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ABSTRACT

This seventh in a series of eleven learning modules on program planning, development, and evaluation is designed to help secondary and postsecondary vocational teachers analyze an occupation (task analysis) and organize the results of the analysis so as to maximize its value in developing an educational program. The terminal objective for the module is to conduct an occupational analysis. Introductory sections relate the competencies dealt with here to others in the program and list both the enabling objectives for the five learning experiences and the resources required. Materials in the learning experiences include required readings (e.g., defining scope of an occupational analysis, preparing an initial listing of duty and statement, verifying task and duty statements, and analyzing and reporting task inventory data), checklists, and the teacher performance assessment form for use in evaluation of the terminal objective. (The modules on program planning, development, and evaluation are part of a larger series of 100 field-tested performance-based teacher education (PBTE) self-contained learning packages for use in preservice or inservice training of teachers in all occupational areas. Materials are designed for use by teachers, either on an individual or group basis, working under the direction of one or more resource persons/instructors.) (SH)

MODULE

A-7

Conduct an Occupational Analysis

MODULE A-7 OF CATEGORY A—PROGRAM PLANNING, DEVELOPMENT, AND EVALUATION
PROFESSIONAL TEACHER EDUCATION MODULE SERIES

The Center for Vocational Education
The Ohio State University

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FOREWORD

This module is one of a series of 100 performance-based teacher education (PBTE) learning packages focusing upon specific professional competencies of vocational teachers. The competencies upon which these modules are based were identified and verified through research as being important to successful vocational teaching at both the secondary and post-secondary levels of instruction. The modules are suitable for the preparation of teachers in all occupational areas.

Each module provides learning experiences that integrate theory and application, each culminates with criterion referenced assessment of the teacher's performance of the specified competency. The materials are designed for use by individual or groups of teachers in training working under the direction and with the assistance of teacher educators acting as resource persons. Resource persons should be skilled in the teacher competency being developed and should be thoroughly oriented to PBTE concepts and procedures in using these materials.

The design of the materials provides considerable flexibility for planning and conducting performance-based preservice and inservice teacher preparation programs to meet a wide variety of individual needs and interests. The materials are intended for use by universities and colleges, state departments of education, post-secondary institutions, local education agencies, and others responsible for the professional development of vocational teachers. Further information about the use of the modules in teacher education programs is contained in three related documents **Student Guide to Using Performance-Based Teacher Education Materials, Resource Person Guide to Using Performance-Based Teacher Education Materials** and **Guide to Implementation of Performance-Based Teacher Education.**

The PBTE curriculum packages are products of a sustained research and development effort by The Center's Program for Professional Development for Vocational Education. Many individuals, institutions, and agencies participated with The Center and have made contributions to the systematic development, testing, revision, and refinement of these very significant training materials. Over 40 teacher educators provided input in development of initial versions of the modules, over 2,000 teachers and 300 resource persons in 20 universities, colleges, and post-secondary institutions used the materials and provided feedback to The Center for revision and refinement.

Special recognition for major individual roles in the direction, development, coordination of testing, revision, and refinement of these materials is extended to the following program staff: James B. Hamilton, Program Director, Robert E. Norton, Associate Program Director, Glen E. Fardig, Specialist, Lois Harrington, Program Assistant, and Karen Quinn, Program Assistant. Recognition is also extended to Kristy Ross, Technical Assistant, Joan Jones, Technical Assistant, and Jean Wisenbaugh, Artist for their contributions to the final refinement of the materials. Contributions made by former program staff toward developmental versions of these materials are also acknowledged. Calvin J Cotrell directed the vocational teacher competency research studies upon which these modules are based and also directed the curriculum development effort from 1971–1972. Curtis R. Finch provided leadership for the program from 1972–1974.

Appreciation is also extended to all those outside The Center (consultants, field site coordinators, teacher educators, teachers, and others) who contributed so generously in various phases of the total effort. Early versions of the materials were developed by The Center in cooperation with the vocational teacher education faculties at Oregon State University and at the University of Missouri-Columbia. Preliminary testing of the materials was conducted at Oregon State University, Temple University, and University of Missouri-Columbia.

Following preliminary testing, major revision of all materials was performed by Center Staff with the assistance of numerous consultants and visiting scholars from throughout the country.

Advanced testing of the materials was carried out with assistance of the vocational teacher educators and students of Central Washington State College, Colorado State University, Ferris State College, Michigan, Florida State University, Holland College, P.E.I., Canada, Oklahoma State University, Rutgers University, State University College at Buffalo, Temple University, University of Arizona; University of Michigan-Flint; University of Minnesota-Twin Cities; University of Nebraska-Lincoln, University of Northern Colorado, University of Pittsburgh, University of Tennessee, University of Vermont, and Utah State University.

The Center is grateful to the National Institute of Education for sponsorship of this PBTE curriculum development effort from 1972 through its completion. Appreciation is extended to the Bureau of Occupational and Adult Education of the U.S. Office of Education for their sponsorship of training and advanced testing of the materials at 10 sites under provisions of EPDA Part F, Section 553. Recognition of funding support of the advanced testing effort is also extended to Ferris State College, Holland College, Temple University, and the University of Michigan-Flint.

Robert E. Taylor
Executive Director
The Center for Vocational Education

THE CENTER FOR VOCATIONAL EDUCATION
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The Center for Vocational Education's mission is to increase the ability of diverse agencies, institutions, and organizations to solve educational problems relating to individual career planning, preparation, and progression. The Center fulfills its mission by

- Generating knowledge through research
- Developing educational programs and products
- Evaluating individual program needs and outcomes
- Installing educational programs and products
- Operating information systems and services
- Conducting leadership development and training programs.

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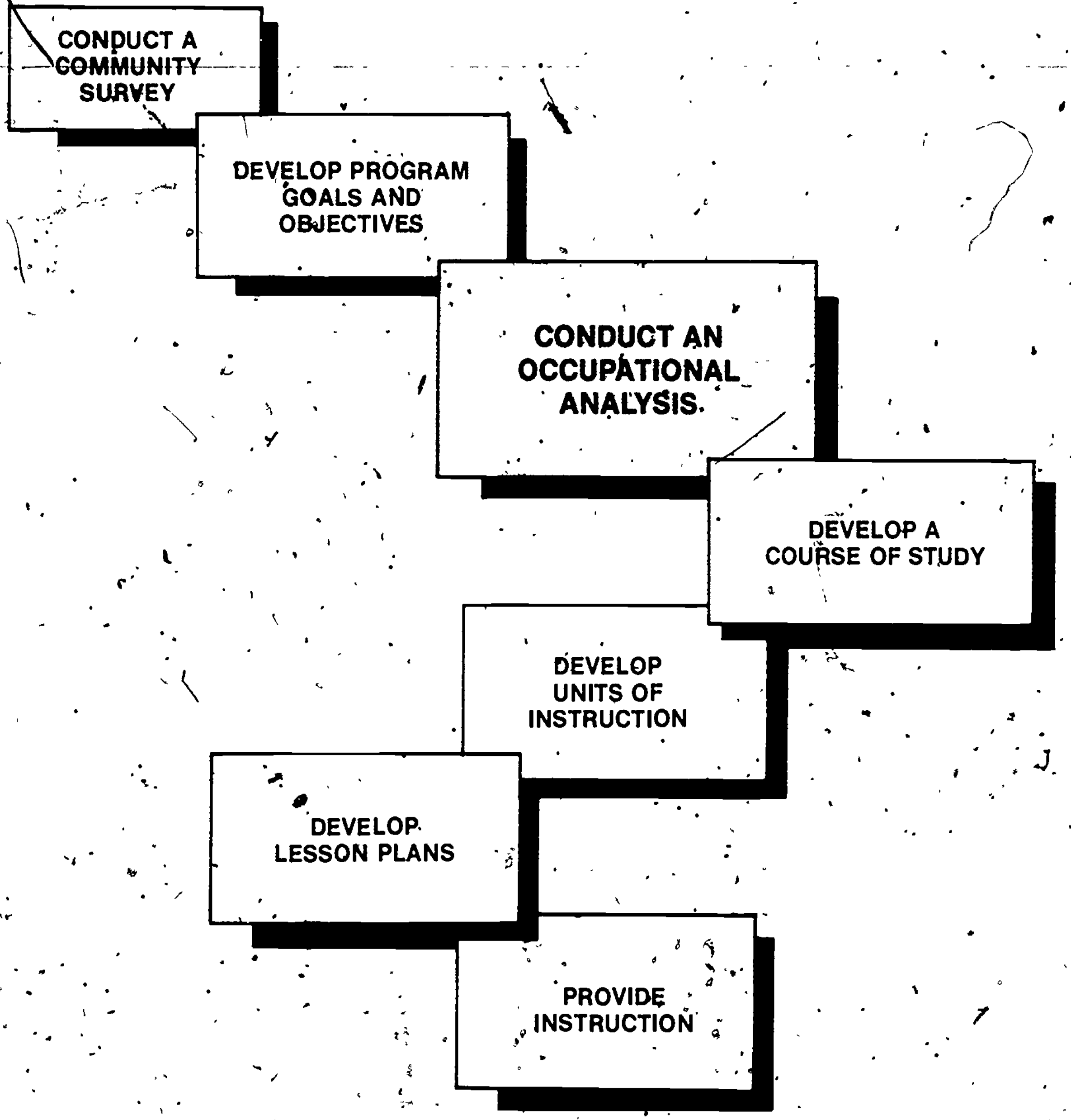
The American Association for Vocational Instructional Materials (AAVIM) is an interstate organization of universities, colleges and divisions of vocational education devoted to the improvement of teaching through better information and teaching aids



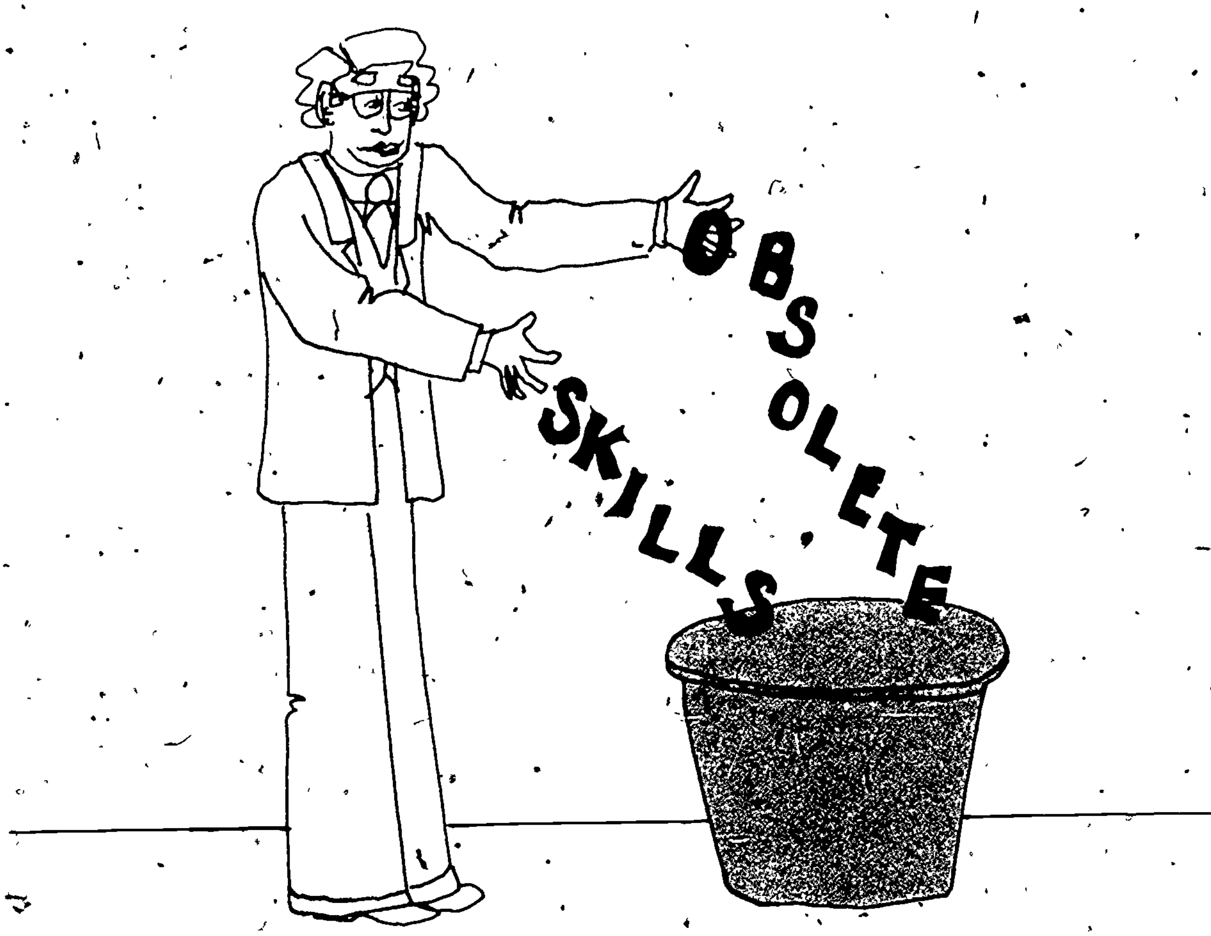
CURRICULUM DEVELOPMENT PROCESS

INTRODUCTION

The rationale for vocational education rests on the premise that the skills contributing to success in an occupation can be identified and used to develop relevant educational experiences. The learning experiences which are believed to develop occupational proficiency must be reviewed and revised from time to time to meet changing occupational requirements. Occupational analysis has long been used by vocational educators to identify the skills that should be taught in a vocational education program. Often, a new analysis results in the identification of unnecessary or obsolete skills which should be eliminated from an existing program.

It is important that we continue to identify the critical knowledge and skills needed if the goal of vocational education—that of successful employment in an occupation suited to the needs and interests of each individual—is to be met. Since it is possible to design a good educational program only when the end results being sought are clearly stated, the analysis of an occupation is an important step in the vocational education planning and curriculum development process. This curriculum development process is depicted in the diagram on p. 2.

Your successful completion of this module will prepare you for analyzing an occupation. In addition, you will learn how to organize the results of the analysis so as to maximize its value in developing an educational program.



ABOUT THIS MODULE

Objectives

Terminal Objective: While working in actual school situation, conduct an occupational analysis. Your performance will be assessed by your resource person, using the Teacher Performance Assessment Form, pp. 69-71 (*Learning Experience V*).

Enabling Objectives:

1. After completing the required reading, define the scope of an occupational analysis (*Learning Experience I*).
2. After completing the required reading, prepare an initial listing of duty and task statements by partially analyzing a selected occupation (*Learning Experience II*).
3. After completing the required reading, verify an initial listing of task and duty statements (*Learning Experience III*).
4. After completing the required reading, analyze and report the task inventory data (*Learning Experience IV*).

Resources

A list of the outside resources which supplement those contained within the module follows. Check with your resource person (1) to determine the availability and the location of these resources, (2) to locate additional references in your occupational specialty, and (3) to get assistance in setting up activities with peers or observations of skilled teachers, if necessary. Your resource person may also be contacted if you have any difficulty with directions, or in assessing your progress at any time.

Learning Experience I

Optional

Reference: Fryklund, Verne C. *Occupational Analysis: Techniques and Procedures*. New York, NY: Bruce Publishing Company, 1970.

Reference: Ammerman, H. L. and F. C. Pratzner. *Performance Content for Job Training. Volume I: Introduction*. Columbus, OH: The Center for Vocational Education, The Ohio State University, 1977.

Reference: Ammerman, H. L. *Performance Content for Job Training. Volume 2: Stating the Tasks of the Job*. Columbus, OH: The Center for Vocational Education, The Ohio State University, 1977.

Reference: U.S. Department of Labor, Bureau of Employment Security. *Dictionary of Occupational Titles*, Volumes I and II, 1965. (NOTE: Updated editions of the DOT are published periodically.)

Reference: U.S. Department of Labor, Bureau of Labor Statistics. *Occupational Outlook Handbook*, Current Edition.

Reference: Arnold, Walter M. et al. (Eds.). *Career Opportunities for Technicians and Specialists*. Volumes I–V. New York, NY: Doubleday & Co., Inc., 1969–70.

Reference: Norton, Joseph L. (Ed.) *On the Job*. New York, NY: Doubleday & Company, Inc., 1971.

Learning Experience II

Required

Two or more employers or employees whom you can interview concerning a selected occupation.

One or more references (e.g., *curriculum guides, existing task inventories*) which you can review.

Optional

Reference: Ammerman, H. L. *Performance Content for Job Training. Volume 2: Stating the Tasks of the Job*. Columbus, OH: The Center for Vocational Education, The Ohio State University, 1977.

Learning Experience III

Required

An initial partial listing of task and duty statements to use in verifying the statements.

A resource person and/or peers to review an initial listing of task and duty statements.

Five workers whom you can contact to verify an initial listing of task and duty statements.

Optional

Reference: Ammerman, H. L. *Performance Content for Job Training. Volume 3: Identifying Relevant Job Performance*. Columbus, OH: The Center for Vocational Education, The Ohio State University, 1977.

Reference: Ammerman, H. L. and D. W. Essex. *Performance Content for Job Training. Volume 4: Deriving Performance Requirements for Training*. Columbus, OH: The Center for Vocational Education, The Ohio State University, 1977.

Learning Experience IV

Required

Sample inventory data to use in preparing a summary report.

Learning Experience V

Required

An actual school situation in which you can conduct an occupational analysis.

A resource person to assess your competency in conducting an occupational analysis.

This module covers performance element numbers 32–35 from Calvin J. Cotrell et al., *Model Curricula for Vocational and Technical Teacher Education: Report No. V* (Columbus, OH: The Center for Vocational Education, The Ohio State University, 1972). The 384 elements in this document form the research base for all The Center's PBTE module development.

For information about the general organization of each module, general procedures for their use, and terminology which is common to all 100 modules, see About Using The Center's PBTE Modules on the inside back cover.

Learning Experience I

OVERVIEW

Enabling Objective

After completing the required reading, define the scope of an occupational analysis.

Activity

You will be reading the information sheet, Defining the Scope of an Occupational Analysis, pp. 6–12.

Optional Activity

You may wish to read the supplementary references, Fryklund, *Occupational Analysis: Techniques and Procedures*, pp. 1–4; Ammerman and Pratzner, *Performance Content for Job Training, Volume 1: Introduction*; and/or Ammerman, *Performance Content for Job Training, Volume 2: Stating the Tasks of the Job.*

Optional Activity

You may wish to meet with a teacher in your occupational specialty who is skilled in conducting occupational analyses to determine how the scope of the analysis was defined.

Optional Activity

You may wish to read appropriate sections of the *Dictionary of Occupational Titles*, Volumes I and II; the *Occupational Outlook Handbook*; Arnold, *Career Opportunities for Technicians and Specialists*; and/or Norton, *On the Job.*

Activity

You will be defining the scope of an occupational analysis by preparing one or more occupational descriptions, as appropriate.

Feedback

You will be evaluating your competency in defining the scope of an occupational analysis, using the Scope Definition Checklist, pp. 13–14.

7

Activity

For information on the purposes of, terms commonly used in, and steps involved in analyzing an occupation, and how to define the scope of an occupational analysis, read the following information sheet:

DEFINING THE SCOPE OF AN OCCUPATIONAL ANALYSIS

Purposes of Analyzing an Occupation

An occupational analysis defines a worker's **role;** that is, what the worker does on the job. These analyses serve an important function in determining how organizational activities are conducted and managed, products are produced and distributed, and services are provided for. Usually, the results of an occupational analysis are used for the following four related purposes.

First, this type of information is often given to a prospective worker to **explain what he/she is or will be expected to do** on the job. It helps the worker understand the requirements of the job, and the responsibilities and functions he or she will have.

Second, an analysis can serve as a **basis for organizing the job.** During such an organizational effort, decisions might be made regarding the sequence in which work is to be performed, or which workers will perform certain tasks. These decisions are made so that the work can be performed efficiently and effectively.

Third, **educational programs can be developed** using the analysis. Once specific worker skills are identified, a sound basis exists for identifying the types of educational experiences a potential worker should be provided in order to be competent in those skills.

The fourth purpose for which analyses are often used is **evaluation.** Knowing exactly what is involved in a job or occupation enables one to determine whether an individual is carrying out his/her work role. It also provides a basis for evaluating how well an individual in a training program is progressing.

For vocational teachers, the overriding purpose of conducting an analysis of an occupation is to obtain a sound basis for **designing, revising, or updating a training program.** It also helps teachers evaluate the progress of students toward their occupational goals. By using the information secured through an analysis, teachers have a basis for decision-making.

Terms in Occupational Analyses

Before discussing the steps involved in analyzing an occupation, you need an understanding of the terms associated with occupational analyses. They are as follows:

An **occupational cluster** is a group of **jobs/occupations** that are related on the basis of the type of materials and equipment worked upon, subject matter content needed, or technical concepts involved. For example, textile workers are a group of individuals who work with textiles. They form an occupational cluster.

A **job/occupation** is a collection of **duties and tasks** constituting the total work assignment of a single group of workers performing essentially the same type of work and/or having the same job title. For example, an alteration specialist is a specific type of textile worker whose job consists of altering clothing.

A **duty** is an arbitrary **division of a job** (or of an occupational area) **into related tasks** for descriptive purposes. Duties are usually stated as a general area of responsibility, with action words ending in "ing." For example, a specific duty of an alteration specialist may be altering men's clothing.

A **task** is a meaningful **unit of work activity** generally performed on the job by one worker within a limited period of time. This task is logical and necessary to achieving a single objective or output. For example, when altering men's clothing, the alteration specialist may be given the specific task of tapering the legs of a pair of men's slacks.

A **step or element** is an **action, operation,** or **activity** which is a logical **segment of a task** and, when completed, advances the work For example, one of the important steps involved in tapering the legs of a pair of slacks may be to replace the cuffs.

The relationship of these occupational terms, along with supporting examples, is shown in Figure 1. In addition to being familiar with them, you also need an understanding of the definitions of the following analysis terms

- An **analysis** is an orderly process for determining the makeup of a whole by dividing it into its essential parts.
- An **occupational analysis/job analysis** is the systematic identification, usually for instructional purposes, of the essential tasks which workers are required to perform on the job. Such an analysis may also include working conditions, technical knowledge required, and worker qualifications
- A **task analysis** is the systematic examination of a task and the identification of the steps, operations, or elements involved in the task

Steps in Analyzing an Occupation

You need an understanding of the previous terms before you prepare to analyze an occupation. After attaining this understanding, you will need to accomplish the following steps in conducting an occupational analysis

1. **Define the scope or breadth of the analysis.**—That is, determine whether it is for one specific occupation or for an occupational cluster.
2. **Prepare an initial listing of analysis components (duties and tasks).**—That is, develop a list of statements describing worker duties and tasks in each occupation involved.
3. **Verify initial listing of analysis components.**—That is, confirm that the statements actually describe the work performed in the occupation(s) being considered.
4. **Compile a final listing of the analysis components.**—That is, gather together statements which have been confirmed as describing the occupation(s).

Each of these steps is depicted in Figure 2 The first step, that of deciding on the scope of the analysis, will be discussed in this learning experience. A detailed discussion of the subsequent steps will be presented in later learning experiences

FIGURE 1

RELATIONSHIP OF OCCUPATIONAL TERMS, WITH EXAMPLES

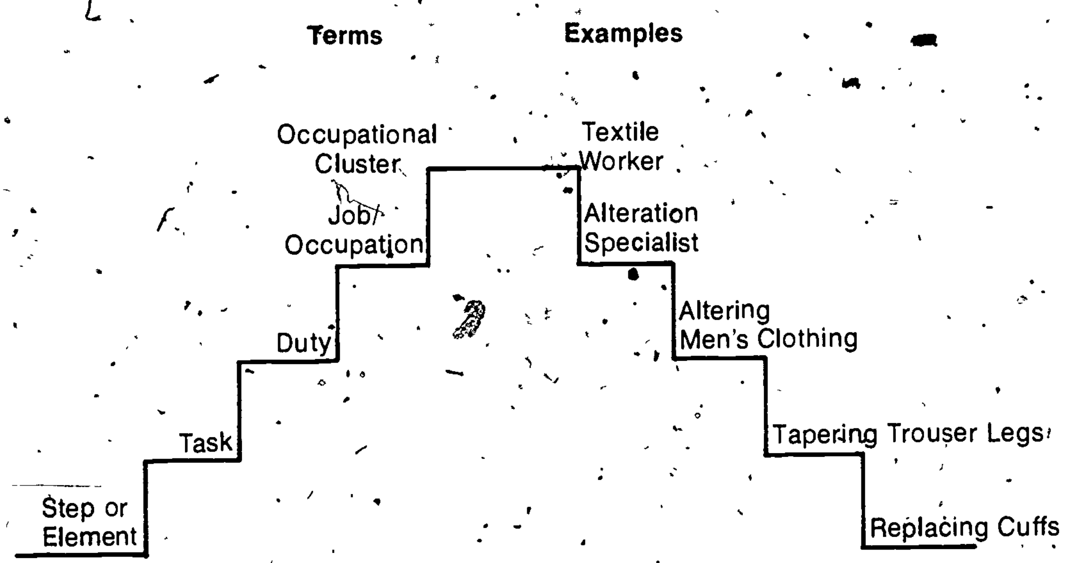


FIGURE 2

STEPS IN ANALYZING AN OCCUPATION

Define Scope. → Prepare Initial Listing → Verify Initial Listing → Compile Final Listing

Defining the Scope of the Analysis

The first step in analyzing an occupation is to decide on the breadth or scope of the analysis. Determining this scope will affect how the analysis inventory (i.e., list of statements describing worker performance) will be constructed and administered. If analysis statements are kept quite specific and occupations are clustered too broadly, there will be a large number of statements in the inventory and the analysis will be cumbersome. If the statements of work activity are too general, the volume of associated work will be reduced, but the inventory results will probably be less useful.

Because of the potential difficulties which might arise from either situation, it is recommended that analyses be designed between the two previously mentioned extremes. For example, constructing an analysis of the occupational cluster of **secretary** to use as a basis for planning a program to prepare **legal secretaries** would not be useful because it would be too general. The statements of work activity in the inventory would not be specific enough to give students the special skills they need to become legal secretaries (e.g., knowledge of legal terminology).

Your program for training legal secretaries would need to be based on an analysis of the job of legal secretary. However, when preparing statements of work activity for the specific job of legal secretary, you must be careful not to bog down the analysis with too specific statements (e.g., ability to pronounce legal terminology).

An additional factor which should be considered in deciding how broad an analysis to make relates to the breadth of preparation a student needs to be employable. If a program is directed only toward a **specific** occupation, what happens to graduates if there are no immediate vacancies, if they are unemployed for long periods of time, or if that job becomes obsolete? If they are able to enter an occupation other than the one for which they were prepared, will they be productive, and will they be able to hold on to their positions?

As with the previous concern about the specificity of the analysis statements, this concern can be avoided by conducting an analysis for a cluster of related occupations—occupations that have more or less similar skill and knowledge entry-level requirements. This would make the program more comprehensive and provide individuals leaving the program with more options for becoming employed.

When updating an analysis for an existing vocational program, you would normally analyze the same occupations that the vocational program was based on. The scope of an existing program analysis might, however, be **enlarged** if the enrollment was **low** because the occupational area was too narrowly defined, or **reduced** if the enrollment was **high** and the occupational area very broadly defined.

There could be a third concern in planning the breadth of the analysis. The occupation(s) you choose to deal with in the analysis might depend on whether you are trying to **update** an existing program or **design** a new program.

Therefore, the three concerns you should be addressing when determining the scope of the analysis are—

- What is the nature of the work activity statements you will be dealing with?
- Are students employable after leaving the program?
- What is the present status of the program?

While all these concerns are important and should be considered, the employability of students leaving the program is by far the most important

Using community survey and other inputs.—Many questions that you will need to have answered before conducting the analysis can be answered by **reviewing** community survey data and **talking** with members of the community. They can also be answered by examining **employment projections** from state and federal employment offices, and from local business and industry.

After answering the questions you have, it should be a relatively simple matter to identify an occupation or occupational cluster for which employees should be prepared, and in which there is potential student interest. Some of the questions you will need answers to are as follows

- In what occupations or occupational area(s) do employment opportunities exist? Will these opportunities exist two, three, four, or five years later? If not, what other occupations or occupational areas offer more employment potential during the next five years?
- Are qualified students interested in preparing to work in the identified occupations or occupational areas?
- Are the rewards offered in these occupations or occupational areas of sufficient magnitude to hold an individual who has been prepared?
- Is a formal educational program really necessary for preparing workers for any of the occupations or occupational areas?
- Will employers hire individuals who have completed a formal program?

If an occupational cluster is identified as needing to be analyzed, each of the occupations included in the cluster need to be identified For example, Borcher and Leiter identified their automotive mechanics cluster as including the following occupations (1) mechanic, (2) mechanic's helper or apprentice, (3) service manager, (4) service writer or advisor, and (5) garage owner (usually only in the case of the independent garage) [1]

Using the data you have collected, together with input from your advisory committee, you should be able to identify the involved occupations in your occupational cluster. *The Dictionary of Occupational Titles* or the *Occupational Outlook Handbook* may prove valuable in identifying and describing related occupations (see p. 12).

Developing the job descriptions.—Once the occupation or occupations are identified, you should proceed with defining the scope of the analysis by developing occupational or job descriptions for each occupation specified Although such descriptions vary widely in content, the following information should be included in your analysis

- What is the occupational title(s)?
- What is the *Dictionary of Occupational Titles* code number, if available?
- What does the individual do?
- What must the individual know (general areas of knowledge only)?
- Where does the individual work, and under whose supervision?
- What are the physical requirements?
- What are some of the more common tools and equipment used on the job?
- What future occupational changes are expected?
- What related occupations exist which require more or less preparation?
- What licensing requirements exist, if any?

Two sample descriptions, which have been used in connection with analysis procedures, are shown in Samples 1 and 2

The preparation of these occupational descriptions will play an important role in any analysis effort as they help to define the scope of the analysis to be performed This is especially important in communicating to others exactly what is being undertaken.

In preparing these descriptions, there are many

1 Sidney D Borcher and Paul B Leiter, *Automotive Mechanics Occupational Performance Survey*, Interim Report (Columbus, OH The Center for Vocational Education, The Ohio State University, 1973) p 3

sources of data from which you can get the necessary information. Your own personal knowledge of an occupation might result in your being a primary source of such information. However, a broader range of sources should usually be used. Workers and employers can provide you with the answers to many questions about their occupations. Members of your advisory committee may also be able to provide you with useful information. In addition, many published sources are available that describe occupations. The *Dictionary of Occupational Titles*, the *Occupational Outlook Handbook*, *Career Opportunities*, and *On the Job* are some of the more readily available ones (see p. 12).

Previously developed occupational descriptions are also often available in curriculum guides or other educational literature related to preparing an individual for employment. These often will need to be revised and updated, however. Sometimes employers can provide detailed job descriptions which they have developed for use in their own operations.

Preparing for the analysis.—To prepare yourself for conducting the analysis, you should be sure you are familiar with the language and characteristics of the occupations to be studied. Information for these purposes may be obtained from—

- books, periodicals, and other literature on technical or related subjects available in libraries
- catalogues, organizational and flow charts, and process descriptions already prepared by business or industry
- technical literature on industrial processes, and job descriptions prepared by trade associations, trade unions, and professional societies
- pamphlets, books, and job descriptions prepared by federal, state, and municipal government departments which have interests in the industry or occupational area

By planning in advance for the analysis, you will be able to talk to management, supervisors, and workers in a language common to all. This background information will also help you observe and evaluate job tasks and processes objectively without loss of time.

SAMPLE 1

JOB DESCRIPTION

Occupational Cluster: Alteration Specialist[2]

Occupations: Seamstress (DOT Code No. 782.884)

Alteration Tailor (DOT Code No. 785.281)

In the textile service industry, the bulk of the repair and/or alteration of clothing will be handled by two trained and skilled individuals. Their job titles are dressmaker (seamstress) and bushelman (alteration tailor). The head of the department will usually take care of any customer fitting problems. The dressmaker who does alteration work performs a wide variety of sewing operations, such as hemming coats and dresses, removing and replacing zippers, resewing seams, and performing other minor alterations.

The bushelman (alteration tailor) will, as a rule, work on the heavier fabrics and garments, such as trousers, suit coats, top coats, and rainwear. The bushelman will perform such tasks as lengthening or shortening sleeves, trouser cuffs, coat and skirt hems. He/she will also alter waistbands for trousers, slacks, and skirts. The head bushelman or dressmaker will handle garments that come under the heading of plant damage or have a major sewing problem.

Responsibilities of the head dressmaker or bushelman may also include the supervision of sewing room operations and maintenance of various records.

2. Elaine Buerkel and Joseph H Rehling, *Alteration Specialist Occupational Analysis* (Columbus, OH Instructional Materials Laboratory, Trade and Industrial Education, The Ohio State University, 1974), p 11

SAMPLE 2

JOB DESCRIPTION

Occupation: Ranch Laborer[3] (DOT Code No. 413.887)

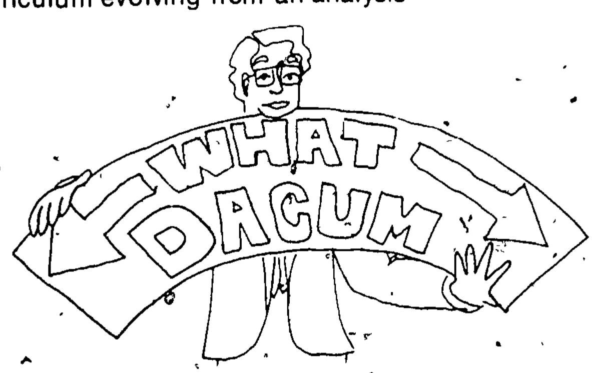
Participates in branding, dehorning, and castrating. Herds animals to pens and pastures. Applies prescribed medications. Digs post holes by hand, repairs fences and buildings using hand tools, pulls weeds by hand, removes trash and dirt from watering places. Mixes feed by hand. May ride horseback to assist in herding. Does not operate mobile or stationary power-driven equipment.

3 Lee R Gobbo, "Competencies Needed for Employment in Beef Production Enterprises" (unpublished master's thesis, Colorado State University, 1975), p 142

Using the DACUM approach to competency identification.[4] —It should be mentioned at this time that, while the previously discussed approach to identifying job tasks is the most commonly used, there are other approaches which are gradually emerging. The DACUM technique, for example, is a relatively new approach which is now being used at some post-secondary institutions as a basis for program planning.

DACUM (**Developing A Curriculum**) was created in the late 1960's by the Experimental Projects Branch, Canada Department of Regional Economic Expansion, and the General Learning Corporation of New York. It has proven to be a very effective approach for quickly deriving, at a relatively low cost, the competencies or tasks that must be performed by persons employed in a given position or occupational area.

DACUM, which utilizes small-group brainstorming techniques, is a process which results in a skill profile for a particular job or occupational area. DACUM is primarily concerned with the **what** of a curriculum, rather than the **how**. It is, in fact, a form of an analysis of the occupation rather than a curriculum evolving from an analysis



4 Material adapted from William E Sinnett, *The Application of DACUM in Retraining and Post-Secondary Curriculum Development* (Toronto, Ontario Humber College of Applied Arts and Technology, Lakeshore Campus, 1974)

It is graphic in nature, presenting definitions of an entire occupation on a sheet of paper This tends to prevent treatment of any element of the occupation in isolation and, conversely, tends to promote treatment of each element as part of a larger whole General areas of competence required in the occupation are defined and each is subdivided into those individual skills (tasks) that collectively enable an individual to perform competently within that general area. These skills are defined quite simply and are structured independently in small blocks on the chart. Each can serve as an independent goal for learning achievement.

A carefully chosen group of about 10–12 experts in the occupational area form the DACUM committee and work for three days to develop the DACUM chart. Committee members are recruited directly from business, industry, or the professions, and do not include vocational educators. A DACUM committee is carefully guided through each of the following steps.

1. Provide a general introduction and orientation.
2. Review a description of the specific job or occupational area.
3. Identify the general areas of competence.
4. Identify the specific skills for each of the general areas of competence
5. Review and refine the skill statements
6. Sequence the skill statements.
7. Establish levels of competence for each skill in terms of difficulty, frequency, and general importance.
8. Structure the competency profile chart into a final form.

Once completed, the DACUM chart serves as a basis for the content structure of the instructional materials that are developed by the vocational teacher with the advice of the occupational advisory committee.

Optional Activity

For further information about the purposes of, and rationale and techniques for, conducting an occupational analysis, you may wish to read Fryklund, *Occupational Analysis: Techniques and Procedures*, pp. 1–4; Ammerman and Pratzner, *Performance Content for Job Training, Volume I: Introduction*; and/or Ammerman, *Performance Content for Job Training, Volume 2: Stating the Tasks of the Job*.

Optional Activity

You may wish to arrange through your resource person to meet with a teacher in your occupational specialty who is skilled in preparing for an occupational analysis. During this meeting, you may wish to discuss how he/she defines the scope of an occupational analysis, and to obtain a copy of a recently conducted occupational analysis for your review.

Optional Activity

For information you will need when conducting an occupational analysis, you may wish to read appropriate sections of references which describe occupations such as the *Dictionary of Occupational Titles*, Volumes I and II; the *Occupational Outlook Handbook*; Arnold, *Career Opportunities for Technicians and Specialists*; and/or Norton, *On the Job*.

Activity

Select an occupation or occupational cluster in your vocational service area and define the scope of a proposed occupational analysis for your community. This will include—

- identifying as many of the jobs commonly found within the occupational area as possible
- developing brief, but comprehensive, written descriptions for at least two of the jobs
- by reviewing available community survey data, securing basic employment opportunities data for the two selected jobs to help further define the scope of the analysis
- interviewing two or more employers in the occupational area selected

Feedback

After you have defined the scope of work for an occupational analysis, use the Scope Definition Checklist, pp. 13–14, to evaluate your work.

SCOPE DEFINITION CHECKLIST

Directions: Place an X in the NO, PARTIAL, or FULL box to indicate that each of the following performance components was not accomplished, partially accomplished, or fully accomplished. If, because of special circumstances, a performance component was not applicable, or impossible to execute, place an X in the N/A box.

Name

Date

Resource Person

LEVEL OF PERFORMANCE

	N/A	No	Partial	Full
1. An occupation or occupational cluster was selected for analysis considering the following:				
a. community employment needs	☐	☐	☐	☐
b. resources available to use in planning and conducting the analysis	☐	☐	☐	☐
2. For the selected occupation or occupational cluster, data indicate that:				
a. employment opportunities will exist at the time the students complete their preparation	☐	☐	☐	☐
b. rewards of such work are sufficient to hold prepared individuals	☐	☐	☐	☐
c. a formal educational program is necessary for preparing workers	☐	☐	☐	☐
d. employers will hire individuals who have completed an educational program	☐	☐	☐	☐
3. If an occupational cluster was selected, the occupations within that cluster were identified	☐	☐	☐	☐
4. An occupational description has been prepared for at least two of the jobs involved and each includes the following types of information:				
a. occupational title(s)	☐	☐	☐	☐
b. *Dictionary of Occupational Titles'* code number	☐	☐	☐	☐
c. what the individual does	☐	☐	☐	☐
d. what the individual must know (general areas of knowledge)	☐	☐	☐	☐
e. where the individual works, and under whose supervision	☐	☐	☐	☐
f. what the physical requirements are	☐	☐	☐	☐
g. what some of the more common tools and equipment used on the job are	☐	☐	☐	☐

	N/A	No	Partial	Full
5. In developing the occupational descriptions, the following sources of data were consulted:				
a. *Dictionary of Occupational Titles*	☐	☐	☐	☐
b. *Occupational Outlook Handbook*	☐	☐	☐	☐
c. manpower survey data for community	☐	☐	☐	☐

LEVEL OF PERFORMANCE: All items must receive FULL, or N/A responses. If any item receives a NO, or PARTIAL response, review the material in the information sheet, Defining the Scope of an Occupational Analysis, pp 6–12, revise your definition accordingly, or check with your resource person if necessary.

Learning Experience II

OVERVIEW

Enabling Objective	After completing the required reading, prepare an initial listing of duty and task statements by partially analyzing a selected occupation.
Activity	You will be reading the information sheet, Preparing an Initial Listing of Duty and Task Statements, pp. 16–25.
Optional Activity	You may wish to read the supplementary reference, Ammerman, *Performance Content for Job Training, Volume 2: Stating the Tasks of the Job.*
Activity	You will be preparing an initial listing of task and duty statements for a specific occupation.
Feedback	You will be evaluating your competency in preparing an initial listing of duty and task statements, using the Initial Listing Checklist, pp. 27–28.

Activity

For information concerning the preparation of an initial listing of duty and task statements, read the following information sheet:

PREPARING AN INITIAL LISTING OF DUTY AND STATEMENTS[5]

Locating Sources

After you have defined the scope of your analysis, your next step is to prepare an initial listing or inventory of the duties and tasks of the occupation. This is an initial and fairly rough list—one that you will revise and refine in the course of your analysis. In constructing such a listing, seek input and information from employers, employees, advisory committee members, interested individual members of employer and employee organizations, and relevant printed materials. This information, combined with your own knowledge of the occupation, should provide you with a reasonably complete list.

Among the printed materials you should consider is **Resources In Vocational Education** (Columbus, OH: The Center for Vocational Education, The Ohio State University). Materials announced in *Resources in Vocational Education* include instructional materials such as those developed by local school districts, state departments of education, curriculum development laboratories, and industrial organizations. Research materials developed by research projects supported by the U.S. Office of Education, National Institute of Education, Department of Labor, Office of Economic Opportunity, private foundations, and other organizations are also included.

There are many **previously constructed inventories and analyses** available which you should review when preparing your initial listing. For example, **The Center for Vocational Education** at The Ohio State University has constructed some inventories, and these are available through the Educational Resources Information Center (ERIC) system. These and other tasks lists can be located through *Resources in Vocational Education*.

In addition, The Center has published three volumes entitled **Directory of Task Inventories**. Each directory contains information compiled from a review of documents from state educational and employment service agencies, occupational curriculum labs and research coordinating units, branches of the armed forces, selected private research and development agencies, and other organizations.

At the time of this writing, the **Instructional Materials Laboratory**, Trade and Industrial Education, The Ohio State University, Columbus, Ohio, has released analyses for seventy-one occupations. It is expected that this number will increase by ten each year. These publications are available by job title for a nominal fee from the laboratory.

The **Vocational-Technical Education Consortium of States (V-TECS)**, a consortium of 16 states, has joined together to conduct occupational (task) analyses of many occupational areas. Task statements are compiled and used to develop catalogues of performance objectives and criterion-referenced evaluation measures which, at the present time, are shared among consortium members only. As of this writing, V-TECS has produced catalogues of objectives and criterion-referenced measures for 33 occupations. If you live in one of the following states which are V-TECS members, you may wish to obtain a copy of the catalogues from your state department of education: Alabama, Delaware, Florida, Georgia, Indiana, Kentucky, Louisiana, Maryland, Michigan, Mississippi, Pennsylvania, South Carolina, Tennessee, Virginia, West Virginia, and Wisconsin. In addition, the U.S. Air Force Training Command and the U.S. Naval Training Command are members.

Many other organizations have been involved in the development of inventories or analyses. You should identify these organizations and ask to examine sources of relevant information to determine if anything of value is available to you. If your state has an individual responsible for vocational education curriculum materials development, you may wish to discuss your needs with him/her.

In addition, there are many **curriculum publica-**

5. Much of this material was adapted from William H. Melching and Sidney O. Borcher. *Procedures for Constructing and Using Task Inventories* (Columbus, OH: The Center for Vocational Education, The Ohio State University, 1973).

tions such as guides, outlines, courses of study, and objectives lists which you may find helpful when preparing your listing. Many curriculum publications contain some type of analysis information. While they vary in detail and completeness, they can serve as useful sources of statements or as information from which statements might be developed.

Modern **texts** can also furnish you with ideas for your task list. Chapter or section headings, topic statements, and instructional content can be used to generate items for the list. You can also use the texts to double-check the completeness of lists you may already have It should be mentioned that the acquisition of reference materials should start well in advance of the actual construction of the initial inventory. This will allow you some time between the location and receipt of some materials

Observing, interviewing, or informally conversing with selected workers on the job are effective means of establishing the initial listing. Though an initial listing can be prepared in this manner, it is probably more efficient to prepare the original listing using other techniques, and then to verify the listing using the observation or interview technique The following are suggested steps to follow in developing the initial listing (or inventory) of task and duty statements.

1. Determine the duty categories.
2. Prepare task statements
3. Organize the tasks and statements into a preliminary inventory.
4. Ask people from the occupational area to review the preliminary inventory.
5. Revise the inventory based on information received during the review
6. Pilot test the inventory.
7. Verify the inventory using incumbent workers.

(Step seven will be discussed in Learning Experience III.)

Developing an Inventory

As noted earlier, the number of statements in an inventory or listing is largely dependent on the scope of the occupation or occupational area for which information is to be sought It is generally recommended that one's interest be focused on a **cluster** of closely related jobs. This means that the inventory will usually include several occupations, all requiring similar skills and knowledge.

The inventory also should be designed to cover all levels of a particular career or promotion ladder. However, in cases where there is a large cluster of management positions, it may be best to develop separate inventories, one for the management positions and one for skilled workers

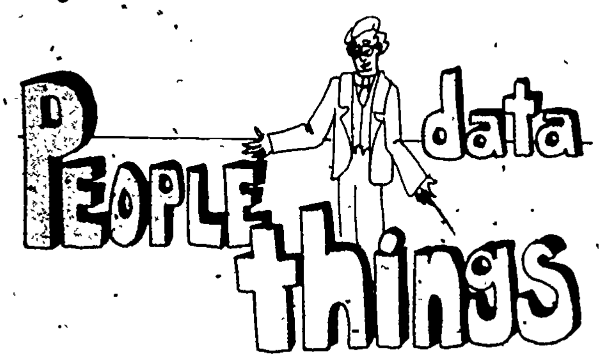
It is recommended, for practical reasons, that an inventory should generally contain at least 200, but not more than 600, task statements **The ultimate determiner of the number of task statements should be the complexity of the occupation being analyzed.** Complex occupations will obviously require more task statements than simpler ones Certainly **all** task statements, regardless of the number, which have **direct implications for instruction** should be listed when the analysis is being made for curriculum development purposes.

Since you will be testing this inventory at a later date by asking workers to respond to tasks on a voluntary basis, length should also be roughly determined by the number of tasks these people can reasonably be expected to react to in a limited amount of time Unless you can pay them, you cannot expect workers to spend over one hour of their time completing an inventory

Duty Statements

Before assembling task statements for the inventory, tentative duty categories must be established under which the task statements will be grouped You will recall that a duty is an **arbitrary division** of a job (or occupational area) consisting of related tasks that are grouped for descriptive purposes. There are generally two types of duty statements in an inventory. These are duty statements that reflect **supervisory activities** (e g , supervising, organizing, planning, directing, implementing, training, inspecting, and evaluating) and statements that reflect **work performance activities** (e.g., performing, maintaining, troubleshooting, repairing, removing and replacing, ad-

justing, and installing). An "object" (item acted upon) is used with these action words to further specify the duties, e.g., repairing **transmissions.** The "object" is always either data, people, or things.



Other duty headings will be suggested by headings from analyses, organizational charts, textbooks, and curriculum guides. A worker in a particular job might perform a number of related tasks which logically can be grouped together, and an appropriate duty heading can be written to cover those tasks.

If few task statements (i.e., ten or less) are found for a particular duty category, tasks under related duties might be combined. Examples of such combinations are "organizing and planning," "directing and implementing," and "inspecting and evaluating." Thus, more than one action word may be used to designate a single duty category. Examples of typical duty statements are listed in Sample 3.

Task Statements

Several important issues arise in connection with the preparation of task statements. One issue is, how specific should the task statements be? It is clear that they must be specific enough to give vocational teachers the information they need to be able to develop effective and efficient courses of instruction. If they are too specific, they can become cumbersome and result in more detailed information about workers' performance than can be incorporated in an educational program. If they are too general, information about important activities may be lost, communication among analysts and curriculum designers may be reduced, and general conclusions may be reached that provide no effective guidance.

While it is possible to distinguish between the **what** and **how** aspects of work activities, it is doubtful whether task statements should contain both elements. Following are examples to illustrate the point.

What	How
• Calculate the cost of a shipment of supplies.	• Use a fully automatic desk calculator.
• Estimate the stress on a beam in a structure (building) or (piece of equipment).	• Use the IBM 650 computer

While statements containing both elements can provide more information than statements containing only one element, using many combinations of what's and how's can easily lead to an inventory of unmanageable length. It is better, therefore, to make separate statements.

A similar problem exists if one focuses only on a specific example of an activity. For example, a statement such as "Calculate the profit margin on shoes" focuses on performing this activity only in relation to **shoes**. Yet, the calculation of a profit margin is the same process, whether for use with shoes, eggs, or for some other item. In other words, the real activity (calculate profit margin) may be performed for a variety of purposes.

Sometimes, such a statement identifies two completely different processes (e.g., check tires for proper inflation, check tires for tread wear). In this case, two separate statements would be preferred.

SAMPLE 3

DUTY STATEMENTS

I. Automotive Mechanics Task Inventory

A. Organizing and Planning
B. Supervising
C. Evaluating and Inspecting
D. Training
E. Performing Maintenance Control Functions
F. Performing — Engine Overhaul Activities
G. Maintaining and Repairing Power Trains
H. Maintaining and Repairing Automatic Transmissions
I. Maintaining and Repairing Electrical Systems
J. Maintaining and Repairing Fuel Systems
K. Maintaining and Repairing Cooling Systems
L. Maintaining and Repairing Standard and Power Steering Units
M. Maintaining and Repairing Braking Systems
N. Maintaining and Repairing Front Ends
O. Maintaining and Repairing Automobile Air Conditioners
P. Maintaining and Repairing Automobile Heaters
Q. Lubricating and Maintaining

II. Business Data Processing Task Inventory

A. Supervising Data Services Functions
B. Supervising Management Analysis
C. Supervising Automatic Data Processing Equipment Operations
D. Supervising Programming
E. Supervising Data Systems Analysis and Design
F. Performing Data Processing Functions
G. Performing Management Analysis Functions
H. Operating Automatic Data Processing Equipment
I. Performing Systems Programming
J. Performing Scientific Programming
K. Programming Computers
L. Performing Feasibility Studies (Pilot Projects)
M. Designing Data Systems

III. Secretarial Science Task Inventory

A. Organizing and Planning
B. Supervising and Implementing
C. Coordinating and Performing Personal Activities for Employer
D. Inspecting and Evaluating
E. Training
F. Performing Stenographic Activities
G. Performing Bookkeeping and Accounting Activities
H. Preparing Forms and Publications
I. Performing Receptionist Activities
J. Performing Clerical Activities
K. Maintaining Files and Library
L. Performing Mailroom Activities

Developing a task inventory in which all statements are equal in specificity is desirable, but usually impossible. The level of specificity one needs in a given situation should be the deciding criterion. There is probably no one ideal level of specificity. Examples of task statements from a secretarial science task inventory are shown in Sample 4.

SAMPLE 4

TASK STATEMENTS

SECRETARIAL SCIENCE TASK INVENTORY[6]

G. PERFORMING BOOKKEEPING AND ACCOUNTING ACTIVITIES	CHECK ✓ If Done	TIME SPENT 1. Very Much Below Average 2. Below Average 3. Slightly Below Average 4. About Average 5. Slightly Above Average 6. Above Average 7. Very Much Above Average
1. Act as cashier or teller		
2. Administer imprest or petty cash funds		
3. Administer small purchases such as credit card charges and blanket purchase agreements		
4. Age the accounts receivable		
5. Approve bills of any kind		
6. Approve customers' checks, charge purchases, etc.		
7. Approve monthly group insurance bills		
8. Arrange for insurance policies		
9. Ascertain availability of funds		
10. Calculate deductions (Income Tax, FICA, Insurance, etc.)		
11. Check bills and/or invoices		
12. Check money orders and checks, as to amount, dates, signatures		
13. Check on supplies (for reordering purposes)		
14. Close ledger accounts		

6 Adapted from Sidney D Borcher and John Joyner, *Secretarial Science Occupational Performance Survey*, Interim Report (Columbus, OH The Center for Vocational Education, The Ohio State University, 1973), pp 43 and 50–55.

15. Control the safekeeping of monies, bonds, or sealed bids		
16. Compose business reports of any kind		
17. Compute amount and percent of markup or loss		
18. Compute depreciation		
19. Compute dividends		
20. Compute interest charges		
21. Compute payrolls for employees		
22. Compute property taxes		
23. Compute income taxes		

A final problem is the need for grammatical consistency. A straightforward verb-object construction (repair fuel pumps) is recommended. Eliminate modifying phrases as much as possible, unless the modifying phrase has direct implications for curriculum (e.g., check fuel system for cleanliness).

As a further expression of this consistency, as much as possible, one should use only a single verb in each statement. Thus, statements containing multiple verbs such as "remove and replace," "type and proofread," "inspect and repair," etc., are generally rejected even though the worker might regard the two actions as part of the same task. You should make your own decision in this matter, using multiple verbs where you feel they are justified.

General Guidelines for Task Statements

Several considerations should be kept in mind when constructing, reviewing, and editing task statements. Here are some of the most helpful.

Consider the purposes to be served by the task inventory.—Each task statement should be written in the context of the uses to be made of the information derived from it. In general, the statement should serve one or more of the following purposes.

- The task statement should elicit responses that differentiate between workers in different job types within the occupational area.
- The task statement should elicit responses that differentiate between manager and supervisors, supervisors and foremen, and foremen and workers.

Consider the worker responding to the task statements.—In considering the worker who responds to the job inventory, each task statement should conform with the following ground rules:

- The task statement must be clear so that it is easily understood by the worker.
- The task statement must be stated using terminology that is consistent with current usage in the occupational area.
- The task statement should be brief to save reading time of the worker.
- The use of abbreviations should be avoided, if possible, since they may not be understood throughout the occupational area. Where they must be used, it is good practice to spell out the term and follow it by the abbreviation in parentheses the first time it appears in the inventory. In later usage, the abbreviation may stand alone.
- The task statement must be ratable in terms of time spent and/or other rating factors. This **eliminates** skill, knowledge, and responsibility items that begin with such words as "Have responsibility for . . . ," "Know how to . . . ," "Understand . . . ," "Have knowledge of . . . ." Such statements found in source materials should be written as two or more task statements (e.g., "Maintain files" or "Supervise maintenance of files," **not** "Have responsibility for maintaining files").

- Vague or ambiguous words, such as "check," "assist," "coordinate," "recommend," and "assure," should be avoided.
- Short words should be used in preference to long words or expressions (e.g., "Fill out work orders," **not** "Prepare forms for vehicle repairs to be accomplished by mechanics").
- The qualifications a worker has, such as intelligence, aptitude, knowledge, education, skill, training, and experience are not tasks and are not included in the duty-task section of the job inventory. Information with regard to certain qualifications, such as training, education, and work experience, however, may be obtained by including appropriate items in the **background information section** of the inventory.
- Receiving instruction is not included as a task unless useful work is actually performed during the training. Thus, classroom instruction, laboratory or shop instruction, and the coaching a person receives are not tasks. On-the-job training, however, may include the performance of tasks under a supervisor. These tasks are listed in the inventory the same as any other tasks. Giving instruction, which is a supervisory duty, is included under "Training."
- The task statement should begin with a present tense action word with the subject "I" understood (e.g., "Operate," "Write," "Clean," **not** "Operates," "Writes," "Cleans").
- Task statements are arranged alphabetically under each duty. This order shortens the worker's reading time and assists in recalling tasks that are not listed. For example, the worker can easily scan through a list of tasks beginning with the word "Inspect" to make sure that all the inspections he/she performs are in the inventory. The alphabetical arrangement also helps the inventory developer eliminate duplicate tasks.

Consider task statement format to facilitate analysis.—Each task statement must appear in a format that will make it most useful. The following guidelines should be followed.

- Task statements should be limited to not more than two lines.
- The task statements are numbered consecutively, beginning with "1" under each duty heading.
- Each task statement must be specific and capable of standing alone. An item such as "Operate other types of equipment" is meaningful to a worker if listed at the end of a series of "Operate . . . equipment" tasks. However, later, in the consolidated inventory to be prepared from the results, the tasks are not printed in the same order as in the inventory. Thus, the original context may be destroyed, and an item like "Operate other types of equipment" may no longer make sense.
- Each task statement must be a complete sentence. Do not use an action subheading followed by a series of objects. For example, statements should be constructed to read "Type and correct offset masters," "Type and correct spirit masters," "Type and correct stencils." They should **not** be constructed to read "Type and correct the following: (1) offset masters, (2) spirit masters, and (3) stencils."
- The period at the end of the task statement is omitted.
- Use "such as" followed by two or three samples. Avoid "and/or" and "etc." Write "Type cards, such as index cards, file cards and 'address finder' cards," **not** "Type cards, such as index cards, file cards, and/or 'address finder' cards, etc."
- Parallel tasks should appear in appropriate duties. For each task listed as being supervised, there should almost certainly be a related task which is performed. Equipment to be inspected is also likely to be repaired or replaced.
- Use simple statements without qualifiers unless the qualifier is essential to the meaning of the statement (e.g., "Operate paper cutter," **not** "Operate paper cutter to cut paper." However, "Schedule employees for on-the-job training," **not** "Schedule employees").
- If a modifier is needed for greater specificity, be sure to include all other significant tasks with comparable modifiers. For example, in an automotive mechanic inventory, "Repair transmissions" would not be specific enough. Therefore, if the statement were modified to read "Repair automatic transmissions," then "Repair manual transmissions" should also be added.
- Avoid tasks that are obviously too specific or trivial (e.g., "Operate fork lift truck," **not** "Turn ignition key," "Shift gears," "Elevate fork").
- Avoid tasks that are too general. Such tasks will not differentiate job types (e.g., "Repair carburetors," "Repair standard transmissions," **not** "Repair motor vehicles").
- In general, avoid multiple verbs in a task statement, unless several actions are invariably performed together (e.g., "Erect and align poles," **not** "Inspect, tow, and repair engines or equipment").
- As far as possible, tasks included in the job

inventory should be independent. Avoid overlapping task statements (e.g., "Prepare lesson plans" might be used with "Maintain instructional records or charts," **not** with "Prepare lessons").

Inventory Organization

When organizing the inventory, it is important that supervisory duties such as organizing, planning, inspecting, evaluating, and training be placed last on the list. These are left until last for two reasons. Because of the ongoing nature of many supervisory activities, it is more difficult to write time-ratable supervisory items. The review can become bogged down if supervisory tasks are taken first. By taking them last, the reviewer will have had some practice with easier items. In addition, the non-supervisory tasks are regarded as the central tasks of the career area and, therefore, comprise the main body of the inventory.

Reviewing the Initial List

After the preliminary inventory has been constructed, reviews should be conducted using people from the occupational area. These people should refine and revise the inventory items **prior** to your administering the items to the incumbent workers. The purpose of the review is to add missing statements, delete obviously irrelevant statements, and improve the wording of vague or lengthy statements.

Individuals should be selected for their occupational knowledge and practical experience in all aspects of the occupational area. If several specific occupational titles are covered by the inventory, it is advisable to obtain at least one worker or supervisor of each job title. A supervisor who directly supervises several job titles is usually more desirable as a participant.

In selecting reviewers, one must be flexible. It is not possible to know at the outset which individuals will give the best and most complete information, nor precisely how many reviews will be required. Conclude the review process when you judge that the preliminary form is well structured and essentially complete. From three to eight reviews are adequate for most inventories. However, as a rule and to the extent practicable, the more reviewers, the better.

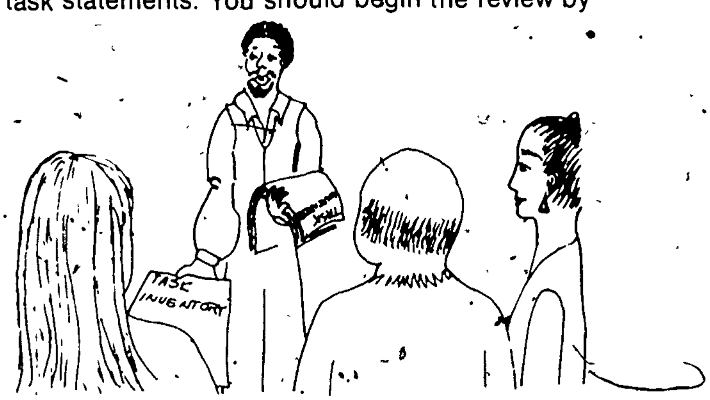
Whenever possible, it is desirable to use persons from several different businesses or companies. This avoids getting only the organizational structure and work breakdown of a single establishment. In most cases, it is easy to find individuals who are willing to take an hour to sit down and to go over the preliminary inventory.

Conducting the Review

The purposes and uses of the inventory should be explained to the workers before they begin the review of the task and duty statements. The reviewer should clearly understand how the duties and tasks are to be stated and how specific they should be.

The reviewers should then be shown a list of the duty headings. These are reviewed one by one for clarity and accuracy. If the reviewers point out duties that are missing from the list, consider adding additional ones.

After completing the review of the duty headings, the reviewers should be given a copy of the task inventory, and asked to review the individual task statements. You should begin the review by



reading each task statement aloud and asking questions about the particular task. Following are examples of the types of questions to be asked

- Is the task statement clear? Will everyone understand what this means?

- Is this task covered by a previous task statement?
- Does this task fit better under another duty?
- Are there any other tasks that should be under this duty?
- Is this task performed in your business?
- Is this task performed by any workers in the occupational area?

You should not attempt to secure perfectly polished task statements from the reviewers. However, you should accurately record the main substance of the new statements and revisions in a form that can be edited later. The reviewers should not be considered experts on how to write task statements, but should be used to review the essential **content** of the statements.

All tasks under a duty heading should be covered before going on to the next duty. When the non-supervisory duties are completed, the supervisory tasks are reviewed. If the non-supervisory duties or tasks are changed in any important way during the review, it may be necessary to revise the supervisory sections accordingly. For example, if new non-supervisory duties are added, parallel tasks should be added to cover the supervision of those duties.

Editing and Grouping Items

When the reviews are completed, all preliminary inventories that were used during the reviews should be assembled. All revisions, new tasks statements, and comments of the reviewers should be copied from these into a single inventory booklet.

Final decisions to accept or reject the proposed changes are made by the person(s) who constructed the preliminary task inventory and conducted the interviews. Further consultation with technical reviewers may be necessary for some items, especially if conflicting revisions or suggestions have been given by the reviewers. Most conflicts can be resolved by reference to a published source or by a telephone call to an authority in the field. Once these decisions have been made, all items (especially new or revised ones) must be checked to determine whether they are consistent in format.

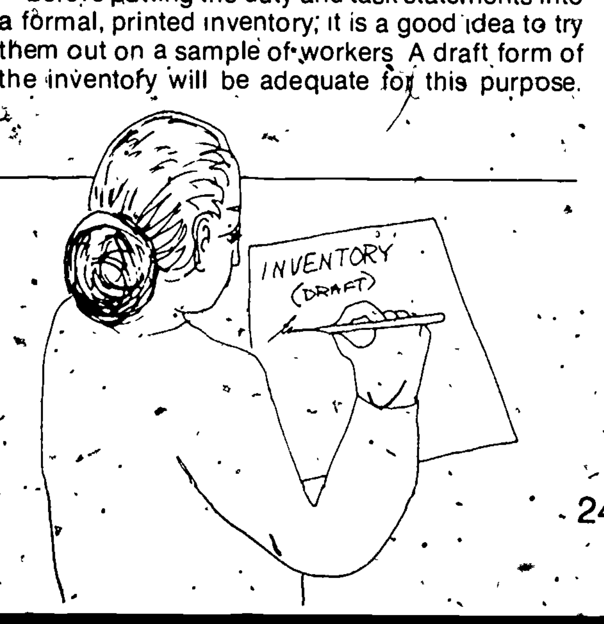
In terms of organizational format, all statements falling under a duty should be arranged alphabetically by the action word (e.g., adapt, build, compose). This will help the target audience, the incumbent worker, detect missing information and reduce the time he/she spends completing the inventory. Future modifications to the inventory are also easier to make.

As an additional aid to the incumbent worker, the tasks within a duty may be grouped or categorized into major sections. These groupings should appear natural to the worker, thereby helping him/her make judgments. Duty statements should also be grouped in the most logical sequence.

The revised listing should be reviewed by members of the occupational advisory committee and others involved in the original development of the list. Once the revised list has been accepted, it should be prepared for pilot testing.

Pilot Testing the Items

Before putting the duty and task statements into a formal, printed inventory, it is a good idea to try them out on a sample of workers. A draft form of the inventory will be adequate for this purpose.



The goal here is to obtain some firsthand feedback from workers as to whether they understand the statements. To do this, the developer of the inventory should locate a few workers who represent the full range of incumbent workers who will eventually respond to the inventory. The developer should then ask each one to individually read each statement. The worker should be asked to comment on any statement that appears confusing to him/her. The specific reason for the confusion should be determined and suggested revisions devised with the worker's help.

It should be clear that the worker is not asked at this time to indicate whether he/she performs a given task; but rather to indicate his/her **com-**

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prehension of the statement of each task It is the clarity of each statement that is being pilot tested, not the adequacy of the statements to describe what the worker does.

The need for pilot testing is dependent upon the degree to which the preliminary form of the inventory has been reviewed by other persons from the occupational area If several knowledgeable persons from the occupational area have carefully reviewed the inventory, and the occupational advisory committee has also studied the instrument, pilot testing is of lesser importance However, it is always a good idea, if time and funds permit, to try to check on the clarity of directions and the type of responses likely to be received

Optional Activity

For further information on preparing an initial listing of duty and task statements, you may wish to read Ammerman, *Performance Content for Job Training, Volume 2: Stating the Tasks of the Job*

Activity

Develop an initial, but partial, duty and task inventory for an occupation of your choice. Pick an occupation such as secretary, nurse, teacher, or automotive mechanic with which you are already familiar. You will need to have easy access to two or more persons (employers or employees) in the occupation with whom you can consult. You will also need to have easy access to one or more references (e.g., curriculum guides, existing task inventories, etc) for your review

Prepare a list of duty statements for the occupation For at least **four** of those statements, develop at least **six** task statements each If you prepared occupational descriptions for Learning Experience I which meet these criteria, you may select one of them

Feedback

After you have developed your preliminary inventory, use the Initial Listing Checklist, pp. 27–28, to evaluate your work

NOTES

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INITIAL LISTING CHECKLIST

Directions: Place an X in the NO, PARTIAL, or FULL box to indicate that each of the following performance components was not accomplished, partially accomplished, or fully accomplished. If, because of special circumstances, a performance component was not applicable, or impossible to execute, place an X in the N/A box.

Name ______________________

Date ______________________

Resource Person ______________________

	LEVEL OF PERFORMANCE			
	N/A	No	Partial	Full
Sources of information used in preparing the initial listing included:				
1. you	☐	☐	☐	☐
2. employers	☐	☐	☐	☐
3. employees	☐	☐	☐	☐
4. previously constructed inventories and analyses	☐	☐	☐	☐
5. curriculum publications such as guides, outlines, courses of study	☐	☐	☐	☐
The duty statements:				
6. reflect both supervisory and work performance activities	☐	☐	☐	☐
7. are arranged so supervisory statements appear last	☐	☐	☐	☐
8. are designed so each statement contains an action word ending in "ing" plus an object, e.g., adjusting baler needles	☐	☐	☐	☐
The task statements:				
9. differentiate between workers in different occupations and at different levels	☐	☐	☐	☐
10. use terminology that is consistent with current usage in the occupation	☐	☐	☐	☐
11. are brief to save reading time	☐	☐	☐	☐
12. are ratable in terms of time spent	☐	☐	☐	☐
13. are stated in accepted form and structure	☐	☐	☐	☐
14. are not too specific or too general	☐	☐	☐	☐
15. are independent of one another	☐	☐	☐	☐
The preliminary version of the initial listing:				
16. was reviewed by two or more reviewers from the occupational area	☐	☐	☐	☐
17. was revised to incorporate the reviewers' comments, insofar as practical	☐	☐	☐	☐
18. was formatted for consistency after the review	☐	☐	☐	☐

LEVEL OF PERFORMANCE: All items must receive FULL, or N/A responses. If any item receives a NO, or PARTIAL response, review the material in the information sheet, Preparing an Initial Listing of Duty and Task Statements, pp. 16–25, revise your inventory accordingly, or check with your resource person if necessary.

30

Learning Experience III

OVERVIEW

Enabling Objective

After completing the required reading, verify an initial listing of task and duty statements.

Activity

You will be reading the information sheet, Verifying an Initial Listing of Task and Duty Statements, pp. 30–48.

Optional Activity

You may wish to read the supplementary references, Ammerman, *Performance Content for Job Training, Volume 3: Identifying Relevant Job Performance*; and Ammerman and Essex, *Performance Content for Job Training, Volume 4: Deriving Performance Requirements for Training.*

Activity

You will be verifying an initial listing of task and duty statements.

Feedback

You will be evaluating your competency in verifying an initial listing of task and duty statements, using the Initial Listing Verification Checklist, pp. 51–52.

Activity

For information concerning the verification of an initial listing of task and duty statements, including the types of information to be collected, the selection of participants, and the procedures to be used, read the following information sheet:

VERIFYING AN INITIAL LISTING OF TASK AND DUTY STATEMENTS[7]

Verification of the initial listing of task and duty statements is an important step in the occupational analysis process. It confirms that the inventory task statements actually describe the activities conducted as part of the occupation being considered.

One might ask why such verification is necessary if earlier suggestions regarding development of the initial listing were followed. One might be especially curious if already developed analyses or the employee observation technique were used. Verification is an attempt to show that the listing is applicable to an occupation in a specific employment area and to ensure that a broad base of input is used. With this verification, one increases the probability it will indeed describe the occupation.

Determining the Information to Collect

To prepare the initial listing of task and duty statements for verification, several things must be done. First, with the aid of your advisory committee, determine what type or types of information should be collected related to the inventory. For example, if an analysis is to be conducted purely to describe what takes place in an occupation, one might determine whether the various tasks or steps are performed by the worker. A sample of a simple scale that would obtain that type of information is shown in Sample 5.

7. Much of this material was adapted from *Handbook for Analyzing Jobs* (Washington, DC U S Department of Labor, Manpower Administration, 1972).

SAMPLE 5

FORM FOR CHECKING PERFORMANCE

OCCUPATION: Artificial Inseminator[8]

Duty: Handling Cattle

No.	Task	Check If Performed
1	Detect heat	
2	Determine time to inseminate	
3	Identify symptoms of reproductive diseases	
4	Maintain breeding records	
5	Move cattle	
6	Operate breeding chute	

8. Adapted from Gobbo, "Competencies Needed for Employment in Beef Production Enterprises," p 150

For a vocational educator responsible for planning an instructional program, this will probably not provide enough information to use in making intelligent instructional decisions. For such planning, questions such ~~as the~~ following might be appropriate:

- Is the task performed by beginning workers?
- How often is the task performed?
- How important is the task?
- How difficult is it to learn to perform the task?

Sample 6 illustrates an inventory in which such questions are asked.

SAMPLE 6

INVENTORY FOR CHECKING PERFORMANCE

OCCUPATION: Feed Lot Foreman[9]

Duty: Keeping Records

No.	Tasks	Check (✓) if performed by beginning worker	How often is the task performed?	How important is the task?	How difficult is it to learn to perform the task?
1	Keep equipment inventory				
2	Keep financial records				
3	Keep livestock inventory				
4	Keep production records				
5	Set up record-keeping system				

9 Gobbo, "Competencies Needed for Employment in Beef Production Enterprises," pp. 110–111

It may be of value to the educator to find out whether the tasks involved are performed by **beginning workers.** This is especially important if the instructional program to be developed is to be oriented toward providing the entry-level skills required by workers. A question dealing with the **frequency of performance** might also be of value in identifying frequently performed tasks which should be emphasized in an instructional program. A rating of the **importance of a task** might be obtained also to aid in making instructional decisions. This may be needed since mere performance or frequency of performance may not be accurate indicators of importance, especially in some medical or public service occupations. A rating of **how difficult** it is to **learn** to perform a task might be of value in allocating instructional resources.

Another form which might be of use to you is shown in Sample 7. Note particularly the scale used in Column C: **Essential — Desirable — Unnecessary — Not Sure.** Such scales have proven to be very popular for use as part of data-gathering devices. Two other such scales are the Importance Scale and the Agree/Disagree Scale. The Importance Scale includes five ratings: **Of Extreme Importance—Of Considerable Importance—Of**

Some Importance—Of Limited Importance—Of No Importance. The Agree/Disagree Scale also has five ratings: **Strongly Agree — Agree — Uncertain — Disagree — Strongly Disagree.** Number values can be assigned to each rating in order to make tabulation possible. Note that in order to use scales such as these, the statement to be rated must be stated either positively or negatively. If the investigator is interested in greater detail in the analysis, task analysis and task detailing sheets such as those shown in Samples 8 and 9 might be used. Note that a task detailing sheet contains a listing of the steps involved in the task. Curriculum laboratories conducting full-scale task analyses collect even more detailed data.

SAMPLE 7

ANALYSIS WORKSHEET

Occupation: ______________________

Duty: ______________________

Column A	Column B				Column C								Column D	Column E
Task	Frequency of Performance				Importance								Conditions Under Which Task Will Be Performed	Criteria that Exhibit Satisfactory Application of the Task
	Number of Times Per				For Occupational Entry				For Occupational Advancement					
	Day	Week	Month	Year	E	D	U	NS	E	D	U	NS		

In addition to the types of information indicated previously, **background information** should normally be collected. This section of the inventory is used to obtain information relevant to the incumbent workers. The purpose of these items is (1) to describe the workers surveyed, (2) to answer questions of interest to users of the survey data, and (3) to help distinguish among significant occupational types of special worker groups. Information about job location, previous work experience, source of training, and other job related information apart from the specific duties and tasks performed may be requested. Care should be exercised so that only relevant information is requested.

SAMPLE 8

TASK ANALYSIS[10]

Occupation: Wastewater Treatment Plant Operator

No.	Task	Frequency of Performance[1]	Importance[2]	Learning Difficulty[3]
1	Adjust chlorination and record	3 times a day	1	1
2	Adjust recirculation to flow	Rarely	2	1
3	Check for malfunction of equipment	Continuous	2	1
4	Clean and maintain work area and equipment	Continuous	1	2
5	Composite sampling for lab analysis	Hourly	1	2
6	Drawing digested sludge to beds	Once a month	2	2
7	Drawing raw sludge to digester	12 times a day	2	1
8	First aid	Rarely	2	2
9	Maintain security regulations	Hourly	2	3
10	Operate emergency power generator	Once weekly	2	2
11	Reading meters—(flow)	Hourly	1	3
12	Record digester gas production and consumption (heat regulation)	3 times a day	3	3
13	Record pertinent information on daily log	Hourly	2	3
14	Sampling for D.O.	9 times a day	1	2
15	Sampling for H_2S	12 times a day	1	2

[1] Rarely, once a month, _____ times a month, once a day, _____ times a day
[2] 1–Very important, 2–Important, 3–Not very important
[3] 1–Difficult, 2–Moderately Difficult, 3–Easy

10 Taken from *Guidelines for Establishing and Evaluating Programs to Prepare Water and Wastewater Treatment Plant Operations*, Bulletin 79L-6 (Tallahassee, FL State of Florida, Department of Education, May 1971)

SAMPLE 9

TASK DETAILING SHEET[11]

Occupation: Wastewater Treatment Plant Operator

Task: Drawing Digested Sludge to Beds

No.	Steps in Performing Task	Type of Performance[1]	Learning Difficulty[2]
1	Interpret lab results to determine proper time for function	2	2
2	Operate valves to start and regulate rate of flow	1	2
3	Observe consistency	2	2
4	Draw off proper amount	1	2
5	Flush lines	1	1
6	Collect sample for lab analysis	1	1
7	Record amount drawn to drying bed	2	1
8	Clean equipment	2	1

[1] 1–Manipulation, 2–Discrimination, 3–Problem Solving
[2] 1–Easy, 2–Difficult, 3–Very Difficult

11 *Guidelines for Establishing and Evaluating Programs to Prepare Water and Wastewater Treatment Plant Operations*

The following types of background information are usually required.

- identification information (e.g., date, name or number to identify the individual respondent, occupation or job title)
- type of business in which individual works
- work experience
- education and training information

Examples of background information questions which have been used are presented in Sample 10

At this point, a draft of the final inventory instrument should be prepared. This draft should include all statements to be verified, any rating scales to be used, along with the requested background information. A sample form which was used in one analysis effort is presented in Sample 11. Note that this sample form provides space for the respondent to add statements to those already identified in the inventory. Any type of form developed should provide the opportunity for the respondent to record and rate additional statements. The completed form should be reviewed by the members of your advisory committee

Selecting Participants

Once a decision has been made as to the type(s) of information desired, you and your advisors should decide what group or groups of individuals will be asked to help verify the statements. The overall purpose for identifying participants is to ask them to verify the list of statements—that is, to confirm that the statements do indeed describe actual occupational activities . Explain to the participants that the verified statements will be used as bases in designing a new vocational education course, revising an existing one, and/or in preparing instructional materials. In deciding whom to ask to participate in the verification process, you should consider the following.

- Participants should be selected for their job knowledge and practical experience in the occupational area of concern.
- If the analysis deals with a cluster of related jobs, **obtain at least** two incumbent workers or work supervisors for each job title. This should give a picture of the discrepancy, if any, between what is being done on the job and what is indicated by the inventory statements.
- Whenever possible, it is desirable to include participants from different businesses or companies. This avoids getting the organizational structure and work breakdown of only a few establishments.
- Make sure that the participants are representative of area employers, employees, and trade or labor organizations.

SAMPLE 10

BACKGROUND INFORMATION

Code # ____________

Date ____________

1. Name ______________________________________
(Optional)

2. What is your present job title? ______________________________

3. Check the type of business in which you work:

_ Banking-finance
_ Construction
_ Distribution (wholesale-retail)
_ Education Research
_ Insurance
_ Manufacturing
_ Public Utility
_ Publishing
_ Legal Service
_ Health Service
_ Transportation
_ Government (specify level)
☐ Local
☐ State
☐ Federal
_ Other ______________________
(please specify)

4. How many years have you worked at your present job? ______________________

5. Where did you receive your training?

_ on-the-job (self-learned)
_ military school
_ correspondence course
_ secondary public school
_ public vocational-technical school
_ private business school
_ junior or community college
_ college or university
_ other ______________________
(please specify)

SAMPLE 11

INVENTORY INSTRUMENT

Name: ____________________
Position: ____________________
Business Address: ____________________
____
Phone: ____________________
Date: ____________________

Department of Vocational Education
Agriculture Education Section
Colorado State University
Fort Collins, CO 80523

NATIONAL AGRICULTURAL OCCUPATION COMPETENCY PROJECT[12]

Instructional Area: Production Agriculture

Employment Area: Beef Production

Occupation Cluster: Feed Truck Driver

Job Description: Drives a special feed hauling truck in transporting prepared feed to cattle pen feeding bunks as assigned. Unloads truck with the power driven mechanism and distributes feed in feed bunks. Performs maintenance on the truck such as lubrication, changing oil, and does minor repair such as replacing light bulbs, fuses, and changing tires. Keeps truck clean. Inspects the truck for proper operation and safety.

Directions: Check degree of importance for each competency to enter this occupation in 1975 as a beginning employee based on your experience. Additional spaces are provided for competencies you may wish to add and evaluate.

Competencies (Tasks)	Essential	Important	Of Some Importance	Not Important	Does Not Apply
1. Driving and unloading truck.					
a. Distributes feed in feed bunks.					
b. Drives gas or diesel truck.					
c. Operates unloading mechanism.					
d. Positions truck for loading feed.					
e.					
f.					
2. Inspecting and maintaining truck.					
a. Checks air cleaner; services when needed.					
b. Checks brakes; services when needed.					
c. Checks coolant; services when needed.					
d. Checks lights and other electrical devices; replaces bulbs and fuses when needed.					

12. Gibbo, "Competencies Needed for Employment in Beef Production Enterprises," pp 121–122

	Essential	Important	Of Some Importance	Not Important	Does Not Apply
e. Checks oil; changes according to schedule.					
f. Checks tires; changes them when needed.					
g. Checks water level in battery; adds water when needed.					
h. Fills truck with fuel; services fuel filter.					
i. Lubricates truck and unloading mechanism according to schedule.					
j. Maintains truck in safe operating condition.					
k.					
l.					
3. Record keeping.					
a. Keeps records of feed hauled.					
b. Keeps records of pens fed.					
c. Keeps records of truck maintenance.					
d. Keeps records of truck repairs.					
e. Operates scales and records weights of feed.					
f.					
g.					

After deciding who will participate in the verification process, you should decide how the process will be conducted. What will the participants be asked to do? Will they be observed and/or interviewed? Will it be more practical to ask them to attend a meeting? Will a list of statements be sent to the participants through the mail?

If the participants are asked to verify the statements without being paid for their services, calling them to a meeting may be asking too much. In any case, it might be very difficult to arrange such a meeting if the participants work in different places and on different schedules. Visiting them individually to observe their work activities and/or to conduct an interview is also time consuming and may be very expensive.

Mailing the task inventory would permit you to reach more participants. In addition, the participants would not be pressured by your presence, and the data could be collected with less expense. While mailing the inventory may be preferable, a thorough occupational analysis can be conducted utilizing any of the previously mentioned methods.

Make sure that the directions on how to verify the statements are clearly stated and easily understood. Sample instructions for an inventory to be completed solely by the respondent are shown in Sample 12. If the participant is to be observed or interviewed by you or another individual, or if several interviews or observers are involved, specific instructions must be provided. A sample set of instructions is shown in Sample 13. When several interviewers or observers are involved, they should participate in a training session conducted prior to the actual collection activities to ensure the data collected reflect the same considerations.

SAMPLE 12.

INVENTORY INSTRUCTIONS

Instructions for Self-Administration of this Inventory

In completing the inventory, you are to respond in terms of your present regular job. Disregard any task that is not part of your regular assignment, no matter how often you did it in the past. Additional tasks you do for a few days while someone is away are not to be reported. In recalling tasks, go back far enough in time to get a true picture of your job. If your work changes from one season to another, you may have to go back a full year. If there was a permanent change in your duty assignment during the past year, go back to the time just after this change. You probably will need to go back not less than three months or more than a year.

Do the following steps in order:

1. Fill in the **Background Information**. Be sure you provide all information asked for.
2. Beginning with Duty A, read each task statement under every duty. As you read, place a check mark (✔) in the column beside each task you do.
3. When you finish all task statements in a duty, add (write in) any other tasks you do that are not listed. If some tasks do not fit under any duty, write them in on the blank page at the end. Be very thorough about adding tasks.
4. When you have finished all duties, turn back to Duty A again. Now make a TIME SPENT rating for each task you have checked or added. The 5-point rating scale you are to use is at the top of each page. TIME SPENT means the total time you spend on each task you are rating. Be sure to rate every task you checked or wrote in.

SAMPLE 13

INTERVIEWER'S GUIDE[13]

I. **Scheduling the interview by telephone:**

This is ______________ from the College of Agriculture at Cornell University. I'm in the area interviewing different kinds of ornamental horticulture businesses for our horticulture task analysis study. You were suggested by Cooperative Extension Agent ______________ (name of agent) as a person to contact to request an interview in the areas of __________, __________, __________, (business areas). Our study has the endorsement of Cooperative Extension and __________ (horticulture trade organization if applicable).

If possible, I would like to schedule about ______ hour interview with you sometime on ______________ (date and time).

(Assuming a Positive Response)

Is ______________ (address of business from agent) the correct address?

Do you have any suggestions as far as parking is concerned?

Thank you Mr. __________, I will be looking forward to seeing you on ______________ (date, time, and location of interview).

NOTE: We may want to consider asking the Extension Office in the area to serve as a clearing-house in case an emergency comes up and the interviewee needs to contact us by phone.

II. **During the Interview**

1. Verify the business name, address, and telephone number of the business (recorded prior to the interview).
2. Record full name of the person(s) interviewed.
3. Record interviewee'(s) title using commonly accepted title such as manager, supervisor, assistant manager, etc.
4. Record the highest and lowest number of full-time, part-time and seasonal workers employed during 1970. Full-time constitutes 35 or more hours per week. Part-time is less than 35 hours.
5. Record the total number of new employees hired during 1970. These may be to fill vacated and/or new positions.
6. Record if there is any product specialization in the business area (e.g., roses in the greenhouse production area).
7. Define and explain the meaning of the task to the respondent:

   Task: A task is a logically related set of actions required for the completion of a job objective. A group of acts or activities that generally occur close together and have common purposes, it forms a logical and necessary part of the performance of a duty.

13 Arthur L. Berkey, William E. Drake, and James W. Legacy, *A Model For Task Analysis in Agribusiness* (Ithaca, NY: Division of Agricultural Education, Department of Education, New York State College of Agriculture and Life Sciences, Cornell University, 1972), pp. 152–154

8. Explain job conditions and performance level for tasks. (See key for conditions and performance levels).
9. Show and explain instrument to respondents:
   a. Tasks performed and indicated by a check in the performance column.
   b. The key is used with job conditions and performance level.
   c. Job conditions presented are indicated by drawing a slash through one or more letters which represent the response indicated on the key.
   d. Performance level
      1. Quantitative—write in the number of units per hour, draw a slash through the one letter representing the correct response.
      2. Qualitative—draw a slash through the one letter representing the correct response.
10. Explain the division of the ornamental horticulture industry into 9 business areas and into functions within business areas (refer to list of business areas and functions).
11. Explain that performance of tasks should be judged in terms of the task being performed by **some** person **within** the business areas being interviewed.
12. Explain that the interpretation of task statements should be in terms of the function under which they are listed.
13. Request that any performed tasks not listed be written in and rated as to job conditions and performance level in the spaces provided at the end of each function. If more than two tasks need to be added, use the reverse side of the sheet and so indicate on the bottom of the second page.
14. Assist the interviewee in completing the rating of job conditions and performance level for several tasks until it is apparent he understands and is correctly recording his responses.

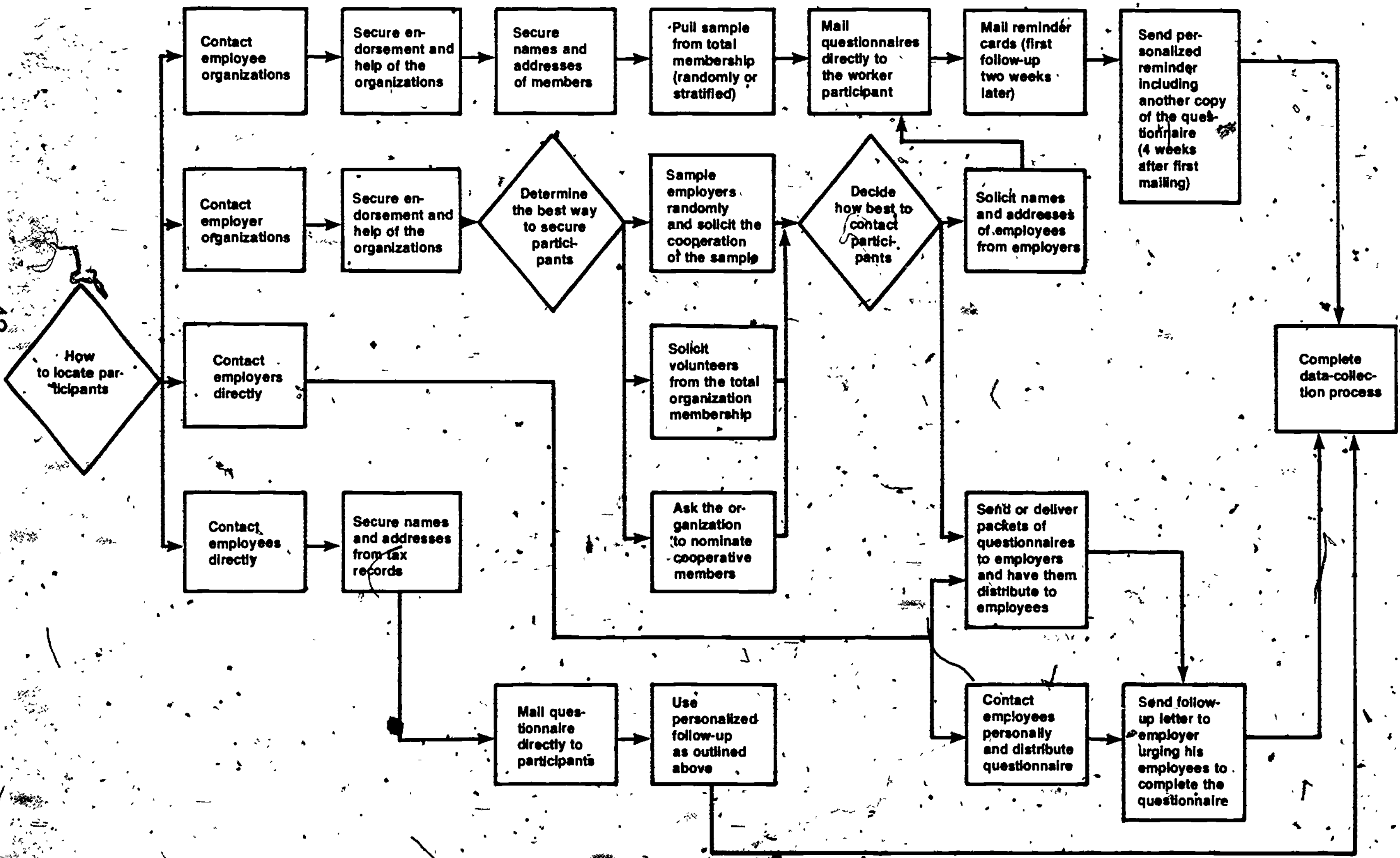
How many participants need to be identified depends on many factors. For example, it depends on how they will be asked to verify the statements; how many occupational titles are included in the analysis; or how many of the participants you expect to be able to help. To have only 10, 15, or 20 individuals verify the statements may be too small to be representative of the people employed in the occupations you are analyzing. To have 100 or 300 might be just right. The number of participants you choose to verify the statements also depends on the type of analysis you are planning. An analysis for an occupation to be used in a local community will probably require fewer participants than an analysis for an occupation to be used statewide. If an observation and/or interview is to be used in soliciting data, fewer participants would be required than if a mailed instrument is used. Select the number of participants that you can reasonably expect to cooperate during the analysis. Also, select the number you will be able to work with considering possible limitations such as time, money, and staff; and the number which can provide the type of valid and reliable data you need.

Once the number of participants has been identified, one or more of the procedures shown in Figure 3 or some other procedure may be used for selecting and locating the required participants. Although it is included as one alternative in the figure, the **least desirable** approach is to go directly to the employees **without** the approval and cooperation of their employers. It is often advantageous to have support of a well-known employee or employer organization in conducting the analysis.

At this point, sufficient copies of the instrument(s) to be used should be prepared. Be sure to prepare a sufficient number of extra copies for follow-up and other uses.

FIGURE 3

SELECTION AND LOCATION OF PARTICIPANTS FOR VERIFICATION PROCESS



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Contacting Participants

Contact those whom you have selected to serve as participants to explain the purpose(s) of the analysis project. If your first contact is with a labor or trade organization (e.g., local chapter of the United Auto Workers or the National Secretaries Association) or an employers association (e.g., automobile dealers association or beef cattle farmers association), explain the purpose of the project. Then, request that they identify skilled, competent individuals in their membership or employ, whom they would recommend to serve as participants. Secure a letter of endorsement from such organizations, if possible. Such endorsement will help open the door to the individual employers or employees.

When prospective participants are contacted by letter to participate in a survey in which mailed inventories (questionnaires) are used, be sure to include the following information in a cover letter.

- purpose(s) of the analysis
- sponsor of the study
- reason they were selected to serve as participants.
- what they are requested to do
- a date when the list of statements should be returned to you

In addition, include the following:

- a letter of endorsement from their employer or organization
- the list of statements to be verified
- a self-addressed, stamped return envelope

To encourage the return of the completed list of statements, send a reminder to all prospective participants who have not returned the inventory about two weeks after your first letter was mailed (see Sample 14). Four weeks after the initial contact, a personal letter and a second copy of the list of statements should be sent to all non-respondents (see Sample 15). If these mailings do not result in the desired responses, consider calling or visiting the non-respondents. Efforts should be made to secure as many returned lists as possible, with your goal being a return of 100 percent.

If the observation and/or interview technique is to be used, the initial contact might be by telephone, personal visit, or letter. Regardless of the method of contact, the individuals should be provided the following types of information.

- purpose(s) of the analysis
- reason they were selected to serve as participants
- what they are requested to do
- endorsement by any organization of the project
- details on when, where, and how the verification activity is to be conducted

They should then be asked if they are willing to participate in the verification activity. When a sufficient number of participants have been identified, the observations and/or interviews should be conducted.

Conducting an Observation-Interview

Obtaining information by observation-interview involves analyzing jobs by observing workers, supervisors, and others who have information pertinent to the job. It is the most desirable method for analysis purposes because it (1) involves firsthand observation by the analyst, (2) enables the analyst to evaluate the interview data and to sift essential from nonessential facts, and (3) permits the worker to demonstrate various tasks of the occupation rather than describing the occupation orally or in writing.

SAMPLE 14

FOLLOW-UP LETTER

REDLANDS AREA VOCATIONAL SCHOOL
GREENVILLE, KANSAS

Mrs. Carol Reid
Wedgewood Beauty Shop
152 Larkin Avenue
Greenville, Kansas

Dear Mrs. Reid:

Some two weeks ago, a questionnaire was mailed to you asking you to help us with an occupational analysis inventory by identifying tasks performed in your occupation. As of yet, we have not received your response.

We believe this analysis to be of considerable importance, not only to the success of the cosmetology program at Redlands, but also to the needs of the community. Would you please take a few minutes during the next two or three days to respond to the questionnaire and return it to me. Your response will be most appreciated.

If, by chance, you no longer have the questionnaire, please drop a card to us and we will be happy to send you one.

Sincerely,

Samuel Marcus, Instructor
Department of Cosmetology

SAMPLE 15

FOLLOW-UP LETTER

REDLANDS AREA VOCATIONAL SCHOOL
GREENVILLE, KANSAS

Mrs. Carol Reid
Wedgewood Beauty Shop
152 Larkin Avenue
Greenville, Kansas

Dear Mrs. Reid:

The occupational analysis conducted by the Cosmetology Department at Redlands Area Vocational School is almost completed. Obviously, however, it is important that the data we gather from the analysis are accurate and complete. For this reason, we are anxious to receive completed questionnaires from every member of our sample.

We have not received your completed questionnaire. Therefore, I am enclosing a duplicate of the questionnaire which was sent to you a few weeks ago.

The purpose of this study is to find out what tasks you need to perform and how often. This information will then be made available to persons who do training for the various jobs. Your answers will not be evaluated or reported in any way. They will be tabulated as a group, and in no way will names be associated with responses.

Your cooperation in filling out the questionnaire will be greatly appreciated. Thank you for your assistance.

Sincerely,

Samuel Marcus, Instructor
Department of Cosmetology

The observation-interview also has several limitations that you should note. It runs into higher costs than other methods and usually involves much more time. It is less likely to obtain representatives of an occupation because of fewer numbers of workers who respond, and it results in less standard data because of the greater possibility of recording and observation errors. It also requires the respondent to **recall** tasks performed rather than simply **recognizing** tasks on a list. It takes many observations-interviews to obtain data equivalent to a mailed inventory in terms of completeness, representativeness, and accuracy.

You can use the observation-interview method in two ways. You can observe the worker on the job performing a complete work cycle **before** asking any questions. During the observation, you can take notes of all the job activities, including those you do not fully understand. A previously prepared form can make note-taking easier. When you are satisfied that as much information as possible has been accumulated from observation, you can talk with the worker, supervisor, or both, to supplement your notes.

Or, you can observe and interview **simultaneously**. While watching, you can talk with the worker about what is being done, and ask questions about what you are observing, as well as the conditions under which the job is being performed. Here, too, you should take notes in order that all data pertinent to the job and its environment may be recorded.

The interview process should be a conversational interaction between individuals. Communication is a two-way process. Therefore, you must be more than a recorder; you must contribute to the conversation. The amount and objectivity of information you receive depends upon how much you contribute to the situation. This contribution should be one of understanding and adjusting to the worker and the job.

A good background preparation will enable you to obtain facts quickly, accurately, and comprehensively. You must be able to establish friendly relations on short notice, obtain all the pertinent information and yet be sufficiently detached to be objective and free of bias.

When adequate time and funds are available, the interview may be the most effective and most dependable method of securing data. The extent to which you are able to make use of this method depends on your ability to make use of conversation to encourage the formation of judgments, analyze the essential points of the interview, and report the data accurately. Sample 16 presents some interviewing suggestions.

Taking notes.—You must develop a certain skill in combining note-taking with the conversational aspect of the interview. You must be able to write intelligible notes while engaged in conversation.

Often, when a worker is being interviewed, he/she will stop talking while notes are being made. You should make it clear whether you wish the conversation continued or not in these circumstances.

You can use a portable cassette recorder to make a tape recording of the interview. This should be used to supplement your note-taking; it should not be depended upon as the sole record of the conversation.

However, some workers object to others recording what they say. You must decide how much the interview may be affected by this attitude and modify your practices accordingly.

Following are some suggestions for effective note-taking.

- Notes should be complete, legible, and contain data necessary for the preparation of the analysis inventory.
- Notes should be organized logically, according to tasks and the categories of information required for a complete analysis.
- Notes should include only facts about the occupation, with emphasis on the work performed.

Obtaining Information By Other Methods

In many instances, it is impossible to use the observation-interview method. The worker may not be observed performing tasks because of security reasons, reluctance on the part of management to allow the analyst to observe the manufacturing process, or the complex and protracted nature of the work. For example, you might find it a bit difficult to observe and interview a photographic darkroom worker or a skin diver as they go about their tasks.

In other instances, it may be impossible to interview the worker while observing the work because of the surrounding noise or the employer's request not to disturb the worker by asking questions. A large number of jobs, such as those in professional and technical areas, do not lend themselves to the observation method since they do not involve a set sequence of activities and, therefore, cannot be observed as an entire unit.

On completion of an analysis study, a letter of appreciation should be directed to the plant management for all courtesies and cooperation given. Then the data secured as a result of the study must be compiled and analyzed and the inventory put into a more usable form.

SAMPLE 16

INTERVIEWING SUGGESTIONS

Opening the Interview

- Put the worker at ease by learning his/her name in advance, introducing yourself, and discussing general and pleasant topics long enough to establish rapport.
- Make the purpose of the interview clear by explaining why the interview was scheduled, what is expected to be accomplished, and how the worker's cooperation will help in the production of a valuable occupational analysis. Assure the person that the interview is not concerned with time study or wages.
- Encourage the worker to talk by always being courteous and showing a sincere interest in what is said.

Steering the Interview

- Help the worker to think and talk according to the logical sequence of the tasks performed. If tasks are not performed in a regular order, ask the worker to describe the tasks in a sequential manner by taking the most important activity first, the second most important next, and so forth. Request the worker to describe the infrequent tasks of his/her job, ones that are not part of his/her regular activities, such as the occasional set-up of a machine, occasional repairs, or infrequent reports.
- Allow the worker sufficient time to answer each question and to formulate an answer. Ask only one question at a time.
- Phrase questions carefully, so that the answers will be more than "yes" or "no".
- Leading questions should be avoided.
- Secure specific and complete information pertaining to the questions required for a complete analysis of an occupation.
- Conduct the interview in plain, easily understood language.
- Consider the relationship of the occupation under analysis to other occupations in the department.
- Control the interview with respect to the economic use of time and adherence to subject matter. For example, when the interviewee strays from the subject, a good technique for bringing him/her back to the point is to summarize the data collected up to that point.
- The interview should be conducted patiently and with consideration for any nervousness or lack of ease on the part of the worker.

Closing the Interview

- Summarize the information obtained from the worker, indicating the major duties performed.
- Close the interview on a friendly note.

Miscellaneous Do's and Don'ts for Interviews

- Do not take issue with the worker's statements.
- Do not show any partiality to grievances or conflicts concerning the employer-employee relations.
- Do not show any interest in the wage classification of the job.
- Show politeness and courtesy throughout the interview.
- Do not "talk down" to the worker.
- Do not permit yourself to be influenced by your personal likes and dislikes.
- Be impersonal. Do not be critical or attempt to suggest any changes or improvements in organization or methods of work.
- Talk to workers only after receiving the permission of the supervisor.

Optional Activity

For further information on verifying an initial listing of task and duty statements, you may wish to read Ammerman, *Performance Content and Job Training, Volume 3: Identifying Relevant Job Performance*; and/or Ammerman and Essex, *Performance Content for Job Training, Volume 4: Deriving Performance Requirements for Training.*

Activity

Conduct a **limited-scale** verification of an initial listing of task and duty statements. If you completed Learning Experience III, you may use the partial initial listing you developed at that time. If not, you may use a partial listing supplied by your resource person or gathered from some other source.

Decide on the questions you want to ask about each statement, and prepare a suitable instrument and directions that will obtain the type of responses desired. Ask your resource person and/or peers who have taken or are taking this module to review this instrument for clarity and accuracy.

Verify the partial listing by mailing the instrument to five prospective participants, or by interviewing five such workers using the instrument.

Feedback

After you have verified an initial listing of task and duty statements, use the Initial Listing Verification Checklist, pp. 51–52, to evaluate your work

NOTES

INITIAL LISTING VERIFICATION CHECKLIST

Directions: Place an X in the NO, PARTIAL, or FULL box to indicate that each of the following performance components was not accomplished, partially accomplished, or fully accomplished. If, because of special circumstances, a performance component was not applicable, or impossible to execute, place an X in the N/A box.

Name ____________________

Date ____________________

Resource Person ____________________

LEVEL OF PERFORMANCE

	N/A	No	Partial	Full
1. The teacher determined the type(s) of information to be collected including:				
a. task and duty information	☐	☐	☐	☐
b. background information on respondents	☐	☐	☐	☐
2. The teacher prepared a draft of the final inventory instrument and had it reviewed by a resource person and/or peers	☐	☐	☐	☐
3. Participants were selected considering:				
a. their job knowledge and practical experience in the occupational area	☐	☐	☐	☐
b. representation of different businesses or companies	☐	☐	☐	☐
c. representation of employers, employees, and trade or labor organizations	☐	☐	☐	☐
4. If the observation-interview approach was used, specific instructions were prepared for use by observers and/or interviewers	☐	☐	☐	☐
5. If a mail questionnaire was used:				
a. previously prepared forms were used to facilitate the gathering of data	☐	☐	☐	☐
b. a listing with specific instructions was provided	☐	☐	☐	☐
6. When participants were contacted regarding the analysis, they were told:				
a. the purpose(s) of the analysis	☐	☐	☐	☐
b. why they were selected to serve as participants	☐	☐	☐	☐
c. what they were requested to do	☐	☐	☐	☐
d. details on when, where, and how the verficiation activity is to be conducted	☐	☐	☐	☐

	N/A	No	Partial	Full
7. During the conduct of an observation and/or interview:				
a. previously prepared forms were used to facilitate the gathering of data	☐	☐	☐	☐
b. observations and interviews were conducted so as to limit interference with the work being performed by the individual	☐	☐	☐	☐
c. sufficient time was allocated for observations and/or interviews	☐	☐	☐	☐
d. interviews were closed on a friendly note	☐	☐	☐	☐
e. adequate notes were taken to be of value	☐	☐	☐	☐

LEVEL OF PERFORMANCE: All items must receive FULL, or N/A responses. If any item receives a NO, or PARTIAL response, review the material in the information sheet, Verifying an Initial Listing of Task and Duty Statements, pp. 30–48, take steps to revise your initial listing accordingly, or check with your resource person if necessary.

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Learning Experience IV

OVERVIEW

Enabling Objective

After completing the required reading, analyze and report the task inventory data.

Activity

You will be reading the information sheet, Analyzing and Reporting Task Inventory Data, pp. 54–63.

Activity

You will be analyzing the data obtained from a limited-scale task inventory investigation and reporting the data.

Feedback

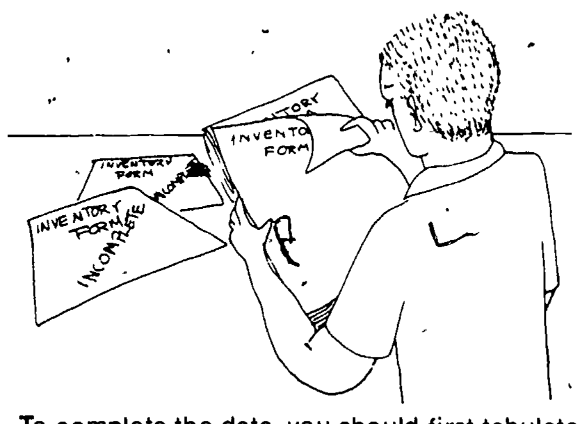
You will be evaluating your competency in analyzing and reporting task inventory data, using the Task Inventory Data Analysis Checklist, p. 65.

Activity

For information concerning the procedures for analyzing and reporting task inventory data, read the following information sheet:

ANALYZING AND REPORTING TASK INVENTORY DATA

Once the task inventory data have been collected, they must be analyzed. To begin this process, check the inventory forms for completeness as they are returned by the participants, observers, or interviewers. Those that were not properly completed should be discarded and not considered further.



To complete the data, you should first tabulate them. This is accomplished by developing one or more frequency counts for each statement verified. For hand tabulating, this might be achieved by using a blank form similar to the one used during the data-collection process, or a specially prepared form. Sample tabulation forms are shown in Samples 17 and 18. Sometimes data processing equipment (e.g., computers) can be used for tabulating the data if a large amount of data is to be processed.

If additional statements were added by one or more respondents during the verification process, the number of individuals who added any one statement will likely to be very low. Probably the best way of handling these statements is to include them in a separate section of a summary tabulation form, as shown in Sample 19. If resources permit, the added statements should be submitted to the participants for detailed consideration.

When one or more of the frequency counts have been completed, the data should be put into a form which makes them easier to interpret. One way of doing this is to show the frequency of occurrence of the different items by using a table, a bar or line graph, or a frequency curve.

Another way to make the data more meaningful is to convert them into percentages or averages. Data might be presented as percentages for each statement, numbers and percentages of responses for each statement, or mean (average) responses. Examples of these are presented in Sample 20.

To arrive at an average or mean for the responses, a value must be assigned to each scale category. Note in item 2 of Sample 20 that "of extreme importance" was assigned the value of 4, "of considerable importance" the value of 3, "of some importance" 2, "of limited importance" 1, and "of no importance" 0. The assigned value for a specific category is then multiplied by the number who responded in that category. The totals for the columns, five in this case, are then added together. The sum resulting from this operation is then divided by the number of respondents to obtain the average. To obtain the average indicated in item 2, the following was computated.

Number		Value		Totals
2	X	4	=	8
1	X	3	=	3
8	X	2	=	16
0	X	1	=	0
4	X	0	=	0
15				27

The total obtained, 27, is then divided by the total respondents, 15. As a result of this division, the average of 1.8 was obtained.

There are many other ways in which data may be analyzed and presented.[14] For example, measures of central tendency such as the following might be used.

- **Mean.**—This is the arithmetic **average** which can be obtained as described above.
- **Median.**—This is the **mid-point** in the distribution of values or cases, or the point in a distribution with an equal number of cases on each side of it.
- **Mode:**—The mode is that **value** in a distribution which has the **largest frequency**, or occurs most frequently.

14. To gain skill in analyzing data, you may wish to refer to Module A-3, *Report the Findings of a Community Survey*

Making the Data Summary

At this point, a summary of task statements and responses should be compiled. This summary should be prepared with the purpose of the analysis in mind. For example, if the intent was to describe the total occupation, the summary should be rather detailed. If the intent was to establish a basis for an educational program for preparing individuals to enter an occupation, then the summary should not reflect as detailed a listing of occupational activities. Rather, it should identify only those activities which an individual must be able to perform to enter the occupation.

The data collected as the result of the analysis procedures must now be interpreted. Statements to be included in the inventory must be identified. If a detailed list is to be developed, all statements identified as being relevant should be included. If a limited listing is to be prepared, only those statements identified as being relevant to beginning employees should be included. Or, only those statements identified as being performed by 50 percent or more (or some other arbitrary percentage) of the respondents should be included. Additional limitations could be imposed by selecting some minimum average scale value to be used in identifying the statements to be included (e.g., 1.50 on the importance scale discussed earlier).

In making decisions concerning what statements should or should not be included in the summary, caution must always be exercised in interpreting the data. Examine the table in Sample 21. Let us assume that the analyst elected to place emphasis on "frequency of performance" in identifying statements to be included, and selected a minimum average value of 2.50. Would you include task 2, "edit letters dictated by employer"? Note that only eight respondents performed this task. If the 2.50 minimum average value is the only criterion, then it probably should be included.

However, more realistic criteria might include a minimum average value of 2.50 and a minimum of 50 percent of the respondents indicating they perform the activity described. In this case, task 2 would not be included. It is suggested that as much of the data collected as possible be included in the summary. However, you should always be careful to explain and interpret any unusual situations which may be identified.

Once the criteria for selecting the statements are determined, a format for presenting them must be identified. The format must be conducive to presenting the type of information which is desired. Sample formats which can be used are shown in Samples 22 and 23.

Remember, this summary listing should generally conform to the statement standards suggested earlier in this module. In addition, statements may be added or deleted on the basis of the information collected. Duty statements might be altered or consolidated. Task statements may be listed in alphabetical order under the duty statement or be ranked on the basis of selected data collected during the analysis procedures.

If the analysis was originally conceived as dealing with an occupational cluster, it is important that the activities described earlier in this module be performed for each occupation identified as being included in the cluster. Once the summary of task statements has been prepared for each of the individual occupations, an effort should be made to prepare a consolidated summary of task statements which depicts activities involved in the cluster.

This can probably be best achieved by using a form similar to that shown in Sample 24. Once the form is completed with the activities important to the various occupations identified, it is a relatively simple matter to prepare a summary of task statements for the cluster.

Prior to preparing such a final summary, the completed form should be reviewed to determine if, indeed, the occupations which were identified earlier are similar enough in the activities required to warrant being so clustered. If it is determined that an occupation does not fit, then that occupation might best be eliminated from the cluster. This is particularly important if it is anticipated that the final summary of analysis components will be used in developing an instructional program to prepare individuals for working in occupations considered to be part of the cluster.

Presenting the Findings

After tabulating, analyzing, and interpreting the data, the findings should be presented so as to be of maximum value to the user. For an analysis such as the one described in this module, it is important that the resulting findings be presented in such a manner that they will be usable by persons other than the analyst.

To be of such value, the report developed as a result of the analysis procedures should reflect not only the summary of identified task and duty statements, but how and why the list was developed. The report for vocational educators should contain information related to the following topics.

- need for vocational education programs related to the occupation in terms of employment outlook and need for prepared individuals to enter the occupation(s)

- occupational description(s)
- summary of the task and duty statements along with relevant findings
- procedures used in developing the inventory, including the guidelines followed in making pertinent decisions as to which statements were included

Tables, charts, and graphs should be used in conjunction with the narrative to graphically illustrate the findings for the reader.

After the analysis has been completed, you are ready to proceed with the development of an instructional program. Using the summary report, particularly the summary of task statements, you can formulate relevant objectives and begin the development of instructional materials.

SAMPLE 17

SIMULATED DATA TABULATED USING DATA COLLECTION FORM[15]

Directions: Check degree of importance for each competency to enter this occupation in 1975 as a beginning employee based on your experience. Additional spaces are provided for competencies you may wish to add and evaluate.

Occupation: Feed Lot Hand

Competencies	**Essential**	**Important**	**Of Some Importance**	**Not Important**	**Does Not Apply**
1. Tending cattle.	𝍸	𝍸 ||||	||		
a. Bed cattle shelters, pens, and trucks	𝍸 |||	𝍸 |	|	|	
b. Castrate cattle		||	𝍸 |	𝍸	|||
c. Dehorn cattle	||	𝍸	𝍸 |	|	|
d. Mark cattle by using paint and chalk; by using ear tags and ear notches		𝍸 || 7	|||	𝍸	|
e. Brand cattle.	||	||	𝍸 𝍸	|	
f. Control movement of cattle between the various pens	𝍸 |||	𝍸	||		
g. Fit and show market cattle	||	𝍸	𝍸	||	||
h. Apply medicants by using syringe		|||	||||	𝍸 |	|||
i. Apply medicants in feed and water	|||	||||	𝍸 |	|	|

15 Form adapted from Gobbo, "Competencies Needed for Employment in Beef Production Enterprises," p. 116

SAMPLE 18

TABULATION FORM FOR TASKS PERFORMED BY RESPONDENTS

Occupation: Drycleaner

Duty: Spotting Operations

Tasks		Name or Code Number of Respondents															
No.	**Statement**	001	002	003	004	005	006	007	008	009	010	011	012	013	014	015	
1	Separate garments with spots and stains	✓	✓		✓												
2	Apply reagents to spots and stains before garments are cleaned	✓	✓	✓													
3	Sprinkle chemical solvents over stains and pat area with brush or sponge until stain is removed	✓	✓	✓	✓												
4	Spray steam, water, or air over spot to flush out chemicals and dry garments	✓	✓	✓	✓												
5	Apply chemicals to neutralize effect of solvents	✓	✓	✓	✓												

SAMPLE 19

TABULATION SUMMARY FORM

JOB TITLE: SALES MANAGER[16]
JOB NUMBER: 35
SPECIFIC JOB DUTIES

Interviewees* indicated that the following tasks were performed (1) regularly, (2) occasionally, or (3) never.

Transient (over 100 rooms) S	Transient (over 100 rooms) E	Transient (under 100 rooms) S	Transient (under 100 rooms) E	Transient (under 100 rooms) E	CRITICAL TASKS
1	1	1	1	1	1. Solicits income-producing business of all types for the hotel or motel
1	2	1	1	1	2. Directs promotional correspondence with travel bureaus, organizations, etc.
1	1	1	1	1	3. Obtains information on contemplated conventions, social functions, etc.
1	1	1	1	1	4. Contacts convention sponsors for their patronage
1	2	1	1	1	5. Attends meetings of such groups as Rotary Club and Chamber of Commerce for developing promotional plans for attracting more people into the city or area
1	1	1	1	1	6. Contacts executives of national or state-wide business enterprises to obtain their business
1	3	1	1	1	7. Contacts local groups to promote facilities for local dances, banquets or luncheons
1	1	1	1	1	9. Furnishes newspapers with interesting stories or events about the hotel to obtain free publicity
1	1	1	1	1	10. Initiates and promotes events which contribute to the popularity and income of the hotel or motel
1	1	1	1	2	11. Travels outside the city to promote the hotel or motel facilities and services

TASKS ADDED BY INTERVIEWEES:

1. Participates in professional associations to keep informed of changes in the industry, new techniques and approaches
2. Establishes sales policies and procedures with the general manager
3. Trains new personnel in his/her department
4. Advises the manager pertaining to sales
5. Helps form plans to promote the hotel's facilities
6. Participates actively in local civic and social clubs and groups

*"S" indicates the supervisor of the employee whose job was selected for study; "E" indicates the employee in the job selected for study.

16 Adapted from Lucy C Crawford, *A Competency Pattern Approach To Curriculum Construction in Distributive Teacher Education* (Blacksburg, VA Department of Education, College of Arts and Sciences, Virginia Polytechnic Institute, 1967), p 1001

SAMPLE 20

DATA AS PERCENTAGES AND NUMBERS

Item 1 Task Statements	Number Performing N=30	Percentage Performing
1. Detect heat	30	100
2. Determine time to inseminate	22	70.3
3. Identify symptoms of reproductive diseases	10	33.3
4. Maintain breeding records	8	26.7
5. Move cattle	25	80.3
6. Operate breeding chute	28	90.3

Item 2	Importance										
Task Statement No.	Of Extreme Importance (4)		Of Considerable Importance (3)		Of Some Importance (2)		Of Limited Importance (1)		Of No Importance (0)		AVERAGE
	No.	%	No.	%	No.	%	No.	%	No.	%	
1	2	13	1	7	8	53	0	0	4	27	1.8

SAMPLE 21

ANALYSIS

Duty: Performing Stenographic Activities

Tasks	Number Performing	Frequency of Performance					Average Frequency of Performance
		not at all (1)	seldom (2)	quite often (3)	often (4)	very often (5)	
1. Compose correspondence	15		10	5			2.33
2. Edit letters dictated by employer	8		3	4	1		2.75
3. Operate dictaphone	25		10	12	3		2.72
4. Operate dictating machine	25		8	7	10		3.08
5. Operate shorthand machine	27		5	7	15		3.37
6. Transcribe (type) from dictaphone	25		10	12	3		2.72
7. Type minutes or reports of meetings	80			10	20		3.06

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SAMPLE 22

SUMMARY FORM

TASKS PERFORMED BY ALTERATION SPECIALISTS ARRANGED IN CLUSTERS[17]

Task Clusters (arranged in descending order of mean frequency scores)	Performance Rate of Tasks*
A. Analyzation of Fitting Problems	
Analyze fitting problems of customer	A
Fit garment on customer, examining: Location and slope of shoulder line	A
Fit garment on customer, examining: Location of grain lines	B
Fit garment on customer, examining: Design of garments	B
Maintain grain line in fitting	B
Fit garment on customer, examining: Position of darts in bodice and at elbow	B
Offer suggestions, when requested, for desirable alterations	B
Fit garment on customer, examining: Position of waistline	B
Fit garment on customer, examining: Length of bodice and sleeve	B
Fit garment on customer, examining: Ease at bust	C
Fit garment on customer, examining: Measurement of waistline	C
Mark or pin garment indicating desired alterations	C
B. Alterations Offered	
Alter shoulder length or slope	A
Alter length of coat, skirt, dress, slacks	A
Alter waist measurement	A
Sew rips and seams	A
Rip stitching without injuring fabric	A
Alter length of sleeves in coat, suit, dress	A
Change style of suit	B
Performance of various hem types	B
Taper shirts	B
Cuff trousers	B

*An A indicates a task which is performed several times a week; B a task which is performed several times a month; C a task which is performed several times a year; D a task which is performed less than once a year; and—a task which is never done.

17. *Identification of Tasks in Home Economics Related Occupations Clothing, Apparel, and Textile Services* (Des Moines, IA Department of Public Instruction, 1974), p 26

SAMPLE 23

SUMMARY FORM

MEAN FREQUENCY FOR FABRIC SPECIALIST[18]

RANK*	ITEM NUMBER	TASK	MEAN FREQUENCY
1	2	Select appropriate notions according to fabric content	3.94
2	1	Aid customer in selection of fabric content for end use	3.93
3	35	Give customer information about care procedures for fabrics	3.89
4	4	Aid customer in selection of interfacings for each fabric content	3.87
5	34	Aid customer in selecting a fabric suitable for a particular pattern	3.74
6	38	Aid customer in selecting a pattern appropriate for a particular fabric	3.64
7	47	Do housekeeping duties, i.e., dust, sweep	3.51
8	3	Aid customer in pattern selection for her figure	3.49
9	32	Restock shelves	3.48
10	27	Do routine office work: answer telephone, take messages, file	3.40
11	31	Do routine cleaning of tables and shelves	3.38
12	36	Lay patterns on fabrics to see if pattern will fit a specified amount of fabric	3.36
13	22	Order patterns	3.34
14	11	Stock shelves with notions	3.31
15	26	Handle customer complaints	3.14

*Descending Order
Scale—0 to 4

18 *Identification of Tasks in Home Economics Related Occupations Clothing, Apparel, and Textile Services*, p. 84

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SAMPLE 24

CONSOLIDATED SUMMARY FORM CLUSTER ACTIVITY LISTING[19]

Cluster: Automotive Mechanics

Activities (Duty/Tasks)	(1) Mechanic	(2) Mechanic's Helper	(3) Service Manager	(4) Service Writer or Advisor	(5) Garage Owner	(6)	(7)	(8)	(9)	(10)
G. Maintaining and Repairing Power Trains										
1. Adjust external shift linkage on manual transmissions										
2. Adjust mechanical type clutch										
3. Analyze and repair electrical control circuit and components for overdrive units										
4. Balance drive shaft (in-car)										
5. Inspect shifting										
6. Inspect drive shaft										

19. Duty, tasks and occupations adapted from Borcher and Leiter, *Automotive Mechanics Occupational Performance Survey*, p 44

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Activity

Prepare a task inventory summary report using the data you collected in Learning Experience IV. If you did not collect data for verifying the task statements in an occupational analysis in Learning Experience IV, you will need to ask your resource person for sample inventory data that you can use for this purpose. You may wish to work with a peer who has collected such data and is also ready to prepare a summary.

Feedback

After you have prepared a task inventory summary report, use the Task Inventory Data Analysis Checklist, p. 65, to evaluate your work.

TASK INVENTORY DATA ANALYSIS CHECKLIST

Directions: Place an X in the NO, PARTIAL, or FULL box to indicate that each of the following performance components was not accomplished, partially accomplished, or fully accomplished. If, because of special circumstances, a performance component was not applicable, or impossible to execute, place an X in the N/A box.

Name

Date

Resource Person

LEVEL OF PERFORMANCE

	N/A	No	Partial	Full
1. Data from usable forms were tabulated using appropriate procedures	☐	☐	☐	☐
2. Tabulated data were presented in forms to make them easily interpreted (e.g., percentages, measures of central tendency, and measures of variability)	☐	☐	☐	☐
3. Realistic criteria were established and utilized for selecting statements to be included in the final summary	☐	☐	☐	☐
4. A final summary report was prepared in which the following topics were discussed:				
a. need for vocational education programs related to this occupation in terms of the employment outlook and of the need for prepared individuals to enter the occupation	☐	☐	☐	☐
b. occupation description	☐	☐	☐	☐
c. summary of task and duty statements along with relevant findings	☐	☐	☐	☐
d. procedures used in developing the inventory, including the guidelines followed in making pertinent decisions as to which statements were included	☐	☐	☐	☐

LEVEL OF PERFORMANCE: All items must receive FULL, or N/A responses. If any item receives a NO, or PARTIAL response, review the material in the information sheet, Analyzing and Reporting Task Inventory Data, pp. 54–63, revise your data summary accordingly, or check with your resource person if necessary

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Learning Experience V

FINAL EXPERIENCE

Terminal Objective

While working in an **actual school situation,*** conduct an occupational analysis.

Activity

At a time when your program planning, development, and/or evaluation calls for the identification of the skills needed for success in an occupation(s), conduct an occupational analysis. This will include—

- defining the scope of your analysis by preparing an occupational description
- preparing an initial listing of duty and task statements for the occupation
- verifying the initial listing of duty and task statements
- analyzing and reporting the task inventory data

NOTE: As you complete each of the above activities, document your actions (in writing, on tape, through a log) for assessment purposes.

Feedback

Arrange in advance to have your resource person review your documentation and observe at least one instance in which you are verifying the duty and task statements.

Your total competency will be assessed by your resource person, using the Teacher Performance Assessment Form, pp. 69–71.

Based upon the criteria specified in this assessment instrument, your resource person will determine whether you are competent in conducting an occupational analysis.

*For a definition of "actual school situation," see the inside back cover

NOTES

TEACHER PERFORMANCE ASSESSMENT FORM

Conduct an Occupational Analysis (A–7)

Name

Date

Resource Person

Directions: Indicate the level of the teacher's accomplishment by placing an X in the appropriate box under the LEVEL OF PERFORMANCE heading. If, because of special circumstances, a performance component was not applicable, or impossible to execute, place an X in the N/A box.

	LEVEL OF PERFORMANCE					
	N/A	None	Poor	Fair	Good	Excellent
In defining the scope of the analysis, the teacher:						
1. considered community, student, and resource factors in selecting an occupational cluster	☐	☐	☐	☐	☐	☐
2. prepared a complete occupational description for each occupation involved	☐	☐	☐	☐	☐	☐
3. consulted standard authoritative sources of data in developing the occupational descriptions	☐	☐	☐	☐	☐	☐
In developing the initial listing of duty and task statements, the teacher:						
4. consulted several appropriate sources of information	☐	☐	☐	☐	☐	☐
5. included enough task statements to adequately describe the occupation	☐	☐	☐	☐	☐	☐
6. included both supervisory and work experience activities in the duty statements	☐	☐	☐	☐	☐	☐
Task statements in the initial inventory:						
7. differentiated between workers at different occupations and levels	☐	☐	☐	☐	☐	☐
8. were stated briefly and clearly	☐	☐	☐	☐	☐	☐
9. used the terminology of the occupation	☐	☐	☐	☐	☐	☐
10. were ratable in terms of time spent and other factors	☐	☐	☐	☐	☐	☐
11. did not include non-task items	☐	☐	☐	☐	☐	☐
12. were written in accepted format	☐	☐	☐	☐	☐	☐
The initial task statement listing:						
13. was reviewed by workers and/or supervisors of workers from the occupational area	☐	☐	☐	☐	☐	☐
14. was revised following the review, if necessary	☐	☐	☐	☐	☐	☐

	N/A	None	Poor	Fair	Good	Excellent
The revised version of the initial listing:						
15. was reviewed by workers from the occupation to indicate their comprehension of each statement and their understanding of the directions	☐	☐	☐	☐	☐	☐
16. allowed for appropriate information on the workers' backgrounds and personal records to be recorded	☐	☐	☐	☐	☐	☐
Participants in the verification process were selected in relation to:						
17. their knowledge and experience in the occupational area.	☐	☐	☐	☐	☐	☐
18. their representation of the appropriate occupational groups	☐	☐	☐	☐	☐	☐
19. available resources for the project	☐	☐	☐	☐	☐	☐
In verifying the statements, the teacher:						
20. developed detailed procedures to be used	☐	☐	☐	☐	☐	☐
21. gave interviewers special training if an observation or interview procedure was selected	☐	☐	☐	☐	☐	☐
22. prepared sufficient numbers of copies of the final inventory for participants and follow-up	☐	☐	☐	☐	☐	☐
23. gave potential participants adequate information on the purposes and requirements of the verification process	☐	☐	☐	☐	☐	☐
24. prepared forms to be used to gather data during the observation or interview	☐	☐	☐	☐	☐	☐
In analyzing the data, the teacher:						
25. tabulated data using appropriate procedures	☐	☐	☐	☐	☐	☐
26. prepared data in a manner designed to make them easy to interpret	☐	☐	☐	☐	☐	☐
27. used realistic criteria for selecting task statements to be included in the final listing	☐	☐	☐	☐	☐	☐

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A final analysis report was prepared, including the following sections:

	N/A	None	Poor	Fair	Good	Excellent
28. need for the vocational education program of concern	☐	☐	☐	☐	☐	☐
29. occupation description(s)	☐	☐	☐	☐	☐	☐
30. inventory of analysis components	☐	☐	☐	☐	☐	☐
31. related data and findings	☐	☐	☐	☐	☐	☐
32. procedures and criteria used in developing the inventory	☐	☐	☐	☐	☐	☐

LEVEL OF PERFORMANCE: All items must receive N/A, GOOD, or EXCELLENT responses. If any item receives a NONE, POOR, or FAIR response, the teacher and resource person should meet to determine what additional activities the teacher needs to complete in order to reach competency in the weak area(s).

NOTES

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ABOUT USING THE CENTER'S PBTE MODULES

Organization

Each module is designed to help you gain competency in a particular skill area considered important to teaching success. A module is made up of a series of learning experiences, some providing background information, some providing practice experiences, and others combining these two functions. Completing these experiences should **enable** you to achieve the **terminal** objective in the final learning experience. The final experience in each module always requires you to demonstrate the skill in an actual school situation when you are an intern, a student teacher, or an inservice teacher

Procedures

Modules are designed to allow you to individualize your teacher education program. You need to take only those modules covering skills which you do not already possess. Similarly, you need not complete any learning experience within a module if you already have the skill needed to complete it. Therefore, before taking any module, you should carefully review (1) the Introduction, (2) the Objectives listed on p 4, (3) the Overviews preceding each learning experience, and (4) the Final Experience. After comparing your present needs and competencies with the information you have read in these sections, you should be ready to make one of the following decisions:

- that you do not have the competencies indicated, and should complete the entire module
- that you are competent in one or more of the enabling objectives leading to the final learning experience, and thus can omit that (those) learning experience(s)
- that you are already competent in this area, and ready to complete the final learning experience in order to "test out"
- that the module is inappropriate to your needs at this time

When you are ready to take the final learning experience and have access to an actual school situation, make the necessary arrangements with your resource person If you do not complete the final experience successfully, meet with your resource person and arrange (1) to repeat the experience, or (2) complete (or review) previous sections of the module or other related activities suggested by your resource person before attempting to repeat the final experience.

Options for recycling are also available in each of the learning experiences preceding the final experience Any time you do not meet the minimum level of performance required to meet an objective, you and your resource person may meet to select activities to help you reach competency. This could involve (1) completing parts of the module previously skipped, (2) repeating activities, (3) reading supplementary resources or completing additional activities suggested by the resource person; (4) designing your own learning experience, or (5) completing some other activity suggested by you or your resource person.

Terminology

Actual School Situation . . . refers to a situation in which you are actually working with, and responsible for, secondary or post-secondary vocational students in a real school. An intern, a student teacher, or an inservice teacher would be functioning in an actual school situation. If you do **not** have access to an actual school situation when you are taking the module, you can complete the module **up to** the final learning experience You would then do the final learning experience later; i e , when you have access to an actual school situation

Alternate Activity or Feedback . . . refers to an item or feedback device which may **substitute** for required items which, due to special circumstances, you are unable to complete.

Occupational Specialty . . . refers to a specific area of preparation within a vocational service area (e g , the service area Trade and Industrial Education includes occupational specialties such as automobile mechanics, welding, and electricity).

Optional Activity or Feedback . . . refers to an item which is not required, but which is designed to **supplement** and enrich the required items in a learning experience

Resource Person . . . refers to the person in charge of your educational program, the professor, instructor, administrator, supervisor, or cooperating/supervising classroom teacher who is guiding you in taking this module.

Student . . . refers to the person who is enrolled and receiving instruction in a secondary or post-secondary educational institution

Vocational Service Area . . . refers to a major vocational field agricultural education, business and office education, distributive education, health occupations education, home economics education, industrial arts education, technical education, or trade and industrial education

You or the Teacher . . . refers to the person who is taking the module.

Levels of Performance for Final Assessment

N/A . . The criterion was not met because it was **not applicable** to the situation

None . . . **No attempt** was made to meet the criterion, although it was relevant

Poor . . . The teacher is unable to perform this skill or has only **very limited ability** to perform it

Fair . . . The teacher is unable to perform this skill in an acceptable manner, but has **some ability** to perform it

Good . . . The teacher is able to perform this skill in an **effective** manner.

Excellent . . . The teacher is able to perform this skill in a **very effective** manner.

Titles of The Center's Performance-Based Teacher Education Modules

Category A: Program Planning, Development, and Evaluation

A–1 Prepare for a Community Survey
A–2 Conduct a Community Survey
A–3 Report the Findings of a Community Survey
A–4 Organize an Occupational Advisory Committee
A–5 Maintain an Occupational Advisory Committee
A–6 Develop Program Goals and Objectives
A–7 Conduct an Occupational Analysis
A–8 Develop a Course of Study
A–9 Develop Long-Range Program Plans
A–10 Conduct a Student Follow-Up Study
A–11 Evaluate Your Vocational Program

Category B: Instructional Planning

B–1 Determine Needs and Interests of Students
B–2 Develop Student Performance Objectives
B–3 Develop a Unit of Instruction
B–4 Develop a Lesson Plan
B–5 Select Student Instructional Materials
B–6 Prepare Teacher-Made Instructional Materials

Category C: Instructional Execution

C–1 Direct Field Trips
C–2 Conduct Group Discussions, Panel Discussions, and Symposiums
C–3 Employ Brainstorming, Buzz Group, and Question Box Techniques
C–4 Direct Students in Instructing Other Students
C–5 Employ Simulation Techniques
C–6 Guide Student Study
C–7 Direct Student Laboratory Experience
C–8 Direct Students in Applying Problem-Solving Techniques
C–9 Employ the Project Method
C–10 Introduce a Lesson
C–11 Summarize a Lesson
C–12 Employ Oral Questioning Techniques
C–13 Employ Reinforcement Techniques
C–14 Provide Instruction for Slower and More Capable Learners
C–15 Present an Illustrated Talk
C–16 Demonstrate a Manipulative Skill
C–17 Demonstrate a Concept or Principle
C–18 Individualize Instruction
C–19 Employ the Team Teaching Approach
C–20 Use Subject Matter Experts to Present Information
C–21 Prepare Bulletin Boards and Exhibits
C–22 Present Information with Models, Real Objects, and Flannel Boards
C–23 Present Information with Overhead and Opaque Materials
C–24 Present Information with Filmstrips and Slides
C–25 Present Information with Films
C–26 Present Information with Audio Recordings
C–27 Present Information with Televised and Videotaped Materials
C–28 Employ Programmed Instruction
C–29 Present Information with the Chalkboard and Flip Chart

Category D: Instructional Evaluation

D–1 Establish Student Performance Criteria
D–2 Assess Student Performance: Knowledge
D–3 Assess Student Performance: Attitudes
D–4 Assess Student Performance: Skills
D–5 Determine Student Grades
D–6 Evaluate Your Instructional Effectiveness

Category E: Instructional Management

E–1 Project Instructional Resource Needs
E–2 Manage Your Budgeting and Reporting Responsibilities
E–3 Arrange for Improvement of Your Vocational Facilities
E–4 Maintain a Filing System
E–5 Provide for Student Safety
E–6 Provide for the First Aid Needs of Students
E–7 Assist Students in Developing Self-Discipline
E–8 Organize the Vocational Laboratory
E–9 Manage the Vocational Laboratory

Category F: Guidance

F–1 Gather Student Data Using Formal Data-Collection Techniques
F–2 Gather Student Data Through Personal Contacts
F–3 Use Conferences to Help Meet Student Needs
F–4 Provide Information on Educational and Career Opportunities
F–5 Assist Students in Applying for Employment or Further Education

Category G: School-Community Relations

G–1 Develop a School-Community Relations Plan for Your Vocational Program
G–2 Give Presentations to Promote Your Vocational Program
G–3 Develop Brochures to Promote Your Vocational Program
G–4 Prepare Displays to Promote Your Vocational Program
G–5 Prepare News Releases and Articles Concerning Your Vocational Program
G–6 Arrange for Television and Radio Presentations Concerning Your Vocational Program
G–7 Conduct an Open House
G–8 Work with Members of the Community
G–9 Work with State and Local Educators
G–10 Obtain Feedback about Your Vocational Program

Category H: Student Vocational Organization

H–1 Develop a Personal Philosophy Concerning Student Vocational Organizations
H–2 Establish a Student Vocational Organization
H–3 Prepare Student Vocational Organization Members for Leadership Roles
H–4 Assist Student Vocational Organization Members in Developing and Financing a Yearly Program of Activities
H–5 Supervise Activities of the Student Vocational Organization
H–6 Guide Participation in Student Vocational Organization Contests

Category I: Professional Role and Development

I–1 Keep Up-to-Date Professionally
I–2 Serve Your Teaching Profession
I–3 Develop an Active Personal Philosophy of Education
I–4 Serve the School and Community
I–5 Obtain a Suitable Teaching Position
I–6 Provide Laboratory Experiences for Prospective Teachers
I–7 Plan the Student Teaching Experience
I–8 Supervise Student Teachers

Category J: Coordination of Cooperative Education

J–1 Establish Guidelines for Your Cooperative Vocational Program
J–2 Manage the Attendance, Transfers, and Terminations of Co-Op Students
J–3 Enroll Students in Your Co-Op Program
J–4 Secure Training Stations for Your Co-Op Program
J–5 Place Co-Op Students on the Job
J–6 Develop the Training Ability of On-the-Job Instructors
J–7 Coordinate On-the-Job Instruction
J–8 Evaluate Co-Op Students' On-the-Job Performance
J–9 Prepare for Students' Related Instruction
J–10 Supervise an Employer-Employee Appreciation Event

RELATED PUBLICATIONS

Student Guide to Using Performance-Based Teacher Education Materials
Resource Person Guide to Using Performance-Based Teacher Education Materials
Guide to the Implementation of Performance-Based Teacher Education