3
.131	Posts charges to guest accounts	9	2.6	2.6
.166	Takes reservations	9	2.6	2.8
.004	Acts as reservationist	8(80%)	3.0	2.1
.018	Answers inquiries on reservations	8	2.8	2.4
.039	Checks out guests by direct billing	8	2.8	2.0
.041	Checks in guests	8	2.8	2.6
.082	Handles complaints	8	2.8	2.3
.028	Assigns rooms	8	2.6	1.9
.107	Maintains list of guests	8	2.6	2.7
.150	Resolves guests' complaints	8	2.6	2.4
.162	Sorts mail	8	2.5	2.4
.034	Blocks reservations	8	2.5	1.9

Code	Name of Task	Number Performing	Mean Importance	Mean Performance Rating
7010.01.130	Phones reservations confirmations	6	2.5	2.8
.134	Posts reservations	6	2.5	2.8
.141	Provides service information	6	2.5	2.8
.043	Checks guests' folio	5(50%)	3.0	2.6
.168	Turns in cash	5	3.0	3.0
02.009	Answers inquiries about hotel policy	5	3.0	2.2
01.032	Balances cash	5	2.8	2.4
.051	Controls the storage of guest valuables	5	2.8	2.6
.062	Determines reservations availability	5	2.8	2.6
.066	Discusses billing problems with guests	5	2.8	2.8
.096	Logs telephone charges	5	2.6	2.7
.140	Provides property information	5	2.6	3.3
.172	Validates parking tickets	5	2.6	3.3
.179	Sells newpapers and sundries	5	2.6	2.4
.025	Arranges for special guest services	5	2.4	1.4
.142	Provides features information	5	2.4	3.3
.159	Sells special events tickets	5	2.4	3.3
.029	Attends meetings related to hotel operations	5	2.2	1.6
.061	Determines what should be brought to management's attention	5	2.2	1.2
.106	Maintains directory of emergency numbers	4(40%)	3.0	2.7
.158	Routes reservation deposits	4	3.0	3.0
.006	Acts as chief officer on duty	4	2.7	2.5
.095	Locates shortages	4	2.7	2.5
.105	Maintains directory of telephone numbers	4	2.7	2.3
02.007	Adjusts errors in guests' accounts	4	2.7	2.5
01.093	Keeps a list of on-call personnel and services	4	2.5	1.7
.119	Operates automatic posting machine	4	2.5	2.7
.164	Submits telephone charges	4	2.5	3.0
02.001	Acts as front office cashier	4	2.5	2.0
01.169	Types reservations	4	2.3	2.7

Task Inventory
(example)

D.O.T. 971.381

Lithographic Stripper

Task Statements

Preparing to Strip Flat

1. Interpret instructions for stripping
2. Select stock for flat
3. Prepare stripping tabl.
4. Arrange the negatives in proper numerical order
5. Interpret imposition layout
6. Layout the flat
7. Layout multiple flats for color work

Stripping the Flat

1. Examine negatives for size and quality
2. Determine the emulsion side of the negative
3. Scribe lines on the negative
4. Scribe borders on the negative
5. Scribe reference marks onto the negatives
6. Remove film blemishes
7. Opaque all show through defects such as pin holes, scratches
8. Prepare rubylith masks for halftones
9. Prepare rubylith masks for flat tints
10. Trim negatives
11. Position the negatives on the flat
12. Strip a halftone negative
13. Strip a line negative
14. Strip a line positive

15. Strip the flat for step and repeat work
16. Strip film positive
17. Strip butted negatives
18. Strip-in inserts into the main negative
19. Strip flat for multiple color work
20. Tape negatives to the flat
21. Cut windows in the flat
22. Cut reference marks into the flat such as:
    a. gripper edge marks
    b. cylinder marks
    c. trim marks
    d. cut and fold marks
23. Inspect the flat for accuracy
24. Mark proof (silverprint) from flat
25. Number all flats
26. List exposure sequence for platemaker
27. Indicate screen tints for platemaker

APPENDIX C

Making Your Own Task Inventory

What is a task?

The verbal expression of a task typically includes a specific action verb and the brief identification of what is acted upon. A task is a group of work activities which is associated for a common purpose or end, and those work activities, taken collectively, have meaning or use to the job. A task is the basic element for curriculum development because it constitutes a sufficiently large act to be meaningful in itself. Sometimes tasks are combined to form a larger whole or "duty".

Why is a task inventory needed?

A task inventory is a listing of the tasks performed by an employee in a specific occupation. It identifies what to teach in vocational education because it describes what workers do on-the-job.

How can a task inventory be constructed?

You can construct a task inventory by following the steps listed below.

1. Select personnel to write task statements which include representatives from education, industry and research. (Use your Advisory committee)
2. Establish the criteria by which each task statement will be evaluated. (Are your task statements really tasks or are they work activities or duties?)
3. Review the literature pertaining to the occupation being analyzed.

3. (con't)

   a. Prepare a laundry list of tasks from available sources.

      (1) Dictionary of Occupational Titles

      (2) Occupational Outlook Handbook

      (3) Vocational Education and Occupations

      (4) Pertinent studies and research papers

   b. Place tasks on 3 X 5 index cards and arrange them alphabetically.

4. Obtain task lists from selected educational institutions.

5. Obtain task lists from selected firms in the occupation. (Job descriptions obtained from the personnel department often include task listings also, consult the Industrial Engineering Departments for Time Studies)

6. Compile a comprehensive task list using all of the selected sources.

7. Have the comprehensive task lists evaluated by:

   a. Selected education representatives

      (1) Vocational Centers

      (2) Area Vocational-Technical Insitutues

      (3) Universities and State Colleges

   b. Selected firms from industry

      (1) Supervisors

      (2) Foremen

      (3) Managers

8. Using this input make necessary additions, changes and deletions from the task list.

9. Return corrected task list to educational institutions and industry for final approval if deemed necessary.
10. Use the finished task list for the occupation being analyzed.
11. Once the list of tasks is made, there are questions pertaining to worker performance of those tasks, which need to be answered by selected firms from industry.
    (1) Do the majority of the workers in the occupation perform the task?
    (2) Is the task performed fairly frequently, say once a day or once a week?
    (3) Is a fairly large amount of time devoted to the task?
    (4) Is the task generally considered of moderate or more importance in the occupation?
    (5) Is it necessary for workers to be competent in this task when they are first hired?

Your task inventory should be given to appropriate employees and their immediate supervisors. Ask them to modify, delete or add tasks when necessary and to answer all of the questions asked about each of the tasks on the inventory. It is desirable, but not always possible, to also observe the employees performance on the job and check the task list against actual performance.

Once the data has been collected, it must be summarized so that all of the information about that specific occupation is contained on one task

inventory. When you have "in-hand" the task inventory, return to page 24 of this Handbook and continue following the steps suggested for building your curriculum.

APPENDIX D

APPENDIX D

MEASURES TO DETERMINE LEARNER ACHIEVEMENT

Direct Measures - Product or Process

1. Standardized rating scales and check lists. For judging the quality of products in visual arts, crafts, shop activities, creative writing, exhibits for competitive events, cooking, typewriting, letter writing, fashion design, and other activities. Rating may then be compared with those of identified norm student groups.

2. Standardized tests of psychomotor skills and physical fitness. Ratings may be compared with those of identified norm student groups.

3. Teacher-made rating scales and check lists. For observation of classroom behaviors; performance levels of speech, music, and art; observation of creative endeavors, personal and social adjustment and physical well-being. Also to be used for judging those same processes or products listed for standardized rating scales and check lists.

Indirect Measures - Product or Process

1. Standardized achievement and ability tests. Scores from these tests permit inferences regarding the extent to which cognitive objectives have been attained in relation to identified norm student groups.

2. Standardized self-inventories. Designed to yeild measures of adjustment, appreciations, attitudes, interests, and temperament from which inferences can be made concerning the possession of psychological traits or interests similar to other identified groups of persons.

3. Teacher-made achievement tests - objective and essay. The scores allow inferences regarding the extent to which specific instructional objectives have been attained. True and false, multiple choice, completion and matching are the commonly used objective tests.

4. Questionnaires. Frequencies of responses to items in an objective format which permit descriptions of selected student traits or the evaluation of student attitudes toward a course or other experience.

5. Interviews. Frequencies and measurable levels of responses to formal and informal questions raised in a face-to-face interaction. These may be considered oral examinations.

6. Self-evaluation measures. Student's own reports on her/his perceived or desired level or achievement, on her/his perception of her/his personal and social adjustment, or her/his future academic and vocational plans.

7. Peer nominations. Frequencies of selection or of assignment to leadership roles for which the sociogram technique may be particularly suitable.

Measures to Determine Learner Achievement - Continued

8. Projective devices. Casting characters in a class play, role playing, or picture interpretation based on an informal scoring method that usually involves the determination of frequencies of specific behaviors, or rating of their intensity or quality.

9. Case problems. The creation of hypothetical problem-solving situations in which the approach or reasoning used to reach a conclusion is as important or more important than the solution itself.

Miscellaneous Criterion Measures of Attitude

1. Absences. Full-day, half-day, part-day, or other selective indices pertaining to frequency and duration of lack of attendance.

2. Anecdotal records. Critical incidents noted including frequencies of behaviors judged to be highly undesirable or highly deserving of commendation.

3. Attendance. Frequency and duration when attendance is required or considered optional, as in club meetings, special events, or off-campus activities.

4. Books. Number checked out of library, renewed or read when reading is required or voluntary.

5. Changes in program or in teacher as requested by student. Frequency of occurrence.

6. Dropouts. Numbers of students leaving school before completion of program of studies.

7. Grouping. Frequency and/or duration of moves from one instructional group to another within a given class grade.

APPENDIX E

APPENDIX E
ADVANTAGES AND LIMITATIONS OF SOME CLASSROOM MEDIA

Flat Pictures--Drawings and Photographs

Many instructional activities can be facilitated by the use of a single drawing or photograph. By means of photography and enlargements, an illustration of what is being discussed may be created in a form that is permanent, needs no special equipment to view, and can be edited to eliminate material that is not important or is distracting. A series of photographs may be arranged to illustrate the steps in a sequence. Furthermore, they can be placed in close proximity to the practice area and used as a guide. By preparing suitable captions for the photographs, commentary or instructions that are needed may be made a part of the visual.

Advantages:

1. Presentation may be shown one at a time or in groups.
2. Ease of duplication.
3. Size may be tailored to fit needs of learning situation.
4. Needs no equipment to view.
5. Any existing visual can be copied and edited to suit requirements of instruction. A limitless variety of materials can be obtained easily and cheaply from magazines, newspapers, etc.

Limitations:

1. Require special skills and equipment or dependence upon a photographic laboratory.
2. Color is costly compared to black and white--though color is not needed for some illustrations.
3. Bulky in mounted, larger sizes--difficult to transport and store compared to other media visuals.

Photographic Slides

Though presenting many of the characteristics of flat, still picutres, slides have the additional characteristic of being presented in a situation that makes them very compelling to the eye. Darkened rooms give the observer

Photographic Slides (con't)

little else to view except the screen, and the sudden appearance of the new visual makes in attention difficult.

Preparation of color slides is constantly being made easier by new developments in equipment and materials. Cameras exist that can show the exact area being photographed. The camera may be moved to within inches of the subject; the camera can indicate when it is adjusted for proper exposure; or, it will set itself for taking the picture, either by existing light or with flash, leaving only the adjustment of focus to be done by the operator.

Advantages:

1. Simplicity of preparation processing includes mounting in holders.
2. Realatively inexpensive--color originals costing slightly more than duplicates.
3. May be produced and shown with simple, realiable equipment that is readily available in most schools.
4. Copies of existing color visuals from publications may be made available to students in another media form.
5. Flexibility in arrangement of slides in teaching sequence--ease of revision.
6. Automatic projection available.
7. Portability and storage.
8. Can be used in individual or group instruction.
9. May be combined with taped sound.

Limitations:

1. Required either a good knowledge of photographic technique or equipment that will be fairly automatic in adjusting for exposures.
2. Slides can be spilled, get out of sequence or be projected in incorrect positions if not used in an indexed storage system.
3. Changing the sequence of slides or adding or deleting slides may mean that accompanying sound tapes must also be redone.
4. Motion of objects in a picture cannot be shown directly, only still pictures.

Filmstrip

Filmstrips present essentially the same quality and format of visual displays as the single slides just discussed. The strip itself makes only one sequence of presentation possible for the viewer, and this order cannot be changed accidently as with slides. A filmstrip projector is, of course, necessary for the showing of this media. Sound can be put with the filmstrip by using a record, a tape, or putting the sound directly on the filmstrip.

Advantages:

1. Compact and easily stored.
2. Cannot get out of sequence or position.
3. May be viewed with hand or desk viewer for individual instruction.
4. Duplicates may be obtained cheaply compared to slides.

Limitations:

1. May not be edited or rearranged as to sequence.
2. Are difficult to produce locally.
3. Only one sequence of viewing order is possible.
4. Original filmstrips are expensive when prepared by a laboratory from slides sent to them.
5. Motion of objects in a picture cannot be shown directly, only still pictures.

Motion Pictures

For many years the standard educational film has been the 16mm size with sound right on the film. Commercially produced and expensive, these films are usually loaned or rented from a central library rather than owned by a single school. The 8mm motion picture is more likely to be the kind teachers can make themselves with the assistance of audio-visual personnel in their schools.

Cartridges of 8mm roll film allow easy use by teachers or students and automatically rewind at the end of the showing. Many reel-loading projector are self-threading. The combinations of color, sound, and motion can make this an effective learning experience of groups of students or individuals.

Motion Pictures (con't)

Advantages:

1. Can be used to show motion.
2. Can change the time of an event--can speed very slow motion or can show very rapid motion to an observable pace.
3. Can show the development of an event or concept.
4. Can combine visual, verbal and sound effects in a forceful presentation.
5. Can be animated to illustrate abstract concepts or concealed processes.
6. Simple presentations are inexpensive to produce.
7. Equipment readily available in most schools.
8. Many prepared programs are already available in many subjects.

Limitations:

1. Only one sequence of showing is possible.
2. Expensive to produce in more elaborate forms.
3. Some knowledge and experience with special techniques is necessary to produce a motion picture.
4. Prepared motion pictures may not match the specific objectives of a particular teacher. The specific objectives of most films are often not even stated.

Overhead Transparencies

The overhead projector sends a strong beam of light through a transparency and onto a screen behind the instructor, who is in front of the screen facing the class. This is one medium in which the teacher can prepare a visual presentation while facing and communicating with the class at the same time.

Advantages:

1. Simple operation of the equipment
2. Ability of the instructor to view the class and transparency at the same time.
3. Instructor may write on the transparency and add to pictures, diagrams, or explanations.
4. Color may be used.

Overhead Transparencies (con't)

5. Overlays of transparencies permit successive additions to the presentation.

6. The room does not need to be darkened for showing.

Limitations:

1. Motion cannot easily be shown in pictures.

2. Special pencils are necessary for writing on the transparencies.

3. Transparencies are for use generally with groups of students.

Chalkboards

Chalkboards are so familar as parts of the school environment that they tend to be taken for granted. Consequently, many teachers tend to think only of the obvious uses of the chalkboard and overlook its unique potentialities. School buildings today are equipped with nonglare boards of soft green or other pastel shades, usually permanently mounted on two sides of the class room. The chalk is relatively dustless and clean, and one or more of the board sections is likely to have a metal tacking so that it may be used as a magnetic chalk board.

Advantages:

1. The chalkboard is always ready for use.

2. It is highly flexible for use be either teachers or students.

3. Copy can be easily erased, replaced, or modified.

4. Color may be used.

5. Tests may be placed on the board and covered until ready for use.

Limitations:

1. Material with much detail cannot easily be placed on the chalkboard.

2. Preplanning is necessary to make the best use of the board space available and time of the class.

3. It is used largely with groups of students rather than individuals.

APPENDIX E

ADVANTAGES AND LIMITATIONS OF SOME CLASSROOM MEDIA

MEDIUM	ADVANTAGES	LIMITATIONS	WAYS TO OVERCOME LIMITATIONS
LECTURE	Presents facts and ideas rapidly	Difficulty to adjust individual speed of comprehension	Dynamic, interesting manner
	Emphasis placed where teacher	Mostly one-way communication	Use audiovisual supports
	Excellent for background information	Little learner participation or activity to maintain interest	Ask questions, even if only rhetorical
	No limit to size of audience	No direct check on learning taking place	Pose questions, and provide answers after a pause
	Can be filmed or taped (VTR)	Difficult to prepare for unknown audience	Use check-up questions with student response devices
	Can be interrupted by requests for more detail	Difficult to maintain attention and interest	Supply printed outline, with space for note-taking
	Can be interesting, lively	Effectiveness depends on skill and personality	Use chart to present outline of objectives
	Teacher controls content and sequencing		Prepare transitions, introductions, and summaries
	Combines readily with other media		Adjust vocabulary to the audience
	Can be broadcast to remote locations		Use short quiz last few minutes; provide answer key
DISCUSSION	Encourages learner activity	Depends on learner capacity and mood for participating	Have a reserve of stimulating questions available
	Maintains interest	Time consuming	Practice summary, transition, and guidance of learning
	Avoids monotony	Requires preparation of stimulating questions	Good aids, visuals, handouts

MEDIUM	ADVANTAGES	LIMITATIONS	WAYS TO OVERCOME LIMITATIONS
DISCUSSION (Con)	Learner can check his ideas with those of others	Requires back-up aids if discussion lags	Permissive communicatication with learners
	Prepared questions stimulate critical thinking	Requires instructor skilled in human relations, directing and controlling	Start with a viewpoint designed to provoke discussion
	Gives learner sense of responsibility for	Instructor needs to summarize skillfully, remembering who contributed main points	Be able to predict student response and build upon this
	Exercises skills in democratic cooperation	Instructor must be able to think fast, to shift, adapt, accommodate	Learn the background of students
	Shares experiences of advanced students	Requires permissive guidance	Give advance assignment or briefing
	Mature, cooperative way of learning	Student must read or otherwise prepare in advance	
	Increases student commitment	Size of group limited for active discussion	
	Provides feedback to teacher on progress made	Learners must be homogeneous in in background and maturity	
DEMONSTRATION/ PERFORMANCE	Saves time and talk	Requires skilled demonstrator/ assistants to watch learners' practice	Encourage student questions/ answers between steps of demonstration
	Easier to watch a procedure than to listen to verbal description	During demonstration, no learner participation	Provide immediate learner practice after demonstration
	Realistic; adds variety	Outdoor demonstrations affected by weather	Stop action or direct attention at critical points of demonstration

MEDIUM	ADVANTAGES	LIMITATIONS	WAYS TO OVERCOME LIMITATIONS
DEMONSTRATION/ PERFORMANCE (Con)	Demonstration provides model and standards for learner performance	Perform demonstration at regular speed, then repeat slowly (difficult to do, may confuse learner). Opposite approach is piece-meal, then total performance is at normal rate	Repeat parts, then entire demonstration
	Gives learner confidence when when he performs adequately		If you demonstrate way not to do it, follow at once with correct procedure and emphasize latter
	Explanations are more concrete	May require expensive equipment & personnel on standby for long period	Reward correct student performance, employ and space judiciously
	Provides unity for a series of elements	Frequent rehearsal needed to maintain model demonstration	Use relevant units for part-practice, then whole practice
	Can have large class		Alternate small units of demonstration and practice early, then total performance later
	Minimizes dangers, errors, waste, damage		
AUTO-INSTRUCTION;	Self-paced rate of presentation	Takes many hours to prepare and validate	Be sure teachers, students and administrators understand purpose and use
PROGRAMMED LEARNING;	Designed for performance objectives	Requires training and experience to produce	Reward students for timely completion
LEARNING PACKETS	Provides frequent knowledge of results (reinforcement)	Some learners dislike small steps.	Insure mastery by a criterion test
	Learner masters one step before next is presented	Contrary to school periods set for group pacing	Space criterion tests at suitable intervals
	Active learner participation		
	Low error rate		

MEDIUM	ADVANTAGES	LIMITATIONS	WAYS TO OVERCOME LIMITATIONS
AUTO-INSTRUCTION; PROGRAMMED LEARNING; LEARNING PACKETS (Con)	High retention and progressive achievement Efficient use of time of teacher and learner Content is standard and reproduceable; stability of presentation		

Briggs, Leslie J. Handbook of Procedures for the Design of Instruction. Pittsburgh, Pennsylvania: American Institute for Research, 1970. Chapter VI, Media Selection and Prescription, pp. 93-162. (Pages 100-104 were prepared by Dr. Merlyn Mitchell; Pages 105-108 were prepared by Mr. William Freeman)

APPENDIX F

Appendix F

Job Sheet

For Module #_____
Unit #_____

Directions:

1. Pick up all the equipment listed below
2. Pick up all meterials listed below
3. Bring everything to your work area
4. If you can't find anything, as the instructor
5. Definitions for technical words on the attached sheet

Equipment Needed	Materials Needed	Work Area

Job Steps:

1.

2.

3.

Key Things to Look For:

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