

DOCUMENT RESUME

ED 133 558

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CE 009 627

TITLE Curriculum for Graduate Program to Prepare Vocational Education Curriculum Specialists (VECS). Module 4: Organizing Instructional Strategies.

INSTITUTION Washington State Univ., Pullman. Coll. of Education.

SPONS AGENCY Bureau of Occupational and Adult Education (DHEW/OE), Washington, D.C. Div. of Research and Demonstration.

REPORT NO VT-103-454

PUB DATE [76]

CONTRACT OEC-0-74-9287

NOTE 337p.; For related documents see CE 009 624-632

EDRS PRICE MF-\$0.83 HC-\$18.07 Plus Postage.

DESCRIPTORS \*Curriculum Development; Educational Strategies; Graduate Study; Higher Education; \*Instructional Design; Instructional Materials; \*Learning Activities; Learning Modules; Performance Based Education; Post Secondary Education; Secondary Education; Specialists; Teacher Education; \*Teacher Education Curriculum; \*Teaching Methods; \*Vocational Education

IDENTIFIERS Vocational Education Curriculum Specialists

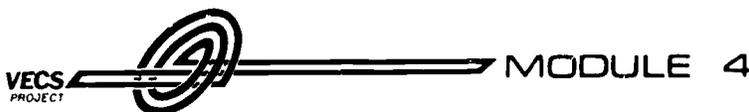
ABSTRACT

Part of an eight-module, graduate level, competency-based curriculum to prepare specialists in vocational education curriculum, this module provides descriptions and activities associated with different instructional approaches. The learning activities are designed to take the learner from comprehension through demonstration of 10 teaching strategies. The module is divided into the 10 strategies of lecture, discussion, demonstration, laboratory, questioning, inquiry, simulation and games, individualized instruction, field experience, and independent study. A final category supplies the learner with criteria for selecting appropriate strategies. Each major section consists of a performance objective subdivided into several instructional objectives with related learning activities and list of resources. A pretest, posttest, and glossary of terms are also included, along with appended units on microteaching and individualized instruction. (NJ)

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ED133558

CURRICULUM  
for  
GRADUATE PROGRAM  
to Prepare  
VOCATIONAL EDUCATION CURRICULUM SPECIALISTS



Organizing  
Instructional  
Strategies

by the  
Department of Education  
Washington State University  
Pullman, Washington 99153

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Developed and disseminated pursuant to grant No. OEC 0-74-9287

for the Curriculum Development Branch

of the Division of Research and Demonstration,

Bureau of Occupational and Adult Education

U. S. Office of Education, Department of Health, Education, and Welfare  
under Part I - Curriculum Development in Vocational and Technical Education  
Vocational Education Amendments of 1968, Public Law 90-576

# INDEX

**LECTURE** [REDACTED]

**DISCUSSION** [REDACTED]

**DEMONSTRATION** [REDACTED]

**LABORATORY** [REDACTED]

**QUESTIONING** [REDACTED]

**INQUIRY** [REDACTED]

**SIMULATION / GAMES** [REDACTED]

**INDIVIDUALIZED INSTRUCTION** [REDACTED]

**FIELD EXPERIENCE** [REDACTED]

**INDEPENDENT STUDY** [REDACTED]

**PUTTING IT TOGETHER** [REDACTED]

The content of this module was used as a part of a graduate course in Vocational Technical Education at Washington State University. The effectiveness of the curriculum material was evaluated on the basis of:

1. Performance data from pre and post tests and other evaluative techniques used in the course.
2. Use of a Curriculum Evaluation Questionnaire which was developed, administered and summarized by the third party evaluator, Northwest Regional Education Laboratory. This questionnaire provided a faculty and student rating of: individualization of the curriculum, choice of learning settings and quality of curriculum.

Revisions in final drafts utilized these evaluations.

COMPETENCY

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THE VOCATIONAL EDUCATION CURRICULUM SPECIALIST  
WILL DEMONSTRATE THE ABILITY TO IDENTIFY AND USE  
APPROPRIATE INSTRUCTIONAL STRATEGIES AND ASSIST  
THE CURRICULUM DEVELOPMENT TEAM IN THIS PROCESS.

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## INTRODUCTION

### Purpose

This module presents a wide range of strategies that will acquaint, or reacquaint, the potential Vocational Education Curriculum Specialist with numerous approaches to instruction. In addition, the learner will be given the opportunity to demonstrate both comprehension and in most cases, application of each strategy.

The module also provides criteria which can be used by the learner to select appropriate strategies for various instructional objectives, learning environments, learner characteristics, and teacher characteristics.

### Rationale

A Vocational Education Curriculum Specialist (VECS) will demonstrate knowledge of instructional strategies in various ways. First, the curriculum specialist is likely to develop instructional materials, and needs a repertoire of strategies for the learning activities in such materials. Second, the curriculum specialist will often work with a team to develop curriculum, and thus must be able to teach others to use instructional strategies. Third, the curriculum specialist will function as a teacher educator to put on workshops and staff development seminars. In this function, the curriculum specialist will use instructional strategies as varied means of sharing information with others.

The learning activities in the module are designed to take the curriculum specialist from comprehension through demonstration of ten teaching strategies, then to provide a model for selecting instructional strategies.

### Assumptions

Two assumptions are fundamental to the content of this module. First, it is assumed that to attain any educational objective, more than one instructional strategy may be used. Second, it is assumed that no one instructional strategy can guarantee student or teacher mastery of a given objective. The selection of how and when to use instructional strategies is ultimately contingent on vocational education teachers and their students. For this reason, the Vocational Education Curriculum Specialist is encouraged to identify instructional alternatives, rather than "the" instructional approach.

The selection and implementation of instructional strategies represent integral aspects of curriculum design and development. As Marshall McLuhan has so aptly noted, "the medium is the message"<sup>1</sup> --the implication being that the medium (strategy) used to teach an idea, a skill, or an ability influences the ultimate learning of the pupil. Recognition of the relationship between instructional approaches and learning, however, should not be interpreted to mean that the medium is the goal: the end of the educational process. Rather, instructional strategies are means. Together with other variables, such as subject content and teacher behavior, strategies are part of the process by which specified goals and objectives are achieved.

### Overview

This module provides descriptions and activities associated with many possible instructional alternatives. It does not prioritize the approaches.

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<sup>1</sup> Herbert Marshall McLuhan, and Quentin Fiore, The Medium is the Message, (New York: Randon House, 1967).

Rather, it is emphasized that particular educational purposes and objectives, social and physical settings, materials, teachers, and students each may call for the use of particular instructional methods. Thus, careful articulation among all variables of learning is essential in effective educational planning, and is a basic competency of the curriculum specialists.

Many strategies are described within this package. The selection of which instructional strategies to include was not easy. A comprehensive list of instructional strategies might include the following:

Audiovisual techniques	Case method
Committee activity	Computerized instruction
Debate	Demonstration
Dramatization	Discussion
Field experiences	Drill
Group therapy	Games
encounter experiences	Independent study
sensitivity awareness	Inquiry
Guest speaker	Learning activity packages
Individualized instruction	Lecture
Laboratory	Panel
Learning centers	Role playing
Library	Self-instructional packages
resource centers	Socio-drama
media center	Supervised study
Problem solving	Synectics
problem analysis	
Review and practice	
Roundtable	
Simulation	

Study guides

Team learning

Symposium

Textbook

Teaching machine

Unipac

Team teaching

Tutoring

#### Values clarification

No doubt, one could identify other strategies to add to this list. The strategies that were ultimately included were selected because they seemed related to, and representative of, a wide variety of the approaches applicable for vocational education classes. (Audiovisual techniques and other media applications were not included because, strictly speaking, these are techniques that can be utilized to augment any of the other strategies). Chosen strategies are:

1. Lecture
2. Discussion
3. Demonstration
4. Laboratory
5. Questioning
6. Inquiry
7. Simulation/Games
8. Individualized instruction
9. Field experience
10. Independent study

The module is divided into categories, one for each of the ten strategies, plus a category that should "pull it all together." The sequence of the categories within the module is purposeful but not inviolate. The sequence puts the strategies on a continuum, from those that are primarily

teacher-focused (lecture) to those that are mostly student-focused (independent study).. From the learner's viewpoint, the categories can be taken in any order; each is designed to be autonomous.

The learning activities within each category also have sequence; in this case, taxonomic sequence. Where possible, the activities begin with competencies at the knowledge level and end with applied behaviors.

The final category of the module supplies the learner with a method for choosing appropriate strategies. By applying the criteria, the Vocational Education Curriculum Specialist can match strategies to classroom environment, to the resources and objectives, to the teaching style of the instructor and to learning styles of the students.

Each category closes with a list of related resources. The resources are not required for the activities, but are meant to supply further depth for interested learners. The module appendixes contain reference materials for various categories and activities.

#### Directions for Module Use

As an educator with several years of experience, the potential curriculum specialist already knows how to teach. So, what purpose can this module serve?

First of all, learners probably will not want to complete the entire module. In their current "basket of tricks," they already have several teaching strategies that they use often and well. If those strategies are included here, learners should review the performance objective/instructional objectives page at the beginning of the category. This review, together with their pretest results, should help them decide if they want, or need, to complete any or all of that category.

Next, learners should consider the fact that everyone can improve their

teaching skills. Expanding their knowledge of, and experience with, new teaching strategies is one way to increase teaching effectiveness and make classes more interesting for students. They should use this module to explore new strategies and refresh their knowledge of those they use frequently. If they have used some of these strategies in the past with little success, then they might want to try again.

There will never be a single, most effective instructional strategy. Because of the wide diversity in the environments where learning occurs, the varying experiences and backgrounds of teachers and students, and the diverse array of instructional goals and objectives, it is dangerous to make any rigid statements about the positive or negative features of any one strategy. Learners are therefore encouraged to experiment with a number of the strategies in the module. Ultimately, only they can determine the appropriate strategy to attain a particular goal. Learners must analyze their own teaching action and their own most effective styles of communication.

The intent of this module is to help learners develop an increased understanding of a variety of teaching strategies, and to give some opportunities to practice these skills. They are encouraged to adapt, rather than adopt, these modes of instruction. They should approach this "sales counter of strategies" as a shopper, concentrating on the items that seem most applicable at this time--perhaps the areas where they currently perceive themselves as weakest. The learners should attempt to keep an open mind during the selection process, rather than assume that certain strategies "just aren't for me." They may find peer and instructor microteaching helpful in evaluating current strengths and weaknesses.

All students should complete Category 11, "Putting It Together" (beginning on page 303). The activities in this category provide the guidelines for selecting instructional strategies--surely an essential skill for the curriculum specialist.

### Module Prerequisites

Although the emphasis is on vocational education, the objectives and activities in this module are appropriate for learners in any field of education who plan to instruct others. The module prerequisites that have been identified are:

1. teaching experience,
2. completion of the Prerequisite Module in this series,
3. ability to prepare lesson plans,
4. ability to distinguish between goals and behavioral objectives, and
5. comprehension of various domains in a taxonomy of objectives.

## PRETEST AND POSTTEST INSTRUCTIONS

Keys are provided for the multiple choice items on each test. All students should complete each item on the pretest--evaluation of the responses should provide valuable data for the decision of "which students should complete which categories."

The strategy decision items on each test are somewhat more difficult to evaluate. There are no right and wrong answers, although each item is "loaded" to suggest a particular strategy. Very often, creative students can think of ways to use seemingly inappropriate strategies to accomplish various objectives. These items can be used successfully to launch informative class discussions on instructional strategy decision making. Each item can be varied infinitely by changing one or more variables.

## PRETEST

All learners should complete the entire pretest. Evaluation of the responses will help detect weaknesses and provide criteria for selecting those categories of the module which should be completed by individual learners.

### Lecture

1. Which of the following is not an advantage of using lecture as an instructional strategy?
  - A. Lectures are economical in terms of learner time.
  - B. Lecturing matches the learning style of some students.
  - C. For students, lectures provide for "learning by doing."
  - D. Good lectures can provide interest and motivation to a large group of students at one time.
  
2. Which of the following statements about lecture are not true?
  - A. By lecturing, teachers can emphasize, repeat, and summarize important concepts.
  - B. Lectures are economical--one teacher can reach a large number of students at the same time.
  - C. Lectures allow for teacher control.
  - D. Lecturing is a simple skill--easily mastered by anyone.
  
3. Choose the communication skills which improve the use of lecture as an instructional strategy.
  1. Increase your students' vocabulary and pique their interest by frequently using new words and technical terms.
  2. Show enthusiasm for the subject of your lecture.
  3. Relate the lecture to previous experiences of your audience.
  4. To avoid confusing students with new materials, use the same books to prepare your lecture as they're required to read for class.
  5. To emphasize important points of your lecture, provide a summary at the end.
  - A. 1, 2, 3, 4, 5
  - B. 1, 3, 4, 5
  - C. 2, 3, 5
  - D. 1, 2, 3, 4
  - E. 2, 3, 4, 5
  
4. Which of the following behaviors is not recommended for the effective lecturer?
  - A. Use a rhetorical speaking style.
  - B. Display a sense of humor.
  - C. Use positive feedback.
  - D. Use verbal and visual illustrations.

## Discussion

5. Discussion can be defined as:
- A. A set of oral, content, or process oriented presentations.
  - B. Exchange of ideas with learning by all concerned.
  - C. Recitation of newly acquired facts.
  - D. All of the above.
6. Of the following discussion types, which one emphasizes inquiry or discovery teaching where students have to become skillful askers of questions?
- A. Discursive group
  - B. Socratic group
  - C. Heuristic group
  - D. Task group
7. Which of the following discussion techniques uses a form of creative thinking?
- A. Buzz session
  - B. Didactic
  - C. Brainstorming
  - D. Task
8. Which of the following is true of the brainstorming techniques?
- A. Piggybacking on someone else's idea is encouraged.
  - B. Judgments are made of each idea.
  - C. Practical and logical ideas are encouraged.
  - D. Quality of ideas is important.

## Demonstration

9. Criteria used in the selection of the demonstration method as a teaching technique are:
- A. inexpensive, interesting, and easy to prepare.
  - B. effective, involves two or more senses, and adaptable.
  - C. efficient, adaptable, and used for large groups.
  - D. involves two or more senses, interesting, and requires much preparation.
10. The key concepts and considerations necessary in preparation of a demonstration are:
- A. topic, purpose, content, steps, apparatus, and practice.
  - B. topic, purpose, evaluation, eye contact, and workmanship.
  - C. content, steps, topic, workmanship, feedback, and practice.
  - D. topic, audience participation, seating, steps, and purpose.

11. "Chatter" is a term referring to:
- A. script used in presenting the demonstration.
  - B. use of relevant information to fill in time lapses.
  - C. participation of the audience during a demonstration.
  - D. dialogue used to present information by the demonstrator.
12. If a student is to have adequate guidelines to follow in their own performance, the demonstrator must have:
- A. used quality performance standards.
  - B. planned objective ahead of time.
  - C. involved students in the demonstration.
  - D. allowed for individual differences.

#### Laboratory

13. When planning for the laboratory experience, which of the following is not a necessary consideration?
- A. The task analysis.
  - B. The timing of the exercise.
  - C. A form of written directions.
  - D. An innovative approach to the situation.
14. Which of the following best describes the use of laboratory in vocational education?
- A. Exploration of student attitudes toward work.
  - B. Practical application of principles.
  - C. Theoretical derivation of formulas.
  - D. Instruction of occupational skills.
15. Learning activities in the project method are selected according to the:
- A. occupational objectives of the student.
  - B. students' aptitudes in classroom instruction.
  - C. facilities offered by a cooperative employer.
  - D. importance of each activity in Distributive Education.
16. Experimentation is a type of laboratory used for the purpose of:
- A. discovering inconsistencies in theories taught.
  - B. verifying or discovering facts.
  - C. developing affective competencies.
  - D. helping students with special needs.

## Questioning

17. In order to encourage different levels of learning, questions should be varied in type. Such questions may be asked to:
1. Elicit simple recall
  2. Compare and contrast
  3. Classify
  4. Choose alternatives
  5. Present a relationship
- A. 1, 2, 4, 5  
 B. 2, 4, 5  
 C. 1, 2, 3, 4, 5  
 D. 1, 2, 3  
 E. 1, 3, 4, 5
18. Convergent questions could best be described as:
- A. A single question which elicits multiple responses.
  - B. A type of question which encourages a student to think creatively.
  - C. A question whose response requires judgment against a determined set of criteria.
  - D. A type of question that promotes focus on a narrow objective.
  - E. Questions which are general in nature.
19. Which of the following questions has been properly framed by the teacher?
- A. Teacher: What are some advantages of home ownership over home renting? (pause) Paul?
  - B. Teacher: Does anyone want to explain what a home mortgage is?
  - C. Teacher: Jasper you've been disruptive for the last half hour. Go to the board and write out the answers to questions 1-3.
  - D. Teacher: Carol, (pause) define the term, consumer.
  - E. Teacher: What is the difference between a loan and revolving credit? (Pause)
20. Pick the response below that best describes an evaluative question.
- A. Same as divergent questions, with the addition of judgmental criteria.
  - B. Questions used by the instructor to evaluate the progress of students.
  - C. Used by class members to evaluate each other.
  - D. Questions are asked by students, rather than by the instructor.
  - E. Questions that focus on a single, narrow objective.

## Inquiry

21. Using inquiry as an instructional technique:
- A. Requires the instructor to ask questions in a skillful way.
  - B. Encourages the student to use the scientific method.
  - C. Is one of the few methods that originated in the 20th Century.
  - D. Is economical in terms of learning time.
  - E. Allows the student to take a passive role.

22. Which of the following are roles of the teacher in using the inquiry strategy?
1. Plans the material that stimulates an inquiry lesson.
  2. Prods the students into exploring alternatives.
  3. Requests defense of statements.
  4. Discourages unorthodox ideas.
  5. Asks questions to redirect thought.
- A. 1, 2, 3, 4, 5  
B. 1, 2, 3, 4  
C. 1, 2, 3, 5  
D. 2, 3, 4, 5  
E. 1, 2, 4, 5
23. According to John Dewey, which of the following is not part of the definition of inquiry?
- A. Active consideration of beliefs.
  - B. Persistent consideration of beliefs.
  - C. Consideration of knowledge in the light of grounds that support it.
  - D. None of the above are included in Dewey's definition.
  - E. All of the above are included in Dewey's definition.
24. Which of the following is not a characteristic of a good stimulus device?
- A. It gives the students motivation to inquire.
  - B. It is at variance with the student's experiences.
  - C. It includes a problem, questions, and possible solutions to the problem.
  - D. It focuses the student's attention on a realistic problem.
  - E. It encourages the student to seek explanations.

#### Simulation

25. Simulation can be defined as:
- A. Reality restricted by rules.
  - B. A portion of reality in an artificial situation.
  - C. An individual assuming a role of another individual.
  - D. A group of individuals in which one eventually becomes the winner.
26. Which rule(s) is (are) common to simulation, games, and role playing?
- A. It should be spontaneous.
  - B. It should have clearly stated objectives.
  - C. It should be a realistic situation.
  - D. All of the rules apply.

27. The role of the instructor in a simulation includes all of the following except:
- A. Sympathizer.
  - B. Final authority.
  - C. Coach.
  - D. Contributor.
28. Which of the following techniques allows the student to make decisions, see the effects of these decisions, and then live with these effects in making new decisions?
- A. Games
  - B. Simulations
  - C. Role playing
  - D. B and C

#### Individualized Instruction

29. DPI is an individualized program which stands for:
- A. Des Moines Plan for Individualization.
  - B. Detroit Plan for Individualization.
  - C. Duluth Plan for Individualization.
  - D. Denver Plan for Individualization.
  - E. Dewey Plan for Individualization.
30. Research indicates that learning increases if:
- A. Instructors use the teaching method they feel most comfortable with when dealing with students.
  - B. Students are trained to better understand the teaching methods of their instructors.
  - C. Material is presented in the learning style favored by the student.
  - D. Teaching methodologies are generally de-emphasized.
31. A useful guideline concerning the use of mediation is:
- A. Mediation serves longest and best if teachers don't try to adjust or modify it.
  - B. Because of the cost, media should provide more subject matter, with less stair-stepping and feedback, than other teaching methods.
  - C. A filmstrip is generally preferable to a workbook.
  - D. Many different teachers should be able to use the same mediated individualized unit.
  - E. The selected mediation need not correspond exactly with the wording of the performance objective.

32. Which of the following are implementation techniques of individualized instruction?
- A. Inservice method
  - B. Task Force method
  - C. Subgrouping method
  - D. Learning Guide method
  - E. All of the above

#### Field Experience

33. The student's experiences are carefully planned and supervised by the school and the employer to comply with strict<sup>o</sup> legal regulations relating to an employee situation. This best describes:
- A. Work observation.
  - B. Paid work experience.
  - C. Work study.
  - D. Non-pay work experience.
  - E. Diversified or multi-occupations.
34. Students are legally defined as economically disadvantaged, full time vocational students, at least fifteen (15) but less than twenty-one (21) years of age when they are involved in:
- A. Work study.
  - B. Diversified or multi-occupations.
  - C. Work observation.
  - D. Apprenticeship.
  - E. Paid work experience.
35. Select the cluster of field experiences in which the work situation is used as a laboratory to practice skills learned in the classroom.
- A. Paid work experience, non-pay work experience
  - B. Cooperative Vocational Education, work study
  - C. Internship, work study
  - D. Paid work experience, work observation
  - E. Internship, Cooperative Vocational Education
36. Select the cluster of field experiences in which the school has a limited role in the student's experiences at the work station.
- A. Cooperative Vocational Education, work study
  - B. Internship, non-pay work experience
  - C. Apprenticeship, Cooperative Vocational Education
  - D. Work study, paid work experience
  - E. Work observation, Cooperative Vocational Education

## Independent Study

37. Which one of the following concepts is not consistent with accepted theories of Independent Study:
- A. Teacher assignments.
  - B. Intrinsic rewards.
  - C. Flexible scheduling.
  - D. Self evaluations.
38. An appropriate Independent Study plan for vocational education students would most likely include all of the following except:
- A. Time lines and due dates.
  - B. A statement of the problem.
  - C. Structured procedural guidelines.
  - D. Sources of information.
  - E. Evaluative criteria.
39. The least structured inquiry technique is:
- A. Class discussion.
  - B. Open ended problem.
  - C. Problem formulation.
  - D. Analysis of an unusual event.
40. Independent Study should be limited to only those students who:
- A. Have high intelligence.
  - B. Have been motivated to study specific topics.
  - C. Have good study habits.
  - D. Have had experience using inquiry techniques.

Strategy Decision Items (questions 41-45): Select an appropriate instructional strategy and two (2) alternative strategies for each question. Be prepared to defend your choices.

41. The Behavioral Objective:

To research and report on the importance to marketing and distribution of consumer buying habits, trends in population, income, motivation, and other research or statistical data.

The WHO variables:

teacher: Willing to try anything

student(s): Very motivated, self-directed

The WHEN variable:

Time is flexible.

The WHERE variable:

The spacious D.E. classroom/laboratory is available if needed.

The HOW variable:

Well stocked library

Town has resource persons.

The strategy:

Alternative Strategies:

42. The Behavioral Objective:

Specify types of health problems which may result because of inadequate supply of certain minerals and vitamins in the diet.

The O variables:

teacher: concerned about meeting the needs of individual students.

student(s): it seems like every student learns at a different speed and each has a different learning style.

The WHEN variable:

Time is flexible.

The WHERE variable:

Home and Family Life education has a moderately large laboratory facility.

The HOW variable:

Reference books, single-concept films and other resources are available.

The strategy:

Alternative Strategies:

## 43. The Behavioral Objective:

Students will be able to identify common breeds of farm livestock.

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## The WHO variables:

teacher: an open minded individual.

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student(s): interested in agriculture, but a somewhat rambunctious group.

They stay out of trouble when they're actively involved in the learning process.  
 They already have some background on this subject, but need reinforcement and practice.

## The WHEN variable:

Somewhat limited.

---

## The WHERE variable:

A classroom and ag shop are available.

---

## The HOW variable:

Resources are limited--most depend on the resourcefulness of the teacher  
 and the students.

---

## The strategy:

## Alternative Strategies:

## 44. The Behavioral Objective:

The student can demonstrate the use of good telephone technique by:

(1) giving greeting courteously, (2) identifying location, (3) recording time of call, caller, message, (4) repeating message to insure accuracy.

The WHO variables:

teacher: puts high priority on preparing her health occupation students for the "real world."

student(s): interested in various occupations in the healthcare field--few have any practical experience.

The WHEN variable:

Flexible.

The WHERE variable:

Within the school, the class has access to a classroom and a small laboratory.

The HOW variable:

Money is a problem, but resources are generally available if the cost is within reason and the need is well documented.

The strategy:

Alternative Strategies:

## 45. The Behavioral Objective:

The local Future Business Leaders of America group needs to raise enough money to send one of its members, a national officer, to the national meeting being held 2,000 miles away.

## The WHO variables:

teacher: a first year B & O instructor, FBLA advisor, wants to get students involved in the decision making process.

student(s): motivated, enthusiastic, willing to work hard. All they need is direction.

## The WHEN variable:

The national meeting is six months away.

## The WHERE variable:

Practical consideration would probably keep the moneymaking activities within the community, a town of 20,000.

## The HOW variable:

No limits on creativity.

## The strategy:

## Alternative Strategies:

## Pretest Key

## Lecture

1. C
2. D
3. C
4. A

## Discussion

5. D
6. C
7. C
8. A

## Demonstration

9. B
10. A
11. B
12. A

## Laboratory

13. D
14. B
15. A
16. B

## Questioning

17. C
18. D
19. A
20. A

## Inquiry

21. B
22. C
23. E
24. C

## Simulation

25. A
26. B
27. D
28. A

**Individualized Instruction**

- 29. C
- 30. C
- 31. D
- 32. E

**Field Experience**

- 33. D
- 34. A
- 35. E
- 36. D

**Independent Study**

- 37. A
- 38. C
- 39. C
- 40. B

**Putting It Together (Strategy Decision Items)**

- 41-45 Strictly speaking, there are no right and wrong answers to these questions. Student responses should be evaluated by the instructor in terms of appropriateness, variety, and rationale (if necessary).

## Posttest

Learners should complete only those sections of the posttest that correspond to the categories which have been completed.

## Lecture

1. Each of the following are tested principles of effective lecturing behaviors, except:
  - A. Don't be afraid to digress from the theme if you think of interesting topics as you go along.
  - B. Encourage verbal participation from the learners.
  - C. Use conversational style and don't try to practice rhetorical skills.
  - D. Relate to the background of the learners.
2. Through the use of lectures, the instructor is able to:
  - A. Repeat and summarize important ideas.
  - B. Save teacher time and learner time.
  - C. Provide instruction to many students at one time.
  - D. Meet the individual needs of class members.
3. The use of positive feedback by the lecturer:
  - A. Is impossible when the class is large.
  - B. Lessens students' fear of failure.
  - C. Can be done non-verbally.
  - D. Both B and C are correct.
4. Choose the true statement regarding lecture.
  - A. It is one of the best strategies to encourage creative thinking by students.
  - B. It matches the learning style of some students.
  - C. It allows the development of problem solving skills.
  - D. None of the above.

## Discussion

5. A good definition of discussion as an instructional strategy would be:
  - A. A verbal interchange between a speaker and a large audience.
  - B. Any exchange of ideas between people in a group.
  - C. An exchange of information about a specific topic by a limited number of goal-directed persons.
  - D. Verbal interaction among a group of 15-30 persons who have a problem to solve.

6. In which of the following discussion types does the teacher act as a questioner or responder?
- A. Didactic group
  - B. Heuristic group
  - C. Task group
  - D. Discursive group
7. Which of the following is/are necessary to have a good discussion?
- A. Common topic or problem
  - B. Goal directed
  - C. Small number of students
  - D. All of the above
8. Of the following discussion types, which one requires free and uninhibited discussion by students on a topic which they select?
- A. Task group
  - B. Didactic group
  - C. Discursive group
  - D. Socratic group

#### Demonstration

9. Criteria used in the selection of the demonstration method as a teaching technique are:
- A. Inexpensive, interesting, and easy to prepare.
  - B. Effectiveness, involves two or more senses, and adaptability.
  - C. Efficiency, adaptability, and used for large groups.
  - D. Involves two or more senses, interesting, and requires much preparation.
10. The key concepts and consideration necessary in preparation of a demonstration are:
- A. Topic, purpose, content, steps, apparatus, and practice.
  - B. Topic, purpose, evaluation, eye contact, and workmanship.
  - C. Content, steps, topic, workmanship, feedback, and practice.
  - D. Topic, audience participation, seating, steps, and purpose.
11. To aid the demonstrator in choosing a suitable topic for a demonstration in Auto Mechanics, which of the following questions is most appropriate?
- A. What is background ability of the students?
  - B. Are objectives and activities suitable to subject area?
  - C. Do students have prior interest in topic?
  - D. Is the title informational and specific?

12. In the evaluation of a demonstration, which of the following major areas should be measured?
- A. Knowledge of topic, organization, eye contact
  - B. Voice, topic selection, preparation time
  - C. Preparation, presentation, individual evaluation
  - D. Preparation time, adaptability, interest level

#### Laboratory

13. The vocational education laboratory can best be described as a means of:
- A. Exploring student attitudes toward work.
  - B. Teaching an occupational skill.
  - C. Working with practical application of principles.
  - D. Deriving formulas theoretically.
14. To discourage "cookbook" usage of written directions in the laboratory the instructor should:
- A. Let the student formulate the directions after the exercise.
  - B. Distribute the directions some time prior to the actual experience.
  - C. Write directions to include only technical information.
  - D. Urge students to do the exercise without questions.
15. This type of laboratory experience allows the student to verify or discover facts:
- A. Experimentation.
  - B. Task Force Production.
  - C. The Project Method.
  - D. Skill Building.
16. Developing evaluation techniques for the laboratory experience should:
- A. Be ignored because daily practice indicates learning.
  - B. Emphasize application to reflect the principle of laboratory.
  - C. Involve only theoretical aspects because daily activities indicate learning.
  - D. Be limited to only one type for objectivity.

#### Questioning

17. Good questions have all of the following characteristics except:
- A. They're clearly worded.
  - B. They're specific, rather than general.
  - C. They generally elicit a yes or no response.
  - D. They're asked in a quiet, encouraging manner.
  - E. They're varied in type.

18. When an instructor wants to elicit a number of different responses, the best questioning technique is which of the following?
- Divergent
  - Convergent
  - Echo
  - Whiplash
  - Scatter
19. Which of the following questions has been properly framed by the teacher?
- Teacher: John, I told you to quit talking. Just for that, you answer the next question.
  - Teacher: Who can tell me the difference between vitamins and minerals?
  - Teacher: Debbie, can you define credit buying
  - Teacher: What are some guidelines for selecting safe toys? (Pause)
  - Teacher: What is the difference between a guarantee and a warranty? (pause) Dorene?
20. A good definition of a convergent question is:
- A question which requires creative thinking to answer.
  - A question that elicits many answers.
  - One in which the response requires judgment against specific criteria.
  - One that focuses on a narrow objective.
  - One which is general in nature.

#### Inquiry

21. All of the following are roles of the teacher in using the inquiry strategy except:
- Discourages student from ideas that are unorthodox.
  - Asks questions to redirect student thought.
  - Encourages students to explore alternative ideas.
  - Requests defense of statements.
  - Plans the material that stimulates an inquiry lesson.
22. Pick the true statements about the inquiry strategy.
- Slower students are often confused by attempting to deal with divergent thinking and abstract concepts.
  - The method is especially effective in teaching large numbers of students.
  - It helps students learn how to learn.
  - Inquiry sessions may be monopolized by students who are more intellectually able.
- 1, 2, 3, 4
  - 2, 3, 4
  - 1, 3, 4
  - 1, 2, 3
  - 1, 2, 4

23. According to Dewey's definition of inquiry, which of the following is true?
- Inquiry is a persistent and careful consideration.
  - Notions to be considered are any belief or supposed form of knowledge.
  - Inquiry deals with proven facts.
  - Pupils must show support for their beliefs and knowledge.
  - The students' approach to inquiry is active, not passive.
24. A stimulus device, or event, serves as a focus for an inquiry lesson. The characteristics of a good stimulus device are:
- It should be at variance with the students' expectations.
  - It gives the students motivation to inquire.
  - It provides a problem for students to achieve.
  - It provides a problem, questions, and possible solutions.
- 1, 2, 3, 4
  - 1, 3, 4
  - 2, 3, 4
  - 1, 2, 3
  - 1, 2, 4

#### Simulation

25. Gaming can be defined as:
- A portion of reality in an artificial situation.
  - An individual assuming a role of another individual.
  - Establishment of a set of allowable actions, a segment of time, and a framework within which the action takes place.
  - All of the rules apply.
26. Which of the following is (are) rule(s) for simulation?
- It should be simple.
  - The situation should be realistic.
  - It should be non-threatening.
  - All of the rules apply.
27. Games are made up of the following parts except:
- Roles.
  - Rules.
  - Moves.
  - Organization and conclusion.
28. Simulations can be used to:
- Create student interest in learning.
  - Look at selected controlled situations.
  - Involve students in potentially threatening situations without danger to them.
  - All of the above.

## Individualized Instruction

29. In evaluating an individualized program for proper use of materials, which of the following are NOT criteria to be considered?
- A. Cost
  - B. Easy to operate
  - C. Uniform to other materials in building
  - D. Allows for speed and immediate feedback
  - E. Allows for efficiency in teaching
30. Some of the advantages of individualized instruction are:
- A. Less work involved in using the individualized approach.
  - B. Fewer discipline problems, better adjusted students.
  - C. Parent support; less truancy and dropouts.
  - D. B and C.
  - E. A, B, and C.
31. PLATO is another individualized program which is short for:
- A. Programmed Learning in Accordance to Objectives.
  - B. Prescribed Learning Activities to Meet Objectives.
  - C. Personalized Learning Activities to Meet Objectives.
  - D. Programmed Learning Activities to Meet Objectives.
  - E. Programmed Logic for Automated Teaching Operations.
32. During the Prescriptive Stage of an individualized instruction program the teacher:
- A. Tells the student which of the learning activities are best suited for him/her.
  - B. Determines what times of the day the student is most alert.
  - C. Explains learning alternatives available to the student.
  - D. Asks the student to complete a questionnaire to determine motivation.
  - E. Tests the student for his/her entry skill.

## Field Experience

33. A program where students work for pay as producing employees with no related classroom instruction and limited school supervision is known as:
- A. Diversified or multi-occupations.
  - B. Paid work experience.
  - C. Cooperative Vocational Education.
  - D. Apprenticeship.
  - E. Work observation.

34. Primarily an exploratory activity in which the student does not actually perform work is known as:
- A. Diversified or multi-occupations.
  - B. Paid work experience.
  - C. Cooperative Vocational Education.
  - D. Non-pay work experience.
  - E. Work observation.
35. An alternative of school and work that is related to the student's occupational goal; the student receives pay and credits. This describes:
- A. Work observation.
  - B. Paid work experience.
  - C. Cooperative Vocational Education.
  - D. Non-pay work experience.
  - E. Work study.
36. Select the cluster of field experience that involve a work situation which does not necessarily relate to the student's career goal.
- A. Work study, Cooperative Vocational Education
  - B. Work study, paid work experience
  - C. Internship, non-pay work experience
  - D. Paid work experience, Cooperative Vocational Education
  - E. Internship, apprenticeship.

#### Independent Study

37. Which of the following best describe Independent Study?
- A. Costly administration
  - B. Individualized instruction
  - C. Preliminary group experiences
  - D. Programmed instruction
38. An appropriate Independent Study plan for Vocational Education would most likely include all of the following except:
- A. Time lines and due dates.
  - B. Learning activities.
  - C. Performance objectives.
  - D. Structured procedural guidelines.
39. Student characteristics that result in successful Independent Study ventures may be found in all of the following except:
- A. Self-motivation.
  - B. Goal orientation.
  - C. Extrinsic rewards.
  - D. Self-evaluation.

40. The Independent Study teacher needs to \_\_\_\_\_ to be of greatest help to the students,

- A. Recognize the degree of student readiness
- B. Be an expert in inquiry approach to problem solving
- C. Set the time lines in the study plan
- D. None of the above

Strategy Decision Items (Questions 41-44): select an appropriate instructional strategy and two (2) alternative strategies for each question. Be prepared to defend your choices.

41. The Behavioral Objective:

Working as part of a group, the student will demonstrate the ability to  
define a problem, formulate and analyze possible solutions, then test the  
hypothetical solutions until one is found to be suitable.

The WHO variables:

teacher: willing to act as resource person instead of leader.

student(s): vary somewhat in interest and ability.

The WHEN variable:

Class is held daily in 2-hour blocks.

The WHERE variable:

A classroom and laboratory are available.

The HOW variable:

Common audiovisual aids are available. The opportunity for teacher-made  
materials is limitless.

The strategy:

Alternative Strategies:

## 42. The Behavioral Objective:

In a real or realistic situation, the student will demonstrate effective communication techniques in selling a product.

## The WHO variables:

teacher: concerned about students' ability to "do the job" after graduation.

student(s): high school seniors enrolled in an agribusiness class

## The WHEN variable:

Beginning of the school year

## The WHERE variable:

A classroom is available.

Community locations are a possibility.

## The HOW variable:

Resources depend mostly on the ingenuity of the teacher.

## The strategy:

## Alternative Strategies:

43. The Behavioral Objective:

Describe various occupational opportunities for workers in your field  
of health care.

The WHO variables:

teacher: a former Peace Corps volunteer and recruiter with a wide  
variety of experiences and contacts relating to health occupation opportunities  
world wide.

student(s): members of a care class on health occupations--the class has  
100 students.

The WHEN variable:

A maximum of one hour is available.

The WHERE variable:

A large classroom is regularly scheduled.

The HOW variable:

Audiovisual equipment is available.

The strategy:

Alternative Strategies:

44. The Behavioral Objective:

Given any automobile, the student will conduct a safety inspection of all lights on or in the passenger vehicle in accordance with given procedures.

The WHO variables:

teacher: a proficient auto mechanic--relates well to small groups of students.

student(s): there are 25 of them crowded into an inadequately-sized facility.

Their abilities vary--a few of the students have already mastered this objective--others still need instruction.

The WHEN variable:

Various activities are carried on at the same time around the shop to make maximum use of the space. Thus the time allowed for this objective is flexible.

The WHERE variable:

A small laboratory; there is space for only one vehicle inside at a time.

The HOW variable:

Resources are very limited. No commercial audiovisual or self-study guides are available.

The strategy:

Alternative Strategies:

## Posttest Key

## Lecture

1. A
2. D
3. D
4. B

## Discussion

5. C
6. B
7. D
8. C

## Demonstration

9. B
10. A
11. A
12. C

## Laboratory

13. C
14. B
15. D
16. B

## Questioning

17. C
18. A
19. E
20. D

## Inquiry

21. A
22. C
23. C
24. D

## Simulation

25. C
26. D
27. A
28. D

**Individualized Instruction**

- 29. B
- 30. D
- 31. E
- 32. C

**Field Experience**

- 33. B
- 34. E
- 35. C
- 36. B

**Independent Study**

- 37. B
- 38. D
- 39. C
- 40. A

**Putting It Together (Strategy Decision Items)**

- 41-44 Student responses to these items should be evaluated by the instructor in terms of appropriateness, variety, and use of strategies studied within this module.

## GLOSSARY OF TERMS

- \*DEMONSTRATION METHOD:** A procedure for doing something in the presence of others for the purpose of either showing them how to do it themselves or to illustrate a principle.
- \*DISCOVERY METHOD:** A procedure in teaching which emphasizes individual study, manipulation of objects, and other experimentation by the student before generalization; requires delay in verbalization of important discoveries until the student is aware of a concept.
- DISCUSSION METHOD:** A small number of goal directed learners who meet together concerning a common topic and who interact verbally to initiate, exchange, and evaluate information and ideas.
- FIELD EXPERIENCE:** A strategy that utilizes experiences in a work setting to achieve educational goals.
- GAMES (EDUCATIONAL):** A type of simulation restricted by rules, where the individual who gains the most information becomes the winner.
- INDEPENDENT STUDY:** Educational activity carried on by an individual seeking self-improvement, usually but not always self-initiated.
- INDIVIDUALIZED INSTRUCTION:** A type of teaching/learning in which the teacher patterns instruction to the individual learner.
- \*INQUIRY:** A strategy for learning by encouraging students to be inquisitive and curious and to try to find answers for themselves.
- \*LABORATORY METHOD:** The instructional procedure by which the cause, effect, nature, or property of any phenomenon, whether social, psychological, or physical, is determined by actual experience or experiment under controlled conditions.
- \*LECTURE METHOD:** An instructional procedure by which the lecturer seeks to create interest, to influence, stimulate, or mold opinion, to promote activity, to impart information, or to develop critical thinking, largely by the use of the verbal message, with a minimum of class participation.
- \*LECTURE - DEMONSTRATION METHOD:** An instructional procedure in which the verbal message is accompanied by the use of apparatus to demonstrate principles, determine or verify facts, clarify difficult parts, or test for comprehension of the material under discussion.
- \*MICROTEACHING:** A type of simulation in which the "teacher" instructs a small group of students in a laboratory setting.
- QUESTION:** A series of words which is understood by the listener and propels the listener into an intellectual endeavor in order to make a response which is understood by the questioner.

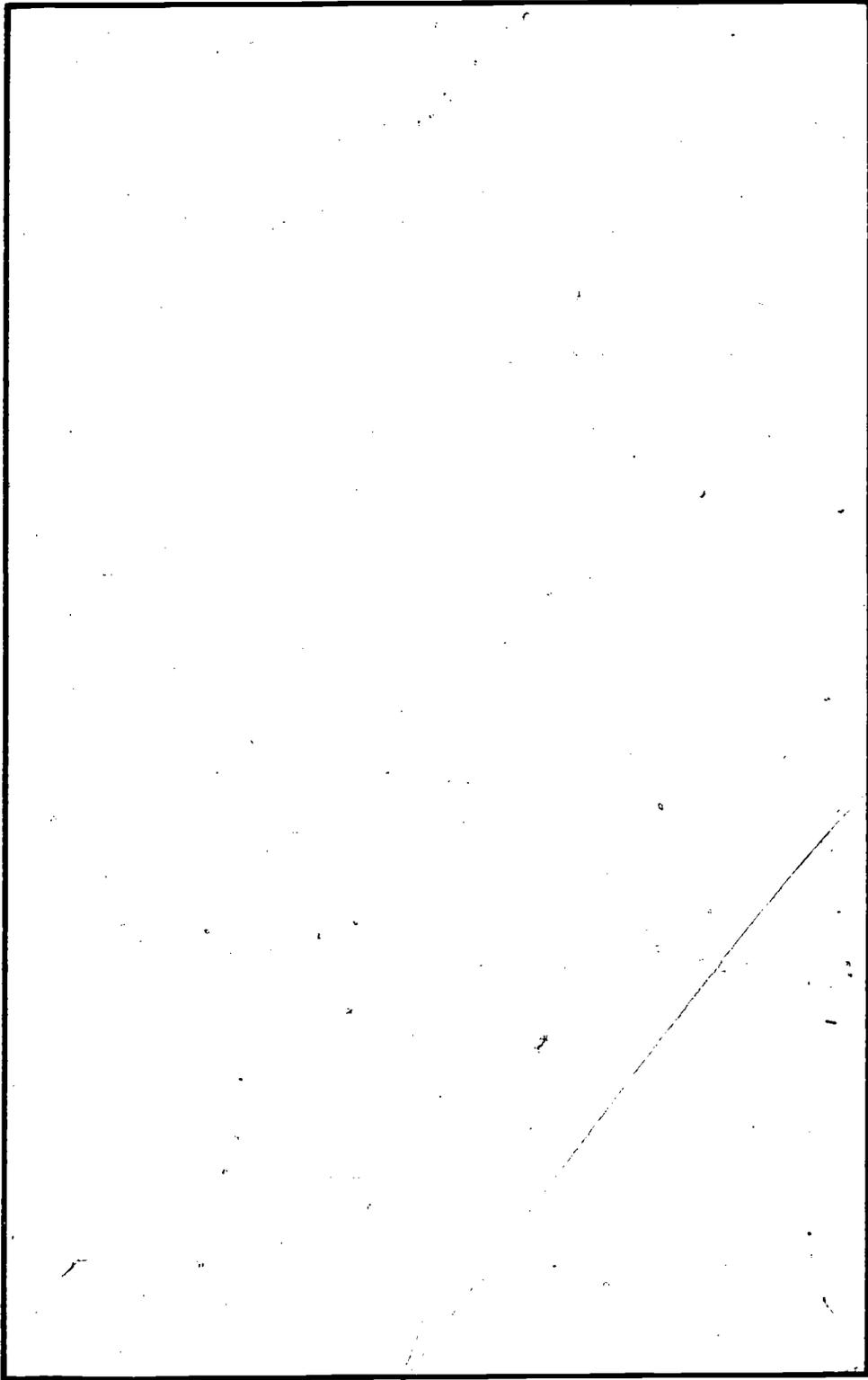
\*QUESTIONING: A method of instruction based on the use of questions to be answered by the student.

\*SIMULATION: In learning, making the practice and materials as near as possible to the situation in which the learning will be applied.

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\*  
Taken from or adapted from Carter V. Good, Dictionary of Education, 3rd ed.,  
New York: McGraw Hill Book Co., 1973.

# LECTURE



## CATEGORY: LECTURE

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**PERFORMANCE OBJECTIVE 1**

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Describe and demonstrate lecture techniques.

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Instructional Objective 1.1

The learner will provide a personal definition of effective lecturing, and will identify advantages and disadvantages of the lecture method.

Instructional Objective 1.2

The learner will identify basic elements of communication skills for effective lecturing.

Instructional Objective 1.3

The learner will demonstrate through "mini-lecture" (5-7 minutes) and self-critique of the presentation, the ability to apply lecture techniques.

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**PERFORMANCE OBJECTIVE 1**

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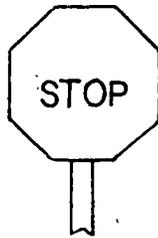
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Describe and demonstrate lecture techniques.

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Introduction

The lecture is probably the most severely criticized and misused form of communication in education. Also it is probably used more frequently than any other instructional strategy.



Are you planning to omit this particular section of the module? Such a reaction on your part would be quite understandable. After all, we all know what a lecture is . . . and many of us have used this strategy again and again and again. Right?

But how many really good lectures have you heard . . . and how many good lectures have you presented? Why is it that some lecturers can keep 300 people on the edges of their chairs for an entire hour, and others can put an audience to sleep in 30 seconds?

If you are going to use the lecture method or help other teachers to use this approach, then it will be to your advantage to learn desirable lecturing techniques. You can learn to be an effective lecturer.

### Instructional Objective 1.1

The learner will provide a personal definition of effective lecturing, and will identify advantages and disadvantages of the lecture method.

#### Learning Activity 1.1-a: A Personalized View of the Lecturing Experience

Write down on another sheet of paper the three most memorable (personally meaningful) learning experiences you can recall in which the lecture method was utilized. Recall the time, and the individual who gave each memorable lecture. Do your best to identify the three lectures that, from your perspective, seem to have had a significant impact on you.

Next, analyze the strengths of these three lectures. Try to identify and write down why each was memorable to you. What elements made the lectures effective? Consider the following questions and record your response on another sheet of paper.

- \* In what setting did each lecture occur? In a classroom or elsewhere? Was the setting crucial to the effectiveness of the presentation?
- \* Who (besides the lecturer) was involved? Did the behavior of the listeners account for some of the impact of the lecture?
- \* Was the lecture a planned event or did it happen spontaneously?
- \* Was there anything special about what you learned? Did the learning fall under the rubric of "subject matter" or was the learning more unusual and/or personal?

\* Was there anything unique about you at the time of each lecture? For example, did you feel an especially strong need to learn?

Next, try to make generalizations about the conditions that, for you, are needed for a lecture to have significant personal impact. Are there some commonalities about these three lectures that you can describe?

Finally, write down your prescription for the types of lecturing skills and techniques that you want to develop. In other words, compare your own present lecturing style with the generalizations for effective lecturing that you have just made.

#### Learning Activity 1.1-b: Why Use Lectures?

Despite frequent condemnation of the lecture as an instructional strategy, there are some learning situations for which it is appropriate. It offers certain advantages over other methods. Some of the evidence in favor of lectures is as follows:

- \* Some students learn more readily by listening than by reading.
- \* It is easier for an instructor to coordinate lectures (than discussions, etc.)
- \* Lectures are economical of learner time. The presenter can synthesize a great amount of material into a lesson. If demonstrations accompany the lesson, they can often be accomplished more easily by a single effort than by having all students work with the equipment.

- \* The "explosion of knowledge" seriously limits the amount of current information that can be transmitted through textbooks.
- \* Lectures are economical in terms of teacher time.
- \* Inspiring teachers, by lecturing, are able to spark the interest of many students.
- \* Lectures may be particularly valuable in introducing a concept and students can be encouraged to study a subject that might otherwise prove intimidating to them. The lecture allows the presenter to focus and direct attention to specific parts.
- \* Through lecturing, the teacher can provide useful repetition of important ideas. Frequent summaries are helpful in synthesizing large amounts of information for student retention.
- \* Demonstrations enable the teacher to utilize activities that might be too dangerous for pupils themselves to perform in a regular classroom.
- \* Large group presentations increase the accessibility of competent instructors.

What other advantages of the lecture would you add to this list?

What are some disadvantages of the lecture approach?

#### Instructional Objective 1.2

The learner will identify basic elements of communication skills for effective lecturing.

### Learning Activity 1.2-a

Read the following discussion of effective lecturing behaviors. These criteria will be used later to evaluate your micro-teaching lecture.

#### SOME TESTED PRINCIPLES OF EFFECTIVE LECTURING BEHAVIORS

This part of the lecturing category consists of a mini-encyclopedia of communication skills that can help to make lectures more effective.

1. Encourage Student Verbal Participation--both during and after the lecture. The basic premise of this principle is that teacher talk dominates too much classroom time. Effective teacher behavior, even during a lecture, entails some interaction. Telling is not teaching. This does not mean that a totally teacher-dominated lecture is never appropriate in an educational setting. It does mean that the amount of student learning is generally negatively correlated with the amount of teacher talk. A major aim for all teachers should be the fostering of a classroom environment conducive to student verbal involvement.

How can teachers help students increase their levels of verbal communication during and after the lecture? They can attempt to know their students and help them to know each other. The teacher can communicate to each student, both verbally and non-verbally, that, "I want you to respond, and I will respect you regardless of whether you answer in ways that I consider 'correct' or 'incorrect'." This type of behavior requires the teacher to remove, as much as possible, student fears of ridicule or failure.

2. Use Positive Feedback. One of the most effective ways of ameliorating students' fear of failure is to offer positive feedback when they make contributions to the lecture. Learning theory has provided ample evidence that

reinforcement is a major component of effective learning. Of course, a major problem facing the teacher is the difficulty of giving positive feedback to thirty students participating in a learning endeavor. Although it may be unrealistic to give positive feedback 100 percent of the time, the teacher's overall behavior should reflect a commitment and ability to use positive rather than aversive and punitive forms of control.

3. Display a Sense of Humor. It is often effective, in terms of gaining student attention, to tell a story or share an anecdote. This does not mean that the teacher must do a Johnny Carson monologue or a Dick Gregory routine to produce an environment conducive to learning. Being funny is not nearly as important as having a sense of humor--of laughing with students and showing them that you, the teacher, appreciate occasional levity, too.

4. Use Conversational Style. Rhetoric may be an interesting field of study, but the classroom is not an appropriate place for the teacher to practice oratorical skill. Explicit language delivered in a logical manner and in a customary conversational style helps students focus on what is being said rather than how it is being spoken. In 1961, Homer Rose offered the following rules of speaking to teacher candidates. The same advice seems applicable today.

- a. Use terms which your students understand. Consider the educational level of the group.
- b. Do not use a large number of words which are unfamiliar to your students. Your purpose is to express ideas, not impress your listeners with your vocabulary.
- c. Use technical terms when they are essential, but define each new term the first time it is used. Remember, many words have several meanings.
- d. Use short sentences.
- e. Eliminate unnecessary words and phrases.
- f. Change a few of your key statements to questions to which you yourself supply the answers.

- g. Vary your sentence construction to add interest to your delivery. Vary the beginning of your sentences.
- h. Be specific. Whether your primary objective is to have your students acquire a general understanding or to learn detailed facts, make your statements exact and precise.<sup>1</sup>

5. Be Alert to Voice Quality--Tone, Rate, Enunciation. Students may not be listening even though they are able to hear the teacher. In part, the selection process is dependent on the speaker's rate of speaking, the tone and enunciation, as well as the content of the message. That is, students "select" consciously or unconsciously what they will listen to and what they will "block out." It is important, therefore, for the teacher to vary rate of speech in congruence with the type of material being discussed, to pause occasionally and give students a chance to cognitively process the information, to vary pitch and intonation for interest, to give stress to points of significance, and to enunciate words so that they can be understood. An easy technique to check for these variances is to audio tape just a few minutes of each lesson. Replay the tape during a free period. Then establish a list of traits on which you desire improvement.

6. Show Enthusiasm. "Enthusiasm is contagious" may be a hackneyed cliché, but the message is still pertinent. Of course, genuine enthusiasm cannot be forced, but it can be nurtured if the teacher constantly searches for new and useful materials that make the subject not only more interesting and relevant to students, but to the teacher as well. If you feel that what you are teaching is meaningful and worthwhile, your students will be able to sense this enthusiasm.

7. Be Prepared. Knowledge of the subject matter and careful preparation are influential traits in motivating students. When the teacher does not feel

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<sup>1</sup>  
Homer C. Rose, The Instructor and His Job (U.S.A. American Technical Society, 1961), p. 81.

comfortable with the material, the teacher tends to react defensively toward student-directed questions. Whereas teacher confidence tends to breed pupil confidence in the value of learning and in the teacher figure, lack of teacher confidence tends to promote dysfunctional student contempt and boredom.

Lectures should be planned and organized so that they do not digress. It is often effective to announce your purpose at the beginning of the lecture. The lecture development should then stick to the theme.

8. Be Flexible. How are you going to deal with student questions, or with student denials of what you are saying? Will you react defensively? Probably the most effective teacher behavior in handling these types of situations is exhibited by the instructor who is able to be open and honest with the students. You don't have to know all the answers. As a matter of fact, you most certainly won't know them all.

The teacher who can indicate a willingness to explore new responses and exhibit a willingness to change, will find that the students will also begin to develop these behaviors. Students often have new and creative ideas that may not have occurred to you. This type of student contribution can be one of the more satisfying aspects of the teaching profession.

9. Use the Experiential Background of the Audience. Lectures should be related to students' backgrounds, knowledges, skills, and interests. If they are not, the students are soon "lost."

10. Don't rehash textbooks or other materials the students have read or should have read for themselves. The lecture should present new and fresh ideas not readily available to students.

11. Verbal and Visual Illustrations. Talks should be replete with verbal illustrations. Illustrations can accent abstract ideas. Lectures can also include simple visual aids such as specimens, flat pictures,

chalkboard sketches, or transparencies.

12. Provide a Summary. The relatively long lecture should include a summarization at its close.

13. Help Students Develop Note-taking Skills. Give the class instruction (especially at the secondary level) in taking simple notes and in organizing verbal material.

### Instructional Objective 1.3

The learner will demonstrate through a "mini-lecture" (5-7 minutes) and a self-critique of the presentation, the ability to apply lecture techniques.

### Learning Activity 1.3-a: Microteaching a Lecture

Prepare a five minute mini-lecture. Your lesson can focus on content from any vocational area. Select a topic or skill that you would like to teach to other vocational educators.

#### DIRECTIONS:

1. Prepare a lesson plan for your mini-lecture.
2. Narrow the topic. Focus on a single concept or skill for this short lecture. You simply won't be able to teach "all we've ever wanted to know about the sabre saw, but have been afraid to ask" in five minutes.
3. Use the lesson during a microteaching session. Video tape the lesson, replay the video tape and critique your lecturing example. Use the instructions for microteaching given in Appendix A. OPTION: ask other students to also critique your lecture!

## ANNOTATED LIST OF SELECTED RESOURCES FOR FURTHER STUDY

Callahan, Sterling G. Successful Teaching in Secondary Schools. Glenview, IL: Scott, Foresman and Co., 1971.

Provides some helpful discussion on types of lectures and criteria for evaluating lectures, and offers examples of the lecture method in the classroom environment.

Coleman, John-E. The Master Teachers and The Art of Teaching. New York: Pitman Publishing Corp., 1967.

Discusses, along with nineteen other approaches, the lecture method--its background, advantages, and disadvantages. Also reviews the five steps required in the formal lecture today.

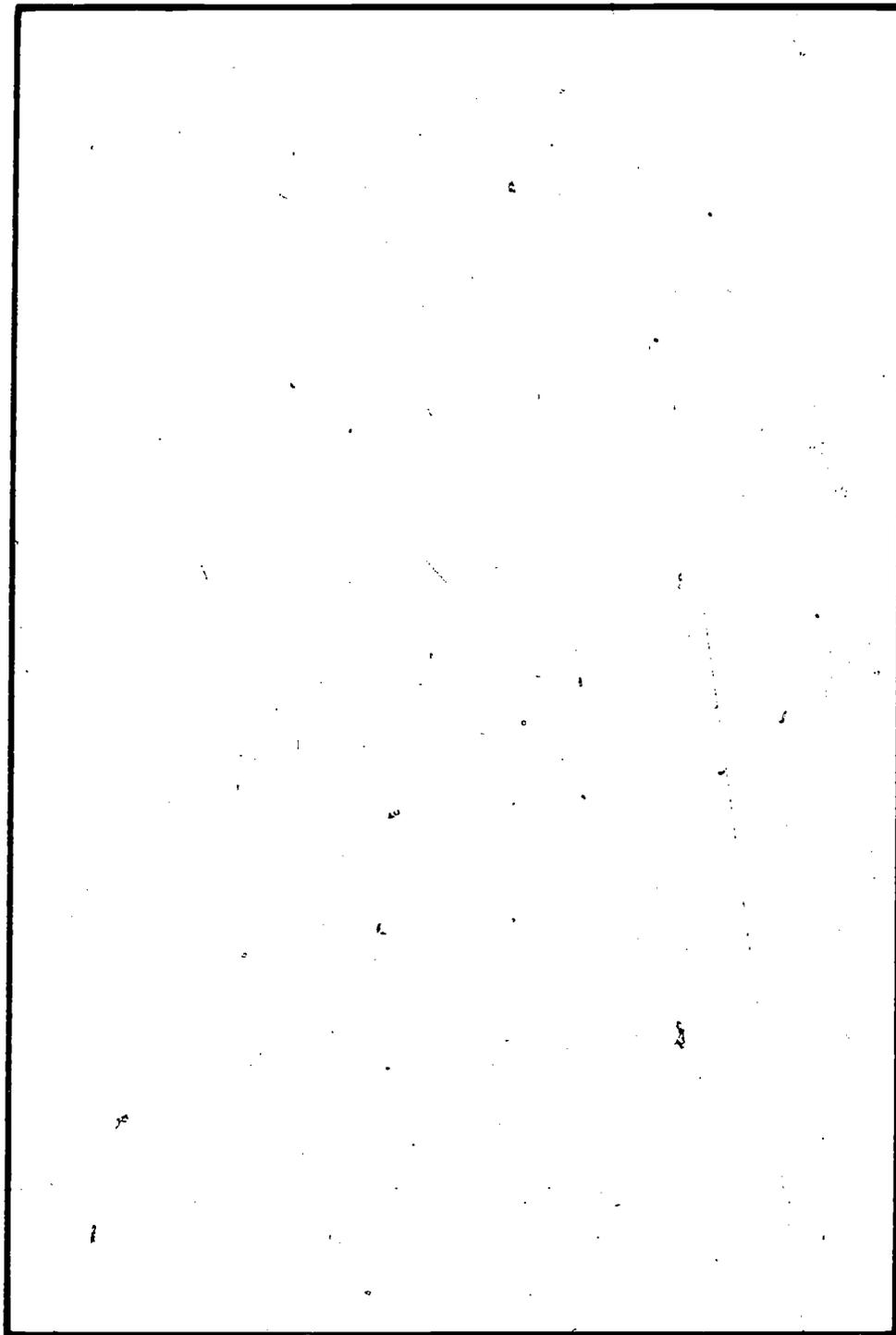
Hyman, Ronald T. Ways of Teaching. New York: J. B. Lippincott Co., 1970.

Offers rationale, underlying justifications, and helpful guidelines to the lecture method as well as an example with commentary and variations on the lecture model.

Means, Richard. Methodology in Education. Columbus, OH: Charles E. Merrill Publishing Co., 1968.

A little book with a lot (over 70) of "methods." It presents data on the lecture method and some versions of it--as lecture, discussion, outside speaker, indoctrination, and the like.

# DISCUSSION



## CATEGORY: DISCUSSION

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PERFORMANCE OBJECTIVE 2

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Describe and demonstrate a variety of techniques appropriate for small group discussion.

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Instructional Objective 2.1

The learner will define and describe discussion as it applies to teaching and learning.

Instructional Objective 2.2

The learner will compare and contrast nine types of discussion.

Instructional Objective 2.3

The learner will select an appropriate type of discussion group to meet a stated objective.

Instructional Objective 2.4

The learner will demonstrate the use of brainstorming as a discussion technique and will test "Uses of Small Group Discussion in Vocational Classes."

Instructional Objective 2.5

The learner will participate in a Buzz Group to aid in understanding this type of discussion technique; the learner will specify his/her feelings or opinions concerning student achievement levels.

Instructional Objective 2.6

The learner will identify methods of encouraging student participation in discussion.

Instructional Objective 2.7

The learner will prepare a discussion lesson plan that could be used in a vocational class.

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**PERFORMANCE OBJECTIVE 2.**

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Describe and demonstrate a variety of techniques appropriate for group discussion.

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Instructional Objective 2.1

The learner will define and describe discussion as it applies to teaching and learning.

Learning Activity 2.1-a: Definition

Read the following description of discussion which includes the elements that are part of discussion, as well as arguments for and against its use.

Then answer the questions in the formative check.

DISCUSSION

What is a "discussion" as it applies to teaching and learning? First, a discussion is not merely an informal group "rapping" in a comfortable corridor. Nor is it a clique-dominated bull session conducted by only a few group members. Nor is it the type of activity that is too frequently called "a discussion"--an assignment where the teacher tells the class to read certain pages and to be prepared to "discuss" them the following day. Unfortunately this situation often dissolves into a lecture-quiz of textbook facts; maybe into a low level recitation session. There are times when this may be a legitimate teaching strategy, but it is not a discussion--and should not be confused as one.

What is the difference, then, between lectures, recitations, and discussions?

Obviously, group size is an important distinguishing feature. Lectures can be given to any size group, recitations are more likely to be one-to-one exchanges, while discussions involve a high degree of interaction among three to fifteen persons.

Lectures (as noted in the earlier category of this module) do not particularly involve students (involvement in a physical or verbal sense). Some lecturers do allow for student response to questions, but the primary emphasis of a lecture is the deliverance of a predetermined quantity of material, all controlled by the teacher.

Conversely a discussion denotes an active process of student-teacher or student-student involvement in the classroom situation. From the students' viewpoint, recitation and lecture are relatively passive activities. Discussion allows active student involvement in discovering and stating personal viewpoints, not merely repeating that which has already been presented.

For purposes of this module, and so that the separate parts of the discussion process may be more clearly delineated, a discussion is defined as including these elements: (1) a small number (3-15) of students meeting together, (2) who recognize a common topic or problem, (3) who are being directed toward some goal (often of their own choosing), (4) who initiate, exchange, and evaluate information and ideas, and (5) who interact verbally--objectively and emotionally.

Why use discussion? The principle purpose of a discussion is to promote meaningful personal interaction, and of course, learning. The learning may involve skills, attitudes, or processes. An accepted psychological principle is that people learn best when they are actively involved or participating. Thus, if a teacher desires to promote a wide range of interests, opinions, and perspectives, small group discussions are one way to accomplish the goal. If a teacher desires to have different students doing different tasks or activities

at the same time, all leading to meaningful goals, then discussions are appropriate. If a teacher desires to practice indirect control of thought, then discussion is an appropriate technique. If a teacher desires to structure some informality in the group, then the use of discussions would be a means to that end.

FORMATIVE CHECKS ✓  
Learning Activity 2.1-a

On a separate sheet of paper:

- List at least four elements that need to be present in order to label an activity as being a discussion.
- List at least three reasons for using discussion techniques. Before going further, write your definition of small-group discussion.

Instructional Objective 2.2

The learner will compare and contrast nine types of discussion.

Learning Activity 2.2-a

Read the description of types of discussion groups which follows. Then, prepare a grid which compares and contrasts the nine types of discussion groups. The characteristics used for comparison may vary, but the final product should contain the information needed by an instructor who plans to use any type of discussion as a teaching strategy. This could be an independent activity. Another option would be to have small groups of 3-4 students each prepare the grid, using large sheets of paper and felt tip pens or crayons. Another option could be followed by a comparison of grids

prepared by individuals or groups. Sample grids are included on pages 71-72.

## 1 TYPES OF DISCUSSION GROUPS

There are a variety of discussion techniques which have been successfully used and described. These can be classified in several ways. Here we are identifying and listing nine types. These are not discrete types and some actually involve the use of several of the other identified types. The Vocational Education Curriculum Specialist must be aware of the characteristics of different types of discussion groups to recommend proper usage.

When facilitating a small group discussion, the teacher must make a decision about the emphasis of the group. Some types emphasize the interaction of group members, or process. Other types emphasize the completion of a given task, or product. Another variable to be considered is the degree of teacher control on the group. In the following descriptions, the groups are listed in descending order of teacher (leader) control.

Type 1 - Didactic. A small group discussion type in which the primary purpose is to give information to participants is commonly called a "didactic" group. The basic procedure for the didactic group is to subdivide the class into small groups where either the teacher, a teacher aide, or student leader presents some information or material to others. The didactic group should be small, probably 5-7 members, and is highly product oriented. The teacher should encourage students to lead the group if they are ready. With some of the shy or less confident ones, this may take considerable effort. Help each

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Adapted from Donald O. Orlich, R. A. Pendergrass, and Constance Kravas, Conducting Successful Discussion, a module utilized at Washington State University, Pullman, WA, 1972. (Mimeographed.)

leader focus on the key concepts of his lesson. Organize the students into groups based on their needs, or if possible, on the basis of interests. Once the discussions start, the teacher should observe various groups, especially the presenters in these groups, so that feedback can be given to them to help them improve their own skills.

Type 2 - Tutorial. Usually the tutorial discussion group is used to help students who have had difficulties in learning, or in progressing at a satisfactory rate. The tutorial group focuses on a narrow amount of material and only a few students (4-5) should be in the group. The person who leads the discussion has three major functions to perform: (1) question the students to pinpoint the exact problem that is blocking learning, (2) provide information, or help, in order to facilitate learning, and (3) encourage the students to question-and-answer among themselves. Remember that students often learn better from each other than from the teacher!

Prior to using student tutors, a teacher must be satisfied that each potential student tutor has mastered competencies such as the skills of questioning, giving positive reinforcement, and analyzing work tasks. Many school districts are currently using student tutors and are finding them to be invaluable resources for the classroom teacher.

Although remedial work will probably be used most often to alleviate student learning difficulties, the tutorial discussion group is an excellent method to encourage independent projects for advanced learners. Many gifted students will find it a challenge to try and explain their project to other students.

The person who leads the tutorial type of discussion will need to have developed some skills in the area of human relations. The leader will need to be patient yet provide encouragement, be warm and friendly, yet keep the group moving towards its product, and be accepting of others who learn slowly yet not

accepting of non-effort by group members.

Type 3 - Task. One of the least complex discussion types is that of the "task group." As the name implies, students are involved in some type of work or activity in which significant contributions can be made by each group member. Prerequisite to using the task group is the specification of clearly defined tasks to all group members. Similar to a committee, a task group has clearly defined goals, clearly identified individual assignments and roles. Further, it may be beneficial for the teacher to establish a work schedule, a system for internal monitoring of achievements, and possibly even provide all of the learning resources that may be necessary to accomplish the identified tasks.

Task groups tend to be teacher dominated in that the teacher does the selecting of the tasks and usually assigns each class member to accomplish some specific role. This discussion type can be used very efficiently during the early part of a semester when a teacher is attempting to prepare students with specific process competencies.

Type 4 - Socratic. The socratic group has a distinct process orientation, but product is its key element. The process is patterned after the teaching style of Socrates, who would pose a problem and then question his students until they arrived at an answer. Each response by the student produced either a challenge from Socrates or a new question leading to the solution of the problem.

This type of discussion can accommodate a large number of participants. The one caution is that if ten to fifteen students are in the group, then the leader must challenge all to become involved and not let just a few do all the interacting.

Students should be given a brief overview of how the group process works. They need to understand that the main role of the teacher is to be an "information or opinion seeker" and "facilitator", and that the students' role is that

of "information or opinion giver" and "clarifier or elaborator."

The typical way to start a socratic discussion is to pose a problem which is either divergent or evaluative. The problem should be one in which student response can be determined through an exchange of information or opinions, or through the utilization of appropriate reference materials. The discussion leader must make a snap decision after each student response to determine whether to challenge the response, reject the response as it is going in the wrong direction, accept the response as being totally correct and move to the next logical question, or to use part of the response in formulating the next question or statement. You will no doubt realize that an effective socratic discussion leader needs to be able to think quickly.

There is one problem with this discussion type. Some teachers attempt to use this type far too early in the school year, prior to knowing their students personally. In challenging student responses, some teachers have a tendency to become cutting and derogatory in their remarks. Thus, the teacher must understand that this discussion type has actually two basic stages: the first stage is that which has been described above, the analytic stage. The synthetic stage then follows.

As a transition between the two stages, after the teacher has had an opportunity to demand self-analysis and self-criticism of the comments or arguments that have been made, the teacher then calls for an interim recess, or rest period, where the teacher attempts to summarize all of the points that have been made as well as the errors of logic or fact. After the summary has been posted the teacher then sets the stage for phase two.

The second phase of the socratic type commences when the teacher asks the students to begin to evaluate statements that have been presented and to rephrase or reform the statements so that they become more valid, more descriptive, more

operationally defined or accurate. During phase two the teacher must be very supportive and attempt to clarify all statements. During the second stage of the Socratic discussion the teacher role is that of synthesizer and summarizer. Quite obviously, this type of discussion group could be extremely self-damaging to students with low self-confidence. Throughout the discussion the teacher should explain all that is taking place and why the teacher is attempting to do it.

Type 5 - Phillips 66. The "Phillips 66" discussion group involves exactly six students. It is established quickly and does not call for pre-orientation of students, and students do not have to be highly skilled in group interaction for this type of discussion to work. In fact, the Phillips 66 technique is most appropriate as an initial mixer activity.

The class is divided into groups of six. The groups then have one minute in which to pick a secretary and a leader. The teacher gives a clear and concise statement of the problem or issue for discussion. The time limit for the discussion is then started and students have exactly six minutes to come to an agreement as to the best solution of the problem. Other than starting the discussion, the teacher has no formal part in the discussion group.

Type 6 - Brainstorming. This type of group is useful when a high level of creativity is desired. Any number of students can become involved in a brainstorming study. The shorter the period of time for discussion, the fewer the number of group participants, so let time dictate the size within a five to fifteen limit.

The discussion is started by the leader who briefly states the problem under consideration. Every school subject has some elements which require students to do some free-wheeling thinking. This is when you want to use a brainstorming group.

After the topic is stated and before interaction starts, it is crucial to select a method of recording the discussion. It could be taped, or one or more

students who write quickly could serve as recorders. The leader should also stress to the group that all ideas need to be expressed. All participants need to realize that quantity of suggestions is paramount.

There are some very important rules to follow when using the brainstorming technique. The following rules seem to be especially important.

- a. All ideas, except for obvious jokes, should be acknowledged.
- b. No criticism is to be made of any suggestion.
- c. Members should be encouraged to build on each other's ideas. In the final analysis, no idea belongs to an individual, so encourage "piggybacking."
- d. Solicit ideas, or opinions, from silent members. Then give them positive reinforcement.
- e. Quantity is more important than quality. This does not relieve the group members from trying to think creatively or intelligently.

Brainstorming is an initiating process and must be followed up with some other activity. One way to follow up would be to use the ideas generated in the brainstorming session as the basis for another "type" of discussion. After the discussion or brainstorming session, it is important that ideas be evaluated and as many as possible be used by students in follow-up activities. The evaluation of a brainstorming session should not be lengthy and it should be non-threatening for the participants.

Type 7 - Heuristic. If a teacher desires to emphasize the inquiry approach, or discovery teaching, then the heuristic discussion group is extremely valuable. Any number of students may be in the discussion group, but it is suggested that six to ten would be ideal.

The purposes of the heuristic group discussions are easily stated; stimulation of scientific thinking, development of problem solving skills, and the acquisition of new facts. It is possible that the teacher may always be the

leader of this type of group. However, if you have a student who has demonstrated good questioning skills and who understands the concept (facts) under consideration, then let that student be the leader.

J. Richard Suchman<sup>2</sup> has long encouraged teachers to establish environments where inquiry development is used to stimulate students to become skillful askers of questions. At the first stage of the Suchman model, students are presented with a problem which demonstrates some principle. Following the exhibition of the problem, a departure for inquiry is utilized where the students ask the teacher a specific question to which the teacher can only answer with a "yes" or "no." Suchman then proposes another procedure where the teacher allows students to test hypotheses so they may determine, by direct evidence, whether or not the hypotheses which they construct were valid. The heuristic group discussion is most appropriate to those disciplines which lend themselves to problem-solving.

It must be realized that, prior to using heuristic discussions, a teacher must first allow students to participate by asking questions which would be generated by making selected observations of phenomena, role playing episodes, or other forms of media. After students have mastered the observing, question-asking and inferring behaviors, other sets of problems could be identified by the teacher and the class subdivided into small groups to complete the investigation of the problem. To make the heuristic group most meaningful, the teacher must plan for an activity which has some degree of authenticity.

"How" students ask questions might be tabulated using the following format. (Figure 1.) Note that there are five categories of higher order questions, one

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J. Richard Suchman, Developing Inquiry, (Chicago, IL: Science Research Associates, 1966).



Type 8 - Buzz. The buzz group is best suited to a small number of students (5-7) who are fairly self-directed. The teacher should be an outside observer, although it is permissible to provide resource help if the group asks for it.

Discussion is opened with a background event, then the class divides into groups. Each group discusses some specific question arising from the event. The group should have a leader who will direct the discussion and then serve as spokesperson in reporting to the other groups.

Each group conducts their own discussion for approximately ten to fifteen minutes. The group tries to arrive at a consensus answer for the question they are discussing. At the end of the discussion period each of the leaders reports their group's consensus. This can be followed with a large group question-and-answer session led by the teacher, or the class might choose to go into task groups to pursue some aspects of the problem.

Type 9 - Discursive. The discursive discussion group has free and uninhibited discussion by students on a topic which they select. The discursive discussion, therefore, is one which is totally student managed and oriented to student issues or topics. The major factor in determining the size of the group is student interest. As many (up to 15) students as are interested in the topic can participate. The length of time will also vary with each discussion session, and no absolute time guidelines can be given; however, it is often wise to end the discussion before the subject is beat to death. This maintains interest for the next discussion period because the students know that they will get another opportunity to express themselves.

It should be kept in mind that discursive groups are high level thinking and producing groups. They are not spur-of-the-moment episodes, or useful merely to kill time (e.g., It is Friday afternoon; why not just let the students discuss

until the bell rings?). Students need time and resources to prepare for the discursive discussion. Group leaders, with help from the teacher, should encourage each student to be emotionally and academically equipped for the discussion.

The process of the discursive group should be carefully evaluated. Each student, and the group as a whole, should receive feedback relating to the functions that they performed during the discussion. Evaluation requires an observer to tabulate behaviors as they occur, or a video tape recording of the session.

DISCUSSION GROUP COMPARISON GRID  
(Sample)

CONTROL	TYPE	PURPOSE	SIZE	ORGANIZATION	INITIATION
High	1) Didactic	Give new information to students	small (5-7)	Subdivide into small groups according to needs and interest	Teacher appoints competent student as leaders
		a) Help students who have learning difficulties	small (5-7)	Few students focusing on narrow amount of material	Specific topic or project
	2) Tutorial	b) Provide encouragement to advanced student with independent projects			
	3) Task	Involve students in an activity with contributions made by each group member	variable (committee)	Each class member assigned specific role	Teach/leader dominated--select tasks, assign roles, set work schedule
	4) Socratic	Solve problems through a questioning process	large (15 max)	Teacher: information/opinion seeker and facilitator. Student: information/opinion giver and clarifier.	Teacher poses a problem
	5) Phillips 66	Initial mixer activity, or Reach quick consensus	6	Group composed of exactly 6 students	Teacher presents concise statement of problem, then has no formal part
	6) Brainstorming	Obtain a wide range of responses for all students	variable (5-15)	Select method of recording ideas	Leader briefly states problem, then records all ideas
	7) Heuristic	Stimulate inquiry, scientific thinking, and problem solving skills	medium (6-10)	Present group with a problem of some authenticity	Teacher states problem
	8) Buzz	Provides practice in leadership, formation of consensus opinion	small (5-7)	Teacher is outside observer Leader directs discussion and acts as spokesman	Open with background event
Low	9) Discursive	Allows uninhibited discussion on subject of student's choosing	variable (2-15)	Student managed: Choose topics & form groups Choose leaders & recorders Assign research roles in advance	Student leader initiates

DISCUSSION GROUP COMPARISON GRID  
(Sample)

CAUTIONS	PROCESS	EVALUATION	APPLICATION
1)	Teacher/leader presents information; students encouraged to verbalize	Teacher observation of groups and feedback to leaders	Use students as group leaders to inform, clarify, review, demonstrate
2) Tutor needs skills in human relations	Question and answer session with students and tutor	Individual evaluation by tutor	Remedial instruction, special projects
3)	Each member contributes to group in satisfying task assignment	Leader observes how each student works with others, and how they accomplish the task	Efficient method to accomplish specific activities and projects
4) Don't use too early in year, before students and teacher are well acquainted	Students formulate answers to questions from teacher	Evaluation of student answers	Encourages students to think through a topic or idea by asking questions
5)	Group has one minute to select a leader and a secretary. Group has 6 minutes to reach consensus	Follow-up discussion to evaluate leader and group effectiveness	Encourages interaction, cooperation, and consensus
6)	Students think creatively, offer ideas, build on ideas of others, all ideas considered	Brief, non-threatening; evaluate ideas as a group	Encourages creative solutions to problems without an apparent solution
7) This approach works best for subjects related to science and social science	Students ask questions which the teacher answers yes or no	Analyze questioning skills by tabulation or videotape	Builds questioning skills
8)	Group discusses a question arising from the event, arrives at consensus in 10-15 minutes. Reports consensus to large group	Discussion of consensus opinions by entire class	Solves big problems or examines events of large significance
9) Don't let groups deteriorate into "rap sessions"	Uninhibited student discussion	Evaluate by tabulation or videotape	Encourages student responsibility; allows examination of issues relevant to students

Instructional Objective 2.3

The learner will select an appropriate type of discussion group to meet a stated objective.

Learning Activity 2.3-a

For the following situations or objectives, select an appropriate type of discussion group.

TYPE OF  
DISCUSSION  
GROUP

- \_\_\_\_\_ 1. A vocational youth group is having a difficult time with fund raising ideas.
- \_\_\_\_\_ 2. Several members of the class are very proficient at a particular task, but others are having extreme difficulty mastering the task.
- \_\_\_\_\_ 3. Students complain that they are not allowed to discuss issues in which they are interested.
- \_\_\_\_\_ 4. Several students have attended a leadership conference and have information that needs to be shared with all members of the class.
- \_\_\_\_\_ 5. Four students are having extreme difficulty in understanding a basic concept.
- \_\_\_\_\_ 6. A decision must be reached by consensus in a very short time.
- \_\_\_\_\_ 7. Students demonstrate real difficulty in thinking through problems.
- \_\_\_\_\_ 8. There appears to be a problem too large to handle.
- \_\_\_\_\_ 9. Students need experience in the process of discovering, inquiring.
- \_\_\_\_\_ 10. The class is to provide possible field trip sites of interest to the subject matter being taught.
- \_\_\_\_\_ 11. The teacher has a problem and will dominate the group to get the result and appoints a committee to attack the problem.

- \_\_\_\_\_ 12. The teacher explains to class that the television set does not work and will only answer the students' questions with a "yes" or "no." They are to solve the problem.
- \_\_\_\_\_ 13. Class has been in session for a full semester and the teacher decides to let the class discuss areas of their interest in small groups.
- \_\_\_\_\_ 14. The class is broken into groups of five (5) students and given a list of malfunctions in an engine. They are given 10-15 minutes to reach a consensus as to steps to take to solve the engine problem.
- \_\_\_\_\_ 15. The first day of class the teacher wants a mixer activity to get students involved and acquainted.
- \_\_\_\_\_ 16. Five students have failed a quiz on salesmanship and the teacher needs to work with this group to find out why.

Key for Learning Activity 2.3-a

1. Brainstorming
2. Tutorial
3. Discursive
4. Didactic
5. Tutorial
6. Phillips 66
7. Socratic
8. Buzz
9. Heuristic
10. Brainstorming
11. Task
12. Heuristic
13. Discursive
14. Buzz
15. Phillips 66
16. Tutorial





5. Small groups can allow students to demonstrate individual strengths.
6. Students can learn faster and better from each other.
7. Students are provided an opportunity to use the vocabulary of the discipline and to verbalize it in an appropriate context.
8. Cooperative work skills can be developed through practice in small group discussions.
9. Skills in leadership, organization, interaction, research and initiative can be learned and improved through discussion techniques.
10. Ideas become more meaningful and personal if a student must defend them.
11. Flexibility toward understanding other viewpoints may also be improved.

Instructional Objective 2.5

(Optional--Learners can meet either Instructional Objective 2.4 or Instructional Objective 2.5.)

The learner will participate in a Buzz Group to aid in understanding this type of discussion technique; the learner will specify his/her feelings and opinions concerning student achievement levels.

Learning Activity 2.5-a: Buzz Group

Your group (probably five or six members) will need a spokesperson; therefore, elect this person before the discussion starts. The spokesperson will later report your conclusions to the other group, or to the instructor. The group has approximately 15 minutes to decide which of the three postulates below is most

correct. It is permissible to mix and match. Remember, you are to arrive at a consensus decision or explain why consensus could not be reached if divergence of opinion is still apparent at the end of the discussion.

The spokesperson will report your conclusions to the rest of the class

Postulate 1. Students achieve in a direct ratio to what the teacher expects them to achieve.

Postulate 2. Student achievement is related to three factors--teacher behavior, student behavior, and classroom environment. All three factors are very important and highly interrelated.

Postulate 3. Students achieve very little in secondary school, but what little they do achieve is mostly related to how well they like school.

Evaluation: Use the form shown in Figure 2, "Discussion Evaluation Form" to rate your discussion. Fill out the form individually.

Follow-up: Using the rating scale form (Figure 2) provide feedback to each other concerning group skills that particular individuals need to develop. Try to be a positive criticizer. Remember that we all need help in having our weaknesses pointed out to us.

Added Activity:

At the end of the initial rounds of discussion, assign three group members to read and report on Pygmalion in the Classroom by Robert Rosenthal and Lenore Jacobsen. Following these reports, discuss the three postulates.

1. I thought that the discussion:

gave everyone a  
chance to participate

was dominated by  
only a few

---

2. With respect to my participation in the discussion, I was:

really with it

could have done better

totally out of it

---

3. The discussion leader:

was fair

encouraged  
participation

selected only a  
few persons

seemed to dominate  
the discussion

---

Fig. 2.--Discussion Evaluation Form

Reference:

Rosenthal, Robert, and Jacobsen, Lenore. Pygmalion in the Classroom. New York: Holt, Rinehart, and Winston, 1968.

Instructional Objective 2.6

The learner will identify methods of encouraging student participation in discussion.

Learning Activity 2.6 a: Motivators Toward Participation

Read the following description of motivation techniques during discussion; answer the formative check questions.

MOTIVATION TECHNIQUES

There are no great secrets of the discussion group trade. You will undoubtedly have some group members who are real "motor mouths", and those who are "wall flowers." The following ideas will be helpful to you in

facilitating small group discussion, and as always, encourage you to use your creativity in trying new ways.

1. Choose relevant topics. The more students are interested, the higher their motivation will be for participation. As much as possible, let the students help you choose the topic. Rework the topic problem or question until it is stated in terms used by the students. Many discussions are ruined because no one can understand what the problem or question is.

2. Let students be in different groups. In hope of early building for success, the teacher may let students group with friends until students learn not to feel threatened by group work. Try to be sure that each group has the skills needed to complete the task.

3. The teacher should encourage direction toward goals (either teacher set or group set). If the goal has many divergent points, then work toward that. If it is to come to a decision or solve a problem, aim towards that.

Train the groups in procedures for setting activities and schedules, how to acquire necessary resources, divide labor, etc.

4. Help a friendly atmosphere prevail where disagreement is permitted actively but not emotionally or in a hostile verbal form. Help students distinguish between disagreeing with an idea and disagreeing with the person who has the idea. Expect the students to joke and kid around some. Don't try to force them to always be serious, and to work on the task 100 percent of the time.

5. There are any number of techniques the teacher can use to get voice contact from non-contributing members. They are limited only to the creative resources of the teacher. For example, have an inflated beach ball which the leader throws whenever he/she wants a student to speak. This is also a good technique to employ in a group which is dominated by a few constant talkers.

Call on student "B" by name and ask her/him to paraphrase what student "A" has just said (to A's satisfaction) and then add his/her own idea. Then student

"C" must paraphrase "B" to B's satisfaction and so on throughout the period. The paraphrasing, besides encouraging listening and focusing on thinking, gives the student a chance to say something on a one-to-one non-threatening basis before giving a personal idea to the group.

**FORMATIVE CHECKS**  
Learning Activity 2.6-a

Place a check (✓) by each statement that serves as a motivator toward participation in discussion:

- a. Educate members in discussion procedures.
- b. Allow students to be in different groups.
- c. Keep students in the same small group.
- d. Choose relevant topics.
- e. Permit disagreement only if it is objective, not if it is emotional or hostile in form.
- f. Permit any form of disagreement.
- g. Encourage direction toward goals.
- h. Evaluate in non-threatening and varied manner.
- i. Use an inflated beach ball and throw it to the student whom you wish to have speak.
- j. Ask students to paraphrase.
- k. Don't call on students who you are sure will have the wrong answer or will be embarrassed.

Key to Formative Check  
Learning Activity 2.6-a

a. x

b. x

c.

- d. x
- e. x
- f.
- g. x
- h.
- i. x
- j. x
- k.

### Instructional Objective 2.7

The learner will prepare a discussion lesson plan that could be used in a vocational class.

#### Learning Activity 2.7-a: A Discussion Lesson Plan

Your task is to develop a lesson plan for a vocational class in which the primary technique is discussion. The following elements should be included:

1. description of the vocational class for which the discussion lesson is to be used;
2. performance objective and a rationale for the objective;
3. description of the discussion technique to be utilized and the reason(s) for using the technique to achieve the stated objective;
4. discussion device, i.e., what will you use to stimulate discussion? (Example: film, handout, etc.), and
5. description of the technique that will be used to evaluate the lesson.

ANNOTATED REFERENCES FOR FURTHER STUDY

Glasser, William. Schools without Failure. New York: Harper and Row, 1969.

Among the most important innovations proposed by Dr. Glasser is the use of the class meeting, led by the teacher, as a counseling group that daily spends time developing--through discussion--the social responsibility necessary to solve behavioral and educational problems within the class.

Great Books Foundation. The Dynamics of Classroom Discussion. Chicago, IL: Great Books Foundation, 307 N. Michigan Ave., 1970.

A twenty-hour course for classroom teachers in the discussion method of education. Designed for K-college teachers, it has application to every subject area in the curriculum and is geared to aiding discussion leaders in developing skills and strategies for helping their students think and learn through discussion.

Gulley, Halbert E. Discussion, Conference, and Group Processes. 2nd ed. New York: Holt, Rinehart, and Winston, 1968.

A comprehensive textbook on discussion, this book promotes an understanding for teachers of the ways in which group discussion functions and how individuals become effective discussion leaders and participants. It emphasizes discussion for decision making and information sharing, and it also describes elements of public and large group discussion. The definitions, models, skills, evaluation measures, and overall ideas and information can be adapted for public schools' work and are useful for persons interested in teaching through the discussion strategy.

Institute for Development of Educational Activities. Learning in the Small Group. Melbourne, FL: Institute for Development of Educational Activities, Information and Services Division, P.O. Box 446, 32901, 1971.

A classroom manual based on a national seminar, this paperback illustrates and briefly describes twelve variations on learning in the small group. The presentations on structuring the small group are extremely valuable for beginning or experienced teachers who are interested in using the discussion strategy. A film based on the manual is also available. Both would be helpful in furthering understanding of the discovery strategy.

National Training Laboratory. The Fishbowl Design for Discussion. Washington, DC: National Training Laboratory, 1812 K Street NW, 20006, 1970.

This exercise is one of a number of materials available through NTL to help teachers work with and through the discussion strategy. Its purposes are to help spread pupil participation and to increase student awareness of the roles played in a discussion.

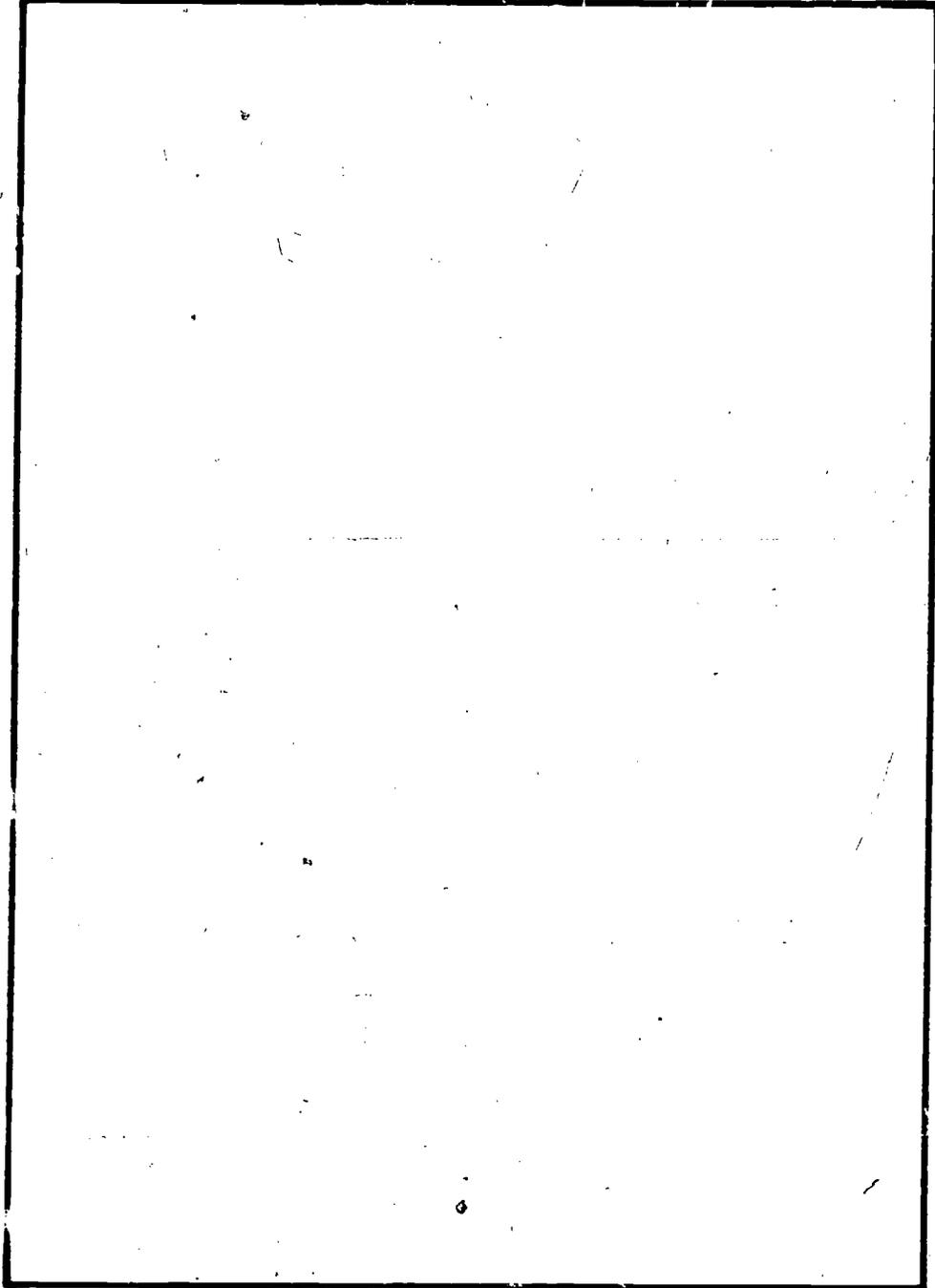
Schmuck, Richard A., and Schmuck, Patricia A. Group Processes in the Classroom. Dubuque, IA: Wm. C. Brown Co., 1971.

The authors describe, through theory, research, and example, the basic characteristics of groups in the classroom. Very worthwhile in itself, this paperback is also an example of the many books available on "group processes"--activities that make use of the discussion strategy.

Stanford, Gene, and Stanford, Barbara Dodds. Learning Discussion Skills Through Games. New York: Citation Press, 1969.

A small paperback that provides a sequence of skill-building games and activities designed to give student necessary practice in discussion techniques. It also presents 15 remedial devices for use whenever a group shows signs of a particular weakness in working together.

# DEMONSTRATION



CATEGORY: DEMONSTRATION

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PERFORMANCE OBJECTIVE 3

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Prepare, present and evaluate a demonstration of a selected concept in a vocational area.

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**PERFORMANCE OBJECTIVE 3**

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Prepare, present and evaluate a demonstration of a selected concept in a vocational area.

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Learning Activity 3-a

After reading the background material on Introduction, Preparation, Presentation and Evaluation, select a concept in a vocational area that lends itself to the technique of demonstration. Using the "Planning Guide" prepare a five to ten minute demonstration and present it to other members of the group.

Evaluate yourself using the score card for demonstrations.

Further Suggestions:

1. Ask the group of vocational educators that are observing your demonstration to become involved in evaluation through use of the score card.
2. If you feel that you need experience in team planning and presenting of a demonstration, plan with another vocational educator.

### Introduction

An effective demonstration is the art of combining words and actions in an interesting pattern to create a desired response in the observer. It is an effective method of learning concepts in vocational education because of the close relationship between development of knowledge, attitudes and skills. The vocational educator uses the demonstration method for presenting proper methods and procedures in attaining desired results, for introducing new and different techniques to the learner, for displaying essential behaviors which contribute to successful employment and for aiding in setting standards for work habits and motivating students.

The final success of a demonstration is measured by the changes in behavior of the people who hear and see it. The demonstrator has the key role of combining personality, knowledge, and skill into a unified whole. These denominators of a demonstration when successfully combined, will create in the observers the desired behavioral changes leading to mastery of the demonstration objective.

To effectively use this technique, the user must have a working knowledge of its advantages and disadvantages.

#### MAJOR ADVANTAGES

1. Involvement of observer can be easily varied--using several series at one time.
2. All areas of learning can be included: cognitive, affective, psychomotor.
3. Stimulates interest and curiosity.
4. Allows a variety of apparatus, materials, and supplies to be used.

#### MAJOR DISADVANTAGES

1. Requires set up and practice.
2. Viability to large groups.
3. Equipment, materials and supplies availability.
4. Cost and time required to obtain one objective.

Regardless of the subject, the basic techniques of a good demonstration are the same. The effectiveness of the demonstration is directly correlated

with the amount of preparation and planning used by the demonstrator.

### Preparation

Detailed planning is necessary before any presentation can be given. Effectiveness will depend upon careful consideration of the questions which follow below. Although this is a demonstration, it is also a lecture, and the audience expects the demonstrator to be continually talking and explaining. This dialogue is referred to by the professionals as "chatter" and it must have some relationship to the material being presented or procedure being observed. To incorporate action and chatter into a smooth presentation, practice is very important.

#### A. CHOICE OF TOPIC

##### 1. CONSIDER AUDIENCE:

- a. What are the interests of observers?
- b. What is the ability level of your students?
- c. How many and what age do they represent?
- d. What do they already know about the topic?
- e. Is the topic relevant to their current and future needs?

##### 2. LIMIT TOPIC TO ONE CENTRAL IDEA

##### 3. SELECT THE TITLE:

- a. Is it short?
- b. Is it descriptive?
- c. Does it stimulate or arouse curiosity?

#### B. STATEMENT OF PURPOSE

##### 1. STATE THE MAIN OBJECTIVE:

- a. What is the statement of educational value?

- b. Is the purpose to entertain, stimulate, convince or create a desire in learning?
2. CONSIDER AUDIENCE INVOLVEMENT:
    - a. What response is required from the audience?
    - b. What skills, knowledge, attitudes are necessary for their participation?
    - c. How can students help in the presentation?
    - d. Is student interaction possible?
    - e. Is consideration planned for needs of special learners?
- C. SELECTION OF CONTENT AND INFORMATION
1. SELECT INFORMATION ESSENTIAL TO THE OBJECTIVE:
    - a. Is it relevant and up-to-date?
    - b. Is it accurate or biased?
  2. PLAN REVIEW OF BACKGROUND TERMINOLOGY OR PREREQUISITES
- D. SEQUENCE STEPS
1. PLAN ORGANIZATIONAL PATTERN:
    - a. Is the outline logically developed?
    - b. Is detail sufficient to obtain key concepts?
  2. PLAN A BALANCE BETWEEN TALK AND ACTION:
    - a. What verbal points need to be emphasized?
    - b. What actions need emphasis?
    - c. How much "chatter" is essential?
    - d. What "pay value" is there for the student?
  3. PLAN PRE-<sup>2</sup>PREPARATION PROCESSES:
    - a. What stages require advanced preparation?
    - b. How much pre-preparation is necessary?
    - c. What integration is required between stages?

E. PLAN VISUALS, EQUIPMENT AND SUPPLIES

1. INTEGRATE MEDIATION FOR RELEVANCY TO PLAN:
  - a. Are all visuals and pieces of equipment necessary?
  - b. Do they focus attention? Are they easy to use?
  - c. Do they fit smoothly into the demonstration?
2. PRE-CHECK ALL MATERIALS, SUPPLIES AND EQUIPMENT:
  - a. Are tools, equipment and supplies ready and functioning properly?
  - b. Is the arrangement planned for a viewing audience? (large enough, neatly lettered posters, sturdy)
3. CONSIDER OBSERVER INVOLVEMENT:
  - a. How many "senses" are involved? (sight, hearing, smell, etc.)
  - b. What is the level of student/observer involvement?

F. PRACTICE

1. DO A "DRY RUN" OF THE DEMONSTRATION:
  - a. Is the action synchronized with the explanation?
  - b. Is there a logical order of activity within the time limit?
  - c. Was equipment used skillfully?
  - d. Were the following personal qualities evidenced? (posture, eye contact, voice, mannerisms, general grooming, rate of speaking, grammar.)
2. ALLOW TIME FOR MODIFICATION AND REORGANIZATION

## PRESENTATION

All the time spent on preparation is wasted unless the presentation is smooth, easily executed, and has continuity.

Opening remarks must be short and to the point, yet be interesting and motivating.

Familiarity with each step in the demonstration will help the handling of materials to be automatic, do away with the possibility of the unexpected happening, and allow the demonstrator to focus more attention on what is being said and done. Apologies are not as necessary as the explanation of the mishap. Do not brush off a mistake, rather explain what happened and what could have been done to prevent such an occurrence. Mastery of the following suggestions will help to make for a successful presentation.

### A. INTRODUCTION

#### 1. ANSWER THE QUESTION WHY:

- a. Is the introduction brief?
- b. Does it provide the reason why this demonstration is important?

#### 2. GET THE ATTENTION OF YOUR OBSERVERS:

- a. Are the opening remarks motivating and interesting?
- b. Is the audience initially involved?

### B. WORKMANSHIP

#### 1. THIS PHASE ANSWERS THE QUESTION HOW:

- a. Are new terms clarified?
- b. Are the observers encouraged to ask questions?

#### 2. USE QUALITY "SHOWMANSHIP":

- a. Are the props carefully and quietly handled?
- b. Have all materials been set up ahead of time?
- c. Were personal qualities considered?

Look at entire audience,  
 Avoid excess use of gestures,  
 Be enthusiastic.

3. OBSERVE BEHAVIOR OF THE AUDIENCE:

- a. Are there any signs of confusion, inattention or disbelief?
- b. Was feedback planned or spontaneous?
- c. Is suspense or curiosity built by questions and wondering out loud?

C. ORGANIZED WORK AREA

1. PLAN SO "ALL" CAN SEE AND HEAR:

- a. Are supplies displayed effectively?
- b. Is space organized and wisely used?
- c. Is finished product available?

2. USE SAFETY PRECAUTIONS.

D. SUMMARY

1. THIS PHASE ANSWERS THE QUESTION WHAT:

- a. Is conclusion brief?
- b. Were most important points reviewed?
- c. Were concluding remarks definite?
- d. Were students reminded of any follow-up requirements? (post evaluation, etc.)

2. FINAL PRODUCT:

- a. Is the final product available for students to analyze?
- b. Does it meet the standards required?

## EVALUATION

The final stage in the art of demonstrating is to critique the effectiveness of the presentation. Having a successful demonstration is possible only if the observers understand and are able to behave differently as a result of observing the demonstration. Standards must have been maintained so the student will have adequate guidelines to follow in their own performance.

The process of evaluation becomes two-pronged for the demonstrator. If a demonstration is used to help others learn, one must first consider the learner in evaluating effectiveness. Self-evaluation becomes the second consideration. A score card has been included in Appendix B for use in the self-evaluation phase.

## A. STUDENT/LEARNER EVALUATION

## 1. CONSIDER INTEREST LEVEL:

- a. How did students react or interact during the demonstration?
- b. What was their level of reactions?

## 2. PERFORM A PROFICIENCY EVALUATION FOLLOWING DEMONSTRATION:

- a. Was the skill successfully performed - process and/or product?
- b. Is a written or knowledge level evaluation sufficient?

## B. DEMONSTRATORS' SELF EVALUATION

1. PERFORM A SELF-APPRAISAL USING SUGGESTED SCORE CARD
2. USE SECOND-PARTY EVALUATION FOR COMPLEMENTARY INPUT

## ANNOTATED LIST OF REFERENCES FOR FURTHER STUDY

Allgood, Mary Brown. Demonstration Techniques. 2nd ed. Englewood Cliffs, NJ: Prentice Hall, Inc., 1959.

A valuable comprehensive guide on the methodology of effective demonstrations. Discusses personal criteria of the demonstration, television techniques, and the teaching of demonstrations.

Brown, J. W.; Lewis, R. B.; and Harclerod, F. F. Instructional Materials and Methods. 2nd ed. New York: McGraw Hill, 1964. Chapter 14.

The use of and giving of demonstrations are discussed in an example-packed chapter. Each area, values of, preparing for, guiding learning examples of and evaluation of demonstrations is provided. In addition, a list of selected readings is provided for further study.

Cooperative Extension Service, College of Agriculture. A Leader's Guide to 4-H Demonstrations. Pullman, WA: Washington State University, January, 1975.

Excellent publication explaining the demonstration technique as applied to use in 4-H extension programs. The practical emphasis lends itself to vocational education. Stages, steps and evaluation make this a most useful reference.

Miller, Rex, and Culpeppar, Fred W., Jr. "How to Give Effective Demonstrations." Industrial Arts and Vocational Education Vol 60, No. 6 (September 1971): 24-25.

A very concisely written, two-page article presenting a rationale and method for giving demonstrations. Content deals with principles, methods, planning, timing, interest, stimulation, set up, and student participation for demonstrations. The only limitation of the article is that, for the beginner, sufficient "How To" is absent.

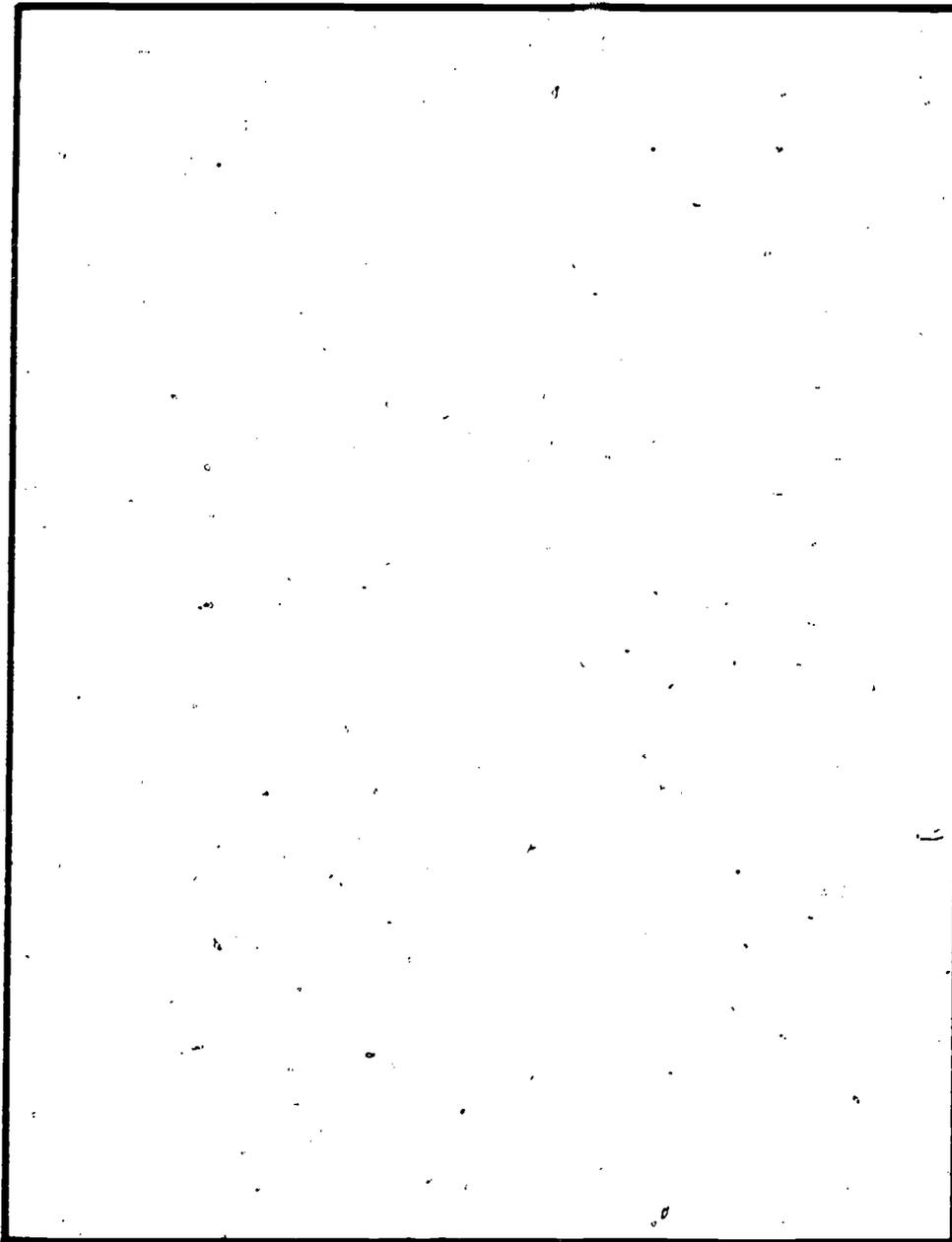
Morgan, Barton; Holmes, Glenn E; and Bundy, Clarence E. Methods in Adult Education. Danville, IL: The Interstate Printers and Publishers, Inc. pp. 117-125.

Succinct in outlining advantages and limitations of the demonstration method. Presented in four steps: preparation by the leader, preparation of the observers; performing and clinching the results. An actual example illustrates the features outlined in the chapter.

Spitze, Hazel Taylor. Choosing Techniques for Teaching and Learning. Washington, DC: Home Economics Education Association, National Education Association, 1970. pp. 21-22.

Condensed overview of demonstrations as a simulation technique. Interesting variations are mentioned as well as guidelines in use.

# LABORATORY



## CATEGORY: LABORATORY

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**PERFORMANCE OBJECTIVE 4**

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Prepare and implement a laboratory activity as an instructional strategy in one area of vocational education.

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Instructional Objective 4.1

The learner will explain, giving examples, the unique features of laboratory, and identify the characteristics of an effective laboratory teacher.

Instructional Objective 4.2

The learner will identify steps for effective laboratory planning and formulate a model to implement an effective laboratory experience in a unit of instruction.

Instructional Objective 4.3

The learner will identify different types of laboratories and modify each for use in one specific vocational area.

Instructional Objective 4.4

The learner will modify an existing laboratory plan to include the components of safety and special needs.

Instructional Objective 4.5

The learner will explain the unique features of evaluation methods used for laboratory activities and develop evaluation devices for respective laboratory experiences.

Prepare and implement a laboratory activity as an instructional strategy in one area of vocational education.

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Tom Fool and the Job School

Once upon a time there lived an unemployed man named Tom Fool. He tried very hard to get a job, but every time he applied for one he was told that he needed training before he could be hired.

One day while waiting for a bus, Tom saw a sign on the fence near the bus stop. It said, "Job School. We will train you at home for any job!" and it gave a phone number to call. Tom was so excited he called the school right away and was given a list of careers to choose from. He decided to become a house painter. Next he was told that all the things he would need to prepare for his new occupation would be delivered to his house.

The next day Tom received two boxes. One contained a blue cap and pair of matching coveralls. The other had two books, How to Become a House Painter, Vols. I and II.

Tom Fool began to learn about house painting. He worked very hard at it. Everyday he put on his cap and coveralls (they told him that this would make him feel like a house painter--very important for his training), sat at his desk and studied for his new job. At the end of one month he graduated from Job School as a house painter and was given a diploma to prove it.

Soon after his graduation Tom applied for a job as a house painter. He was dressed in his cap and coveralls and carried his diploma as proof of his training. Needless to say, he was given the job.

The following morning Tom Fool, house painter, reported to work with all

the knowledge on house painting he had gotten from the two volumes of How To Become a House Painter, his coveralls and cap. He was prepared for anything and everything! This is, until his foreman asked him to open a can of paint-- he couldn't do it. Also, he did not know how to hold the paint brush.

The story can end with a moral: "Clothes alone do not a house painter make," but there is a more important point to ponder. Why did Tom fail? He was highly motivated and studied seriously. He probably gained, from his reading, as much or more than most people would have, but he was still not able to perform on the job. Was it Tom's shortcoming? Did he fail as a student? Probably not; he had the characteristics of a very good student. Tom's problem was with his program of study. It did not include laboratory experience.

#### Instructional Objective 4.1

The learner will explain, giving examples, the unique features of laboratory, and identify the characteristics of an effective laboratory teacher.

#### Learning Activity 4.1-a

Read the background material entitled "What is Laboratory?", "How Does Involvement Teach?" and "What are the Characteristics of an Effective Laboratory Teacher?"

#### Learning Activity 4.1-b

Visit a laboratory in a vocational school.

Observe and describe:

- A. how the laboratory activity is presented,
- B. what type of learning activities were given to the student,
- C. what evaluation methods were used, and
- D. how the characteristics of the teacher being observed compare with the background material on an effective

laboratory teacher.

Interview:

- A. Teacher(s)--to find out what they think about this instructional strategy, what they consider to be shortcomings and the means for improving them, and what problems would be encountered in implementation.
- B. Students--to get their reactions to the strategy.  
What is the difference between laboratory and other kinds of instruction they have had? What factors are most enjoyable?

Analysis:

- A. What characteristics did this teacher have?
- B. What improvements could be made on what you observed in the teaching-learning laboratory, activities, etc.?
- C. Were there other factors that contributed to the effectiveness of the laboratory experience?
- D. How could the laboratory activity have been presented more effectively?
- E. What features were innovative and/or creative, and how can these be used in your field?
- F. Did the activity observed truly lend itself to the strategy?

What is Laboratory?

Laboratory is an instructional strategy aimed at the practical application of principles. It is an extension of the traditional classroom which allows

the student to understand concepts by relating them to practical situations. It gives the learner the opportunity to work with proving hypotheses, thus permitting first-hand experience for gaining knowledge. In Tom Fool's case, a laboratory would have given him the chance to practice painting and to perform some of the tasks performed by real house painters. This would have put meaning into the ideas he found in his books and he would have been better able to do the actual work.

Laboratory uses individualized instruction, job sheets and demonstration techniques, etc., which require a high degree of direct student involvement. Although involvement may also be possible in other strategies, the actual hands-on experience that is offered in laboratory makes it unique.

#### How Does Involvement Teach?

Picture yourself sitting in a lecture hall listening to someone explain how to draw a blood sample from a patient. The lecturer is very thorough and makes good use of visual aids to emphasize important points and specific techniques. At the end of this lecture you have been told the problems you might run into, the fine details of selecting a vein, and the way you should hold a syringe. Will you be able to successfully draw a sample from a patient? Probably not. The "think technique" developed by Professor Harold Hill in The Music Man worked only because the cast of the play had professional musicians in it; the technique is not an effective method for teaching a skill.

Now, imagine holding a syringe in your hand and feeling the arm of your patient to find a vein. You are able to feel the texture of the skin, the size and depth of the blood vessel. You can see the apprehension in the face of your patient. These impressions cannot be taught by a lecturer, but experiencing them will enable you to become proficient in your task. You needed active involvement.

The same is true in all vocational programs. The student needs the chance to

interact with the task, to learn by doing, to develop a concrete rather than an abstract experience background.

Involvement also stimulates interest and motivation. It creates the potential for students to examine attitudes and values about the career they are preparing for, especially those which are intangible. Students have always worked for a correct answer; it is a normal tendency to make the answer come out according to what it is expected to be. In the medical laboratory the outcomes of an assay are unknown, and controls and standards are used to monitor the proper outcome of the technique. If the control and standard values are not within their acceptable ranges, the assay is invalid. If only slightly out of range, is the assay still invalid? Can the results be "juggled" into range so that the assay can be considered correct? Is the time involved worth the effort of repeating the assay? Is it all right to manipulate the results when a patient's well being is at stake? Is it all right to do it even if the patient is not concerned? These questions must be dealt with through involvement in the occupation and the attitudes that are a part of it. They cannot be answered after a lecture on medical ethics. The student's feelings about them are more valuable, and this internalized reaction can be more positively influenced through involvement with the real situation.

The key to the successful use of laboratory is the teacher. With the teacher's planning and preparation for meaningful activities, the student can benefit immeasurably.

#### What Are the Characteristics of an Effective Laboratory Teacher?

The instructor should have a high degree of competence for these activities he/she plans to teach. Students are more likely to learn if they have an example to follow. The teacher is this example and must have a good contemporary basis of knowledge in the field, theoretical and practical. A rich store of

personal experiences from which the teacher can draw to make teaching more meaningful is also helpful. As a student, have you had the experience of being taught by someone who was not confident about the subject? How did that person answer questions about the subject? Was she/he able to point out problems that might arise? Could the person explain all phases of the concept or principle so that you were able to understand? Did you learn? The teacher who is knowledgeable about a subject area is better able to give the student confidence in learning, and can make the student's background experience more meaningful.

The laboratory teacher needs to be imaginative and innovative. Principles and methods are constantly changing within the occupational field, and instructors must continually expand and up-date their programs to keep abreast with those changes. They must develop the means for increasing their availability to the student. One instructor found that much time was spent going over the steps for the operation of machinery in the laboratory. Although these procedures had been explained to the entire class, each student needed individual help with certain aspects. To free the teacher from this, taped instructions were developed which followed the principle of the "taped tour" used by many museums, and "walked" the student through the operation of the machines. (An example script of this procedure follows.)

Effective teachers must be thoroughly familiar with the equipment in the laboratory. This will enable them to offer more meaningful demonstrations to the student. They will also be able to utilize all equipment to their maximum capacity. They should be able to perform minor repairs to insure operability at all times, and to help cut down on operational costs.

In addition to all of this, teachers must be alert and sensitive to conditions in the laboratory, and should have the ability to manage inter-personal

relationships. They must be able to monitor all activities with respect to safety and proper utilization of materials and techniques. They need to move freely through the facility to offer aid and comment as the need arises. They are instrumental in motivating the student and introducing new values and attitudes. For example, instructors in their conduct and attitude toward the occupation can influence the students' ideas about professionalism. They can talk about neatness and organization within the laboratory, and if they follow this with their performance of tasks in a neat and organized manner, they will demonstrate that this is actually possible. If instructors insist that the students maintain a neat and organized work area and believe that this will increase the quality of their work, they will be able to initiate a basis for their feelings of professionalism and pride in their future occupation.

## SCRIPT FOR "WALKING TOUR" ON CHANGING RIBBON ON ELECTRIC TYPEWRITER

Changing the Ribbon of the Mickey Mouse Typewriter, Model Electric 3500

You should be sitting at a Mickey Mouse typewriter, Model Electric 3500. If you are not, please rewind this tape to the beginning and pick up a tape which is for your type of machine.

Is the switch of your typewriter at the "off" position? (pause to give time for student to check). If it is not, please put it at the "off" position. (pause again). Do you have a new roll of ribbon? If not, please turn off your tape player and pick up a new roll from your instructor. Be sure you ask for a ribbon which will fit the Mickey Mouse, Model Electric 3500.

We are now ready to change the ribbon for our machine.

Remove the top cover by pulling it up. (pause to give student time)

Wind the worn ribbon onto the left or right spool by turning it with your forefinger. (pause)

Pull out the spool catch which is the metal piece which seems to be holding the ribbon in place, remove the empty spool. (pause)

Free the end of the ribbon from the hook and draw it out from the spool. (pause)

Set the ribbon color selector which is the small black lever to the right of your tab key so it rests on red. (pause)

Press down on the shift lock key to expose the ribbon in the guides in the center of the machine. (pause)

Disengage the ribbon from these guides. (pause)

Now, remove the spool of old ribbon. (pause)

Place the empty spool on the left spool shaft. (pause)

Place the new spool on the right shaft with the red part of the ribbon on

the bottom. Be certain that the spool is solidly seated in its position. You should hear it snap into place. If it does not snap, re-position it and try again. (pause)

Unwind ribbon from the back of the spool. (pause)

Hook the end of the unwound ribbon to the empty spool and wind several turns until you are sure that the ribbon does not slip off the spool. (pause)

Hold the ribbon with both hands and put it into the guides at the center of the machine. (pause)

Tighten the slack in the ribbon by turning the spool with your forefinger. (pause)

Replace the color selector to the black position. (pause)

Replace the shift lock to its original position. (pause)

Replace the top cover by allowing the two posts on each side of the cover to fit tightly in the holes at the top of the machine. (pause)

Before you remove this tape from your tape player, please be sure to rewind it to the beginning. Thank you.

NOTE: This procedure can be used for any number of operational processes. The pausing after each step should give the student enough time to complete the operation, but it should not be so long as to make the operation time consuming. Realistic timing can be achieved if the taping is done at the actual site with the instructor following the steps at an unhurried pace. The script should be field tested by students to insure that all steps are covered and all terminology is understandable.

### Instructional Objective 4.2

The learner will identify steps for effective laboratory planning and formulate a model to implement an effective laboratory experience in a unit of instruction.

#### Learning Activity 4.2-a

Read background material, "What Goes Into the Planning of the Laboratory Experience?"

#### Learning Activity 4.2-b

Select an aspect of your vocational area which can be effectively presented using the laboratory. Prepare your plan giving objectives, activities, student participation and testing procedures.

#### Learning Activity 4.2-c

For the experience planned in Activity 4.2-b, design a worksheet which includes purpose, materials needed, operational steps and diagrams as needed, and questions which will enable the student to draw conclusions about the exercise.

### What Goes Into the Planning of the Laboratory Experience?

The laboratory facility must be planned to allow for optimum use and minimum inconvenience. It should also be planned with program objectives in mind. Equipment should be installed for maximum efficiency, and materials must be easily accessible and logically placed. In this way the teacher can demonstrate that organization is essential, thereby encouraging good work habits.

Because materials are such an important part of instruction, an inventory must be kept to insure their availability during class time. Ordering of supplies must be done regularly, and provision made for delivery well in advance of their use.

Planning is not confined to administrative matters, however. Experiences must be sequenced to assure that instruction moves from the simple to complex. You cannot sew a dress unless you are able to first sew a straight seam. A task analysis should be made before this part of the planning to insure that all steps are considered.

Timing must also be taken into account. The length of the experience must be planned to assure that it is not fragmented and the student should be able to complete the exercise in the time allotted. Steps should be taken to minimize the time taken for setting up and disassembling equipment, obtaining materials, and cleaning up. Time should be available for explaining pertinent points before the activity and for discussing outcomes at the end of the experience.

Written directions, such as the example which follows, should be given to the student to insure that all steps of the procedure are understood. This hand-out should include a list of the material to be used, illustrations and directions for clarification of specific operations, an explanation of the purposes of the activity, and student objectives. It can also incorporate questions and/or a summary sheet to be worked with upon completion of the activity. All this information should be distributed prior to the meeting time of the laboratory to allow each student to familiarize himself with the agenda. This will minimize the time needed to explain the activity and allow more time for the actual work.

Procedures must be tried out prior to the time the student will work with them. This will uncover safety features which must be mentioned and points where problems might occur. This practice will also insure operability of equipment, availability of materials, and workability of projects. In addition, amounts of

supplies needed can be determined and distribution methods can be developed to reduce waste. If the written directions that are to be given the students are used at this time, judgment can be made as to their clarity and logic.

Planning for the learning activity also involves knowing the types of laboratory experience that can be offered the student.

#### Example for Learning Activity 4.2-a

Written directions give all steps to be followed for successful completion of a laboratory procedure.

#### HOW TO USE HAND SNIPS<sup>1</sup>

##### Objectives of Unit

1. To explain how to make straight cuts with straight, combination, or bulldog snips.
2. To explain how to notch metal.

##### Tools and Equipment

Straight Snips  
 Combination Snips  
 Bulldog Snips  
 Circular Snips  
 Aviation Snips, left and right hand

Trojan Snips  
 Compound Lever Shears  
 Hawks'-Bill Snips  
 Open End Wrench  
 Hammer, Chisel, Lead Cake

#### A. Making Straight Cuts with Straight Snips, Combination Snips or Bulldog Snips

1. Select the proper snips.

NOTE: For mild steel 22 gage and lighter, use either straight or combination snips. For 16 to 20 gage mild steel, use bulldog snips.

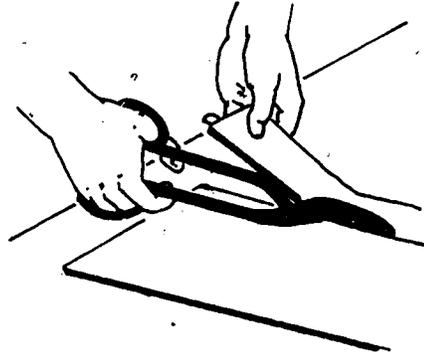
1

D. Kidd and G. Leighbody, Methods of Teaching Shop and Related Subjects, (Albany, NY: Delmar Publishers, 1955), p. 73.

2. Inspect the snips to see that they are properly adjusted.

NOTE: If adjustment is necessary, refer to "Oiling and Adjusting Snips."

3. Grasp the snips in the right hand and the narrowest part of the sheet in left hand.



NOTE: Rest the snips and sheet on bench if necessary.

4. Open the blades of the snips as far as conveniently possible and start the cut at the edge of the sheet.

Fig: Making a Straight Cut

NOTE: The snips should always be held at right angles to the sheet to be cut.

5. Cut the sheet by closing the blades just short of the full length to prevent leaving jagged edges.

NOTE: The length of each cut will be determined somewhat by the gage of the sheet.

6. Start the snips at the extreme end of the preceding cut.
7. Finish the cut, keeping the snips on the line by changing the direction of the snips if necessary.

### Instructional Objective 4.3

The learner will identify different types of laboratories and modify each for use in one specific vocational area.

#### Learning Activity 4.3-a

Read the background material, "What Types of Laboratories Are There?"

#### Learning Activity 4.3-b

Modify a type of laboratory you have never used before to teach

a concept in your vocational field. Prepare a plan for such an experience and analyze the advantages and/or disadvantages of using the different process.

### What Types of Laboratories are There?

#### I. Experimentation and Skill Building

This is a form of laboratory used to verify or discover facts and to develop specific skills. The objectives of the experiment will determine the task or experience. "The student will show that metals melt at high temperatures and determine the temperature at which iron melts," or "The student will be able to operate the smelter using proper safety equipment." Often both objectives can be combined and the experience can perform a dual purpose: "The student will prepare wet mounts, using normal saline, 2% sodium chloride and distilled water to demonstrate the susceptibility of red cells to their environment." Here the student verifies a physical property of the blood cell and practices the preparation of wet mounts.

The teacher should state the purpose of the lesson and show its relationship to the theory taught previously. The teacher then demonstrates those areas which are unfamiliar to the student. It is possible to change the "givens" to allow for a variety of results. This enhances the opportunity for the student to analyze the procedure and make conclusions about the experience.

Upon completion of the activity, the students write a report or complete a summary sheet to record their findings. Discussion of all outcomes allows for evaluation of each student's results in comparison to peers.

The laboratory experience contains a combination of operations which exist in the actual job, and provision should be made for the repetition of these operations through other assignments to assure a high level of skill development.

The student can be given the opportunity for learning by discovery in a similar situation. This can be done by allowing the student to conduct experimentation to verify a hypothesis. This approach is thought to be extremely challenging, but it is also more time consuming, and the instructor must plan more carefully to insure that progress is made in the right direction. For example, students in agriculture might be asked to formulate and prove hypotheses about environmental conditions on growth of plants. In Industrial Education, a learner might experiment with the composition of aggregates to determine qualities of concrete.

## II. Task Force Production

This type of laboratory is a modification of the small group production process used in industry. In its beginnings, mass production revolutionized industry with its assembly line, but the worker had to pay for this with physical and mental problems which resulted from job dissatisfaction. To counter this, automobile manufacturers developed a team approach to production, where a team of workers is given complete responsibility for completion of major components of a car.

In the classroom, Task Force Production offers a combination of technical, managerial, and social roles with emphasis on the development of the student as well as the product. Each individual, in a group of 3-5 students sharing common production interests, works in all phases of management, planning, and production.

The student is introduced to the concept of task force production, the principles of mass production, and the organization of industry. Then the student is involved in determining the product which will be created; each becomes aware of the need of the consumer. Grouping of students by interest

a product choice is the next step. Management is shared by each group member, and all phases of production are practiced--design, selection of materials, packaging, distribution. At the end of the production period, each group reports to the entire class. Each phase of production is reviewed, discussed and evaluated. The end result is more than an acquisition of psychomotor skills. It includes development of group interaction and decision making ability as well as a more intimate understanding of industry and production. The planning and preparation for such a laboratory experience is time consuming, but the benefits of the outcomes are well worth the effort.

### III. Project Method in Distributive Education

This method coordinates classroom instruction with selected activities or projects related to the individual occupational objectives of the student. It attempts to offer outcomes similar to those of cooperative education with more control by the teacher as to the pace and nature of the experience. The projects are of four categories. Directed observations include such activities as viewing selected films, attendance at trade shows, making customer calls with sales representatives, and guided field trips. Analysis and evaluation uses case studies, interviews and surveys, readings in trade journals, and comparing profit and loss statements. Discussion involves carrying out various discussion techniques to expand knowledge of an area of exploration. This category has the added benefit of developing communication skills. Practice allows actual work with necessary processes. These include participating in employment interviews, and role playing to aid in decision making and problem solving.

Success of the project method depends on established criteria. Specific objectives must be set for each individual and activity, and adequate time must be allotted to the student for participation in the activities. Evaluation of each project is made using the Project Training Record, which follows.

Project Training Record

## Student Participation Activities

Name of Student \_\_\_\_\_ Occupational Objective \_\_\_\_\_

Project Objective \_\_\_\_\_ Curriculum Unit \_\_\_\_\_

## I. Project Description

## II. Dates

A. Assignment Dates \_\_\_\_\_

B. Performance Date \_\_\_\_\_

TASK

DATE

- 1.
- 2.
- 3.
- 4.
- 5.

C. Individual Progress Reports \_\_\_\_\_ (Attached)

D. Student Final Report \_\_\_\_\_  
Date \_\_\_\_\_

## III. Summary (Student Comments)

## IV. Teacher Evaluation and Comments

2

Florida State Department of Education, The Project Plan for Distributive Education in Florida High School, Tallahassee, FL: Florida State Department of Education, 1967), p. 24. ED 017 712

#### Instructional Objective 4.4

The learner will modify an existing laboratory plan to include the components of safety and special needs.

##### Learning Activity 4.4-a

Read background material, "What Else Should Be Known about Laboratory?—Safety and Special Needs."

##### Learning Activity 4.4-b

Using the laboratory plan prepared for Learning Activity 4.2-b, prepare a 1-2 page abstract describing the addition of Safety and Special Needs.

#### What Else Should Be Known about Laboratory?

##### Safety

The laboratory attempts to bring the real life situation into the classroom. At times the classroom is transported to other locations, for example, the use of a wheat field in agricultural education. In any case the setting, the type of equipment used, the varied materials in use and storage make hazards inherent to this type of teaching. Therefore, it is vital that safety practices be stressed throughout the program. Safety features on equipment should be explained and used. For example, acid resistant glasses and fire proof aprons should be required for specific operations. Safety features of the laboratory should be introduced early in the program. Special equipment such as fire blankets and eye baths should be conveniently located and conspicuously labeled, and hazardous materials labeled as such. Students should take an active part in the safety program. They should be involved in monitoring work stations for safe practices and in testing preventative equipment to insure

operability. This type of exposure will encourage good work habits in their future occupation.

### Special Needs

This strategy can offer individualized instruction to the student. It is especially appropriate for use with students having special needs, as most experiences can be easily modified to meet them. For example, a student on crutches can be situated at a work station at the end of a bench to allow more room for maneuvering. The deaf student can be given written instructions that include all the explanations, questions and answers which are brought up in class. Also, the laboratory experience is ideal for the instruction of mentally retarded students.

### Instructional Objective 4.5

The learner will explain the unique features of evaluation methods used for laboratory activities and develop evaluation devices for respective laboratory experiences.

#### Learning Activity 4.5-a

Read the background material, "Evaluation Techniques."

#### Learning Activity 4.5-b

Using the laboratory plan prepared for Learning Activity 4.2-b, develop at least two (2) devices to evaluate the laboratory experience.

### Evaluation Techniques

As in other learning situations, the instructor must evaluate each student. Although evaluation practices used in other areas can also be utilized

here, the basis of the laboratory experience is practical application, and this should be reflected in testing and grading methods.

One type of evaluation is the performance test. It can be used to measure accuracy, speed, ability to plan the work, acquisition of a skill and confidence in the use of tools or other equipment. The objectives of the laboratory exercises should indicate what will be tested. A task which involves all or most of the elements to be tested should be planned. For example, a procedure which is related to the occupational area being tested but unfamiliar to the student can be used to test the ability to plan work, the acquisition of skills, confidence in the use of tools and equipment and good work habits, if the operations involved in its completion have been previously taught. This type of test can be carried out as a laboratory session, and all planning steps carried out to insure its successful execution. Conditions for each student should be as nearly identical as possible. If specific operations are to be tested, the instructor must observe the student at work.

The scoring system for this type of evaluation should be carefully planned. The standards for the end product should be carefully outlined. Work habits and skills must meet a given level of acceptance. A possible method of rating is the use of a scaled checklist, such as the example which follows.

Example for Learning Activity 4.5-a: The Descriptive Form of Rating Scale<sup>3</sup>

Pupils in carpentry are being tested in their ability to install a mortise lock in an inside door. The rating, 4, is the minimum which will be approved.

RATING	STANDARDS
4	<ul style="list-style-type: none"> <li>a. Door catch must spring into catch plate easily and quickly when door is closed.</li> <li>b. The bolt must turn into place easily and without excessive pressure when the key is turned.</li> <li>c. All screws must be in place.</li> <li>d. Neither cover plates nor door may be scratched or marred.</li> <li>e. Cover plate edges must be parallel to edge of door as measured by eye.</li> <li>f. All tools must be used safely.</li> </ul>
3	<p>Standards for 4 must be met and in addition:</p> <ul style="list-style-type: none"> <li>a. Lock and catch plate must fit snugly in openings for them.</li> <li>b. Lock and catch plate must be reasonably flush with wood surfaces in which they are inserted.</li> <li>c. Plate edges must be parallel to edge of door as measured with rule.</li> <li>d. Proper care must be given tools while working.</li> </ul>
2	<p>Standards for 3 and 4 must be met and in addition:</p> <ul style="list-style-type: none"> <li>a. Lock and catch plate must be exactly flush with wood surfaces in which they have been inserted.</li> <li>b. Screws must be driven exactly perpendicular to plates and seat themselves accurately in plate openings.</li> <li>c. There may be no burrs on screw slots caused by screwdriver.</li> </ul>
1	<p>Standards for 2, 3, and 4 must be met and in addition no tool marks may be visible around edges of openings provided for lock or catch plate.</p>

<sup>3</sup>

Kidd and Leighbody, Methods of Teaching Shop, p. 31.

The understanding of working principles and operations can also be measured by using pertinent questions in these areas. If an unfamiliar procedure is used, the student can be questioned on principles which are similar to those already learned; transfer of knowledge is measured in this manner. Questions pertaining to outcomes can be related to understanding the workings of procedures and operations. This process can be used independently or in combination with the performance test.

Another type of test is the practical examination, which differs from the performance test in that it does not use only one complete procedure with a number of tasks. It can evaluate the student's ability to perform a single operation, identify objects, analyze a situation or evaluate alternatives. The procedure for planning this type of examination begins with knowing exactly what is to be measured, and those operations which will measure them. For example, if the ability to read information from a chart or graph is to be evaluated, a chart or graph will be used. A number of demonstrations are set up at different stations of the classroom. Each demonstration is supplied with a task which must be performed or questions which must be answered. During the testing period the student moves from station to station, in a given sequence, and with a set time at each position. If the time limit is 4 minutes per station, all students move at four minute intervals. Scoring of this type of examination is similar to that of conventional tests. It is necessary to insure that each task or operation can be completed in the time limit, and that all students are aware of the sequence and procedure of the test.

Evaluation should involve testing by objectives. The objectives of the program should be reflected in those of the exercises, and these should be used as the basis of the testing situation.

## ANNOTATED LIST OF REFERENCES FOR FURTHER STUDY

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Drawbaugh, C., and Hull, W. Agricultural Education: Approaches to Learning and Teaching. Columbus, OH: C. Merrill Publishing Co., 1971.

A section about school laboratory instruction, pp. 141-161, describes the various types of labs existing in Agriculture Education, such as demonstration, the Experimental-Discovery Method, the Project Method, Simulation, Practice and Drill and Realism. Very extended and detailed approach to the subject.

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Educational Foundations of the Project Method in Distributive Education, Curriculum Planning, Categories of Projects and samples of various projects that can be used in Distributive Education.

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Basic concepts of the strategy based on research.

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The chapter on Learning Experiences is divided into two parts: demonstration, and laboratory activities by the students. Discusses planning, executing the plan and evaluating.

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Theory of teaching and learning, methods of presenting and helping the student master skills and information. Methods of testing skills and knowledge. Very good method applicable to all fields of vocational education.

Marks, M. "The Project Method in Action." Paper presented at the meeting of the National Association of Distributive Education Teachers, Miami, FL, December 9, 1965.

An analysis of the characteristics of the project method in D.E. and its relation to cooperative education.

Means, R. C. Methodology in Education. Columbus, OH: Charles E. Merrill Publishing Co., 1968.

As a part of a survey of instructional methods in pages 46-49, giving the description of laboratory experimentation stating procedural steps, advantages, values limitations, problems and examples.

McClosky, Mildred G. ed. Teaching Strategies and Classroom Realities. Englewood Cliffs, NJ: Prentice Hall, Inc., 1971.

Reports written by new teachers. One by Smith involved the methods in which planning took place. Stimulating, good art work, worth considering if laboratory is a strategy you would like to try.

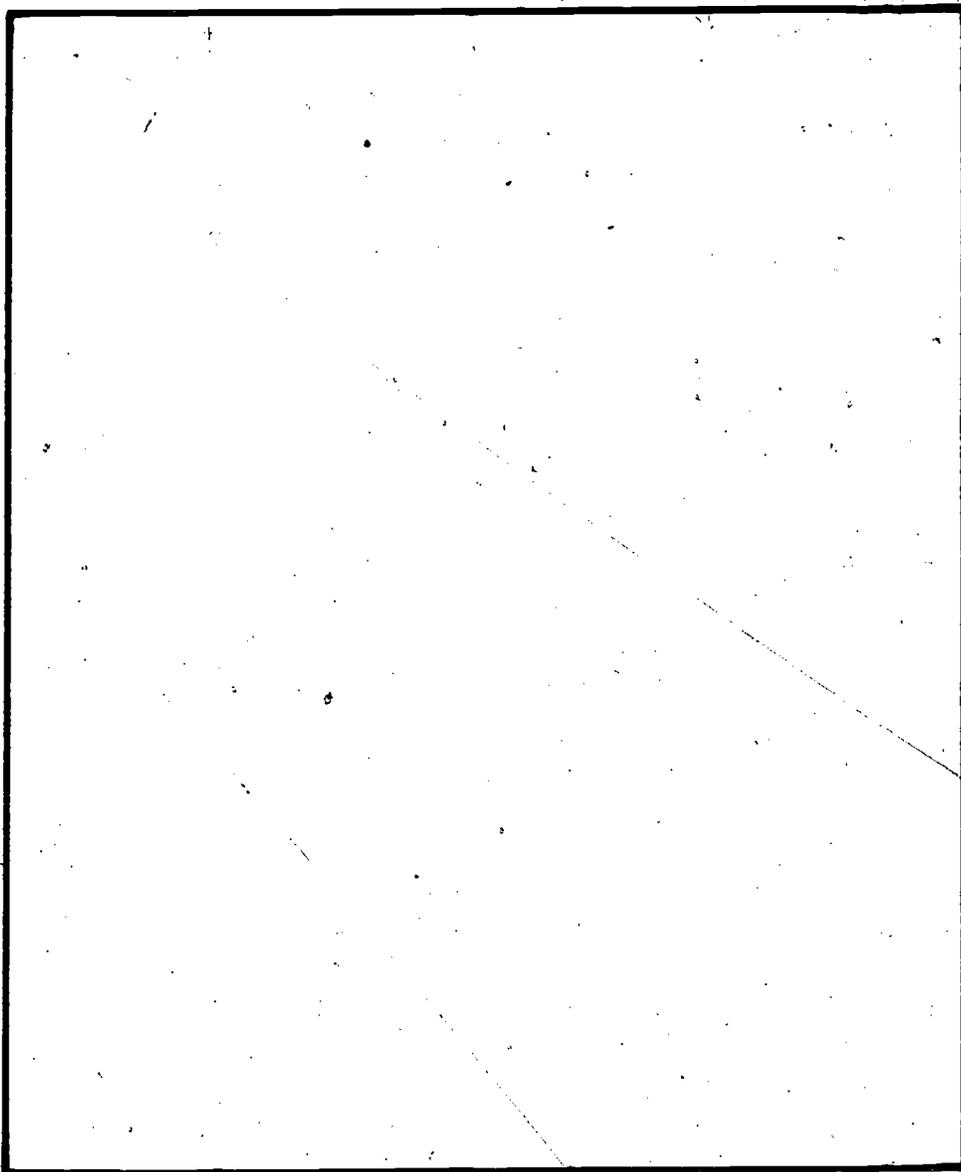
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Considerations for effective school shop planning: space, equipment, housekeeping, safety.

Oaks, M. and Weiking, B. "Task Force Production." Paper presented at American Industrial Arts Association Conference, Seattle, WA, April 1974.

A speech presenting the features of Task Force Production as implemented in industry and Industrial Arts. Advantages of the method; steps describing the process from development of Consumer Product ideas to final evaluation.

# QUESTIONING



## CATEGORY: QUESTIONING

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**PERFORMANCE OBJECTIVE 5**

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Describe and demonstrate a variety of questioning techniques.

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Instructional Objective 5.1

The learner will describe questioning as an instructional strategy and will distinguish between convergent, divergent, and evaluative questions.

Instructional Objective 5.2

Given a video tape in which the same lesson is demonstrated via two different questioning sequences (one episode showing convergent questioning patterns, the other divergent patterns), the learner will tabulate the teacher and student behaviors and draw generalizations based on the results.

Instructional Objective 5.3

The learner will demonstrate comprehension of questioning techniques (framing, handling incorrect responses, encouraging non-volunteers) by correctly answering formative quiz items.

Instructional Objective 5.4

The learner will demonstrate the use of questioning techniques with a microteaching lesson, critique his/her own micro-lesson and obtain three peer evaluations.

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**PERFORMANCE OBJECTIVE 5**

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Describe and demonstrate a variety of questioning techniques.

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Instructional Objective 5.1

The learner will describe questioning as an instructional strategy and will distinguish between convergent, divergent, and evaluative questions.

Learning Activity 5.1-a

Read the following definition of questioning as an instructional strategy, and the characteristics of a poor question.

WHAT IS QUESTIONING?

As children we start to question almost as soon as we learn to talk; we are curious about everything, so we ask what? why? where? when? Throughout our lives asking questions serves as a primary motivator of learning. Therefore, one of the most important skills for the teacher and the curriculum specialist to learn is effective questioning.

Questioning can be defined as a method of instruction based on the use of questions to be answered by the student.

Questioning is a dynamic process. It is useful art or tool, and in the hands of a skillful teacher, serves numerous learning purposes. Good questions stimulate and encourage students to question themselves, other students, and the teacher. Good questions act as a sounding board against which the correctness or acceptability of ideas may be tested, they promote the aims of the lesson in a concise manner, and encourage discussion.

Questions may be asked to: elicit simple recall, compare and contrast, choose alternatives, classify, illustrate or give examples, or present a relationship. Other types may ask the students to describe, explain, outline, or organize ideas in one of several ways.

### What is a Poor Question?

Many lessons could be vastly more stimulating and worthwhile learning experiences if a teacher would use a variety of effective questions and questioning techniques. The problem is developing good questions. After you design a question, ask it to yourself out loud. See how it sounds. You can often detect poor questions, faulty terminology, or other flaws if you see and hear the question.

The most commonly found poor questions have even been given titles. Some of these stand out as really ineffective and should be avoided.

1. The Guessing Question. The student is asked to supply an answer that is only a matter of guesswork:

Do you think more people own red or blue cars today?

2. Indefinite Question. The student is presented with a question lacking definition--limited in scope and purpose.

What's the stock market all about?

3. The Ambiguous Question. Students are presented with a question whose meaning is not clear to them. They are puzzled as to what information they are expected to supply.

What do you like about that advertisement?

4. The Echo Question. The question involves the repetition of one or two key words of the question.

The answer to Harriet's second question is four. Four, Ethel?

5. The Double Question. The student is asked to answer two or more questions that are usually interrelated and told to consider them simultaneously.

What are seven food groups and what nutrients do they provide?

What is the stomach and how does it work?

6. The Whiplash Question. This question starts as a declarative sentence and ends up with a question.

The function of the mitochondria is what?

Edison invented the electric light in his laboratory at where?

7. The Pumping Question. This is a question in which the student is furnished with some letters or words of the answer and is asked to supply the rest.

Columbus discovered America in.....14....?

8. The YES or NO Question. This question is answered YES or NO and calls for no further response. An additional question would have to be asked for more information.

Is an antidote used to nullify the effects of a poison?

Would you say that this shorthand outline is correct?

9. The Tugging Question. The student is asked to furnish additional but not really meaningful information.

Now that we have four words to describe this typewriter, who can give me one more?

Who can give me one more word to describe the fabric?

These questions will slow up, reduce the effectiveness, and minimize the impact of any activity you are using. The guidelines offered for use in the identification of those types of questions to be avoided are only your starting point. Even with a good, well-worded question, the next phase of questioning to consider is the asking of the question.

#### Learning Activity 5.1-b: Basic Questioning Categories<sup>1</sup>

Read the following description of convergent, divergent, and evaluative questioning patterns and answer the questions in the formative quiz.

<sup>1</sup>

Adapted from Donald C. Orlich and Carol Mandt, "Developing the Art of Questioning," unpublished module, Washington State University, Pullman, WA, 1973. (Mimeographed.)

## DESCRIPTION OF QUESTIONING PATTERNS

Questioning activities can be classified into three convenient categories or patterns: (1) convergent, (2) divergent, and (3) evaluative. This categorization is an adaptation of that proposed by James Gallagher and his associates.<sup>2</sup> If a teacher is to recognize the types of questions being asked of students, then it becomes necessary to have a method by which to tabulate or verify that one is utilizing specified questioning patterns. These categories appear to provide an efficient method for tabulating the trends of questions used in a classroom.

### Convergent Questions

As the term denotes, the emphasis of a convergent questioning pattern is to focus on a rather narrow objective through the use of questions which focus on a central theme. Convergent questions tend to elicit short responses from students. When a yes or no or very short answer is desired, then the teacher should ask a convergent question.

A teacher utilizing the convergent pattern is probably asking for responses at the knowledge and comprehension level of Bloom's taxonomy, but this does not mean that a convergent technique is "bad." There are many situations when a teacher wants students to demonstrate knowledge or comprehension of specifics. In such cases, lower level thinking questioning strategies would be most appropriate. What this means then, is that the appropriateness of any set of questioning strategies must be judged solely on the objectives intended.

The basic convergent pattern allows the teacher to ask for rather short length, low-level student responses. There is usually a single answer or a limited number of logical responses. A convergent questioning pattern, therefore, is not especially thought provoking, nor is it appropriate in stimulating classroom discussions. If a teacher desires to stress knowledge or comprehension

2

James Gallagher; Graham A. Nuthall; and Barak Rosenshine, Classroom Observation, (Chicago, IL: Rand McNally, 1970).

levels of thinking among the students, then the convergent pattern is the most appropriate to accomplish oral or written responses.

### Divergent Questions

A divergent questioning technique is the opposite of the convergent technique. The focus of divergently oriented questions is very broad. Rather than seeking a single focus, one seeks responses which lead to a set of foci or a spectrum of responses. Divergent questions also elicit longer student responses. Thus, if a teacher wants different alternatives or different types of responses from the class, then the teacher asks a question which would be divergent in nature.

Eliciting Multiple Responses. If a teacher desires to elicit a number of different responses, then a multiple response technique can be utilized. Basically such a technique would be as follows: the teacher desires that three or four students should respond to a particular divergent question. The teacher asks a question which can be answered with multiple responses, calls on three or four students, and then assumes a passive role in this mini-discussion.

Accepting Diversity. If a goal of the teacher is to allow or encourage novel solutions and creative responses, then the divergent method is appropriate. When asking divergent questions, the teacher must accept a variety of responses as well as some creative ones. This is the most important concept in the art of asking questions. To reinforce appropriate "response behavior," a teacher must provide a high degree of positive feedback or positive reinforcement to each student when appropriate responses are elicited. This in its simplest form means that a teacher may not use "put down" tactics regardless of how outlandish or how inappropriate the student's answer may seem.

### Evaluative Questions

The third basic pattern of questioning is one which utilizes divergent

questions but with one added component--evaluation. The basic difference between a divergent question and an evaluative question is that the latter has a built-in evaluation or judgmental set of criteria. When one asks why something is good or bad, they are requesting an evaluation. However, to prevent nothing more than a poor collection of uninformed student opinions, the teacher should encourage the specificity of the criteria used for evaluation.

A major component in the evaluative question framework is that the teacher helps students in developing a logical framework by which to establish evaluative criteria. The typical teacher comment that, "You're not being logical" gives the student no basis for improvement whatsoever. The teacher must provide a specific set of criteria or specific items as a model for students to develop their own specific sets of criteria.

As evaluative questions are presented and student responses elicited, there will be a tendency for the teacher and the students to desire a classification of the evaluative responses. This classification might be a continuum which will range from "bad" or "logical" responses to "good" or "logically developed" responses.

**FORMATIVE CHECK**  
**Learning Activity 5.1-b**

A series of questions are listed below to aid in diagnosing your analytic skills concerning basic types of questions. Place a "C" in the space provided if the item is "Convergent"; a "D" if it is "Divergent"; and an "E" if it is "Evaluative." Complete all items, then check your responses with the solutions on the next page.

- \_\_\_ 1. What would happen in an office if its filing system were not effective?
- \_\_\_ 2. What are three basic methods for artificial respiration?
- \_\_\_ 3. How might agricultural practices in the USA be changed if the country's population tripled?
- \_\_\_ 4. Why would one select arc welding over gas welding in the fabrication of art objects?
- \_\_\_ 5. How does a child's environment affect its early development?
- \_\_\_ 6. How many milliliters are found in one-half liter?
- \_\_\_ 7. What are some ways that a consumer of food can influence consumer choices available at the market place?
- \_\_\_ 8. Explain the need for human relations training by persons in distribution and marketing?
- \_\_\_ 9. How do radial tires compare to standard tires in terms of performance, price?
- \_\_\_ 10. What is the definition of public relations?

**Key - Formative Check for Learning Activity 5.1-b**

1. D
2. C
3. D
4. E
5. D
6. C
7. D
8. D
9. E
10. D

### Instructional Objective 5.2

Given a video tape in which the same lesson is demonstrated via two different questioning sequences (one episode showing convergent questioning patterns, the other divergent patterns), the learner will tabulate the teacher and student behaviors and draw generalizations based on the results.

#### Learning Activity 5.2-a: Analyzing Questioning Behavior

Video taped episodes will be presented of the same teacher.<sup>3</sup> To quantify specific teacher behaviors, a series of "check-list" types of behaviors are identified below. Tabulate only one specific teacher behavior or technique since it will be possible to tabulate simultaneously all of those listed.

#### CHECKLIST

1. Tabulate the interpersonal sequence that is observable between the teacher and the student. For example, one sequence is teacher - student (T-S) which means that the teacher called on only one student to respond to a question. No other student was involved. A second example would be teacher - student - student (T-S-S) which indicates that the teacher asked the question and two students responded without any interruption by the teacher.

<u>Sequence</u>	<u>Tally</u>	<u>Totals</u>	<u>Percent of Total</u>
T-S			
T-S-S			

---

3

Video tapes of any level of convergent and divergent questioning techniques can be used for this activity. If such tapes are not readily available, they can easily be produced, using the outline of this activity as format.

2. Classify each question that is asked by the teacher according to the following categories:

<u>Category</u>	<u>Tally</u>
Memorization of fact	
Application of Principle	
Analysis of Event	
Evaluation of Judgment	

3. Tabulate the number of times that the teacher repeats a student response.

Tally

4. Tabulate the number of times that the teacher asks a question, then proceeds to answer his/her own question.

Tally

5. Tabulate the number of times that the teacher uses a negative form of feedback to the child. Negative feedback would include such terms as "no," "that is not right," or any other negative associated terminology, If possible, write the precise wording that the teacher uses.

Tally Episode 1

Tally Episode 2

6. Tabulate the number of times that the teacher uses positive feedback. For example, "yes," "that is correct," "good," "all right," "o.k." Where possible write the exact positive feedback word or phrase that was used by the teacher.

Tally Episode 1

Tally Episode 2

7. Tabulate the time duration of both episodes to the nearest minute.

Episode #1 = \_\_\_\_\_ minutes

Episode #2 = \_\_\_\_\_ minutes

8. Tabulate the total number of questions that were asked by the teacher in both episodes. Do not make any value judgments, merely make a tally mark each time that the teacher asks a question.

Episode 1 Tally

Episode 2 Tally

9. Tabulate the number of students who respond to each question. When the teacher asks a question, list the exact number of students who respond to it. Tabulate each question separately. If no one responds to a question, tabulate zero.

Question Number

Number of Responding Students

1.	_____
2.	_____
3.	_____
4.	_____
5.	_____
6.	_____
Etc.	_____

10. Tabulate the number of nonverbal cues--raising of hands, facial expressions, and the like.

Nonverbal Cues

Hand Raising	
Happy Facial	
Sad Facial	
Chair Rocking	
Other	144

11. Clock the number of seconds that

each pupil uses to respond to the

teacher. For responses under one

second, record one second.

1 2 3 4

5 6 7 8

9 10 11 12

13 14 15 16

1 2 3 4

5 6 7 8

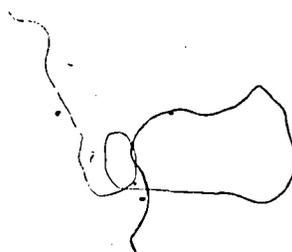
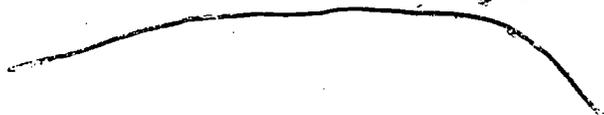
9 10 11 12

13 14 15 16

Formulating Generalizations:

Now that you have collected data concerning the teacher behaviors of \_\_\_\_\_ (name) \_\_\_\_\_ during two different questioning lessons (convergent and divergent/evaluative), make inferences concerning the types of student cognitive responses that are elicited by the questions asked.

What learning priorities were demonstrated during each of these questioning episodes?



Instructional Objective 5.3

The learner will demonstrate comprehension of questioning techniques (framing, handling incorrect responses, encouraging non-volunteers) by correctly answering formative quiz items.

Learning Activity 5.3-a: Questioning Techniques

An understanding of questioning types and levels (see preceding activities) is but a small part of the art of questioning. If teachers are to develop a repertoire of questioning skills, then it becomes necessary to be aware of several questioning techniques that may be used to shape responses from students. The following "questioning skills" address themselves to specific kinds of problems that can be predicted whenever a questioning session is being conducted. Each specific skill will be discussed below so that the learner may identify (and later practice) that particular skill.

## QUESTIONING SKILLS

Framing the Question

Ask the question; pause, call on a student. This method is grounded in the psychological principle that when a question is asked, all students will "attend" to the teacher communication. Any student in the class might be selected by the teacher to respond. Thus, the attention level of the class remains high. If the teacher calls on a student and then asks the question, all those students who are not involved have an opportunity "not to attend" to the communication between teacher and student. One can quickly verify the latter

by tabulating the number of questions that are typically repeated by teachers who call on students then ask questions. Thus, (1) ask the question, (2) pause, (3) call on the students.

#### FORMATIVE CHECK

##### Framing Questions

Place a check (✓) or X in front of each question that has been properly framed by the teacher. If you do not (✓) or X a question, briefly explain why. After completing the formative check, compare your responses to those on the key following.

- \_\_\_ 1. (T) "What does the term "logo" mean in advertising?" (pause) "Christine?"
- \_\_\_ 2. (T) "Charlie," (pause) name the parts of the digestive system."
- \_\_\_ 3. (T) "Nancy, I see you horsing around. Please go to the board and write out problem six."
- \_\_\_ 4. (T) "How do legumes add nitrogen to the soil?" (pause) "Albert?"
- \_\_\_ 5. (T) "Who knows the function of white space?" (pause)
- \_\_\_ 6. (T) "Why would this fabric have to be drycleaned?" (pause) "Mosha?"
- \_\_\_ 7. (T) "What is the difference between a debit and credit?" (pause) "Alfonso?"
- \_\_\_ 8. (T) "What is the importance of studying interpersonal relationships in nursing?" (pause) "Ralph, Peggy, Maria?"

## Key - Formative Check for Framing Questions

- X   1.
- 2. Wrong technique; ask question then call on student.
3. Averse use of learning situation; poor technique.
- X   4.
5. Poor technique; ask a specific student to respond.
- X   6.
- X   7.
8. O.K. This is how you'd get more than one student to respond. (This will be discussed later in the category.)

If you missed two or more reread the section, Framing the Question;  
otherwise continue on to the next section.

### Handling Incorrect or Incomplete Responses.

No matter how skillful a teacher is at motivating students, providing adequate and relevant instructional materials, and asking high quality questions, there will be one problem that affects the questioning session-- incorrect student responses.

Probing (asking the student to amplify or clarify the response) and prompting (providing a hint or some additional information to use in making the response) techniques may be used by a teacher when the answer seems partially correct or are stated incompletely. Basically prompting and probing are rather easy techniques because a teacher can reinforce the positive aspect of the student's response, while ignoring the negative or incomplete component.

However, when a student verbalizes a totally incorrect response, a more complex situation arises. First, a teacher has little to reinforce positively. This means such negative reinforcers such as "no," "you are way off," "that is incorrect," all act as negative reinforcers and, depending on the personality of the child who responds, might tend to reduce that student's desire to respond in a verbal classroom situation. Next, if a teacher responds very aversely to an incorrect student response, there is a high probability that the "ripple effect" will appear. This effect demonstrates that students who are not themselves the target of the teacher's aversae strategy, are in fact affected by what the teacher does to other class members. There is, of course, a difference between a positive or supporting strategy as compared to a negative or threatening strategy. This means that when an incorrect response is provided by the student the teacher might attempt to move to a neutral probing or prompting technique rather than responding

with the usual "no, that is not at all correct."

What, then, can a teacher do? Since the entire approach in this module is to stress the positive, the first decision a teacher might make is to analyze the student's verbal responses to determine if any portion of the response can be classified as being valid, appropriate or correct. Following this "split-second" decision making, the teacher must then provide positive reinforcement or praise for that portion which is interpreted as being valid, appropriate, or correct. For example, if the teacher asks a general mathematics question and the student responds with a number for the answer--which is totally incorrect; then the teacher might state "your response is in the magnitude of the answer," or "could you tell us how you arrived at your answer?" or "could you rethink your solution and take another try at it?" Note that none of these responses are totally negative, but can be considered as "neutral," that is, they are not very positive either.

If there is one crucial teacher behavior in handling incorrect student responses it is to avoid being averse or punishing. If you use a punishing type of response as a teacher then you are in fact using a "put down" strategy. The use of such a strategy tends to produce negative reinforcement and ultimately provides a residual effect which cause students to ignore opportunities to respond verbally.

How can a teacher provide either positive or neutral stimuli and yet elicit an appropriate response from the student? One strategy is to rephrase the question in a different manner so that the burden is at least shifted away from the student. As was mentioned previously, if any portion of the response is correct or appropriate, then the teacher can begin a spontaneous prompting session with that student. The teacher carefully

leads the student with a set of convergent or divergent questions, depending on which would be more appropriate.

Accompanying this strategy is a point which must be kept well in mind: the teacher must be careful so that "non-verbal cues" do not show that the teacher is upset or angry at the incorrect response. Thus, a teacher must maintain congruency of both verbal and non-verbal behavior when handling incorrect responses. For example, a teacher would not frown at a student who states an incorrect response.

Another strategy for helping a student over an incorrect response is for the teacher to diagnose immediately the type of question and ask a similar question to the student but of less difficult magnitude--without making other verbal comments to the student. This is similar to performing a task analysis on a concept wherein simpler concepts must precede the more difficult ones. The latter strategy will be most important where concept learning is being stressed, e.g., social studies, science, grammar, and humanities.

What we are recommending is that the teacher react like a computer programmed for the branching technique. This system always allows the student to get another set of opportunities to show that he/she does "know" something.

**FORMATIVE CHECK****Incorrect Responses**

Below are four multiple response items. On another sheet of paper, indicate the best or most appropriate response. When you complete all four items, turn the page to check your responses.

1. A student in your class cries when informed that she is wrong. Which of the following procedures would you use to help her overcome this problem.
  - A. Never call on her in the future.
  - B. Admonish her for crying
  - C. Ignore the crying and proceed
  - D. None of these is appropriate
  
2. One of your "better" students has given an incorrect response in class, which of the following techniques should be used?
  - A. Tell the student she is right but correct her privately after class.
  - B. Reply with a neutral statement such as. "Would you think that through again?"
  - C. Wait for other students to correct the student.
  - D. Ignore the response and proceed.
  
3. Most teachers "feel" that it's part of their job to tell a student he is wrong because:
  - A. It appears to be easier to maintain classroom control in this manner.
  - B. Teachers are sadistic.
  - C. Punishment is one form of negative behavior that is absolutely necessary to good learning.
  - D. Everyone should experience punishment.
  
4. A student who has not previously responded, does so today but his answer is incorrect. Choose one of the following techniques that you would use to encourage the student to participate again.
  - A. Be honest and tell him he is wrong, but do it in a kind way.
  - B. To build his self concept, tell him he is right and proceed with the class.
  - C. Give no value judgment but proceed with cues to help him form a better answer.
  - D. Say nothing to him, but ask another student for the right answer.

Key - Formative Check for Handling Incorrect Responses

D 1.

B 2.

A 3.

C 4.

If you missed any of the above, reread the section entitled "Handling Incorrect Responses."

If you responded appropriately to all four items, continue your journey.

### Encouraging Non-Volunteers

In most situations, a teacher will not have much of a problem encouraging students to respond to questions. To be sure, if teachers carefully note the students who respond, they will probably find that a few students dominate the verbal questioning sessions. Further observation of any class tends to illustrate that there are several students who do not volunteer their responses. If a teacher goal is to encourage verbal responses, then the teacher must take the appropriate initiative to encourage non-volunteers to respond. Such encouragement is most difficult at the beginning of a new term when teachers are relatively new to students. As a teacher becomes more knowledgeable of student interests, it is easier to prompt a non-volunteer since the teacher can utilize a question that will be in the student's realm of interest. What, then, are some helpful strategies to motivate non-volunteers to respond verbally during a questioning session?

The first technique is to maintain a high positive approach toward the student. The emphasis must be to allow the non-volunteer student to respond appropriately or correctly each time that he or she is called on. This means that the teacher must seek or frame questions which are appropriate to successful answering by the non-volunteer. Once the non-volunteer has responded appropriately, there should be generous positive feedback to encourage the student to continue such behavior. Further, the teacher might devise a systematic plan to develop those questions which require short responses, leading to those questions which require longer responses. In short, the teacher progresses from a convergent frame of reference to a more divergent one. Or, an opposite approach will insure at least some response from non-volunteers, thus allowing for positive reinforcement. An initial beginning point might even be to use rather easy evaluative questions, since most students respond to questions which concern judgment, standards, or

opinion. Whatever the cause for non-volunteering, the teacher must constantly strive to diagnose which verbal deficiencies and assets are apparent. This is not to suggest that a teacher should play the role of the junior psychiatrist, but rather the teacher should simply determine if there is an apparent pattern of verbal deficiencies for specific students.

Another method that can be used to increase non-volunteer participation is to make a game out of questioning from time to time. One way is to place students' names on cards so that the teacher might draw a card at random, thus creating a condition where every student could potentially be called on to respond. Further, if in situations where a great number of hands are raised each time the teacher asks a question, then the teacher can politely ask those students who are raising their hands to "hold all hands for the next three minutes" so that other students may have an opportunity to respond. In this fashion the teacher tends to shape behavior of those students who are adequately reinforced through verbal participation.

Implicit in this section is that the teacher observe and rather systematically note who is volunteering to respond, and to which concepts and in what kinds of situations. If time permits, it would even be desirable to make a daily listing of such verbal activities. A teacher could appoint one member of the class to keep tally each day. At the end of a week a rather definite set of patterns would emerge for each student.

Calling on non-volunteers for aversive or punishment tactics should never be done. Schooling ought to be positive with affective consequences of "approach tendencies" being emulated.

As a general rule, the most influential means by which a teacher may encourage a non-volunteer to participate is for the teacher to be sincere and genuine

in treating each student as a human being. Non-volunteers may have learned (probably painfully) that it doesn't pay to say anything in the class because the teacher will "put you down" anyhow. No one likes to put his hand in a hot fire. No student is going to volunteer for a question if she/he is going to be met with sarcasm, witty innuendoes, snide remarks, or good old fashioned hostility.

#### FORMATIVE CHECK

##### Encouraging Non-Volunteers

Below are two items. Please indicate the most appropriate response. When both are complete, refer to page 155 to check your answers.

1. There is a tendency for teachers to call on students who volunteer in class. Which of the following statements best explains this habit?
  - A. Volunteers usually give controversial answers.
  - B. Non-volunteers are the students with less intelligence.
  - C. The volunteer is easier to identify.
  - D. Volunteers usually give the response that is most desired by the teacher.
  
2. A student who is a non-volunteer is asked to provide a solution to a problem which is being discussed by the class. The student's answer is appropriate but of minimal quality. The teacher should:
  - A. Ignore the student since he/she is obviously incapable of contributing to the class.
  - B. Encourage or praise the student for the response.
  - C. Tell the student, "I guess that is about all we can expect from you, anyhow!"
  - D. A combination of items A and C would do it.

**Key - Encouraging Non-Volunteers**

The most appropriate responses are:

D 1.

B 2.

Instructional Objective 5.4

The learner will demonstrate the use of questioning techniques, with a microteaching lesson, critique his/her own micro-lesson, and obtain three peer evaluations.

Learning Activity 5.4-a: Microteaching

Microteach a lesson in which you demonstrate your competency with questioning as a strategy of instruction. As soon as possible, review your video taped lesson. Analyze your effectiveness in utilizing questioning strategies by writing a self-critique. Turn the critique in to your instructor to obtain additional feedback. (Instructions and evaluation forms for Microteaching can be found in Appendix A). Ask a colleague to critique your micro-lesson using the following guidelines:

- A. What type of teaching strategy (or strategies) is/are being used?
- B. What role is the teacher playing in the learning process?
- C. Are the bulk of student responses convergent, divergent, or evaluative? How could you determine this?
- D. What are the apparent instructional objectives?
- E. How is the teacher evaluating the students' participation?

## ANNOTATED LIST OF REFERENCES FOR FURTHER STUDY

Carin, Arthur A., and Sund, Robert B. Developing Questioning Techniques: A Self-Concept Approach. Columbus, OH: Charles E. Merrill Publishing Co., 1971.

This book presents practical suggestions for teachers in selecting, using, and evaluating appropriate questioning techniques. The stress throughout is on writing and using questions not only for assisting student cognitive achievement, but also as an aid in the building of student self-esteem and creativity.

Far West Laboratory. Minicourse 1: Effective Questioning--Elementary Level. New York: Macmillan Educational Services,

A five-week course to improve skills in framing questions, increasing pupil participation, and use of probing techniques.

. Minicourse 9: Higher Cognitive Questioning--Intermediate and Advanced. New York: Macmillan Educational Services,

A four-week course to aid teachers in presenting analysis, synthesis, and evaluation questions.

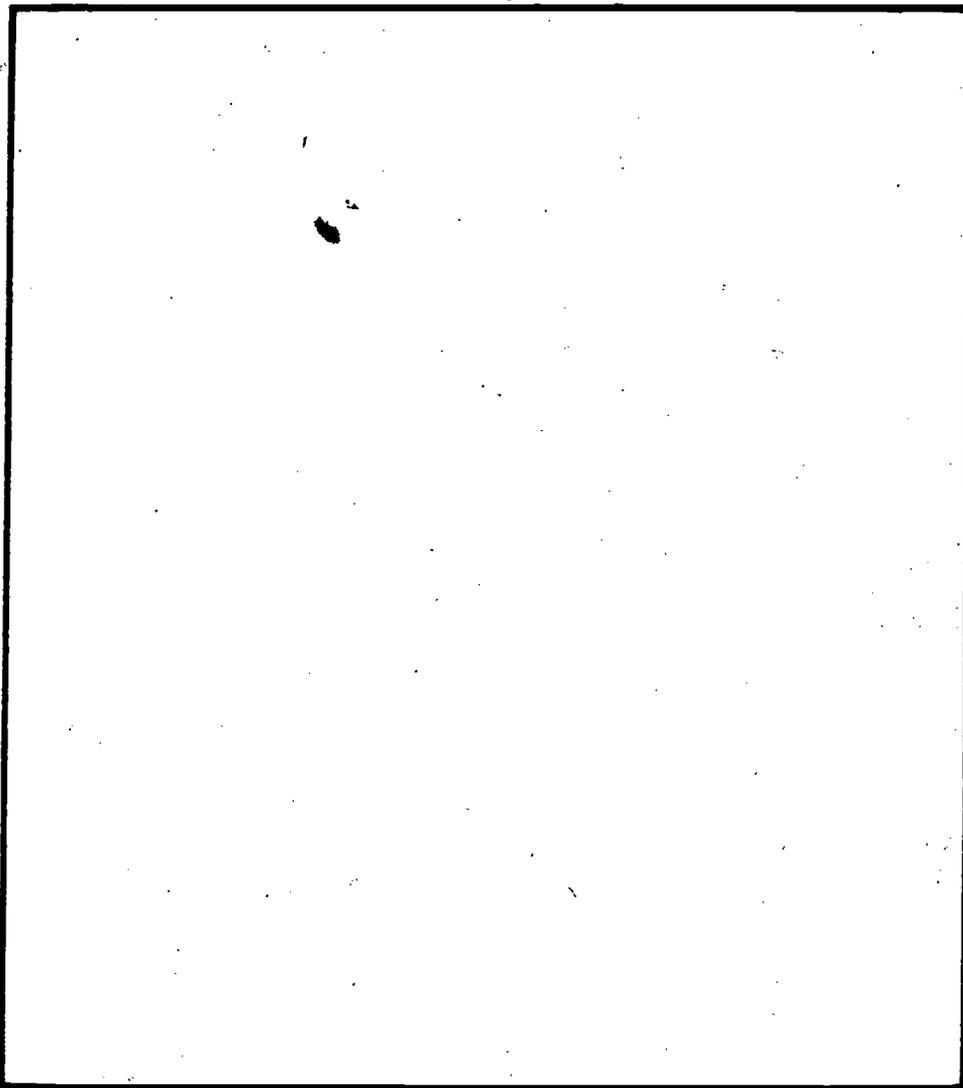
Hunkins, Francis P. Questioning Strategies and Techniques. Boston, MA: Allyn and Bacon, 1972.

Devoted to helping teachers ask questions--a central behavior of the discovery strategy--this paperback includes the major thinking of authorities such as Bloom, Suchman, and Taba. In addition, it offers the reader examples of types of questions at different levels of questioning and suggests various methods for evaluating the effectiveness of teacher-student question-asking behaviors.

Sanders, Norris M. Classroom Questions: What Kinds? New York: Harper and Row, 1966.

A little book that classifies questions along the lines of Bloom's taxonomies of thinking. The numerous examples and self-check "questions on questions" might be particularly useful to beginning teachers who are interested in expanding their question-asking repertoire.

# INQUIRY



## CATEGORY: INQUIRY

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**PERFORMANCE OBJECTIVE 6** ● ● ● ● ●

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Describe the inquiry strategy, prepare an inquiry "stimulus device," and demonstrate the use of inquiry as a teaching strategy.

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Instructional Objective 6.1

Given an example of a stimulus device for an inquiry lesson, the learner will draw conclusions about the unique features of the inquiry strategy.

Instructional Objective 6.2

The learner will define inquiry as a teaching strategy, describe both teacher and learner behaviors, and describe the features of an inquiry stimulus device.

Instructional Objective 6.3

The learner will develop an inquiry device which is adaptable to a group teaching mode, and which is personally conceived and created. The learner will test the effectiveness of the inquiry device by using it as the basis of a microteaching lesson.

Instructional Objective 6.4

The learner will develop a list of topics in vocational education which are appropriate for the inquiry method and list advantages and disadvantages.

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**PERFORMANCE OBJECTIVE 6**

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Describe the inquiry strategy, prepare an inquiry "stimulus device," and demonstrate the use of inquiry as a teaching strategy.

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Instructional Objective 6.1

Given an example of a stimulus device for an inquiry lesson, the learner will draw conclusions about the unique features of the inquiry strategy.

Learning Activity 6.1-a

Read the inquiry device by Judy Boling entitled, "An Inductive Approach to Heat Conductivity in Household Equipment." From this description of an inquiry lesson, draw your own conclusions about features that make inquiry unique from other teaching strategies. Share your conclusions with other learners doing the same activity.

AN INDUCTIVE APPROACH TO TEACHING  
HEAT CONDUCTIVITY IN HOUSEHOLD EQUIPMENT

by Judy Boling<sup>1</sup>

Learning and teaching should cause excitement and interest as well as fulfill specified objectives. The inductive approach to teaching permits both student and teacher to be creative and learn at the same time. The inductive method draws teaching away from the more stilted teacher-tell, student-believe-repeat-do sequence, to one of student-do-discover-learn, teacher-assist-guide technique. Both student and teacher work cooperatively

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<sup>1</sup>

Judy Boling created and field tested this exercise while she was a student at Washington State University, 1975.

and closely in the learning process when inquiry proceeds through an inductively oriented lesson.

The concept of heat conductivity in equipment is a rather difficult one for high school students to comprehend, especially if it is "told" to them. Teaching the concept of heat conductivity is easier with the use of the inductive method and an inductive device, pan "fingerprints." By using the inductive method of instruction, the student has a chance to discover the thermal and conductivity properties, advantages and disadvantages of different pieces of household equipment instead of being told specifically which is best and then doing an experiment to prove what the teacher has said is "true." Inductive instruction allows students to observe, collect information, and then draw conclusions of their own. Students are more likely to remember these generalizations if they discover the answers themselves.

Heat conductivity can be taught by the inductive method with the use of various types of pans and their conductivity "fingerprints." Pan "fingerprints" are produced by the student in the first phase of the lab experiment and then used in the second phase to infer generalizations concerning the heat conductivity of the pans. Below is a brief outline of how the inductive lesson is accomplished.

#### Objectives

The purpose of the equipment lab experiment is to allow the student to be actively involved in the making of the inductive device (pan conductivity "fingerprints") that will be used to arrive inductively at the following generalizations.

1. Different types of pans conduct heat at different rates.
2. Some materials conduct and distribute heat better than others.
3. Pans will need varying amounts of heat and heat control depending on their conductivity to accomplish similar "prints."

Procedures

The lab experiment on heat conductivity and pans can be used for either a high school or college home economics class. A lesson on heat conductivity can be used as an introduction to electrical conductivity if the teacher desires.

## Part I:

## Equipment (per range)

a. Two or more pans of various materials of approximately the same diameter.

(1) aluminum (light and heavy weight)

(2) pyroceram

(3) stainless steel

(4) cast iron

(5) porcelain

(6) glass

b. Vegetable oil (approximately 2 Tablespoons per pan)

c. Paper towels

d. Pastry brush

e. Scissors

f. Tongs

g. Wax paper

h. Dish cloth and towel

## Procedure for pan "fingerprints"

a. Preheat burner to medium-high heat

b. Cut paper towel to fit bottom of pan

c. Coat pan lightly with oil (approximately 2 Tablespoons)

d. Place a paper towel in pan, patting until all of towel is saturated and no air bubbles remain

- e. Place a pan on preheated burner
- f. Record time from moment pan is placed on burner until most of the towel turns a medium cocoa-brown. (Teacher provides a model for comparison.)
- g. Remove paper towel immediately and place on wax paper
- h. Label "fingerprint" with pan type and time
- i. Wash pans in hot soapy water

NOTE: On each successive trial, leave pan on burner until the paper towel is the same degree of brown.

#### Part II:

Class Report. Before making the pan "fingerprints" the class can discuss the pans to be used and list hypotheses as to how they think the pans will rank in conductivity.

Upon completion of their pan "fingerprints" the students should discuss and analyze their findings, construct a table or graph showing the pan conductivity results, and alter and/or evaluate their previously made hypotheses.

#### Summary

The teacher could make the "fingerprints" and use them in an inductive lesson, but the students will experience much more from the lesson if they actually prepare and collect the data that will be used to draw generalizations. Further, the students will undoubtedly identify other variables that affect the pan "fingerprint" such as time on element, size of pan, thickness of material, and others. The exercise will provide a sense of excitement to an experiment that can induce the scientific method of problem solving to what is often a dull discussion.

#### Instructional Objective 6.2

The learner will define inquiry as a teaching strategy, describe both

teacher and learner behaviors, and describe the features of an inquiry stimulus device.

Learning Activity 6.2-a

Read the following description of the inquiry approach and complete the knowledge check at the end of the activity.

THE INQUIRY APPROACH

There is little doubt that questioning plays a critical role in the teaching act. However, the typical questioning process is generally conducted by the teacher, usually for the purpose of finding out which students have studied and which have not. On some occasions questions are asked to help students gain knowledge from their peers, from their texts, or from the teacher. Only rarely do students ask questions, and then only to obtain a factual answer—typically from the teacher.

Recently, a different type of questioning technique has become a part of many teachers' repertoire of instructional strategies: questioning by the students, not to acquire a single factual answer, but investigative questioning to solve important physical, behavioral, philosophical, and historical problems in the world around them. This investigative process, inquiry, not only involves the student in questioning, but helps the student begin the basic processes used in gathering information, making generalizations, forming hypotheses, and testing these hypotheses. Through the use of inquiry as an instructional strategy, students learn how to learn. They actively participate in the teaching-learning transaction.

Although inquiry as a specific approach to instruction is relatively new in American classrooms, it is certainly not a new instructional technique.

Both Aristotle and Plato, while using different approaches, made use of inquiry in their teachings, skillfully blending questioning with the act of query. John Dewey, earlier in this century, also encouraged the development of the natural tendencies of the child to inquire. Dewey suggested that school experiences should help students to learn how to effectively inquire, instead of simply helping them to acquire information.

### Helping Students to Inquire<sup>2</sup>

The inquiry approach does not stress the accumulation of authoritative information and facts. Rather, it is a strategy that emphasizes discovery and problem solving. As such, it is a process, a plan of action that enables the pupil to discover relationships and cause-effect variables. The student is encouraged to utilize the methods of the scientific approach: to observe events, formulate hypotheses, test them through verbal or active experimentation, analyze and interpret the results, and formulate generalizations.

The purpose of the inquiry approach is to involve the student in the processes which are used by researchers in discovering new knowledge. The student actually becomes the scientist, the historian, the economist, the business person or artist and asks the questions that researchers might ask. The inquiry view suggests that students learn most effectively when acting as researchers--actively seeking information, listening to relevant ideas offered by the teacher and other students, managing their own learning, and being aware of these processes. The student participates as both actor and observer.

### The Performance of the Inquiry Teacher

Massialas and Zevin<sup>3</sup> identified eight teaching procedures that they believed

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Adapted in part from W. K. Cross, A Minicourse in Inquiry, A module utilized at Washington State University, Pullman, WA, 1972-1974.

3

Byron G. Massialas, and Jack Zevin, Creative Encounters in the Classroom: Teaching and Learning through Discovery, (New York: Wiley, 1967), p. 25.

are associated with effective utilization of inquiry as a mode of instruction.

They noted that the inquiry teacher often:

1. plans very carefully the topics, ideas, and generalizations that the class may want to explore, and organizes and times the spacing and sequence of the materials,
2. introduces the initial material that will serve as a springboard for inquiry and discussion (the preparation that goes into the construction of this material can never be overestimated),
3. challenges and continuously prods the students to explore and test new alternatives,
4. publicly insists on the communication of beliefs, and asks for the defensibility of statements,
5. summarizes, recapitulates, and asks for clarification of points made by students,
6. during times of impasse, may raise additional questions which may help the class to see alternative ways of solving a problem,
7. legitimizes creative expression (in contradistinction to a traditional teacher who frowns upon ideas that are unorthodox, the inquiry-oriented teacher constantly encourages the students "to play their hunches" and to conjecture; the teacher considers this activity to be the core of the formal classroom instruction), and
8. performs several managerial tasks such as recognizing students and making class announcements.

Remember, the inquiry approach, whether it be inductive, discovery, or problem solving, is focused on students using their mental processes of investigation through questioning. The student should be the one seeking more information, proposing ways of getting that information, and testing the worth of that

information in solving a problem. The teacher should only participate as a facilitator, providing necessary additional information when properly asked, and, in some situations, act as a guide through some very complex ideas. Often when students have gained sufficient information to develop a hypothesis they think is conclusive, the teacher will want to provide some additional information that acts contrary to the student hypothesis.

#### FORMATIVE CHECK

##### Learning Activity 6.2-a

If you were using inquiry processes to teach a lesson in your discipline, what teacher behaviors and student behaviors would you expect to occur in the classroom?

TEACHER INQUIRY BEHAVIORS	STUDENT INQUIRY BEHAVIORS

Feedback: correct your list by referring to the descriptive program in Learning Activity 6.2-b

#### Learning Activity 6.2-b

To complete this activity, you will use the program that follows and the "Inclined Plane" stimulus device which is also included.

#### Use of the Program

1. Cover the right hand column with a separate sheet of paper as you read the program and answer the questions.

2. Write answers on a separate sheet of paper.
3. Check your responses as you proceed through the program by sliding the cover sheet down the right hand column.

## PROGRAM: Inquiry

Inquiry has been defined by John Dewey as:

. . . (the active, persistent, and careful consideration of any belief or supposed form of knowledge in the light of the grounds that support it and the further conclusions to which it tends.)<sup>4</sup>

- |   |                                   |
|---|-----------------------------------|
| 1. Dewey tells us that inquiry is an _____, persistent, and careful consideration.  | 1. _____<br>active                |
| 2. He intimates, then, that pupils are involved in an _____ manner rather than in a passive fashion.  | 2. _____<br>active                |
| 3. The consideration is not only active, it is also _____ and _____.  | 3. _____<br>persistent<br>careful |
| 4. Notions to be considered, according to Dewey's definition of inquiry are "any _____ or supposed form of knowledge."  | 4. _____<br>belief                |
| 5. By using the terms _____ or supposed form of _____ Dewey shows that inquiry works largely with the realm of ideas.   | 5. _____<br>belief<br>knowledge   |
| 6. When we use our stimulus device, such as the "Inclined Plane," we are going to actively, persistently, and carefully _____ any beliefs or supposed form of _____ dealing with the students' discovery of physics principles. | 6. _____<br>consider<br>knowledge |

4

John Dewey, How We Think, (Boston, MA: D. C. Heath and Co., 1910), p. 6.

7. We must remember, to be consistent with our definition; our approach must be \_\_\_\_\_ not passive.
8. In Dewey's definition, careful consideration of beliefs and supposed forms of knowledge is to be done in "the light of the grounds that \_\_\_\_\_ it and the further conclusions to which it tends."
9. In other words, pupils must show \_\_\_\_\_ for their beliefs and knowledge when they supply them as answers in \_\_\_\_\_ sessions.
10. Not only must the consideration be in light of the grounds that support the belief but the further \_\_\_\_\_ to which the belief tends must also be considered.
11. In this definition, then, we are required to look \_\_\_\_\_ than the belief or supposed form of knowledge to the conclusion to which that belief or knowledge may lead us.
12. According to Dewey inquiry is an \_\_\_\_\_ persistent and careful \_\_\_\_\_ of beliefs and knowledge that requires \_\_\_\_\_ and some further \_\_\_\_\_ as to where such beliefs and knowledge might lead.

- |           |               |
|-----------|---------------|
| 7. _____  | active        |
| 8. _____  | support       |
| 9. _____  | support       |
| _____     | inquiry       |
| 10. _____ | conclusions   |
| 11. _____ | further       |
| 12. _____ | active        |
| _____     | consideration |
| _____     | support       |
| _____     | conclusion    |

Massialas and Zevin have also given us a definition of inquiry consistent with Dewey's. It reads:

Inquiry generally aims at the grounding of belief through the use of reason, evidence, inference, and generalization.<sup>5</sup>

13. The common major term in our two definitions is \_\_\_\_\_.
14. The conclusions to which the inquiry considerations lead are referred to by Massialas and Zevin as \_\_\_\_\_ and \_\_\_\_\_.
15. What Massialas and Zevin call evidence, Dewey called \_\_\_\_\_.

In summing up their discussion on inquiry Massialas and Zevin make the following statement:

. . .in inquiry intellectual activity is always purposeful, moves from problem to solution, and entails a series of related but operationally distinguishable cognitive tasks.<sup>6</sup>

16. In this statement the authors again stress that pupils are to be involved in an \_\_\_\_\_ manner.

- |           |                |
|-----------|----------------|
| 13. _____ | belief         |
| 14. _____ | inference      |
| 15. _____ | generalization |
| 16. _____ | support        |
| 16. _____ | active         |

<sup>5</sup>

Byron Massialas and Jack Zevin. Creative Encounters in the Classroom: Teaching and Learning Through Discovery, (New York: Wiley, 1967), p. 1.

<sup>6</sup>

Ibid

17. The word "purposeful" is inserted in place of \_\_\_\_\_ and again leads us to the notion that inquiry pursues knowledge in an active manner.

18. You should now be able to write your definition of inquiry on a separate answer sheet. On completion see if your definition contains synonyms for the five major notions listed in the usual answer column to the right.

17. \_\_\_\_\_

persistent

18. (i) active

(ii) persistent

or

purposeful

(iii) evidence or

support

(iv) conclusions

or

generalizations

(v) belief or

knowledge

If your definition contained all five major notions and seems, in the main, parallel in meaning to the supplied definitions,

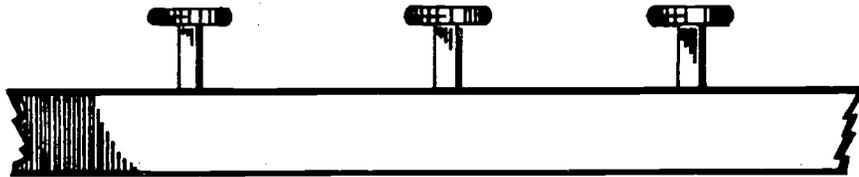
and

if in the program to this point you had no more than three incorrect answers at first trial, you may proceed.

If you do not meet these criteria, do the program over to this point. If you still do not meet the criteria, see your instructor.

## THE INCLINED PLANE

### A Stimulus Device



(This section provides an example of a stimulus device that will lead students to an inquiry session in the discovery of physics principles.)

Study the drawing of the board and nails for a moment before starting the program. The nails have different points: one sharp, one dull, one medium.

1. The board and nails, prepared as in the drawing, are presented to students to focus their attention on a problem--this presentation is called a "stimulus device." In inquiry lesson, students are to pursue a \_\_\_\_\_ actively.
2. In inquiry teaching, the board and nails would be called a \_\_\_\_\_ device.

1. \_\_\_\_\_

problem

2. \_\_\_\_\_

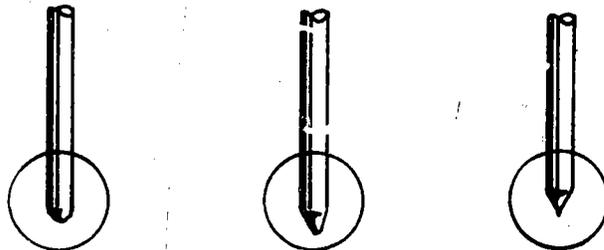
stimulus

3. Read the two page description, "An Introduction to the Inclined Plane," which follows. This description presents the development of the stimulus device, motivating questions, and possible solutions.

#### AN INTRODUCTION TO THE INCLINED PLANE

by Al Grasher<sup>7</sup>

This lesson can be used as an introduction to one of the six simple machines--the inclined plane. It can be used for any grade but it is best for junior high students since it is at this level that simple machines are introduced. The set-up is very simple and can be acquired from any school shop. You need a hammer, a 2 x 4 about 30 cm long (or something to pound 3 nails in), and 3 nails. The nails need some special preparation. The points of each nail should be ground so that you have different sharpness of points. This can be done by using a grinder from the school shop. One point should be very short. The burrs of the second nail should be ground off making the medium point and the third nail should be given a long sharp point, e.g.:




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7

Al Grasher created and field tested this lesson while he was a student at Washington State University, 1975.

These nails should be driven into the 2 x 4, such that they are of equal height. The hammer should be kept hidden. Present the 2 x 4, with the nails in it, to the class and explain that each nail is exactly the same except for their points. Draw examples of the points on the blackboard.

Questions that could be asked:

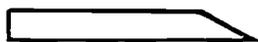
- How can you tell which nail goes with which point?
- Can you devise an experiment to determine which nail goes with which point?

Ideas such as pulling the nails out, burning the wood, pounding the nails all the way through, etc. should be thought of as valid means but physically impossible (invent excuses). The student should come up with a means such that each nail is not viewed. The best solution is to pound each nail with the same force and the nail with the sharper point (or smallest grade) will go in easier. Do this and show the sharpness of each nail.

After discovery of this principle, ask these questions:

- What hypothesis or general principle can you formulate?
- What common objects use this principle? (axes, knives, wedges, etc.)

Then explain how a nail is like an inclined plane. (Cross section of nail:



) and discuss the ease of rolling a heavy drum up a long grade onto a truck.

The general principle can be stated: The smaller the grade the easier it is to do work.

OPTIONAL: If you take a fourth 8-penny nail without the burrs ground off, it should go farther than the middle nail and possibly farther than the sharpest. This is because this nail cuts the wood making it go down easier than just separating the wood as the smooth pointed nails do. This nail could be like an unknown nail and the students will try to guess how the sharpness compares. After you pull it out and show the grade is about the same as the second nail, you can go

into a discussion of the structure of the use of the object. Theoretically an axe should be paper thin because it will make work easier. But you must take into consideration the use of the object. This is the same reason that you don't use a knife to chop down a tree, although it is very sharp!

4. The question presented to motivate the study of this \_\_\_\_\_ device might be: How can you tell which nail goes with which point?

5. Consistent with our definitions of inquiry, pupils are to pursue this problem \_\_\_\_\_ in order to arrive at certain \_\_\_\_\_.

J. Richard Suchman, in describing the initiation of an inquiry session, describes it in the following way:

An inquiry session normally begins with the presentation of an event which serves as a stimulus and focus of study. The event is one which is at variance with the student's expectation of what should happen. This discrepancy gives him a powerful motivation to inquire, to seek an explanation that will eliminate the discrepancy. The event also focuses his attention upon a limited portion of the world which he can more easily analyze.

6. Instead of stimulus device, Suchman utilizes the word \_\_\_\_\_, which he says serves as a focus for inquiry.

7. He says that this event should be one that is at \_\_\_\_\_ with the student's expectations.

stimulus

5. \_\_\_\_\_  
actively  
conclusions or  
inferences

6. \_\_\_\_\_  
event

7. \_\_\_\_\_  
variance

8. His reasoning for this \_\_\_\_\_ discrepancy is that it will provide the student with a powerful \_\_\_\_\_ to inquire.
9. In using the inclined plane and the question posed in frame 4, we are providing the \_\_\_\_\_ or stimulus Suchman says is needed to motivate inquiry.
10. The \_\_\_\_\_ in our stimulus and question is that the nails each have different points and the students are to decide how to determine how the points differ.
11. This type of discrepancy will \_\_\_\_\_ the pupils to seek an explanation for their choice.
12. We may say, therefore, that the board and nails are a \_\_\_\_\_ coupled with a question that is at \_\_\_\_\_ with the usual order of the pupil's classroom expectations. This discrepancy will \_\_\_\_\_ the pupils to inquire in order to find answers satisfactory to themselves.

8. \_\_\_\_\_  
variance  
motivation
9. \_\_\_\_\_  
event
10. \_\_\_\_\_  
discrepancy
11. \_\_\_\_\_  
motivate
12. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
stimulus  
variance  
motivate

The references at the end of this category list sources which provide more depth on the use of inquiry as a teaching strategy. This category cannot, and does not attempt to, cover the field. Rather, it provides an introduction to the strategy and hopefully stimulates further reading by the learner.

Instructional Objective 6.3

The learner will develop an inquiry device which is adaptable to a group teaching mode, and which is personally conceived and created.

The learner will test the effectiveness of the inquiry device by use as the basis of a microteaching lesson.

Learning Activity 6.3-a

Using the stimulus devices encountered earlier in this category (Heat Conductivity in Household Equipment, Learning Activity 6.1-a, and Inclined Plane, Learning Activity 6.2-b) as examples, create a usable inquiry device which meets the following criteria:

1. Usability and Applicability
  - grade level specified
  - subject matter specified
  - alternative uses of device specified
2. Design follows inquiry method
3. Apparent care in production
  - materials are complete, readable, and usable in their present form
  - materials are ready for use by other teachers
  - specific and clearly understandable directions are included for both teachers and students

## TIPS ON CHOOSING AN INQUIRY TOPIC

Although inquiry may be valuable, it is but one of many teaching methods.

A teacher must ultimately make the decision whether the material, topic, or

concept can best be learned through large group instruction, small group instruction, and/or discussion and independent study, or through inquiry sessions, or simulations. Edwin Fenton, noted social science educator who emphasizes inquiry, wrote that prior to determining methods, a teacher should ask the following questions:

1. What content and purposes could students of different levels of ability learn and accomplish for themselves with little or no help from me?
2. What content and purposes require motivation, explanation, demonstration, or other presentation by me or by some other competent person?
3. What content and purposes actually require personal interaction among students and between me and the students?<sup>9</sup>

As you respond to Fenton's questions, remember that the teacher's role as decision maker is contingent upon the teacher having a vast set of resources on which to draw--the first of which is the teacher's own cognitive knowledge of methods.

#### Learning Activity 6.3-b

This activity is designed to let you use the inquiry device created in Learning Activity 6.3-a and practice the inquiry method of instruction with a small group of peers. The lesson will be recorded on video tape for reviewing, refining, and analyzing very specific teaching processes. Microteaching aims to divide the complex act of teaching into simpler components so that the learning task will be more manageable for

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9

Edwin Fenton, Teaching the New Social Studies in Secondary Schools: An Inductive Approach, (New York: Holt, Rinehart, and Winston, 1966), p. 146.

the beginner. When you engage in a microteaching lesson you will focus on a specific aspect of teaching: in this case, "inquiry." (See Appendix A for microteaching instructions and evaluation forms.)

#### TIPS ON USING INQUIRY

The following are suggested tips for using inquiry:

1. Use a variety of inquiry experiences from different sources or projects; do not use just one mode of inquiry or type of inquiry format.
2. Make sure that as many students as possible become interested in the inquiry; don't pursue a problem if most students are not interested.
3. Don't foster dependency in students by giving too much help; try to develop the capacity for students to learn by and for themselves.
4. Accentuate, at least occasionally, the value component in inquiry; have students think about the desirability and feasibility of taking individual or group action.
5. Be positive about students' ideas; do not deny students the opportunity to see that a given hypothesis may have to be rejected.
6. Avoid highly artificial or trivial problems; try for real life problems. Try to give students as much responsibility for their inquiry as possible.
7. Tackle a whole problem instead of just a piece or segment of a problem. Recognize, however, that it may be necessary to sub-divide such problems, and sub-problems may appeal to different individuals.
8. Realize that many students have not been rewarded in the past for asking questions or for proposing ideas. Don't expect creative inquirers to develop in just three weeks. It takes a long time for many students to learn inquiry skills.

Microteaching Replay. The playback gives you an approximation of how you appear and sound to others. In the interest of the efficiency and effectiveness of the program, you should listen to or view the recording as soon as possible after the actual microteaching session, preferably immediately, but certainly no later than 24-48 hours after you microteach.

When you critique yourself utilize the "verbal analysis" to guide you in your analysis of the inquiry lesson.

In addition, ask three of your microteaching "peer students" to give you written feedback on your lesson.

#### Instructional Objective 6.4

The learner will develop a list of topics in vocational education which are appropriate for the inquiry method and list advantages and disadvantages of the method.

#### Learning Activity 6.4-a

After designing an inquiry device and testing it via a microteaching lesson, you should have more definite ideas of what is appropriate as a topic for the inquiry method (a we hope you didn't learn the hard way!). In a small group with other class members (or individually, if necessary), brainstorm a list of topics in vocational education that seem appropriate for the inquiry method. (The Discussion category of this module outlines the use of brainstorming--see page 76.)

If there is more than one group compare lists after the brainstorming activity.

## FEEDBACK

Compare the list of advantages and disadvantages with the following:

Advantages

1. The inquiry strategy is likely to help improve and/or increase the pupil's supply and control of cognitive skills and processes, provided he/she is involved consistently with guided inquiry. Greater strength in the process of inquiry comes from trying to discover; in effect, one learns how to learn.
2. Knowledge gained through this strategy is most uniquely personal and is probably the most powerful (in terms of depth of understanding, retention, and transfer, for example).
3. The inquiry strategy produces a sense of excitement in students. For example, they can get the sense of groping, exploring, succeeding, and occasionally failing that comes to all who inquire on their own (scientists, for instance).
4. The method allows a student to move along paths best suited to his/her own abilities.

Disadvantages

1. The inquiry strategy assumes a certain readiness of mind for this kind of learning. For example, slower students might be confused in attempting to do divergent thinking, deal with abstractions, find the inter-relatedness of concepts within a subject, or compose what they find in either written or oral form. More intellectually able students might monopolize the inquiries, creating frustration for others.
2. The method is not especially efficient for teaching large numbers of students. For example, a great deal of time could be spent helping just one student discover the theories of government upon which the Declaration of Independence is based, or discovering why certain words are spelled as they are.

3. The expectations in the strategy can be disruptive to students and teachers who are accustomed to more traditional planning and teaching.

## ANNOTATED LIST OF REFERENCES FOR FURTHER STUDY

Hudgins, Bryce B. The Instructional Process. Chicago: Rand McNally & Co., 1971.

An interesting discussion and comparison of discovery learning in contrast with what the author terms "reception learning." In addition to describing part of the development of discovery techniques, this paperback lists the basic educational goals for the discovery strategy.

Joyce, Bruce, and Weil, Marsha. Models of Teaching. Englewood Cliffs, NJ: Prentice-Hall, 1972.

Presents a concept attainment model developed from a study of "discovery type thinking" by Jerome S. Bruner and his associates. Its purpose is to teach students about the nature of concepts and the strategies people use to learn concepts. It also describes approaches developed by Suchman and Taba.

McClosky, Mildred. Teaching Strategies and Classroom Realities. Englewood Cliffs, NJ: Prentice-Hall, 1971.

Offers fairly detailed classroom examples of discovery approaches attempted by teachers in the disciplines of English, science, mathematics, and social studies.

Northwest Regional Educational Laboratory. Facilitating Inquiry in the Classroom. Portland, OR: Northwest Regional Educational Laboratory, 1973.

An instructional system based especially on the work of Dr. Richard Suchman. University of Illinois, these materials are designed to assist teachers develop and improve abilities in using 18 tactical moves that allow pupils to inquire. The system aids teachers in identifying what students do when they inquire and how they grow as inquirers. It also helps teachers diagnose and evaluate where individual students are on a continuum of inquirer growth. The system would be most appropriate for an inservice workshop of some 45 hours of instruction on facilitating the inquiry process.

Postman, Neil, and Weingartner, Charles. Teaching as a Subversive Activity. New York: Delacorte Press, 1969.

The authors see inquiry as a "survival strategy" needed by students. In an entertaining and thought-provoking style, they suggest teacher behaviors and attitudes to assist pupils in English and other disciplines in developing critical thinking abilities.

Raths, James; Pancella, John R.; and Van Ness, James S. Studying Teaching. Englewood Cliffs, NJ: Prentice-Hall, 1967.

In a section on "Teaching Method" this text offers three articles directly related to discovery: one by Bruner on the act of discovery, one on teaching social studies through discovery, and one dealing with the rationale and mystique of the method.

Ryan, Frank, and Ellis, Arthur K. Instructional Implications of Inquiry. Englewood Cliffs, NJ: Prentice-Hall, 1974.

Another addition to the rapidly growing number of inquiry-oriented texts and materials at all levels of instruction, this "methods" text defines inquiry in terms of specific operations applicable to classroom efforts of helping students, K-12, general knowledge. Over 65 descriptions of classroom ideas for utilizing the content in a variety of curricular areas (especially social studies) are provided; in addition, the text assists prospective teachers in becoming actively involved in inquiry operations and hence, in learning "inquiry" by becoming inquirers. The overall aim throughout the book is to establish an intimate and explicit tie between instructional theory and instructional practice.

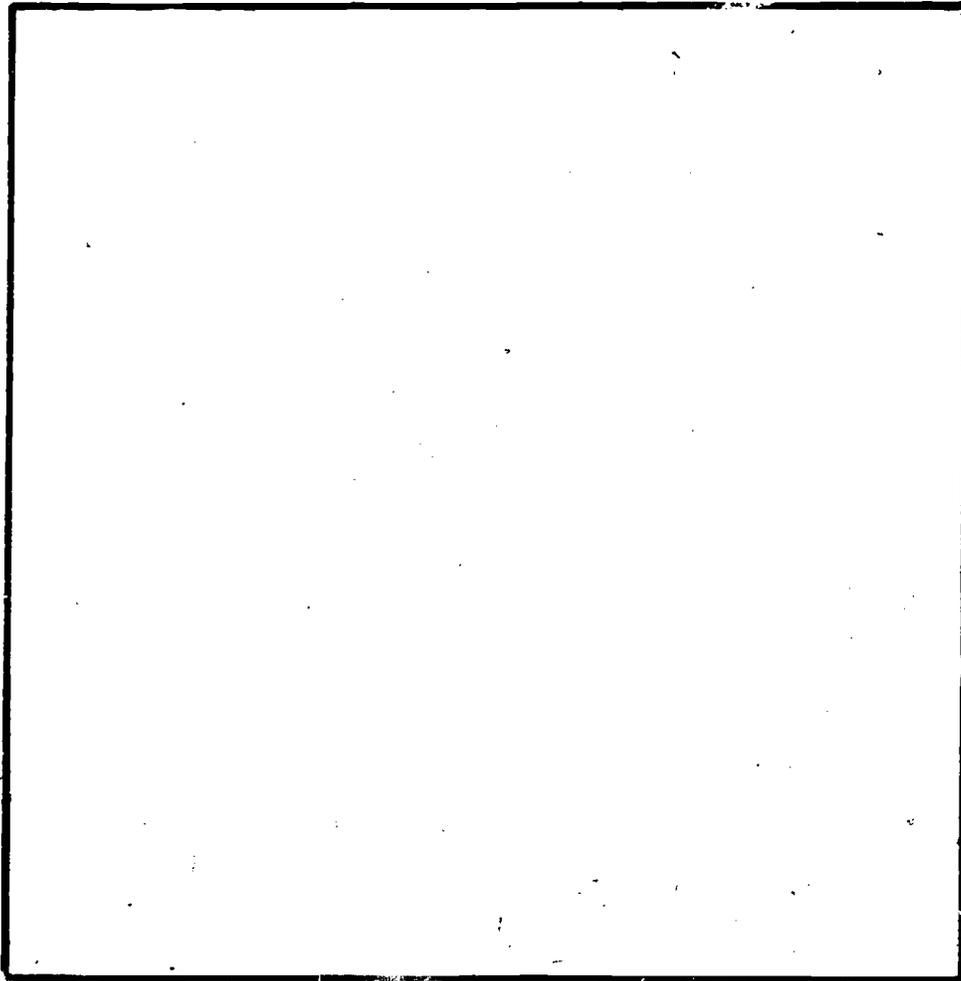
Strasser, Ben B., et al. Teaching Toward Inquiry. Washington, DC: National Education Association, 1971.

Presented in an unusual format, this book is written as a resource for teachers. It deals with "why inquiry," "what people do as they inquire," "facilitating inquiry in the classroom," and "objectives in inquiry." Informative and interesting, it enables teachers to use discovery teaching in their classrooms.

Time-Life, Inc. Finding Out. New York: Time-Life Films, 1967.

A film that shows the methods by which children can be made to discover things for themselves in a "scientific" way.

# SIMULATION / GAMES



## CATEGORY: SIMULATION/GAMES

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**PERFORMANCE OBJECTIVE 7** ● ● ● ● ● ● ● ●

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Describe and demonstrate simulation, games, and role playing as they apply to vocational education.

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Instructional Objective 7.1

The learner will distinguish between simulation, games, and role playing.

Instructional Objective 7.2

The learner will identify the necessary elements of a game as they apply to vocational education.

Instructional Objective 7.3

The learner will define the roles of the teacher and student in simulation and games.

Instructional Objective 7.4

The learner will discuss the values of simulation and gaming as they apply to vocational education.

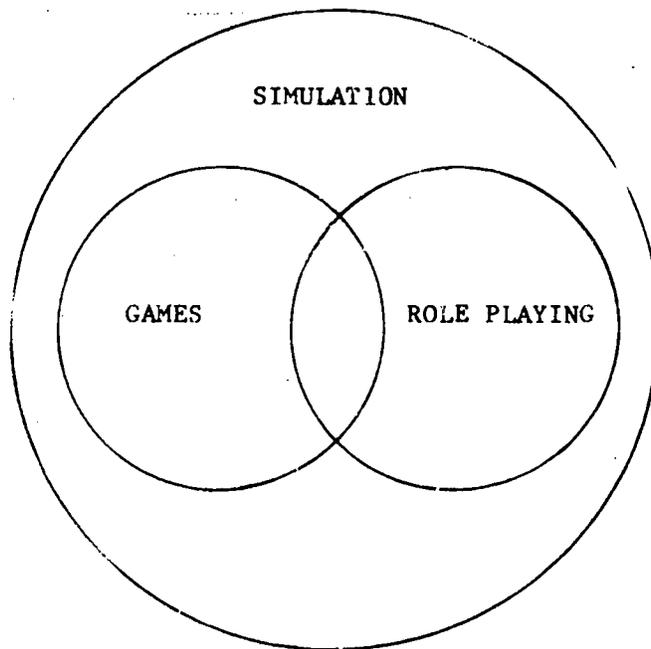
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Define and demonstrate simulation, games, and role playing as they apply to vocational education.

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### Introduction

This category is designed to provide information about simulation, games, and role playing and how to integrate them into vocational education. Simulations are an attempt to model a portion of reality in an artificial situation. Educational games are a portion of reality restricted by rules, where the individual who gains the most information becomes the winner. Role playing is a simulated situation where each individual is given a particular role to assume. The following diagram shows that role playing and games are different, but they may in some cases overlap. It shows that role playing and games both fall under the broader classification of simulations.



## Instructional Objective 7.1

The learner will be able to distinguish between simulation, games and role playing.

### Learning Activity 7.1-a

1. Read the discussion which follows on "Differences Between Simulation, Games, and Role Playing."
2. In your own words, briefly define simulation, games, and role playing.
3. Write a situation or description of a simulation, game, and role playing for vocational education. Follow the characteristics listed in Table 1 to complete your assignment.
4. Use the "Sample Outcomes of Learning Activity 7.1-a," at the end of this activity as a guideline for developing your simulation, game, or role playing.

### DIFFERENCES BETWEEN SIMULATIONS, GAMES, AND ROLE PLAYING

Although some educational trends come and go according to the enthusiasm of students and educators, this is not so with simulation. Simulations are an attempt to model a portion of reality in an artificial situation. They reproduce the social, economic, or political process of particular systems of social interaction. Students assume roles in the system and try to understand how the system operates by participating in it as a member, not an observer.<sup>1</sup>

1

Darrell R. Lewis, Donald Wentworth, Robert Reinke, and William E. Becker, Jr. Educational Games and Simulation in Economics, (New York: Joint Council on Economic Education, 1974), p. 2.

A game as defined by Coleman is:

... a way of partitioning off a portion of action from the complex stream of life activities. It partitions off a set of players, a set of allowable actions, a segment of time, and establishes a framework within which the action takes place. It establishes what one might describe as a minute system of activities, and if the game contains more than a single player, as most games do, the game can even be described as a minute social system.<sup>2</sup>

Role playing is a simulative situation in which students are given information on a particular situation and told who they will be and how they should act.

Simulation has been used synonymously with games and role playing. Games and simulations may be combined with the features of role playing for learning and for using the competitive nature of games to encourage student motivation. The most commonly used term in the material available on the market is "Simulation Games."

The following table shows the characteristics of games and role playing and how each strategy is a part of the broad category of simulation.

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<sup>2</sup> James Coleman, "Academic Games and Learning," National Association of Secondary School Principals, 52, No. 325 (February 1968), 62.

TABL

CHARACTERISTICS OF SIMULATION, GAMES, AND ROLE PLAYING

SIMULATION

GAME

ROLE PLAYING

A. MOTIVATION INCENTIVES

Subject matter generates enthusiasm for or commitment to learning in a subject area or in a course, or to learning in general.

The scoring system provides rewards which depends on the results of the players' decisions.

Players visualize themselves in another person's situation which is not threatening.

B. RULES

1. A clear statement of objectives.
2. The situation should be realistic.
3. The situation should be simple.
4. Should be a non-threatening experience.

1. A clear statement of objectives.
2. A set of rules which should be followed.
3. The agreement of all players to abide by the rules and objectives.
4. A procedure for critiquing or evaluation.

1. A clear statement of objectives.
2. Allow sufficient time to complete role playing.
3. Situation should be simple and spontaneous.
4. Should deal with human relations.

C. LEARNING EXPERIENCES

Focuses upon the development of personal and technical skills of supervision and decision making.

Student interaction in which verbal and interpersonal skills are developed.

Stimulate thought or discussion of different ways of approaching a problem, situation or controversial matter.

D. DESIGNING EASE

More difficult to design than role playing as the consequences of each possible combination of players' decisions must be built in. Must realistically represent resources each person has available in the real situation and the value to each possible outcome.

Once the rules and objectives have been defined and agreed upon then there is no difficulty in getting the game into a time limited basis for a small group.

Easier to design than a simulation game. Designer need only 1) write descriptions of each role, 2) state each player's objectives in general terms, and 3) add a few rules to prohibit grossly unrealistic behavior.

Sample Outcomes: Learning Activity 7.1-a

The following are suggestions only. They are provided for guidelines for developing your own simulation, games and role playing situations.

I. Simulation

Place: Personnel Office (simulated)

People involved: A personnel manager and prospective employee

Situation: The student is interviewing for a position in the company

- Objectives:
- A. Students will be able to demonstrate their knowledge of proper interview techniques.
  - B. Students will be able to develop their personal skills of talking with a prospective employer.
  - C. Students will be able to develop confidence in themselves.

II. Games

There are numerous commercially prepared educational games that could be adapted to vocational education. The important fact is that there are specific rules to be followed and there is usually a winner. Points are usually given as an incentive to become the winner. An example of a game follows Learning Activity 7.2-a.

III. Role Playing

Situation: A mother trying to buy a shirt for her son on a Saturday afternoon at a local department store.

Procedure: Three students are selected. They are handed a card which displays the type of person they should try to become. Only the student playing the role knows what is on the card.

People involved and roles:

Salesperson - A man about 25-30, married and has worked at this store for one year. He is trying to please both sides.

Mother - A very interesting individual. She is always looking for a durable product, but at bargain prices.

Son - He is about 17, varsity basketball player, likes to be stylish and attractive to the opposite sex. Does not like the color or style of the shirt.

Objective: The student will be able to identify the problems associated with a particular situation and describe how he/she would have handled the same problem.

#### Instructional Objective 7.2

The learner will identify the necessary elements of a game as they apply to vocational education.

Before a game is used to provide the necessary information to attain a behavioral objective in the vocational education classroom, two questions should be asked. The first is, "Are they interested?"; second, "Is the game workable in a vocational education classroom situation?"

The answer would then lead to the development of a game. However, there are a few basic elements that need to be defined. The teacher should "build a game" to accomplish the final objective. As described by the Joint Council on Economic Education, there are six questions relating to the parts of the game and the criteria used to evaluate the game.

TABLE 2  
 QUESTIONS AND CRITERIA<sup>3</sup>

QUESTIONS	PARTS OF A GAME	CRITERIA
1. What is the central problem presented in the game?	Problem	Clarity Conceptual content Utility Relationship to the real world
2. What choices are available to players?	Choices	Soundness
3. What are the different moves or activities provided for players?	Moves	Consistency
4. What are the rules of the game?	Rules	Lack of distortion Relationship to problem
5. How is the game organized?	Organization	Inclusiveness Sequencing Relationship to choices, moves, rules
6. What summary activities conclude the game?	Conclusion	Adequacy Applicability Relationship to problem Relationship to activities

<sup>3</sup>

Lewis, Wentworth, Reinke and Becker, Jr. Educational Games and Simulation in Economics, (New York: Joint Council on Economic Education), 1974. p. 32-33. ED 095 057.

Learning Activity 7.2-a

Using information on the Questions and Criteria Table, develop a game that can be used in a vocational education area. (Small groups of 3-4)

Sample Outcomes: Learning Activity 7.2-a

## SUPER STAR GAME

1. The central problem of the game is to provide answers for questions dealing with a vocational area.
2. The students have the choice of playing the game individually or dividing into competing teams with a maximum number of four.
3. If a question is correctly answered, the player or team moves their piece forward the number of spaces indicated on the question card. If the player's or team's piece lands on a bonus question, they are allowed another question. If it lands on a penalty question, they miss a turn. In the event that the player's or team's piece lands on a bonus move or penalty move, their piece is immediately moved that number of spaces indicated in the block.
4. One student will act as the game official. The official will draw a question card and read the question. She/he will decide if a correct answer has been given and then will announce the number of points the question is worth. (Announcing the value of the question ahead of time would allow players to intentionally give the wrong answer to avoid loss of a turn or penalty block.) During team play, a time allowance of ten seconds for consultation should be given and checked by the game official.

5. The order of play is determined and a question is read to that player or team. Unless special moves or questions are encountered, play continues to move back and forth between players or teams. If a question is not answered correctly, the next player or team has the opportunity to answer it. When play is by teams, one player should be selected as a spokesperson. When questions are written, a point value (spaces moved) should be determined according to how difficult the question is. Questions at the knowledge and comprehension level would be worth fewer points than questions at the application, analysis, synthesis, and evaluation levels.
6. The player or team reaching the last square first would be declared the "SUPER STAR." At this time, a summary of the material covered would be useful. Students may then be asked to write questions for use the next time that the material is covered.

# SUPER STAR GAME

1	2	3	4	5	6	7	8	9	10
20	19	18	17	16 Bonus Question	15	14	13	12 Lose Turn	11
21	22	23	24	25	26	27	28 Bonus Question	29	30
40	39 Bonus Question Move 10	38	37	36	35	34	33	32	31
41	42	43	44	45 Penalty Move Back	46	47	48	49	50
60	59	58	57	56	55	54	53	52	51
61	62 Penalty Move Back	63	64	65	66	67	68 Bonus Move 10	69	70
71	72	73	74	75	76 Bonus Question	77	78	79	80
90	89	88	87	86	85	84	83 Bonus Question	82	81
91	92	93 Lose Turn	94	95	96 Penalty Move Back 10	97	98	99	100



Instructional Objective 7.3'

The learner will define the roles of the teacher and student in simulation and games.

Learning Activity 7.3-a

Read the following discussion about the roles of the teacher and students in simulations and games. Then complete the learning check which follows.

## TEACHER AND STUDENT ROLES IN SIMULATION AND GAMES

The vocational teacher must realize that gaining maximum benefit from simulations and games requires much preparation time. The teacher must change his/her teaching role, must be organized, have well stated instructional objectives, and a supporting curriculum. The ultimate success of the exercise depends on the teacher more than any other variable.

The roles of the teacher are listed below to help clarify the above statements.

Teacher Roles

1. The teacher must have the game's objectives and the objectives of the unit being taught clearly in mind.
2. The teacher must be flexible to move in and out of different roles, i.e., umpire, coach, sympathizer, leader, and final authority.
3. The teacher should have a "dry run" before using the simulation or game in his/her classroom.
4. The teacher must stop the game while students still have the desire to continue to play.

The students should be familiar with the activities that are involved in

simulation and games. Time should be devoted to its explanation and practice. The best way for the student to understand this activity is to perform a simulation or game and work out the problems as they arise. The students have well defined roles which are listed below.

#### Student Roles

1. The student should be prepared with a basic understanding to participate in the simulation or game.
2. The student should be willing to assume a participating role which may be a leadership position.
3. The student should be encouraged to maintain good sportsmanship throughout the activity.
4. In order for the simulation or game to be successful, the students must be serious about their participation.

#### FORMATIVE CHECK

##### Learning Activity 7.3-a

In your own words, list at least three roles each for students and teachers who participate in simulations or games. Check your answers against the preceding discussion of roles.

#### Instructional Objective 7.4

The learner will discuss the values of simulation and gaming as they apply to vocational education.

#### Learning Activity 7.4-a

Read the following discussion on the value of simulation and gaming. Individually (in writing) or as part of a group (orally) discuss the value of simulations and games in vocational education.

Develop a list of topics or objectives in vocational education which would be appropriate for use in a game or simulation.

#### THE VALUE OF SIMULATION

A child can transform a few blocks into houses and cars to build a small community, thus simulating a behavior of adults at work. A child relies heavily on imagination, but seldom develops complex reasoning for human and political interactions.

To build a sound knowledge base about a particular subject does not mean the simulation needs to be complex. The simulation should be a mix between the imaginary situation of a child and serious scientific explorations.

What are some of the values of simulations and how can they be used to help build a sound knowledge base? Listed below are the values Cruickshank believes are the most dominant.

Simulations can be used to:

1. collect data about how people behave under certain lifelike circumstances,
2. condition participants to behave in a certain way,
3. provide experiences not normally available in training programs.
4. permit participants to look at only selected, simplified, controlled elements of reality rather than trying to look at and understand all of it,
5. permit participants to engage in potentially dangerous threatening situations without danger and threat,
6. involve students more intellectually and emotionally than most forms of instruction.<sup>4</sup>

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<sup>4</sup>  
Donald Cruickshank, "Simulation," Phi Delta Kappan XI, No. 8 (September 1966), 23.

### THE VALUE OF GAMING

Webster defines games as "amusement, diversion, fun and sport." Although the dictionary does not specifically say so, most games are educational. Children first learn the meaning of rules through games. When playing with others, if a rule is broken, the game will not function as intended.

According to Kelly, the following are the values of educational games:

1. A large amount of decision-making experience is condensed into a short period of time.
2. There is increased interest and motivation on the part of students.
3. Educational games are more realistic than a textbook and have direct relevance to the real world.
4. Games allow students to make decisions, see the effects of these decisions, and then live with these effects in making new decisions.<sup>5</sup>

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5

William H. Kelly, "The Development and Evaluation of an Educational Game to Teach Specific Aspects of Farm Management Decision Making to High School Vocational Agricultural Students" (unpublished Ph.D. dissertation, Cornell University, 1969), p. 37.

## ANNOTATED LIST OF REFERENCES FOR FURTHER STUDY

Anderson, Charles R. "The Effectiveness of a Simulation Learning Game in Teaching Consumer Credit to Senior High School Students in Comparison to a Conventional Approach to Instruction." Unpublished Ph. D. dissertation, University of Maryland, 1969.

This study experimentally tested whether a simulation learning game might be a more effective learning experience than conventional classroom approaches in communicating factual information. Student acquisition of some specifically defined behaviors that might be generalized to a comparable real-life situation were also tested. Scores and ratings between control and experimental groups were tested for significance by analysis of variance and covariance. No significant differences were found except that the simulation learning game was more effective with males.

Berne, Eric. Games People Play. New York: Grove Press, Inc., 1964.

This book deals with the psychology of human relations. "The Games of Life," as the author calls them cover such areas as marital, sexual, party and consulting room games.

Blucker, Gwen. An Annotated Bibliography of Games and Simulations in Consumer Education. Springfield, IL: Illinois State Office of the Superintendent for Public Instruction, 1974.

Boocodk, Sarane S. "The Effects of Games with Simulated Environments Upon Student Learning." Unpublished Ph.D. dissertation, John Hopkins University, 1966.

This study reviewed the problems of doing experimental research on new educational techniques in general and with simulation games in particular. Data from experiments with seven different games were examined. These studies provided empirical evidence of four general types of learning effects: (1) inducements to student motivation and learning, (2) vicarious experience, (3) intellectual learning, and (4) changes in student attitudes. There is also existing evidence to suggest that performance in games is not related to performance on standardized tests.

Center for Vocational Education. Simulation Training for Supervision and Decision Making in Vocational Education. Series No. 35. Columbus, OH: Ohio State University, 1975.

A training package for inservice or graduate education programs in simulation as an instructional strategy. The series is also aimed at developing leadership programs.

Center for Vocational Education. An Interaction Simulation: Coordinated Local-State Vocational Education Planning. Series No. 48. Columbus, OH: Ohio State University, 1971.

A training package for inservice or graduate education programs in simulation as an instructional strategy. The series is also aimed at developing leadership programs.

John G., Richard G. "Simulation Techniques in Career Development." American Vocational Journal 45, No. 6 (September 1972): 30-32.

Job experience; kits motivate students to broaden vocational interests.

Lee, John D. "Occupational Preparation for Today and Tomorrow." Balance Sheet 53, No. 7 (April 1972): 302-5.

Business education, vocational education, job training, individual program, employment qualification, cooperative education, time block, relevance, simulations.

Lewis, Darrell R.; Wentworth, Donald; Reinke, Robert; and Becker, William E. Jr. Educational Games and Simulations in Economics. New York: Joint Council on Economic Education, 1974. ED 095 057

This book is an updated version. In updating they also added a section on evaluating educational usefulness, providing guidelines for game creation, and suggestions as to how games can best be used in economics.

Mauriras-Bousquet, Martine. "An Educational Technique of Great Potential: Simulation Games." Prospects 14, No. 4 (Winter 1974): 555-63.

The author briefly examines the types of simulation games and how they can be used in social sciences, science, mathematics, and vocational education.

McClelland, William A. "Simulation: Can It Benefit Vocational Education?" American Vocational Journal 45, No. 6 (September 1970): 23-25.

Because of a preponderance of job similarities, the author suggests that vocational educators look for answers in the research conducted on simulation in the Armed Forces training programs.

Rice, Dick, and Meekley, Richard. Supervision and Decision-Making Skills in Vocational Education: A Training Report Utilizing Simulation Techniques, Final Report. Columbus, OH: Ohio State University Center for Vocational and Technical Education, March, 1970.

Simulation exercises focusing on the development of personal and technical skills of supervision and decision making. This publication includes four simulation guides and instructor's manual.

Sax, Saville, and Hollander, Sandra. Games People Ought to Play. Reality Games. New York: Macmillan Publishing Co., Inc., 1972.

The authors explain games that enable us to break down habitual ways of responding, and free mind and body to what is happening now—honestly, directly and deeply.

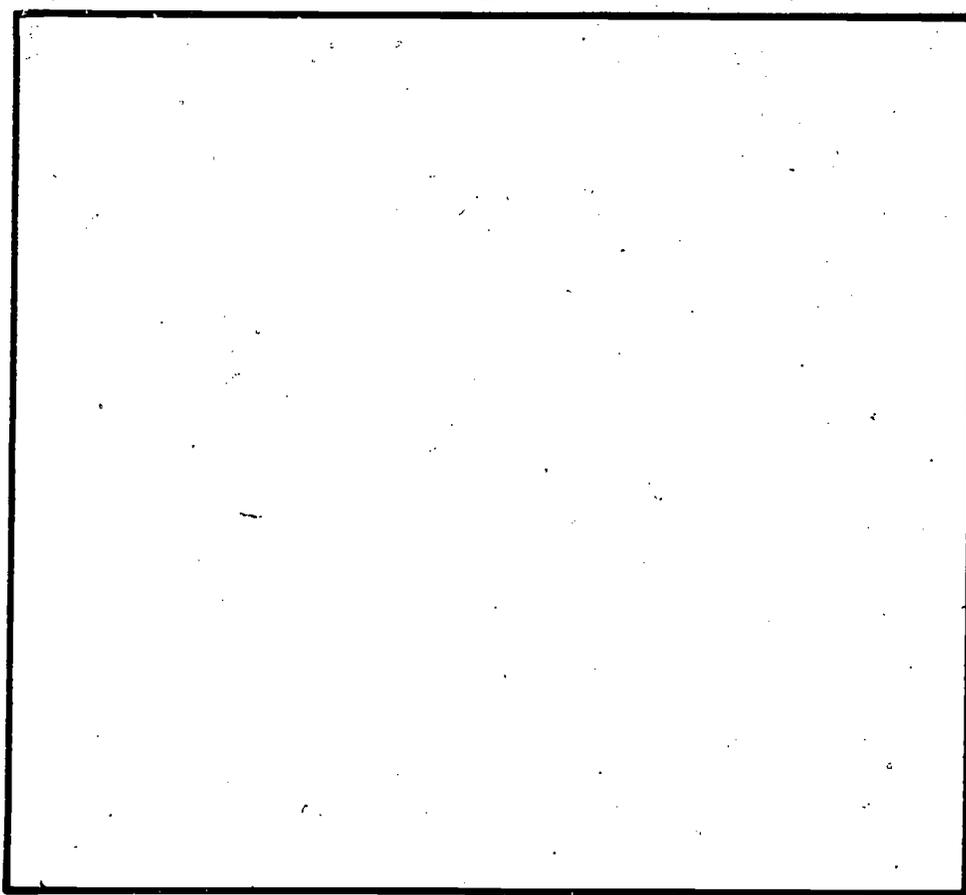
Twelker, Paul A. Instructional Simulation: A Research Development and Dissemination Activity. Final Report. Monmouth, OR: Oregon State System of Higher Education, February, 1969. ED 032 657.

The report describes design techniques, areas of effective application, and research directions in education simulation.

Instructional Simulated Systems: An Annotated Bibliography. Continuing Education Publications, Monmouth, OR: Oregon State System of Higher Education, 1969. ED 041 441.

The report attempts to list the very latest references available and to help readers to develop their own design simulation system.

# INDIVIDUALIZED INSTRUCTION



## CATEGORY: INDIVIDUALIZED INSTRUCTION

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PERFORMANCE OBJECTIVE 8

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Describe and demonstrate individualized instruction techniques.

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Instructional Objective 8.1

The learner will develop a personalized definition of individualized instruction and write a rationale and objectives for its use.

Instructional Objective 8.2

The learner will list and describe the four general types of individualized instruction.

Instructional Objective 8.3

When given a list of acronyms of current exemplary programs in individualized instruction, the learner will list the name, origin, purpose, grade level, and subject matter of the program.

Instructional Objective 8.4

The learner will describe the seven component parts of a good individualized instruction program.

Instructional Objective 8.5

The learner will evaluate the quality of different types of individualized instruction materials against criteria of the seven components of individualized instruction.

Instructional Objective 8.6

The learner will create an individualized learning program for a concept or a portion of curriculum content.

Instructional Objective 8.7

The learner will list a minimum of five advantages and five disadvantages of individualized instruction.

Instructional Objective 8.8

The learner will describe a minimum of two models for implementation of the individualized instruction strategy for a course of study.



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Describe and demonstrate individualized instruction techniques.

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### Introduction

Take a good look at a classroom of students. There they sit, with the new text that the teacher has chosen in front of each of them. The teacher asks the class to begin on page one and read through to page 15 for the following day. By the end of the next week they are all to have read through Chapter 3. Now the teacher begins to explain the first assigned project by lecturing and demonstrating what is required. The teacher is very good and the class seems to be starting well . . . But check back in a couple of weeks . . . Well, the students are all turned to the same page in the text, and they all seem to be involved in generally the same stage of the project, right? But don't think in terms of the whole class (although many teachers do). Instead look at individuals. Look at that student, for instance. He seems bored and his restlessness is disturbing to the others. Wonder if he could have had the text already read and the project completed by now? And that student seems unusually competent with the equipment. Would she rather experiment with more complicated projects? And that individual over there seems to be struggling with the reading material. Perhaps he could be shown or told what the book is explaining as he is also referred for special reading instruction. And look at that student--she's just sitting or else trying to appear busy. Is she confused, discouraged? Maybe there is a problem . . . What is it? THESE STUDENTS ARE BEING TAUGHT AS IF ALL STUDENTS WERE ALIKE, AS IF ONE TEACHING APPROACH AND ONE COURSE CURRICULUM WORKS EQUALLY WELL FOR ALL STUDENTS!!!!

Hey, they aren't and it doesn't--So INDIVIDUALIZE!!!

Every student has a particular set of entry skills, learning styles, goals, motivations, abilities, rates of learning, degrees of retention, strengths, weaknesses, self-discipline, and problem-solving abilities when entering a classroom. And to effectively teach each student in a class, the teacher must offer a variety of methods or strategies. Offering this kind of variety in the classroom is difficult to do.

You are probably aware of teaching strategies such as lecture, discussion, inquiry, questioning, values clarification, demonstration, field experiences, independent study, laboratory, and simulation and games. Individualized instruction creates an environment which allows students to interact with the strategies that are best suited to their needs.

How do teachers and students relate in an individualized program?

Since individualized instruction is student-oriented, it requires a diagnosis of student development to determine the kinds of learning experiences they require. After these needs are properly identified, instruction can be largely pupil directed and pupil administered and, within the limitations imposed by the school's broader time requirements, learning can be adjusted to the learner's needs and capabilities. The strategy assumes that students have the ability to work on their own. The instructor will be used for assistance in providing materials and learning activities at the appropriate time.

#### Individualized Instruction in Other Schools What Can YOU Expect?

Individualized instruction has been adopted in a number of school districts throughout the nation. How have their students scored on standardized tests? In all of the schools studied, there were no instances of lower test scores because of individualized instruction. Some schools experienced no improvement in test scores as compared to non-individualized, control schools. A large number of schools reported improved scores after individualized instruction was introduced. But all of the administrators and teachers concurred

that standardized achievement tests do not adequately test all of their teaching objectives nor all of the resultant student behavior and attitudinal changes which occurred. Such tests do not yet reflect self-concept, independence, motivation or interest, and until they do, formal test results remain incomplete.

How have teachers reacted? Most teachers agree, "Its a lot more work." Teachers also emphasized that they had never felt more satisfied and that they could never return to a traditional, group-oriented teaching approach. Some teachers, however, continued to feel comfortable in a classroom where every child might be working on a different task. Many teachers attached failure of space, materials, knowledge of the strategy, and administrative support.

And how have administrators responded to individualized instruction programs? Most assert that students become more mature and independent, that less truancy results and discipline problems decrease or disappear altogether.

The strategy of Individualized Instruction offers a great deal to the students of any school district. Turn this page to learn what kinds of programs are already in existence, the general components and criteria for any individualized instruction program, and suggestions for implementing such a program in a school district.

Instructional Objective 8.1

The learner will develop a personalized definition of individualized instruction and write a rationale and objectives for its use.

Learning Activity 8.1-a

Choose a minimum of two sources from the annotated list of references and complete the exercise below on a separate sheet of paper.

- A. (1) Title of Book \_\_\_\_\_  
 Author \_\_\_\_\_  
 Definition of Individualized Instruction \_\_\_\_\_  
 \_\_\_\_\_  
 Rationale Offered \_\_\_\_\_  
 Objectives \_\_\_\_\_
- (2) Title of Book \_\_\_\_\_  
 Author \_\_\_\_\_  
 Definition of Individualized Instruction \_\_\_\_\_  
 \_\_\_\_\_  
 Rationale Offered \_\_\_\_\_  
 Objectives \_\_\_\_\_
- B. Write down your own definition of individualized instruction and list, in order of priority, what you feel the major objectives of individualized instruction are.
- Definition \_\_\_\_\_  
 Rationale \_\_\_\_\_  
 Objectives \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Instructional Objective 8.2

The learner will list and describe the four general types of individualized instruction.

Learning Activity 8.2-a

Choosing one of the resource books named below, list by name the four general types of individualized instruction strategies.

References:

Dunn, Rita, and Kenneth Dunn. Educator's Self-Teaching Guide to Individualized Instructional Programs. West Hyack, NY: Parker Publishing Co., Inc., 1975.

Edling, Jack V. Individualized Instruction: A Manual for Administrators. Corvallis, OR: Oregon State University, 1970.

National School Public Relations Association. Individualization in Schools. Education U.S.A. Special Report, Washington, DC: National School Public Relations Association, 1971.

Learning Activity 8.2-b

Choose a source from Learning Activity 8.1-a other than the one selected in Instructional Objective 8.1. For each of the four types, use the suggested outline below to describe the characteristics.

Suggested Outline

Name of Type \_\_\_\_\_

Characteristics:

Person determining goals \_\_\_\_\_

Person determining objectives \_\_\_\_\_

Person determining materials used \_\_\_\_\_

Person choosing learning activities \_\_\_\_\_

Person setting pace of learning \_\_\_\_\_

FORMATIVE CHECK  
Instructional Objective 8.2

Section A

Name the four general types of individualized instruction strategies in use in education today.

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_

Section B

Fill in the blanks with short answers that will appropriately provide the requested information on the four general types of individualized instruction strategies in use today.

1. Type of individualized instruction: \_\_\_\_\_  
 Who determines the goals? \_\_\_\_\_  
 Who determines the objectives? \_\_\_\_\_  
 Who determines the materials used? \_\_\_\_\_  
 Who chooses the learning activities? \_\_\_\_\_  
 Who sets the pace of learning? \_\_\_\_\_
2. Type of individualized instruction: \_\_\_\_\_  
 Who determines the goals? \_\_\_\_\_  
 Who determines the objectives? \_\_\_\_\_  
 Who determines the materials used? \_\_\_\_\_  
 Who chooses the learning activities? \_\_\_\_\_  
 Who sets the pace of learning? \_\_\_\_\_
3. Type of individualized instruction: \_\_\_\_\_  
 Who determines the goals? \_\_\_\_\_  
 Who determines the objectives? \_\_\_\_\_  
 Who determines the materials used? \_\_\_\_\_  
 Who chooses the learning activities? \_\_\_\_\_  
 Who sets the pace of learning? \_\_\_\_\_

4. Type of individualized instruction: \_\_\_\_\_
- Who determines the goals? \_\_\_\_\_
- Who determines the objectives? \_\_\_\_\_
- Who determines the materials used? \_\_\_\_\_
- Who chooses the learning activities? \_\_\_\_\_
- Who sets the pace of learning? \_\_\_\_\_

Instructional Objective 8.3

When given a list of acronyms of current exemplary programs in individualized instruction, the learner will list the name, origin, purpose, grade level, and subject matter of the program.

Learning Activity 8.3-a

Read Appendix C (back of the module). Use the worksheet following to list the name, origin, purpose, grade level, and subject matter for the individualized programs named.

IPI

Name \_\_\_\_\_

Origin (Inventor) \_\_\_\_\_

Purpose \_\_\_\_\_

Grade Level \_\_\_\_\_

Subject Matter \_\_\_\_\_

PLAN

Name \_\_\_\_\_

Origin (Inventor) \_\_\_\_\_

Purpose \_\_\_\_\_

Grade Level \_\_\_\_\_

Subject Matter \_\_\_\_\_

LAP

Name \_\_\_\_\_

Origin (Inventor) \_\_\_\_\_

Purpose \_\_\_\_\_

Grade Level \_\_\_\_\_

Subject Matter \_\_\_\_\_

IGE

Name \_\_\_\_\_

Origin (Inventor) \_\_\_\_\_

Purpose \_\_\_\_\_

Grade Level \_\_\_\_\_

Subject Matter \_\_\_\_\_

IMS

Name \_\_\_\_\_

Origin (Inventor) \_\_\_\_\_

Purpose \_\_\_\_\_

Grade Level \_\_\_\_\_

Subject Matter \_\_\_\_\_

PLATO

Name \_\_\_\_\_

Origin (Inventor) \_\_\_\_\_

Purpose \_\_\_\_\_

Grade Level \_\_\_\_\_

Subject Matter \_\_\_\_\_

DULUTH PLAN

Name \_\_\_\_\_

Origin (Inventor) \_\_\_\_\_

Purpose \_\_\_\_\_

Grade Level \_\_\_\_\_

Subject Matter \_\_\_\_\_



Learning Activity 8.4-a

Read the following material. After you have reviewed this information, complete Learning Activity 8.4-b.

## INDIVIDUALIZED INSTRUCTION PROGRAM COMPONENTS

Diagnosis

Teachers spend a great deal of time trying to pound the proverbial square peg into a round hole because they do not adequately assess the student's (1) interests, (2) learning styles, (3) entry skills, (4) motivation, and (5) independence.

A student's interests, motivation, and independence can be determined by teacher-made questionnaires and by as many teacher/student conferences as needed. Some students learn best by hearing information, others by seeing or reading it, and others through physical manipulation of the environment. Students differ in styles of learning, times of greatest alertness, the length of attention span, types of group work preferred, and positive sound factors.

Learning increases significantly if students are taught according to their most effective learning style. Similarly, teachers may be tested to determine their preferred style which usually indicates their preferred teaching method.

Entry skills can be diagnosed by a number of standardized tests. Many of the programs already discussed have tests available for use. In the vocational-technical education field, standardized tests may be procured from the state department, counselors, advisory committees, and from industry. Teachers may assess entry skills by using traditional paper and pencil tests, student performance tests, or evaluation of work samples.

The diagnostic profile of a student can become rather complex, but one

overriding factor should pervade all diagnosis--student interest. In some cases, this should be the primary basis for determining learning experiences regardless of test scores.

#### Prescription/Selection of Instructional Objectives

This component follows diagnosis if the student is determining goals and objectives. If the teacher is determining goals and objectives and wishes to know the student's skills in relation to those goals, then diagnosis follows the teacher's determination of instructional objectives. Prescription always follows diagnosis.

During the prescriptive stage, the teacher should explain the learning alternatives that are available to the student. The student may not be familiar enough with the various learning alternatives or the subject matter to be cognizant of the choices open. The teacher should also discuss with students their responsibilities for choosing learning objectives that are consistent with their skills, expressed interests, and goals. During prescription the teacher must assist the student in developing skills in choice, planning, and self-observation.

The actual formation of instructional objectives requires teacher skill in composing objectives that specify, in detail, what behavior the student is to do, the environmental conditions for the behavior, and the criteria for success. These objectives can then, in turn, be broken down into carefully sequenced enabling objectives that allow a student to proceed step by step toward mastery of the overall objective.

Ideally, an individualized program not only deals with cognitive learning objectives and test measures, but also with attitudinal objectives. Also, the cognitive performance objectives should span the entire taxonomy and not just require simple recall of facts and specific information.

Coupled with the preparation of instructional objectives, is the preparation of pre and posttests and suitable learning activities. These are designed for pre-assessment to allow for individual differences in knowledge, and provide the proper starting point to the final post-evaluation to assess comprehension of the required knowledge. Samples of both types will be used throughout this category to reinforce their use.

#### Materials and Equipment

Ideally, every individualized instructional unit should incorporate a multi-media approach so that students may hear, see, read, touch, and become physically active. Concepts and facts can be developed through books, films, displays, cassette tapes, pictures, and other media forms to fit each individual's needs. Such an approach engages all of the senses as it allows students to select those media forms that correspond best to their own learning style. But while the various learning styles must be provided for, there are no criteria which insist that "the fancier the media, the better." Indeed, if your district is intending to individualize its instruction, teacher preparation time and funding will not permit an elaborate filmstrip/cassette presentation for every concept. Constant efforts for improvement and diversification of media should still occur, of course.

Suggested criteria for the purchase and production of media are as follows:

1. Select the medium which will help teachers accomplish their objectives. If a teacher specifies that students are to identify different kinds of models from ten slides, they must have practice looking at slides. Sketches won't do in this case.

2. Select media that allow students to proceed through the unit in short steps and provide immediate feedback.
3. Select the media which will make it possible for teachers to efficiently finish producing the unit. Individualization already demands much teacher time. The process should not require more technical know-how to administer in the classroom than most teachers can reasonably be expected to possess.
4. Make sure that a good number of teachers can use the newly produced or purchased unit. Not all teachers may have the same equipment available. Some may wish to use only a part of the unit or make alterations. These kinds of teacher adjustments should be possible.
5. Finally, select mediation which creates the most learning for the least possible cost.

#### Teaching Methods

Like mediation, an individualized instructional program should employ as wide a variety of teaching methods as possible in response to the varying learning styles within any class. Use of the other teaching strategy modules can improve teacher competencies in these strategies. All teaching strategies have their value within individualized instruction, although some are more applicable than others. Lengthy lectures, for example, should usually be replaced by cassette recordings, work books, and/or film strips which better allow students to learn in steps and receive feedback. Some students may occasionally feel more comfortable as part of a group where the activity is largely teacher directed. Methods especially suitable for individualized instruction are simulation/games, laboratory, field experience, discussion, and inquiry. In general, teaching methods used within individualized units should be evaluated according to the following criteria:

1. The intended teaching method should be clearly defined, while the program

also allows for teacher adjustment.

2. Methods used should encourage as much varied response and participation on the part of students as possible. Independence and choice making should be stressed.
3. Even as students are allowed to select teaching methods which meet their needs, the choice of methods should be organized so that a student is encouraged to experience a variety of groupings during a school day: working alone, with a partner, with a teacher or tutor, in a small group, in a large group, etc.

#### Learning Settings

Whether any individualized unit ultimately "works" is dependent upon the learning settings, and this component can be the most demanding in terms of school and district-wide coordination, funding, and planning. Many highly successful individualized programs deal with a single subject area and function within the self-contained classroom. But many others have resulted in media resource centers, learning pods of team teachers organized around multiple disciplines, learning labs, computerized programs, work study, and cooperative programs. New innovations are continuing to be tested to find what is best for each learner. The total learning center specified in an individualized program should meet the following criteria:

1. It must have the general support of the teachers who work within the structure of the learning setting. Some teachers don't enjoy team teaching and are dynamic soloists while others feel that individualization necessitates teamwork.
2. It must organize the various interests and instructional styles into a number of designated areas in the learning setting and then allow for student-initiated movement between these areas.

3. It must make the learning resources easily available to the student.
4. It must provide for a variety of social interactions in a student's day.

#### Instructional Time

Flexibility must be the watchword in terms of instruction time. An acceptable individualized instruction unit is one in which the instructional time meets the following criteria:

1. A fairly accurate estimate of the average class time taken by a particular unit must be established, as soon as verification allows, to implement planning.
2. At the same time, students are allowed to establish their own pace for completing the unit. If students become bogged down, it is an indication that the unit needs revision.
3. The instructional time should not be over-committed to the completion of the basic or required performance objective.

#### Evaluation

The evaluation component provides crucial "signposts" to both the student and the teacher as to where in the program the student should begin his study, how he/she should progress through the program, and in which direction should further study in the next step of the student's development be considered.

Criteria for evaluation measures are as follows:

1. Every program must contain a pretest and posttest which adhere to acceptable standards of test construction.
2. The material cited in the pre and posttests must be embedded in the content of the individualized program. No surprises!
3. The pre and posttests must correspond to the performance objectives.

and to the learning activities. If the performance objectives state that the student will be able to identify six kinds of molds from slides, the pre and posttests must require the students to look at and identify slides.

4. Opportunities for the student self-assessment should be provided in addition to teacher evaluation. An example: "Use the following exercises for further practice until you feel that you have mastered this skill. Then see your teacher about going on to the next instructional objective." or, "Select the sub-objective which was most difficult to master and ask your teacher for additional practice materials."
5. Ideally, the evaluation component should provide the student with alternative choices for the next step of the individualized instruction program.

Learning Activity 8.4-b

After reading the material provided in Learning Activity 8.4-a, complete the following exercise. At least 80% of the answers must be correct in order to pass Instructional Objective 8.4 of this category.

List the seven components of a complete individualized instruction program. For each component, provide three general criteria for determining the quality of the component.

Suggested Format:

Component: \_\_\_\_\_

Criteria: 1 \_\_\_\_\_

2 \_\_\_\_\_

3 \_\_\_\_\_

Instructional Objective 8.5

The learner will evaluate the quality of different types of individualized instructional materials against the criteria of the seven components of individualized instruction.

Learning Activity 8.5-a

Carefully read through the individualized packet found in Appendix C. Evaluate the quality of the entire package according to a minimum of three criteria for each of the seven components. Turn in this evaluation to your instructor.

Possible Format: Evaluation of Media Component

Criteria: \_\_\_\_\_  
           \_\_\_\_\_ Is satisfied           \_\_\_\_\_ Is not satisfied

Reason: \_\_\_\_\_

Criteria: \_\_\_\_\_  
           \_\_\_\_\_ Is satisfied           \_\_\_\_\_ Is not satisfied

Reason: \_\_\_\_\_

Instructional Objective 8.6

The student will create an individualized learning program for a concept or a portion of curriculum content.

Learning Activity 8.6-a

Select a concept or small portion of content in your subject area and create an individualized learning program to convey that material. Refer back to the information in this category and to the sources in the list of references as needed. The program should satisfy a minimum of three

criteria for quality in each of the seven components of individualized instruction and for satisfactory completion, the program must contain the following minimum items:

- a. two performance objectives,
- b. three instructional objectives,
- c. three learning activities and three alternative learning activities,
- d. three open-ended suggestions for independent study, and
- e. a minimum of five pre and posttest items.

Learning Activity 8.6-b

After completing your individualized instruction program, exchange with another student in the class. Work through each other's program and provide suggestions for improvement according to the evaluative criteria already studied. Revise your packet as you feel necessary. Turn in the original version, and any revised sections to your instructor.

Learning Activity 8.6-c

After completion of the individualized instruction programs, have members of the class work through and evaluate the programs of the other members. Turn in the individualized instruction program to the instructor for evaluation, along with a description of how you would revise your program based on the feedback provided by the class.

Instructional Objective 8.7

The learner will list a minimum of five advantages and five disadvantages of individualized instruction.

Learning Activity 8.7-a

Locate a minimum of two references given in the annotated list and read the sections dealing with advantages of individualized instruction. List those advantages common to all references.

Learning Activity 8.7-b

(Optional)

After completion of Learning Activity 8.7-a, form small groups (3-5) and discuss the advantages each member has found. Make a list of the combined advantages for each member.

Learning Activity 8.7-c

Locate a minimum of two references given in the annotated list and read the sections dealing with problems or disadvantages of individualized instruction. List those disadvantages common to all references.

Learning Activity 8.7-d

(Optional)

After completion of Learning Activity 8.7-c, form small groups (3-5) and discuss the disadvantages each member has found. Make a list of the combined disadvantages for each member.

Instructional Objective 8.8

The learner will describe a minimum of two models for implementation of the individualized instructional strategy for a course of study.

Learning Activity 8.8-a

1. Obtain the following reference book:

Dunn, Rita, and Dunn, Kenneth. Practice Approaches to Individualizing Instruction: Contracts and Other Effective Teaching Strategies. West Nyack, NY: Parker Publishing Co., Inc., 1972.

2. Read Chapter 2.
3. Make and submit to the instructor a course outline which describes a way to implement a strategy to a group of teachers in an inservice program.

Learning Activity 8.8-b

1. Obtain the following reference book:

Bishop, Lloyd D. Individualizing Educational Systems. New York: Harper and Row, Publishers, Inc., 1971.

2. Read Chapter 13, pp. 248-270.
3. Draw a diagram of the Professional Teacher Core System.
4. List the duties of each member in assisting the implementation of individualized instruction.
5. Draw a diagram of the Composite Principalsip Task-Force System.
6. List the duties of each member in assisting the implementation of individualized instruction.

Learning Activity 8.8-c

1. Obtain the following reference book:

Hoover, Kenneth H. The Professional Teacher's Handbook: A Guide for Improving Instruction in Today's Secondary Schools. Boston, MA: Allyn and Bacon, Inc., 1973.

2. Explain the purpose of sub-grouping techniques in your own words and make a list of steps (including cautions) for a teacher to follow who wishes to move toward individualized instruction.
3. Submit your work to the instructor for evaluation.

Learning Activity 8.8-d

1. Obtain the following reference book:

Grunlund, Norman E. Individualizing Classroom Instruction. New York: Macmillan Publishing Co., Inc., 1974.

2. Read Chapter 5 and make a list of the elements for the basic learning guide to individualizing instruction.
3. Study the list by repeating it, explaining the steps to at least two other people, and writing them from memory on paper.
4. Obtain evaluation sheet from instructor.

ANNOTATED LIST OF REFERENCES FOR FURTHER STUDY

- \*Bishop, Lloyd D., Individualizing Educational Systems. New York: Harper and Row, Publishers, Inc., 1971.

The text represents an excellent balance between conceptual properties and operational aspects of individualization.

- \*Dunn, Kenneth, and Dunn, Rita. Educator's Self-Teaching Guide to Individualized Instructional Programs. West Nyack, NY: Park Publishing Company, Inc., 1975.

This book serves as a self-instructional and self-evaluating guide to managing, observing and evaluating quality individualized instructional programs.

- \*Practical Approaches to Individualized Instruction. West Nyack, NY: Parker Publishing Company, Inc., 1972.

This book considers the rationale for individualized instruction, development and content of inservice training for teachers, descriptions of teaching methods particularly well suited to individualized instruction, methods of assessment of students and teachers, and the development of adequate media resources.

- Esbensen, Thorwald. Working with Individualized Instruction--The Duluth Experience. Palo Alto, CA: Fearon Publishers, 1968.

Describes the kinds of individualized instruction programs used and their effects on students and teachers.

- Edling, Jack V. Individualized Instruction: A Manual for Administrators. Corvallis, OR: Oregon State Higher Education Board, Teaching Research Division, 1972.

Survey and in-depth report of 100 schools using individualized instruction with emphasis on and recommendations for diagnostic procedures, instructional methods, evaluation results, problems encountered and recommendations on implementation procedures.

- Gitstrap, Robert L., and Martin, William R. Current Strategies for Teachers. Pacific Palisades, CA: Goodyear Publishing Company, Inc., 1975.

This book contains 12 teaching strategies used by instructors. Each strategy description includes a competency sheet, advantages, disadvantages, and classroom examples at the elementary and secondary levels.

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\* Required for learning activities within this category.

\*Grunlund, Norman E. Individualizing Classroom Instruction. New York: Macmillan Publishing Co., Inc., 1974.

This book provides a description of several types of individualized instructional programs and describes a variety of specific procedures for individualizing instruction that can be directly adopted or adapted for classroom use.

Haves, Virgil M. Individualizing Instruction: A Teaching Strategy. New York: Macmillan Publishing Co., Inc., 1970.

A collection of articles that discuss the nature and purpose of individualization and the ways it can be implemented in the classroom.

\*Hoover, Kenneth H. The Professional Teacher's Handbook: A Guide for Improving Instruction in Today's Secondary Schools. Boston, MA: Allyn and Bacon, Inc., 1973.

The handbook describes a basic framework from which each teacher may develop her/his own unique instructional skills. The wide variety of illustrations should enable the reader to perfect a number of instructional techniques in a chosen field of instruction or specialization.

Kapfer, Philip G., and Ovard, Glenn F. Preparing and Using Individualized Learning for Ungraded Continuous Progress Education. Englewood Cliffs, NJ: Educational Technology Publications, 1971.

A "how to" manual that describes specific steps in the creation of learning packets and entire individualized instructional programs. Stresses and demonstrates alternative learning activities for different learning styles, opportunities for "quest" or independent study, development of choice-making skills in the student.

Kim, Eugene C., and Kellough, Richard D. A Resource Guide for Secondary School Teaching. New York: Macmillan Publishing Co., Inc., 1974.

This book is primarily concerned with techniques for improving teacher style and competence in classroom teaching. A practical approach is provided throughout the text by the use of examples of the uses of discussion questions and exercises.

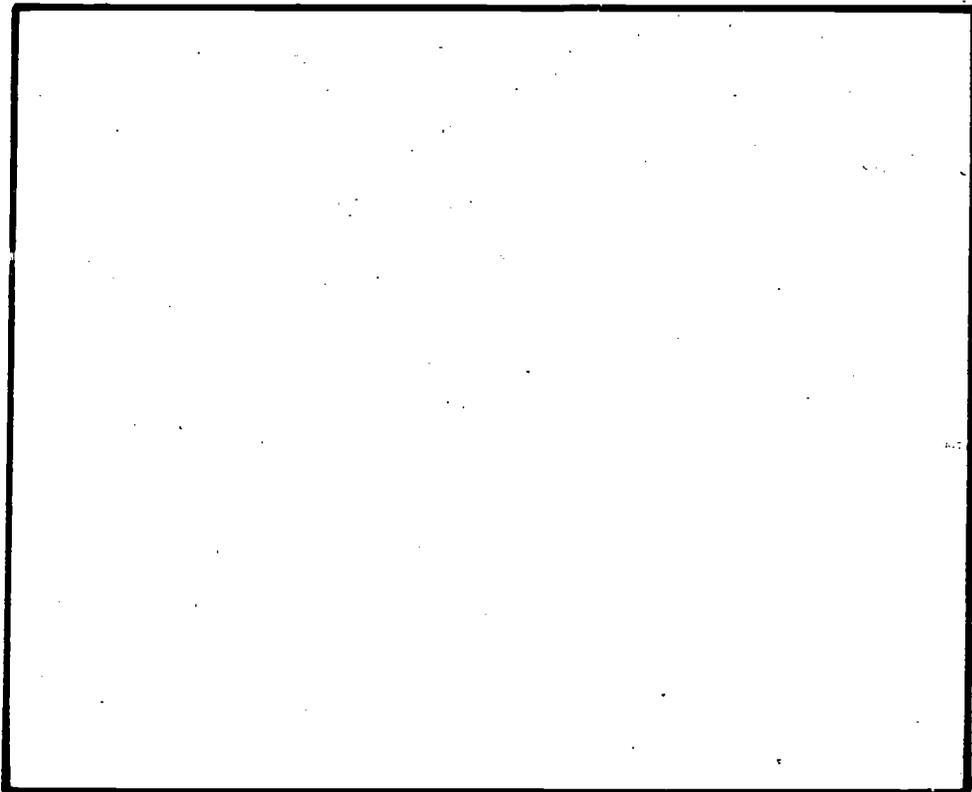
National School Public Relations Association. Individualization in the Schools. Washington, DC: National School Public Relations Association, 1971.

This publication attempts to reveal what is going on in individualized instruction in the schools. Describes the types of programs in operation and where they are being implemented.

Research for Better Schools, Inc. Individualized Instruction. Pullman, WA:  
Pullman Public Schools, 1969.

Booklet provides history of individualized instruction, overview of  
~~strategy and list of necessary components.~~

# FIELD EXPERIENCE



## CATEGORY: FIELD EXPERIENCE

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**PERFORMANCE OBJECTIVE 9**

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Identify and select various field experiences as instructional strategies.

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Instructional Objective 9.1

The learner will identify the various types of field experiences, their characteristics, and purposes.

Instructional Objective 9.2

The learner will select the appropriate types of field experiences that would be best utilized to accomplish various instructional objectives.

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**PERFORMANCE OBJECTIVE 9**

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Identify and select various types of field experiences as instructional strategies.

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Instructional Objective 9.1

The learner will identify the various types of field experiences, their characteristics, and purposes.

Learning Activity 9.1-a

Read the following introductory material and the characteristics of seven types of field experiences. Then participate in one of the knowledge reviews which follows. When completed, go on to Instructional Objective 9.2.

A script for a slide-tape presentation on field experience is included at the end of this category on page 261.

## INTRODUCTION

If the goal of vocational education is preparing students for employment in the real world,<sup>1</sup> then providing students with experiences in that world is a necessary instructional strategy for vocational educators. Strategies that utilize experiences in a work setting to achieve educational goals are known as field experiences; examples are:

1. apprenticeships,
2. internships,
3. non-pay work experience,
4. work observation,
5. paid work experience,
6. work study, and
7. cooperative vocational education.

The rationale for using the world of work as an educational strategy relates directly to the objectives of both general and vocational education. While vocational education is more specifically related to preparing students for entry and advancement in occupations, general education is also concerned with certain aspects of the world of work. The objectives of general and vocational education lend themselves to field experiences in which the student:

1. becomes aware of the world of work,
2. becomes aware of self aspirations regarding occupations,
3. earns money,
4. puts theory into practice, and
5. gains experiences not available in the classroom.

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1

R. N. Evans and D. R. Terry, eds., Changing the Role of Vocational Teacher Education, (Bloomington, IL: McKnight and McKnight, 1971), p. 191.

Field experiences give students a chance to get out of the classroom and into the community. For vocational students, these field experiences offer several distinct advantages over other instructional strategies:

1. Most field experiences provide direct application of vocational learnings.
2. On-the-job involvement helps the student to perceive the "big picture" in any vocational field.
3. Students become involved with community businesses and businessmen, improving relations between the school and community, and increasing contacts for future employment.
4. The variety of field experiences is endless--experiences exist to meet almost any objective in any vocational field.
5. Field experience provides quick adaptability to labor market demands.
6. Little capital outlay for space and equipment in the school laboratory is needed when students are trained on the job.
7. Field experiences help develop realistic attitudes toward job requirements such as speed, quality, and efficiency.

However, since field experiences are, by definition, away from school, there are also disadvantages to using these strategies:

1. At the secondary level, students involved in field experiences are often deprived of social activities associated with the school.
2. Coordination and scheduling of problems naturally increase when institutions other than the school are involved.
3. Getting to the job site is frequently a problem for students involved with field experiences.
4. Unless employers are working with school officials to meet student goals, students might be encouraged to drop out of school in favor of a fulltime job.
5. Field experience programs are not readily adaptable to all communities, especially those that are small or have declining populations.
6. Economic recessions can cause layoffs of student employees, who are often last on the seniority rolls.

The amount of teacher involvement in field experiences varies. For cooperative programs, the teacher is directly involved in coordination, supervision, and evaluation. At the other end of the continuum, work study programs require negligible involvement by the classroom teacher. However, for most field experience programs, certain optimum teacher characteristics can be identified. The teacher should be able to:

1. show evidence of appropriate work experience outside the field of education,
2. articulate with occupations in the geographic area,
3. demonstrate a commitment to a belief in the equality of man and the elimination of discriminatory practices,
4. maintain good public relations and communicate between the school and the community,
5. demonstrate sensitivity to the needs and feelings of all people, including an understanding of the feelings of success, failure, and frustration, and
6. function as a salesperson of the program and motivator of the students.

There is no one "best" type of field experience. Each has its own unique features and special purpose--the "right" one is the one that best meets the objectives of your program.

There is also considerable variation in the definitions of field experience programs. In this category, every effort has been made to use terms in the same manner as do the recognized authorities in the vocational education field.

The next six pages describe the characteristics of seven types of field experience. The script for a slide-tape presentation on the same information can be found at the end of this category, on page 261.

### APPRENTICESHIP

Apprenticeship is an experience of between two and eight years in which the instruction is supplemental to the daily employment of the student (apprentice). The apprentice is selected by a joint apprenticeship committee composed of members from industry and labor.

Purpose: to allow the student to learn and perform, in a productive setting, under the supervision of an experienced employee (master).

Level: students must be at least 18 years old. Limited to apprenticeable trades.

School/Work Relationship: education provides the facilities and the related instruction which is taught by a skilled journeyman. A formal agreement binds the employer to provide instruction in exchange for the work of the apprentice, who is paid for his work. Supervision of the apprentice at the work station is the responsibility of the experienced employee (master).

Vocational Application: Trade and Industrial Education.

### INTERNSHIP

Internship is usually a culminating experience that occurs after the classroom instruction is completed. The student works in a professional situation, under supervision, and is usually paid. The internship is generally fulltime, and lasts at least one semester.

Purpose: to allow the student, in a realistic situation, to apply the attitudes, knowledges, and skills learned in the classroom.

Level: college (2 or 4 year)

professional, sub-professional

School/Work Relationship: the student learns theory in school, then applies knowledge, skills, and attitudes in a work experience after the schooling is finished. Often, the internship site is selected by the school. The major responsibility for student supervision is usually at the work station, but in cooperation with the school.

Vocational Application: Health occupations, Engineering technicians.

#### NON-PAY WORK EXPERIENCE

Non-pay work experience is an instructional strategy in which the student actually performs work for an employer but does not receive pay. The student's experiences and training are carefully and specifically planned by the school and the employer in order to comply with strict legal regulations.

Purpose: to offer an exploratory or training experience that lends to the student's employability utilizing non-pay experiences in situations where a paid experience is not feasible.

Level: usually juniors or seniors in high school. Could be appropriate to any secondary or post-secondary program.

School/Work Relationship: varies with the intent of the experience. If exploratory in nature, the role of the school is (1) providing occupational information, and (2) planning and supervising the work experience with the employee. If training

is the purpose, the role of the school is very similar to that in a cooperative education program. In either case, the employer must be very careful to comply with conditions of the Fair Labor Standards Act relating to an employment situation. The employee provides training and supervision at the work station.

Note: Extreme caution must be used with this instructional strategy because of the legal questions relating to an employee-employer relationship.

Vocational Application: all vocational service areas at secondary or post-secondary level.

#### WORK OBSERVATION

Work observation is usually a strategy used in other programs or a classroom activity rather than a program in itself. In this strategy, the student observes work but does not actually perform. The student is not paid.

Purpose: to allow the student an opportunity to become aware of and/or explore the nature of work and/or occupations.

Level: used frequently in career education programs, especially the middle grade levels. Could be used at any level.

School /Work Relationship: since this is primarily an exploratory activity, there is little, if any, instruction which is directly related to the occupation. A classroom discussion might focus on general occupational information. The role of the school is to arrange the opportunities for students to observe work and provide transportation. The role of the work situation is to provide the opportunities for students to observe work under safe and meaningful conditions.

Vocational Application: pre-vocational and career education programs but could be used as an instructional strategy in any vocational area.

#### PAID WORK EXPERIENCE

Paid work experience programs offer students an opportunity to work for pay as producing employees. The work experience is not necessarily, nor usually, related to the student's occupational goal.

Purpose: to meet general educational goals such as:

- \* explore the World of Work
- \* allow wage earning while continuing education
- \* provide an alternative to the regular curriculum
- \* prevent drop-outs
- \* increase student motivation toward regular curriculum

Level: secondary or post-secondary

School/Work Relationship: there is generally no related class and limited supervision by the school. Students are released from school for a portion of the school day and may or may not receive academic credit. Supervision of the student at the work station is the sole responsibility of the employee. Usually the responsibility of the school is to assist the student in finding employment; if released time and school credit are a consideration, the school validates employment and the number of hours the student is working.

Vocational Application: not considered vocational, but can be used by a school to meet the general educational goals as stated above.

#### WORK STUDY PROGRAM

Work study (as defined by the Vocational Amendments of 1968 Title I, Part H) are programs that offer students a paid experience with an educational or public agency. The students must qualify as needing earnings to continue their education. They are economically disadvantaged, fulltime vocational students who are at least 15 but less than 21 years of age, and they may not work for more than 15 hours per week. Federal support is for 80% of the compensation paid students and for development and administration costs.

Purpose: to provide financial assistance to students who need the earnings to continue their education.

Level: adaptable to any level in which the students meet the age requirements and are employable.

School/Work Relationship: there is no attempt to offer classroom instruction that is related to the work situation, nor are students released from any of their normal educational requirements. The employer alone determines what is performed on the job.

Vocational Application: any eligible vocational student.

### COOPERATIVE VOCATIONAL EDUCATION

Cooperative vocational education (from the Vocational Amendments of 1968 Title I, Part G): ". . . a program of vocational education for persons who, through a cooperative arrangement between the school and employers, receive instruction including required academic courses and related vocational instruction by alternation of study in school with a job in any occupational field . . ." The student receives both pay and credit.

Purpose: to provide classroom instruction and on-the-job work experience that relate to the student's curriculum and stated occupational goals.

Level: secondary, post-secondary.

School/Work Relationship: school provides academic instruction and related vocational instruction. Both classroom and work experiences are planned and supervised by the school and employer so that each contributes to the student's education and employability. The employer provides the laboratory where the student can apply the related vocational instruction provided in the school. The work station also offers the student an opportunity to acquire new competencies not available in the classroom.

Cooperative vocational programs are very structured with the roles of the student, school, and employee well defined.

Vocational Application: all vocational service areas at secondary or post-secondary levels.

FORMATIVE CHECK: Individual  
Learning Activity 9.1-a

On the following pages are Types of Field Experience and Field Experience Characteristics. Cut the pages on the dotted lines to make a series of "learning cards." Make a stack for each type of field experience, placing the appropriate characteristics (cards) on the type of the field experience. When you are finished, check your answers with the answer key at the end of the activity.

FORMATIVE CHECK: Group  
Learning Activity 9.1-a

"SUPERSTAR" FIELD EXPERIENCE GAME

1. Divide the class into teams with a maximum number of four. In small classes, members may function as individuals to answer questions.
2. Use the cards from Formative Check: Individual (above) to provide questions for review.
3. One student will act as the game official to draw a question card and read the question. The order of play is determined and a question is read to that team (or individual). Score is determined by the "SUPERSTAR SCOREBOARD" which follows.
4. The official will decide if a correct answer has been given and then will announce the number of points the question is worth. (Announcing the value of the question ahead of time would allow players to intentionally give the wrong answer to avoid an obvious "loss of turn" or "penalty" block.) During team play, a time allowance of ten seconds for consultation should be allowed and checked by the game official.
5. If a question is correctly answered, the player or team moves forward the number of spaces indicated on the question card. If the player's or team's piece lands on a bonus question, they miss a turn.

- In the event that the player's or team's piece lands on a bonus move or a penalty move, their piece is immediately moved that number of spaces indicated in the block.
6. The order of play is determined and a question is read to that player or team. Unless special moves or questions are encountered, play continues to move back and forth between players or teams. If a question is not answered correctly, the next player or team has the opportunity to answer it. When play is by teams, one player should be selected as a spokesperson. When questions are written, a point value (spaces moved) should be determined according to how difficult the question is. Questions at the knowledge and comprehension level would be worth fewer points than questions at the application, analysis, synthesis, and evaluation levels.
  7. The player or team reaching the last square first would be declared the "winner." At this time, a summary of the material covered would be useful. Students may then be asked to write questions for use the next time the material is covered.

TYPES OF FIELD EXPERIENCES

APPRENTICESHIP	INTERNSHIP
NON-PAY WORK EXPERIENCE	WORK OBSERVATION
PAID WORK EXPERIENCE	WORK STUDY
COOPERATIVE VOCATIONAL EDUCATION	

## FIELD EXPERIENCE CHARACTERISTICS

(Cut page on lines to make "learning cards.")

<p style="text-align: right;">1</p> <p>Duration: 2-8 Years</p>	<p style="text-align: right;">2</p> <p>Usually occurs after classroom instruction is complete</p>
<p style="text-align: right;">3</p> <p>Designed for economically disadvantaged students 15-21 years old.</p>	<p style="text-align: right;">4</p> <p>Observes work, but does not perform.</p>
<p style="text-align: right;">5</p> <p>Purpose is to prevent drop-outs, provide exploration, or an alternative to the regular curriculum.</p>	<p style="text-align: right;">6</p> <p>Student performs work, but is not paid.</p>
<p style="text-align: right;">7</p> <p>Purpose is to allow the student to apply, in a realistic situation, the attitudes, knowledges, and skills learned in the classroom.</p>	<p style="text-align: right;">8</p> <p>A paid experience with an educational or public agency.</p>

<p style="text-align: right;">9</p> <p>Student is not paid.</p>	<p style="text-align: right;">10</p> <p>There is no attempt to offer related classroom instruction.</p>
<p style="text-align: right;">11</p> <p>Student receives both pay and credit.</p>	<p style="text-align: right;">12</p> <p>There is generally no related class and limited school supervision.</p>
<p style="text-align: right;">13</p> <p>Trainee is selected by a committee from industry and labor.</p>	<p style="text-align: right;">14</p> <p>Usually occurs at the college level, in professional or sub-professional occupations.</p>
<p style="text-align: right;">15</p> <p>Students must need earnings to continue their education in order to qualify.</p>	<p style="text-align: right;">16</p> <p>There is little, if any related classroom instruction.</p>
<p style="text-align: right;">17</p> <p>Experience alternates work with related school learning.</p>	<p style="text-align: right;">18</p> <p>Purpose is to allow the student to learn a trade and perform, in a productive setting, under the supervision of an experienced employee.</p>

19  Work is carefully planned because of legal implications.	20  Experience alternates school and work related to student's occupational goals.
21  A formal agreement binds the employee to provide instruction in exchange for work.	22  Employment is not necessarily, or usually, related to the student's occupational goal.
23  Purpose is to allow the student to become aware of and/or explore the nature of work and/or occupations.	

# SUPERSTAR SCOREBOARD

1	2	3	4	5	6	7	8	9	10
20	19	18	17	16 Bonus Question	15	14	13	12 Lose Turn	11
21	22	23	24	25	26	27	28 Bonus Question	29	30
40	39 Bonus Question Move 10	38	37	36	35	34	33	32	31
41	42	43	44	45 Penalty Move Back	46	47	48	49	50
60	59	58	57	56	55	54	53	52	51
61	62 Penalty Move Back	63	64	65	66	67	68 Bonus Move 10	69	70
71	72	73	74	75	76 Bonus Question	77	78	79	80
90	89	88	87	86	85	84	83 Bonus Question	82	81
91	92	93 Lose Turn	94	95	96 Penalty Move Back 10	97	98	99	100

**Key - Learning Activity 9.1-a: Individual**

1. Apprenticeship
2. Internship
3. Work Study
4. Work Observations
5. Paid Work Experience
6. Non-Pay Work Experience
7. Internship or CVE
8. Work Study
9. Work Observation or Non-Pay Work Experience
10. Work Study, Paid Work Experience, or Work Observation
11. Cooperative Vocational Education
12. Paid Work Experience or Work Study
13. Apprenticeship
14. Internship
15. Work Study
16. Work Observation, Paid Work Experience, or Work Study
17. Paid Work Experience, CVE, or Non-Pay Work Experience
18. Apprenticeship
19. Non-Pay Work Experience
20. CVE
21. Apprenticeship
22. Work Experience or Work Study

Instructional Objective 9.2

The learner will select the appropriate types of field experiences that would be best utilized to accomplish various instructional objectives.

Learning Activity 9.2-a: Individual

As a result of a needs assessment, certain groups in the high school population have been identified as having particular needs. As curriculum director, you have been assigned the task of identifying instructional strategies that will relate to those needs. For each of the three groups listed on the next page:

1. identify a field experience that will achieve the objective,
2. state whether the field experience has a possibility of being funded through vocational education,
3. explain how the strategy is to be organized, and
4. state the roles of the school and employee.

Learning Activity 9.3-b: Group

Given the situation in Group II on the next page, a panel of three to four students, each representing one of the following strategies: work observation, work experience, CVE, and non-pay work experience, presents to the group (class) a proposal to have the type of field experience they represent be selected as the appropriate solution to the problem. Each panel member has a maximum of five

minutes and must present accurate information. After the presentations, class members may direct questions to the panel members. After the questioning session, each panel member and each class member is to vote for one of the field experiences. As an option, class members could vote by secret ballot--each vote should include an explanation for the field experience selected. A concluding activity might be a summarizing class discussion.

GROUP SITUATIONS FOR LEARNING ACTIVITIES 9.2-a, 9.2-b

Group I - A considerable number of vocational students are having financial difficulties and many will be unable to continue their education.

Group II - Many juniors and seniors have no clear occupational goal. The regular curriculum does not meet their needs and they have little motivation to succeed in the present offerings. Many of these students are dropping out.

Group III - Many job opportunities are available in the community in the food service area. A survey of students indicates a considerable number of students with a career interest in food service.

## SCRIPT FOR SLIDE-TAPE PRESENTATION

<p>1.</p> <p>(T &amp; I teacher speaks) "You know, we've got a pretty good auto mechanics program here, but the students are lacking one important thing--that's real, on-the-job performance."</p>	<p>T&amp;I teacher with another adult looking at students working on cars in auto shop.</p>
<p>2.</p> <p>(Business and Office teacher speaks) "It seems like every one of my students has a different choice for a career in business. These students deserve an opportunity to explore their interests, but I'm not sure where to begin."</p>	<p>B&amp;O teacher talking with an administrator, students in background.</p>
<p>3.</p> <p>(TITLE PAGE)</p>	<p>Using FIELD EXPERIENCE AS AN INSTRUCTIONAL STRATEGY</p>
<p>4.</p> <p>If the goal of vocational education is preparing students for employment in the real world, then giving students experience in that world is a necessary strategy for vocational education.</p>	<p>Circle of pictures depicting places of employment, e.g., industries, offices, hospitals, etc.</p>
<p>5.</p> <p>Such strategies are equally important to meet the goals of general education, involving students of all ages.</p>	<p>Small children observing workers.</p>
<p>6.</p> <p>Strategies that utilize experiences in a work setting to achieve educational goals are known as <u>field experience</u>.</p>	<p>Using work experiences to achieve educational goals = FIELD EXPERIENCE.</p>

<p>7.</p> <p>Examples of field experiences are:          Apprenticeships,          Internships,          Non-pay work experience          Work observation          Paid work experience          Work study          Cooperative Vocational programs</p>	<p>List: use color and interesting type style.</p>
<p>8.</p> <p>The rationale for using the world of work as an educational strategy relates directly to the objectives of both vocational and general education.</p>	<p>general vocational          educ. educ.          class- scene          room</p>
<p>9.</p> <p>These objectives lend themselves to field experiences in which the student:          becomes aware of the world of work,          becomes aware of self aspirations regarding occupations          earns money,          puts theory into practice, and          gains experiences not available in the classroom.</p>	<pre> graph TD     STUDENT --- Money     STUDENT --- Work     STUDENT --- Experience     STUDENT --- Self     STUDENT --- Practice         </pre>
<p>10.</p> <p>Each field experience strategy has its own unique characteristics--its advantages and disadvantages. For teachers who plan to use these strategies, it is necessary to be able to distinguish between them and to pick the appropriate strategy in meeting educational objectives.</p>	<p>Collage of pros and cons.</p>
<p>11.</p>	<p>INTERNSHIP</p>

<p>12.</p> <p>An internship is usually a culminating experience that occurs <u>after</u> the classroom instruction is completed. The student works in a professional or sub-professional situation, under supervision, and is usually paid. The internship is generally fulltime, and lasts at least one semester.</p>	<p>FEATURES:</p> <ul style="list-style-type: none"> <li>* Follows classroom experience.</li> <li>* Professional situation.</li> <li>* Paid</li> <li>* Fulltime</li> </ul>
<p>13.</p> <p>The purpose of the internship is to allow the student to apply in a realistic situation the attitudes, knowledges, and skills learned in the classroom.</p>	<p>Intern working under supervision.</p>
<p>14.</p> <p>The student learns the theory in school, then applies knowledge, skills, and attitudes in a work experience after the schooling is finished.</p>	<p>School supplies:  <ul style="list-style-type: none"> <li>* classroom learning</li> </ul>           Internship site supplies:  <ul style="list-style-type: none"> <li>* practical application</li> </ul> </p>
<p>15.</p>	<p>APPRENTICESHIP</p>
<p>16.</p> <p>An apprenticeship is an experience of between two and eight years. The instruction is supplemental to the daily employment of the student or apprentice. The apprentice is selected by a joint apprenticeship committee composed of members from industry and labor.</p>	<p>Features:</p> <ul style="list-style-type: none"> <li>* 2-8 years</li> <li>* instruction supplemental to job</li> <li>* Selection by joint apprenticeship committee.</li> </ul>

<p>17.</p> <p>The purpose of the apprenticeship is to allow the student to learn and perform in a productive setting, under the supervision of an experienced employee or master.</p> <p>These experiences are limited to the apprenticeable trades, and to students at least 17 years old.</p>	<p>Apprentice working on job with older master worker.</p>
<p>18.</p> <p>In an apprenticeship, the school provides facilities and related instruction, which is taught by skilled journeymen workers. A formal agreement binds the employer to provide on-the-job instruction in exchange for the work of the apprentice who is paid for his/her work.</p>	<p>School provides: * related instruction and facilities. Employer provides: * OJT</p>
<p>19.</p>	<p>NON-PAY WORK EXPERIENCE</p>
<p>20.</p> <p>Non-pay work experience is an instructional strategy in which the student actually performs work for an employee but does not receive pay. The student's experiences and training are carefully and specifically planned by the school and the employee in order to comply with strict legal regulations.</p>	<p>FEATURES: * On the job work experience. * No pay * Coordination between school and employer.</p>
<p>21.</p> <p>The purpose of this strategy is to offer an exploratory or training experience that lends to the students' employability utilizing non-pay experiences in situations where a paid experience is not feasible.</p> <p>It is usually offered at the junior or senior level in high school, but these experiences could be appropriate to any secondary or post-secondary program.</p>	<p>Student in uniform working in facility.</p>

<p>22.</p> <p>The school/work relationship varies with the intent of the experience. If exploratory in nature, the role of the school is providing occupational information and planning and supervising the work experience with the employee.</p>	<p><b>EXPLORATORY</b>  School provides:  * planning and supervising the work experience with the employer.  Employer provides:  * on the job work experience and supervision.</p>
<p>23.</p> <p>If training is the purpose, the role of the school is very similar to that in a cooperative education program. In either case, the employee must be very careful to comply with conditions of the Fair Labor Standards Act relating to an employment situation.</p>	<p><b>TRAINING</b>  School provides:  * related classroom instruction.  Employer provides:  * OJT</p>
<p>24.</p>	<p><b>WORK OBSERVATION</b></p>
<p>25.</p> <p>Work observation is usually a strategy used in other programs or a classroom activity rather than a program in itself. In this strategy, the student observes work but does not actually perform. The student is not paid.</p> <p>The purpose is to allow the student an opportunity to become aware of and/or explore the nature of work or specific occupation.</p>	<p><b>FEATURES:</b>  * Observation only  * No pay  * Exploratory</p>
<p>26.</p> <p>The work observation strategy is used frequently in career education programs, especially at the middle grade levels, although it could be used at any educational level.</p>	<p>Junior High students observing workers</p>

<p>27.</p> <p>Since work observation is primarily an exploratory activity, there is little, if any, instruction which is directly related to the occupation. However, a classroom discussion might focus on general occupational information. The role of the employer is to allow the student to observe.</p>	<p>School provides: * indirect instruction Employer provides: *observation opportunity</p>
<p>28.</p>	<p>PAID WORK EXPERIENCE</p>
<p>29.</p> <p>Paid work experience programs offer students an opportunity to work for pay as producing employees. The work experience is not necessarily, or usually, related to the student's occupational goal. The purpose of paid work experience programs is to meet general educational goals such as:</p> <ul style="list-style-type: none"> <li>*explore the World of Work</li> <li>*allow wage earning while continuing education</li> <li>*provide an alternative to the regular curriculum</li> <li>*prevent dropouts</li> <li>*increase student motivation toward the regular curriculum</li> </ul>	<p>FEATURES: *Work for pay *Work is not usually related to occupational goal. *General educational goals</p>
<p>30.</p> <p>Paid work experience programs are generally used at the secondary and post-secondary levels. There is generally no related class and limited supervision by the school. Students are released from school for a portion of the school day and may or may not receive academic credit. The role of the employer is to provide a paying job for the student.</p>	<p>FEATURES: *Release time for student *Academic credit (sometimes) Employer provides: *Job with pay</p>
	<p>WORK STUDY PROGRAMS</p>

<p>32.</p> <p>Work study programs, as defined by the Vocational Amendments of 1968, are those programs which offer students a paid experience with an education or public agency. The students must qualify as needing earnings to continue their education. They must be economically disadvantaged, fulltime vocational students who are at least 15 but less than 21, and they may work no more than 15 hours per week. The federal government supports 80% of the compensation paid to students, and of development and administration costs.</p>	<p>FEATURES:</p> <ul style="list-style-type: none"> <li>* Legal definition</li> <li>* Economically disadvantaged students</li> <li>* Federal support for programs</li> </ul>
<p>33.</p> <p>The purpose of the work study program is to provide financial assistance to students who need the earnings to continue their education. The program is adaptable to any level in which the students are from 15-21 years of age.</p>	<p>Students on the job</p>
<p>34.</p> <p>There is no attempt to offer classroom instruction that is related to the work situation, nor are students released from any of their normal educational requirements. The employer alone determines what is performed on the job.</p>	<p>School provides:</p> <ul style="list-style-type: none"> <li>* students (No related instruction, No release time.)</li> </ul>
<p>35.</p>	<p>COOPERATIVE VOCATIONAL EDUCATION</p>
<p>36.</p> <p>The Vocational Amendments of 1968 state that Cooperative Vocational Education is "a program of vocational education for persons who, through a cooperative arrangement between the school and employers, receive instruction including required academic courses and related vocational instruction by alternation of study in school with a job in any occupational field. . . ." The student receives both pay and credit.</p>	<p>FEATURES:</p> <ul style="list-style-type: none"> <li>* Legal definition</li> <li>* Alternation of related classroom instruction with job experience</li> <li>* Pay plus credit</li> </ul>

<p>37.</p> <p>The purpose of cooperative vocational education is to provide classroom instruction and on-the-job work experience that relates to the student's curriculum and stated occupational goals. The strategy is used at both the secondary and post-secondary levels.</p>	<p>Students on the job</p>
<p>38.</p> <p>It is the responsibility of the school to provide academic instruction and related vocational instruction. The employer provides a laboratory where the student can apply the related vocational instruction learned in the classroom. The work station also offers the student an opportunity to acquire new competencies not available in the classroom.</p>	<p>School provides:</p> <ul style="list-style-type: none"> <li>* academic instruction</li> <li>* related vocational instruction</li> </ul> <p>Employer provides:</p> <ul style="list-style-type: none"> <li>* job and specific work experiences, supervision and training</li> </ul>
<p>39.</p> <p>Both classroom and work experiences are planned and supervised by the school and employer so that each contributes to the student's education and employability.</p>	<p>Teacher (in suit) shaking hands with employer (in coveralls). Student in background working on car.</p>
<p>40.</p> <p style="text-align: center;">NO DIALOGUE</p>	<p>Repeat slide #7</p>
<p>41.</p> <p>Using field experiences as an instructional strategy is appropriate for both vocational and general education teachers. The important consideration is to use a type of field experience that is compatible with the educational goals of the program.</p>	<p>Teacher matching strategy to goal</p>

ANNOTATED LIST OF REFERENCES FOR FURTHER STUDY

Materials for all Vocational Areas

COOPERATIVE PROGRAMS:

Ashmun, Richard D., and Klaurens, Mary K. "Essentials in Educating the Teacher-Coordinator." American Vocational Journal 44, No. 5 (May 1969): 28-29; 62.

The author discusses nine essentials in educating the teacher-coordinator.

Butler, Roy L., and York, Edwin C. What Teacher-Coordination Should Know About Cooperative Vocational Education. ERIC Information Series No. 36. Columbus, OH: ERIC Clearinghouse on Vocational and Technical Education, Ohio State University, 1971.

The authors have synthesized information useful to teacher-coordinators as a reference for developing and improving occupational experience programs. Sections include: Planning the Program, Coordinating the Program, and Evaluating the Program.

Dixie, Theodore C., and Welch, Frederick G. Alternative Plans in the Event of Work Interruption: Cooperative Vocational Education in Pennsylvania. CVE Monograph #2. Harrisburg, PA: Pennsylvania State Department of Education, 1973. ED 101 125.

The study described alternative methods to work experience used by cooperative vocational education in the event of student lay-offs.

Evans, Rupert N. "Cooperative Programs: Advantages, Disadvantages, and Factors on Development." American Vocational Journal 44, No. 5 (May 1969): 19-22; 58.

The article provides background material on cooperative programs.

Harris, E. Edward, and Johnson, Peter. An Articulated Guide for Cooperative Occupational Education. Bulletin No. 34-872. Springfield, IL: Illinois State Board of Vocational Education and Rehabilitation, Division of Vocational and Technical Education, 1974. ED 105 151.

The purpose of the guide is to assist educators and community leaders in designing and implementing educational programs to serve student and community needs, and to identify the goals and elements of cooperative vocational education.

Huffman, Harry. Guidelines in Cooperative Education. Columbus, OH: The Center for Vocational and Technical Education, Ohio State University, 1967.

The introduction to this publication (Part I) reviews history, definitions, and advantages to Cooperative Education, and includes art masters which explain the strategy. Part II gives guidelines for implementing cooperative programs. Also included (Part III) are papers presented at a national seminar on cooperative education.

Hunt, Donald C. Fifty Views of Cooperative Education. Washington, DC: U.S. Bureau of Higher Education (DHEW/OE), 1974. ED 102 420.

This is a collection of diverse beliefs on the administration of cooperative education programming.

Mason, Ralph E., and Haines, Peter G. Cooperative Occupational Education and Work Experience in the Curriculum. Danville, IL: Interstate Printers and Publishers, Inc., 1972.

Chapter 1: Overview of work experience. Description and comparison of work observation, general work experience, work study/internships, and cooperative occupational education. Chapter 8-13: The "how to" on setting up cooperative programs. Chapter 14-19: Using cooperative programs in specialized programs--Adult and Continuing Education, various vocational areas. This is one of the best books in the field on all aspects of Cooperative Education programs. There is also limited information on other types of field experience strategies.

University of Minnesota. A Guide for Cooperative Vocational Education. Minneapolis, MN: College of Education, Division of Vocational and Technical Education, 1969.

This is a valuable resource book for teachers who want to establish a cooperative vocational program. Some of the information is applicable to other field experience strategies.

U.S. Bureau of Higher Education (DHEW/OE) New Horizons in Cooperative Education: Project Report. Washington, DC: U.S. Bureau of Higher Education, 1974. ED 100 434.

This is an overview of cooperative education programs in a community college district, including a description of three plans for cooperative programs.

Wallace, Harold R. Review and Synthesis of Research on Cooperative Vocational Education. ERIC Research Series No. 60. Columbus, OH: ERIC Clearinghouse on Vocational and Technical Education, Ohio State University, 1970. ED 040 274.

A well organized summary of research and development on Cooperative Vocational Education. Various units are: Basic Concepts, The Student Learner, The Employment Community, Educational Technology, Program Implementation and Priorities, Problems and Issues.

Review and Analysis of Instructional Materials for Cooperative Vocational Education. ERIC Information Series No. 60. Columbus, OH: Ohio State University, 1972. ED 062 513.

For three learning situations in the cooperative program (vocational or technical course work, training stations, and the related class) the author reviewed pertinent curriculum materials. Aspects of the review were: content, quality and usefulness, validity, enrichment materials and instructional aids, and student involvement and participation.

OTHER FIELD EXPERIENCE PROGRAMS:

Bishop, Jerry. "A Middle School Creates an Employment Service." The Clearinghouse 47, No. 3 (November 1972): 182-184.

Middle school students and potential employers showed so much interest in the school's Work Experience Program, that an employment service was started. The author tells how it was done and gives recommendations for the development of new programs.

Ivins, Wilson H., and Runge, William B. Work Experience in High School. New York: Ronald Press Co., 1951.

Chapters 2 and 3 give a history of work experience as part of education.

Law, Gordon F. Contemporary Concepts in Vocational Education. Washington, DC: American Vocational Association, 1971.

Section 7 (pp. 275-300) covers several aspects of "Cooperative Education and Other Forms of School-Community Involvement." This is interesting reading by the experts on the "whys" and "how to's" of school-community cooperation in education.

Luckner, Barbara A., and Zane, Lawrence F. H. eds. Familiarization and Dissemination of Selected Vocational-Technical Curriculum and Resource Materials, Final Report. Washington, DC: National Center for Improvement of Educational Systems (DHEW/OE), 1974. ED 101 142.

The document includes a paper by Alan Yonan entitled, "Combining Theory with Work Experience Through Apprenticeship." This paper explains the agencies involved in apprenticeship programs (state and trade) and their interrelationships.

Ray, Gordon, and LeKander, Larry. "The Salinas Approach." Thrust for Educational Leadership 1, No. 5 (April 1972): 24-25.

Examples of non-typical vocational programs are described by the authors: floriculture, (ag), Home Care (home ec), Computer Programming (B & O), and Industrial Electricity (T & I).

Venn, Grant. Man, Education, and Work. Washington, DC: American Council on Education, 1964.

A brief overview on apprenticeships is given on pages 104-105.

#### Materials for Specific Vocational Areas

##### AGRICULTURE EDUCATION:

Dillon, Roy. "Cooperation for Realistic Education: Emphasis Agribusiness." American Vocational Journal 48, No. 8 (November 1973): 26-28, 31.

The author describes various field experience programs appropriate for different age levels and different objectives in agricultural education.

Idaho State Board for Vocational Education. Guidelines and Procedures for Cooperative Programs in Agriculture Education. Idaho Vo-Ed #16. Boise, ID: Idaho State Board for Vocational Education, 1971.

This resource manual was developed as a guide for teachers of agriculture education who plan to conduct cooperative programs in agricultural education.

North Carolina State Department of Public Instruction. Cooperative Education in Vocational Agriculture. Raleigh, NC: Division of Occupational Education, State Department of Public Instruction, 1971.

This publication was developed as a guide to teachers, administrators and agricultural businessmen who are interested in adding the cooperative approach to the vocational agriculture programs.

## BUSINESS AND OFFICE EDUCATION:

Flemmons, Martha; Carr-Smith, Norma; and Watts, Jo. "Teaching Designs for Varied VOE Programs." Business Education Forum 27, No. 8 (May 1973): 20-22.

The article includes a comparison of laboratory vs. cooperative teaching strategies, and sample plans for two types of cooperative programs.

New Jersey Department of Education. Cooperative Office of Education. Trenton, NJ: State of New Jersey, Department of Education, Division of Vocational Education, 1969.

This bulletin was designed to provide the educator with the philosophy and practical application of those principles fundamental to Cooperative Office Education.

## DISTRIBUTIVE EDUCATION:

Coakley, Carroll B. ed. Distributive Education Teacher-Coordinator's Handbook. Danville, IL: Interstate Printers and Publishers, Inc., 1972.

The handbook offers guidelines for organizing and implementing distributive education programs.

Crawford, Lucy C., and Meyer, Warren G. Organization and Administration of Distributive Education. Columbus, OH: Charles E. Merrill Co., 1972.

A helpful list of specialized terms, most of which relate to cooperative education, is given on pages 11 and 12. Chapters 5 and 6 would be useful to teachers interested in setting up a cooperative program.

## DIVERSIFIED OCCUPATIONS/MULTI-OCCUPATIONAL EDUCATION:

Moore, Charles E. "Factors to be Considered in Establishing a Diversified Cooperative Occupational Education Program." Man/Society/Technology 33, No. 3 (December 1973): 79-80.

Factors which should be considered when establishing a D.O. program are discussed. The author identifies such factors as: Establishing student need and interest, Determining community attitudes, facilities, and needs; Attitudes of school personnel, Financial aspects, and other factors.

Spooner, Kendrick, and Mutter, Mary Louise. eds. Teacher-Coordinator's Guide for Related Instruction in Multi-Occupation Cooperative Programs. Cheyenne, WY: Wyoming State Department of Education, 1974. ED 105 227.

The guide provides supplementary instructional material for secondary school multi-occupational cooperative programs.

Washington Coordinating Council for Occupational Education. Diversified Occupations Basic Coordinator's Guide. Olympia, WA: Washington Council for Occupational Education, 1970.

A source book for teachers who wish to implement cooperative programs in Diversified Occupations.

Wyoming State Department of Education. Management System for Multi-Occupational Education: Cooperative Occupational Education. Cheyenne, WY: Wyoming State Department of Education, 1974.

This document offers suggestions for the development of management systems and policies for the improvement and implementation of cooperative occupational education programs. It includes objectives, procedures, checklists, forms and requirements.

#### HOME AND FAMILY LIFE EDUCATION:

New Jersey Department of Education. Home Economics Cooperative Education Programs for Youth and Adults. Trenton, NJ: State of New Jersey, Department of Education, Division of Vocational Education, Home Economics Unit, 1971.

This is a handbook for teacher-coordinators of new cooperative programs in Home Economics.

#### TRADE, INDUSTRIAL AND TECHNICAL EDUCATION:

Resnick, Harold, and Ricciuti, Renzo A. "Bridge Building Programs in Industrial Arts: No Panaceas Necessary." American Vocational Journal 48, No. 8 (November 1973): 46-49.

The authors describe a work study program in industrial arts which combines field-based and occupational exploratory activities.

## Materials for Students with Special Needs

### MENTALLY AND PHYSICALLY HANDICAPPED

Croell, Marvin C. A Pilot Project in Curriculum Development for "Work Experience" and "Occupations" Courses for Educable Mentally Retarded Students. Oakland, CA: Oakland Unified School District, 1967. ED 023 207.

A two-phase project on work study for EMR's is described. Descriptions of instructional materials, teaching procedures, and the vocational training program are included.

Mather, Robert J., and O'Toole, Richard. "Counselors Move Out from Behind Their Desks." American Vocational Journal 45, No. 4 (April 1970): 24-26; 32.

Work study programs for the mentally retarded are described: workshop setting, counseling, interpersonal relations, and instructional strategies used in preparation for the work study experience.

New Mexico State Department of Education. A Guide for Teachers of the Educable Mentally Handicapped, Secondary. Santa Fe, NM: New Mexico State Department of Education, Division of Special Education, 1974.

The document is a curriculum guide for a pre-vocational, vocational, and work study program to be used with educable mentally retarded students, 12 to 21 years of age.

Sluser, Ruth, and Mathewson, John. "Summer Work-Study for Educable Mentally Retarded Students." The Bulletin of the National Association of Secondary School Principals 54, No. 344 (March 1970): 48-55.

A summer work-study program was initiated to help the social adjustment of mentally retarded high school students and prepare them for full time jobs. This paper discussed objectives, student selection and evaluation procedures.

U. S. Bureau of Education for the Handicapped. Project Worker: Teacher's Manual for a Course in Career Decision Making for Special Education. Washington, DC: U. S. Bureau of Education for the Handicapped (DHEW/OE), 1974. ED 091 560.

This teacher's manual is coordinated to individually-paced occupational experiences for secondary special education students. These students gain general entry-level skills for employment. The manual includes student checklists, testing instruments, job listing, and suggestions for field experiences and bibliography.

Work Study Program for Handicapped Children. Final Report. Washington, DC: U. S. Bureau of Education for the Handicapped (DHEW/OE), 1974. ED 091 560.

This is the report of a project designed to increase the employability of mentally and physically handicapped high school students. Results included audiovisual materials on job information, assessment of student employability, and placement and evaluation of students in work stations.

Yamagata, Barbara, et al. Curriculum Guide for the Work Study Program, 1974. Fairfax VA: Fairfax County Public Schools, Department of Instructional Services, Special Education Division, 1974. ED 100 094.

This is a work study curriculum guide for mentally retarded high school students. It includes job placement, termination procedures, program forms, program evaluation components, and guidelines and diagrams for classroom and occupational laboratory organization.

#### RURAL DISADVANTAGED:

Cook, John E. "Cooperative Education for Rural Students? It's Possible." American Vocational Journal 50, No. 5 (May 1975): 26-28.

This is an article which gives suggested resources and strategies for cooperative programs in a rural setting.

Miles, Guy H. Guidelines for an Experimental Rural Youth Program for the Southeastern States. Second of Two Final Reports. Washington, DC: Manpower Administration (DOL), 1973. ED 100 544.

This document describes a rural youth work experience and offers tentative guidelines for operating similar programs.

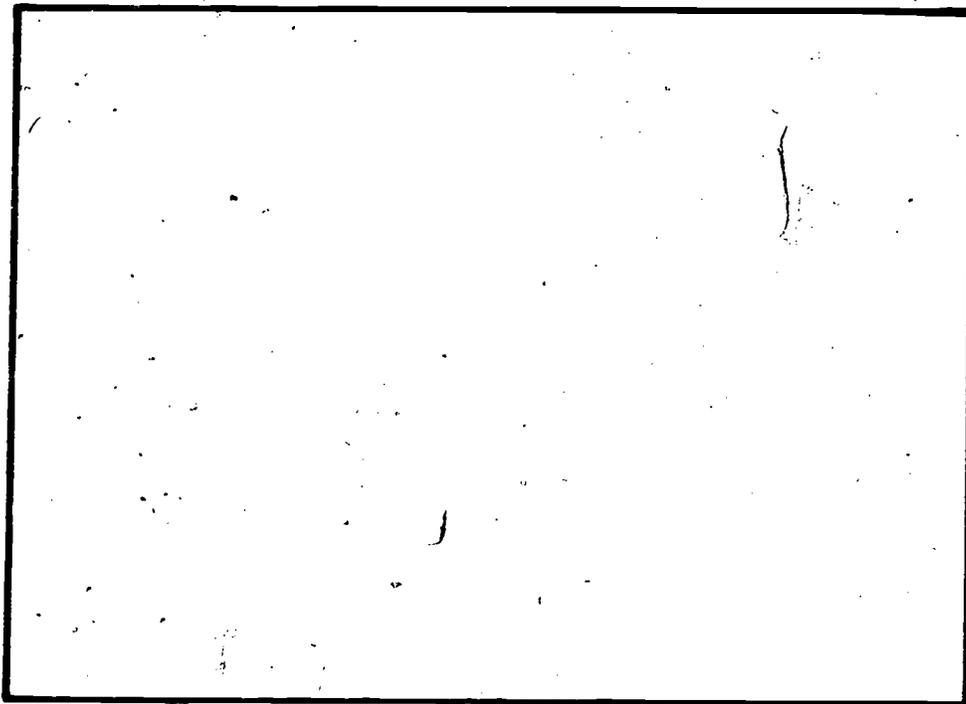
Swenson, Leroy H. "Are Co-op Programs Possible in Small High Schools?" American Vocational Journal 44, No. 5 (May 1969): 22-23.

The author describes the special values and inherent problems of co-op programs in small high schools. He also outlines the steps in planning such programs, the conditions that are required, and the typical occupations involved.

U. S. Department of Health, Education, and Welfare. Proceedings of the Training Institute for Rural Disadvantaged. Washington, DC: Office of Education, August 17-21, 1970. ED 049 389.

This document includes a presentation by Max L. Amberson, on "Adapting Cooperative Vocational Education Programs to Meet the Needs of the Rural Disadvantaged" (pp 86-100). Dr. Amberson includes his suggestions for means of adapting such programs.

# INDEPENDENT STUDY



## CATEGORY: INDEPENDENT STUDY

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**PERFORMANCE OBJECTIVE 10** ●●●●● ●●●●●

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Describe and demonstrate independent study techniques.

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Instructional Objective 10.1

The learner will define independent study and distinguish it from individualized instruction.

Instructional Objective 10.2

The learner will design a preliminary group experience (problem) in one vocational area.

Instructional Objective 10.3

The learner will develop an independent study plan appropriate for a student in a vocational situation.

Instructional Objective 10.4

The learner will use appropriate criteria to evaluate independent study.

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**PERFORMANCE OBJECTIVE 10**

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Describe and demonstrate independent study techniques.

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Instructional Objective 10.1

The learner will define independent study and distinguish it from individualized instruction.

Learning Activity 10.1-a

Read the following introduction, definition, characteristics of teacher and learner, and advantages and disadvantages of independent study, then complete the formative check which follows.

Optional: A script for a slide-tape presentation which introduces Independent Study as an instructional strategy is included at the end of this category.

**INDEPENDENT STUDY**

Introduction

A program of independent study is a teaching strategy that can be utilized to accomplish the aims of the educational process. A teaching strategy is a means to an end and should be modified or discontinued if it fails to accomplish an educational objective.

Independent study is individualized instruction with certain qualifications. On their own initiative, students voluntarily accomplish the objectives of the study. They generally perform the study outside the regular classroom, and have a voice in deciding what, when and how they learn. In contrast to programmed instruction,

the procedures and methods are not readily apparent at the beginning of the study. Another very important qualification is that the rewards for pursuing an independent study program are intrinsic rather than extrinsic. For example, grades and peer approval are examples of extrinsic rewards. But because independent study is tailored to the interests and abilities of the student, most find the study enjoyable, satisfying, and intrinsically rewarding for the sake of learning itself.

#### Definitions in the Literature

Authors of various research studies have defined independent study in a variety of ways. One definition of independent study is "study chosen by an individual because the student wants to pursue it, and in any manner she/he desires."<sup>1</sup> An important part of independent study is having a student accept the responsibility for acquiring knowledge. The teacher acts as a resource for students as well as helping them to plan and evaluate their studies. Independent study was defined differently by Atherton,<sup>2</sup> when he compared the teaching methods for lecture, discussion, and independent study. He defined it as having minimal student/teacher interaction where students were given an assignment to carry out on their own. Students were free to do whatever they wanted with the material. There were no study sessions, programmed adjuncts, or study guides. It was not surprising that he found the independent study method to be the least effective method. He concluded that student/teacher contact provided a more favorable climate for learning.

1

A. W. Chickering, "Dimension of Independence," Journal of Higher Education XXXV (January 1964): 40.

2

C. R. Atherton, "Lecture, Discussion and Independent Study: Instructional Methods Revisited," Journal of Experimental Education 40 (Summer 1972): 24-28.

Some studies described which students should be involved in independent study. Brown<sup>3</sup> stated that only those students who have demonstrated capacity for self-motivation and industry be allowed to study independently. Chickering was somewhat in agreement with him when he stated, "It was the well controlled, highly motivated, self-assured . . . student who worked most successfully."<sup>4</sup> Another viewpoint expressed that all students of all ability levels should be involved in independent study. In Hamden High School, 80 students were selected to be involved in independent study with some of these students pursuing all of their subjects in this manner. The students were admitted to the program only if they knew what subject they wanted to study, how they wanted to proceed with the research and how they wanted to be evaluated. Note that the criteria for selection of students was not ability.<sup>5</sup>

In the 1960's independent study was advocated for all students rather than just for the "gifted." Perhaps the significant point is that students who do not have experience in studying independently are the most in need of direction to develop this ability. If an interest in studying is initiated by the student, is it not the role of the teacher to foster this interest and help the student in his/her endeavor? The teacher can also initiate ideas for independent study.

For the purpose of this category, the definition of independent study includes any learning activity that is motivated by the learner's own aims, done independently of class, and utilizes the teacher primarily as a resource person

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B. F. Brown, Education by Appointment, (West Hyack, NY: Parker Publishers, 1968).

4

Chickering, "Dimensions," p. 40.

5

H. B. Axelrod, "Independent Study: A Report from Hamden High," Clearinghouse 48 (October 1973): 103-105.

Learners have a voice in determining what, when and how they learn. Independent study is student directed rather than teacher directed. When an independent study is evaluated, both the student and teacher are involved in the evaluation procedure. One goal of independent study is to have students improve in their ability to evaluate themselves. Students involved in independent study must have access to a variety of resources. The students and teachers must be able to use the library. This definition effectively excludes individualized instructional programs, correspondence courses, on-the-job training (OJT) situations, and teacher assigned shop projects from consideration within the independent study strategy. This is not to say that these educational activities cannot be incorporated into very productive independent study programs. A discussion of how some of these activities can be expanded into independent study programs related to vocational education is presented later in the discussion.

#### Teacher and Student Characteristics in Independent Study

1. The teacher needs to:
  - a. recognize that students will maintain their motivation only to the extent they are having success,
  - b. provide guidance for the student,
  - c. realize that evaluation is difficult and often subjective,
  - d. realize that not all students are ready to profit from an experience in independent study,
  - e. realize that independent study can be used as a supplement to other teaching strategies,
  - f. provide instruction on how to utilize resource persons and materials,
  - g. be competent in the techniques of problem solving,
  - h. plan the day to allow time for advising students on a one-to-one basis,

- i. encourage all students to develop those behaviors and attitudes necessary for successful independent study.
  - j. provide preliminary group experiences that lead to independent study (discussed later),
  - k. design an independent study plan with the student (discussed later), and
  - l. evaluate the study (discussed later).
2. The students need to:
- a. be self-directed and motivated,
  - b. know how to find information--library and resource people and materials,
  - c. know how to formulate their own goals.
  - d. know how to evaluate their own progress,
  - e. know how to use techniques of problem solving,
  - f. know how to identify and clarify problems,
  - g. enjoy learning, and
  - h. feel free to consult with the teacher for guidance.

#### Advantages of Independent Study

- a. It increases abilities to learn independently.
- b. Wise allotment of time is encouraged.
- c. The students are exposed to related subjects and often become motivated to pursue related subjects in greater depth.
- d. It fosters an understanding of self-evaluation.
- e. It encourages the student to seek out a variety of resources--books, films, teachers and other resource people.
- f. It provides a chance to practice a way of learning to solve problems that students can use throughout life. This concept is vital in vocational education because of rapidly changing technology and the need to keep up with current industrial needs.

Disadvantages of Independent Study:

- a. It is time consuming for the teacher to work with students individually.
- b. It takes more teacher time compared with other teaching strategies.
- c. Students need to be motivated and interested to complete their study plan.
- d. Independent study is more difficult to evaluate when compared to a typical classroom where rote learning is emphasized and tested.
- e. Students must have experience in the inquiry method of learning or time will be wasted in random non-productive behavior.
- f. The teaching behaviors of self-discipline, working independently, self-motivation are not easily taught or learned by students.
- g. The teacher must have the skill to work with the student in motivation, planning, conferences and evaluation.
- h. Many teachers are not well versed in the inquiry approach to teaching.

## FORMATIVE CHECK

Learning Activity 10.1-a

(Answer on separate paper)

1. In your own words, give a definition of independent study. Include important characteristics which identify the strategy, and distinguish the strategy from that of individualized instruction.
2. Summarize some advantages and disadvantages of the independent study strategy.

Instructional Objective 10.2

The learner will design a preliminary group experience (problem) in one vocational area.

Learning Activity 10.2-a

Read the background material on "Preliminary Group Experiences That Lead to Independent Study for Vocational Education." Then use one of the following inquiry techniques to design a class

problem in your vocational area.

Inquiry techniques:

1. analysis of an unusual event
2. open-ended problem
3. problem formulation—a problem is presented that needs to be solved

#### PRELIMINARY GROUP EXPERIENCES THAT LEAD TO INDEPENDENT STUDY.

##### FOR VOCATIONAL EDUCATION

One method of demonstrating to students that learning can take place independently from the teacher is to develop a resource center in the classroom. For example, a reading center in a vocational agriculture class could serve as the setting for preliminary group experience. Students could bring materials from home to donate to the center such as slides, back issues of agriculture magazines, and current periodicals. The class members could then develop independent study problems based on the materials available. They could have individual teacher conferences and later share their learning: prepared booklets, movies, slides, and ditto sheets could be used to report their information to the class.

#### Practice in Using the Inquiry Technique in a Classroom

There are three techniques which can be used in the classroom to help students use the inquiry method. The goal is to go from a more structured situation with teacher direction toward less structured problems with greater student direction.

Techniques are:

1. analysis of unusual events,
2. open-ended problems, and
3. problem formulation.

The student should first be exposed to the "analysis of the unusual event." This analysis is the least complex technique because it has more teacher direction relative to the other techniques. "Problem formulation" has less teacher direction than does the open-ended problem technique.

The unusual event is any circumstance that involves people, living or physical systems, or happenings in a situation that is extraordinary for that particular event; for example--a pine tree growing from a granite ledge. This unusual event can be presented with slides, color lift transparencies, photographs, drawings or some other visual aid. After the unusual event is presented to the students, a class discussion follows. The discussion is concerned with the following questions:

1. What unusual thing is shown? In our example the unusual event is the pine tree growing out of the rocks.
2. What are the possible explanations?
3. What are the best reasons for the unusual event?
4. What library research or experiment would either prove or disprove the reason(s) the event has occurred.

Another inquiry technique that may be used is the open-ended problem. The most identifiable characteristic of an open-ended problem is the lack of a single best solution. Students are encouraged to use their own initiative and creativity to solve the problem in as many different ways as there are students in the class. This technique makes good use of limited library resources and all students contribute to the solution of the problem. The problem(s) are developed and assigned by the teacher. Another approach is to assign an open-ended problem to individual students or to small groups. These students are free to solve the problem in any way they deem most appropriate.

The third technique, problem formulation, is highly unstructured and employs very little teacher direction. The teacher presents a problem. The class discusses the problem and develops alternative solutions. For example, a vocational

teacher presents an inoperable small gasoline engine to the class. The class must first identify the problem then develop alternative solutions. If defective valves are determined to be the problem, then the class must decide whether to grind valves, buy new valves, replace the old valves with used ones, buy a new engine, or get along with it the way it is. As a result of this process, the students may discover other problems. For example the rings may also be defective. There may be other problems as well. The class develops several alternative solutions for each problem. These techniques can be used to motivate independent study and provide students with needed practice in the inquiry approach to problem solving.

#### Instructional Objective 10.3

The learner will develop an independent study plan appropriate for a student in a vocational situation.

#### Learning Activity 10.3-a

Read the following information on "Designing an Independent Study Plan." Then design a study plan for a student in your vocational area. Include (a) time and work schedule, and (b) resources.

#### DESIGNING AN INDEPENDENT STUDY PLAN

Teachers and administrators often complain that students do not know how to study independently. The criticism is often voiced that students cannot identify significant problems, manage their time, plan the study, undertake research or evaluate their efforts. Perhaps it is unfair to expect students to study independently when they have not been exposed to a learning environment

which places the burden of learning on the student. Remember, teachers can provide experiences that will develop independent study skills. Students who are accustomed to having their entire school day planned, programmed, and supervised by others will need help and practice in planning and executing study plans. The teacher and the student need to work together when deciding on:

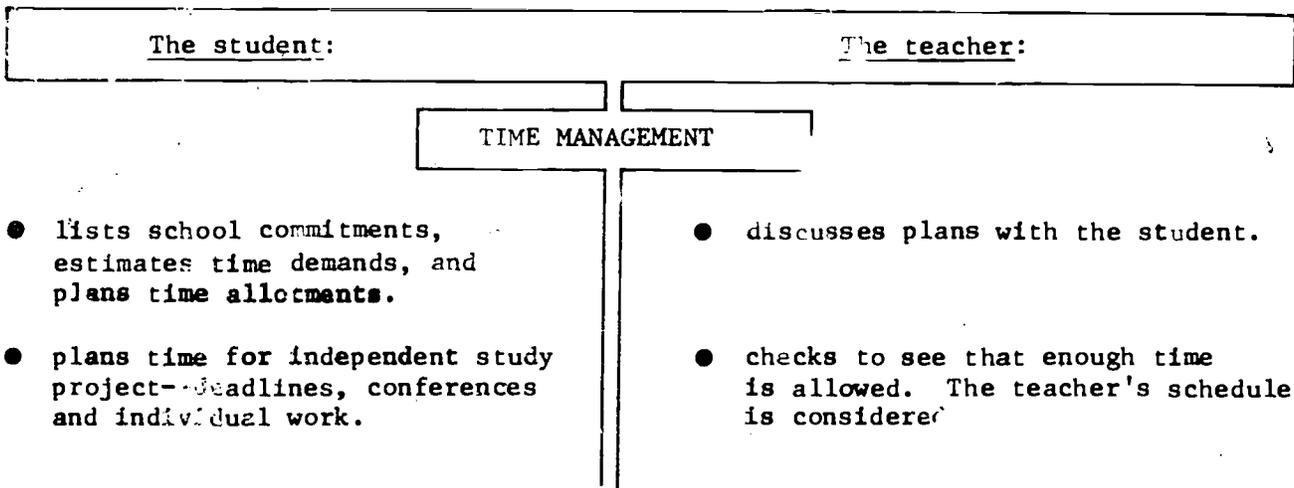
1. the selection of a subject,
2. the development of a study plan, and
3. the evaluation criteria.

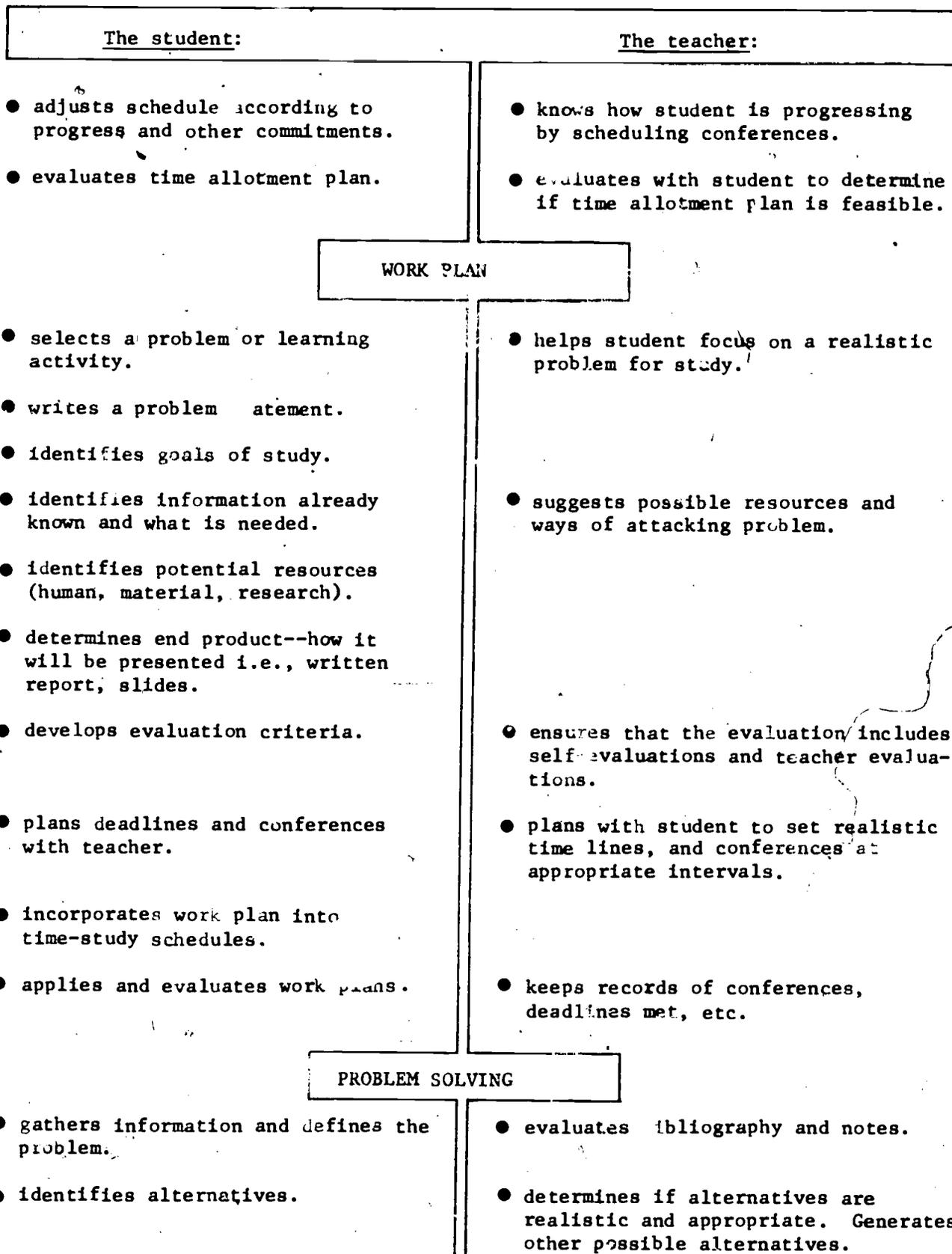
The possible subjects in a vocational education class are limitless. Some suggestions for motivating independent study in the vocational classroom will be mentioned later.

When making a study plan students should:

1. assume responsibility for their own learning in time and work management,
2. develop skill in problem solving techniques, and
3. improve their ability to learn independently.

The following list of specific ways teachers can help students with time and work management, and development of problem solving techniques may be helpful to you.





The student:	The teacher:
<ul style="list-style-type: none"> <li>● weighs, then selects the most feasible alternative(s).</li> <li>● implements the best alternative, then evaluates.</li> </ul>	<ul style="list-style-type: none"> <li>● decides with student in evaluating.</li> </ul>

The third goal we have for students involved in independent study is to improve their ability to learn independently.

The teacher can determine if these abilities are being improved by asking if the student can use people, books, and journals as resources.

Additional ways of evaluating students will be discussed in the next section.

#### Motivating Independent Study in Vocational Education

- a. Publicize independent study programs in school newspapers, radio, TV, local newspapers, etc.
- b. Exhibit finished products at an open house, vocational club night, or advisory committee meetings.
- c. Set up special club awards for independent study projects. Have members of advisory committee act as judges.
- e. Independent study programs that have been developed through FFA and FHA home projects can be used as examples for other class members.

#### Examples of Independent Study in Vocational Education

1. An on-the-job training (OJT) situation whereby the student becomes interested in a related operation of the business and pursues an independent study program in greater detail. The study must be purposeful activity which is well planned and directed. Independent study is not just random acquisition of knowledge and skills as a result of performing regular OJT duties.
2. Develop skills project that goes beyond normal class requirements. Again,

students must be responsible for defining the parameters of this inquiry and must systematically accomplish their objectives on their own initiative. Shop related mechanical problems are numerous and ideally lend themselves to problem solving techniques in vocational education.

3. An independent study of certain aspects of the job that the student becomes interested in as a result of being released from school to observe an occupation in a laboratory situation.
4. An industrial arts student creates an original design to solve a practical problem as a result of self-motivation. Generally, speaking this activity would be above and beyond regular class requirements and expectations.
5. An in-depth study of an aspect related to a student's home project commonly found in vocational agriculture and home economics. Frequently, the independent study project will overlap into the regular classroom activities. This form of independent study is ideal because it relates the extended learning activities to the classroom activities.

#### Instructional Objective 10.4

The learner will be able to use appropriate criteria to evaluate independent study.

#### Learning Activity 10.4-a

Read the following information on "Evaluation of Independent Study." Then design an evaluation form that could be used for the evaluation of the study plan in Learning Activity 10.3-a. One example of such a checklist can be found at the end of this activity.

### EVALUATION OF INDEPENDENT STUDY

Evaluation is often thought of as a way of giving grades to students. However, an independent study evaluation has other characteristics:

1. Students need to develop skills in self-evaluation. It is only recently that student self-evaluation has been accepted as a worthwhile goal for students.
2. Students should have a responsible part in deciding their own grade.
3. Students and teachers evaluate together these parts of independent study: the study plan, problem solving and research techniques employed, and the final project report.
4. Attitudes related to self-study also need to be evaluated. Student attitudes related to motivation, confidence and self-reliance are of concern here.

It is important that evaluation be an on-going process rather than only an end process. It must also involve students so they can gain abilities necessary for self-evaluation.

### EVALUATION FORM FOR INDEPENDENT STUDY

#### Example

#### Explanation:

Each teacher needs to develop his/her own techniques for evaluating independent study. The following checklist will provide guidelines for evaluating the learning process, the end product, and the student's attitudes toward learning.

#### EVALUATION CHECK

#### Learning Process:

1. determines the problem
2. develops a flexible work plan

Poor	Fair	Good	Excellent

	Poor	Fair	Good	Excellent
3. arranges time schedules				
4. adjusts goals and objectives in light of new evidence				
5. pursues a variety of resources to solve the problem				
6. perseveres with work				
7. forms several possible hypotheses				
8. problem solving approach efficiently used				

**End Product:**

1. final report prepared on topic
2. time, study plans completed
3. objectives of study met
4. problem solving process applied
5. good research techniques used
6. creative approaches applied to discovering
7. subject thoroughly researched
8. evaluation against personal standards of excellence
9. evaluation against general standards of excellence


**Attitudes:**

1. works on self-chosen tasks
2. self-satisfaction with work is greatest incentive
3. confronts problems and questions willingly
4. accepts criticisms and suggestions


5. has confidence in her/his ability to work independently
6. self-image is congruent with how others view student
7. is flexible in view of new evidence
8. meets deadlines and commitments
9. accepts responsibility for own behavior
10. relates to others but is not overly dependent upon them.

Poor	Fair	Good	Excellent

## SCRIPT FOR A SLIDE-TAPE PRESENTATION

## "Using Independent Study in Vocational Education"

<p>1.</p> <p>Ag. student, Joe - "I would like to study more about fertilizers. After the problems I had with putting on too much nitrogen, I talked to the extension agent and he gave me a book to read.</p> <p>Do you think I could talk to him tomorrow rather than go to the ag. shop class? Could I write an extra report for credit?</p>	<p>Mr. Greenhorn visiting with a student wearing an FFA jacket.</p>
<p>2.</p> <p>Vocational Agriculture Teacher, Mr. Green - "Well . . . yes I think something can be worked out. We need to develop a plan. Check with me tomorrow during your free period and let's discuss this further.</p>	<p>Close-up of Mr. Green's perplexed face.</p>
<p>3.</p> <p>Mr. Green - "Say, Mr. Taylor, I understand from the principal that several of your students are involved in independent study projects."</p> <p>Mr. Taylor- "Yah, right. I find the technique works well with many of my students. In fact, I am trying to get all of them interested in independent study. Come on down to my office and let's talk about it."</p>	<p>Mr. Green and Mr. Taylor visiting in the hall.</p>
<p>4.</p> <p>Mr. Green - "I'd really appreciate that. I am concerned because I don't know how to evaluate Joe's progress or how the principal will appreciate his not being in Ag. shop class during his regular class period."</p> <p>Mr. Taylor: "Don't worry, Jack is very understanding. He wants assurance that Joe is busy and making progress not just wandering the halls. There won't be any problems. A study plan with objectives, time lines, and responsibilities for both Joe and you) is essential."</p>	<p>Mr. Green visiting with Mr. Taylor in Mr. Taylor's office.</p>

<p>5.</p> <p>Mr. Green: "Well what are the essential ingredients of a successful plan of independent study?"</p> <p>Mr. Taylor: "OK--there needs to be a clear definition of the problem. Second, list several alternative ways to solve the problem."</p> <p>Mr. Green: "I am not certain Joe has the ability to do this. In fact, I have had very little training with this approach to teaching and I am worried about my own ability."</p>	<p>Shot of Mr. Taylor visiting with a student.</p> <p>Close up of perplexed Mr. Green.</p>
<p>6.</p> <p>Mr. Taylor: "I realize this may sound difficult and you can't do it all for Joe either. Joe must do most of the organizing himself. You must encourage and help him select those resources that will help him clarify the problem. However, I have noticed that students really enjoy this; they like the freedom and enjoy being removed from the regular classroom situation."</p>	<p>Student sitting by himself writing.</p>
<p>7.</p> <p>Mr. Green: "Well, what's the next step?" Mr. Taylor: "The next step is to help him weigh and select the most feasible alternative. Finally, you and Joe must agree on the method and type of evaluation."</p> <p>Mr. Green: "I don't know - That all sounds pretty complex to me. Maybe I'd better take that evening extension course on problem solving that is being offered by the Community College."</p>	<p>Student seated. Mr. Taylor standing and pointed at the student's paper.</p> <p>Mr. Taylor and student both seated visiting.</p>
<p>8.</p> <p>Mr. Taylor: "That is a good idea - but don't let that stop you from getting Joe started while he is interested. I'll be happy to help you out. The process is not all that complicated."</p>	<p>Picture of Mr. Taylor.</p>
<p>9.</p> <p>Mr. Green: "I suppose if we established a time line and broke the problem down in component parts-- and in a logical sequence, the process you described would be manageable."</p>	<p>Mr. Taylor writing on the chalk board.</p>

<p>10. Mr. Taylor: "That's right. Just be certain both you and Joe know what is to be done, when it is to be done, how he will do it and how you will know when he has completed the task."</p>	<p>A shot of Mr. Taylor.</p>
<p>11. Mr. Green: "Well the whole idea sounds exciting-- how can I get other students interested in an independent study project?"</p>	<p>Shot of Classroom full of students.</p>
<p>12. Mr. Taylor: "One thing I do is just sit down and talk about independent study with the whole class. I tell and show them some of the things other students have done. I always make certain to inform the class that they must prove to me that they are ready to pursue independent study."  Mr. Green: "What do you mean by being 'ready'?"</p>	<p>Shot of teacher visiting with 5 students in an informal setting.  Close up of one student enthusiastically raising his hand.</p>
<p>13. Mr. Taylor: "Well, they have to show me by their actions that they are mature and responsible enough to work alone. There is very little supervision most of the time. They have to be responsible for their own actions. They also have to be organized and know how to get the information they used."</p>	<p>Another shot of Mr. Taylor watching a student work on a shop project.</p>
<p>14. Mr. Green: "It seems to me that process would take too much of my time explaining how to use the library and lining up resource persons."</p>	<p>Shot of a student, Mr. Taylor and another adult (standing) visiting.</p>
<p>15. Mr. Taylor: "It is true that this takes time. However, these are primarily student responsibilities. A good study plan will save you a lot of time in the long run. In general, people are most willing to take their time to work with a willing student. Of course, the librarian is most helpful."  Mr. Green: "That all sounds great--but how about the evaluation?"  Mr. Taylor: "Again the study plan is the key. Of course if I can get the objectives written in measurable form this will be a big help."</p>	<p>Shot of student visiting with the librarian.</p>

<p>16. Also, there is a check list for evaluating independent study that can be obtained by writing to the Department of Vocational-Technical Education at the state university.</p>	<p>Shot of Mr. Taylor writing at his desk.</p>
<p>17. Mr. Green: "I noticed that Joe wasn't as concerned about the grade as he was about studying fertilization in greater detail."</p>	
<p>18. Mr. Taylor: "That's right - the grade in itself is not important."  Mr. Green: "Thank you for your time. When I talk with Joe tomorrow we'll get started on that study plan."</p>	<p>Picture of Mr. Green and Mr. Taylor shaking hands.</p>

## ANNOTATED LIST OF REFERENCES FOR FURTHER STUDY

Atherton, C. R. "Lecture, Discussion and Independent Study: Instructional Methods Revisited." Journal of Experimental Education 40 (Summer 1972): 24-28.

Comparison of lecture, discussion and independent study teacher methods to determine significant differences on tests for recall, understanding and application of material.

Alexander, William M.; Hines, Vynce A.; and Associates. Independent Study in Secondary Schools. New York: Holt Rinehart and Winston, Inc., 1967.

Defines independent study; describes teacher characteristics, student characteristics, independent study characteristics, administrative responsibilities, and cites many examples of how independent study programs are conducted around the United States.

Axelrod, H. B. "Independent Study: A Report for Hamden High." Clearinghouse 48 (October 1973): 103-105.

Students meet with a teacher in their area of interest once a week. The media person is a key person. He/she has to know what is needed and find it with the student.  
Some students pursue all their subjects this way. They are released to attend nearby universities.  
Students must know what they want to study, how they want to proceed, and how they want to be evaluated.

Brown, B. F. Education By Appointment. West Hyack, NY: Parker Publishers, 1968.

Only students who have demonstrated capacity for self-motivation and industry should be allowed to study independently.

Cleary, F. D. Blueprints for Better Learning: Added Dimension in Skill Development. Nethuchen, NJ: Scarecrow Press, 1968.

Those desiring to utilize independent study, must develop skills in the use of library resources.

Chickering, A. W. "Dimensions of Independence." Journal of Higher Education XXXV (January 1964): 38-41.

Research at Goddard College concluded that independent study was successful for students who had attitudes conducive to studying independently rather than high intellectual ability.

Gilroy, John J. "Independent Study: Assessing Outcome." Clearinghouse 48 (April 1974): 468-472.

Evaluating independent study programs. Goals and objectives of independent study. Methods of acquiring data.

Khal, D. H. "Fifth Grade Moves Toward Independent Study." Illustrated Childhood Education 49 (November 1972): 80-83.

Fifth grade class sets up a library with materials brought from home.

Knapp, R. C. "Independent Study as an Objective of Instruction." High School Journal 56 (November 1972): 77-87.

Characteristics of students involved in independent study. Charts on time management, work management problem solving. Sources of knowledge evaluation, attitudes.

Pare, R. R., and Butzov, J. W. "Reliability and Predictive Validity of a Test of Independence of Work Habits." Educational and Psychological Measurement 33 (Winter 1973): 963-965.

Authors present a test to determine if students could identify independent characteristics in a learning situation.

Ryan, R. D., and Berry, W. "Motivate Your Students with Independent Studies." Illustrated Industrial Education 64 (June 1975): 26-27.

The authors maintain that independent study will lead to positive and rewarding results. They provide an objectives checklist and relate the instructor's responsibilities in an independent study situation.

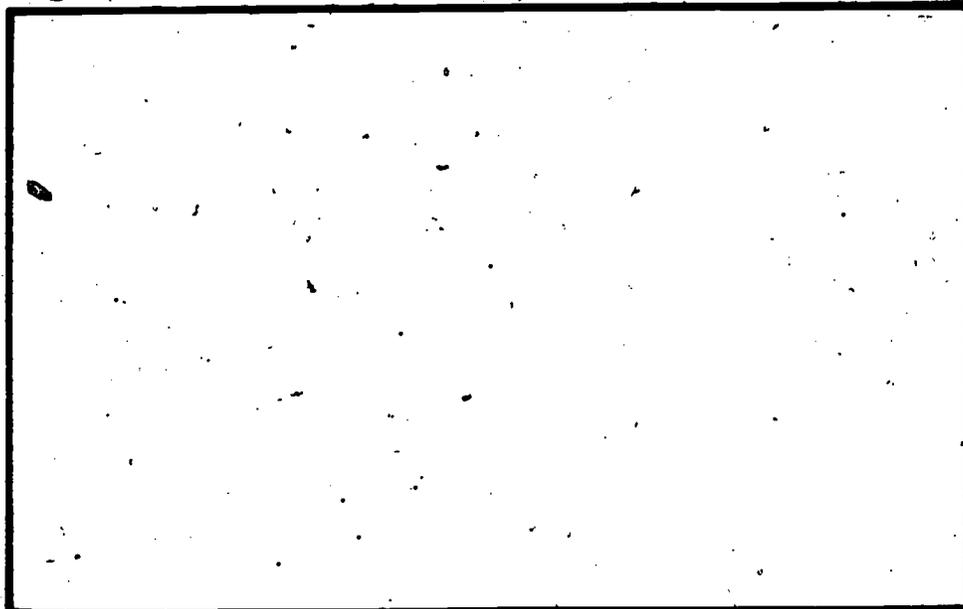
Smith, K. T. A LAP on Writing LAP's. Fort Lauderdale, FL: Bravard County Board of Public Instruction, 1969.

The authors point out the need of students to receive guidance in developing a work plan.

Wilson, J. W., and Armstrong, T. "Techniques for Initiating Independent Study." Clearinghouse 47 (May 1973): 524-528.

Group experiences that lead to independent study. Use of inquiry technique.

# PUTTING IT TOGETHER



## CATEGORY: PUTTING IT TOGETHER

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**PERFORMANCE OBJECTIVE 11** ● ● ● ● ● ● ● ● ● ●

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Identify the components of instructional strategy decision making and select alternative strategies for given learning situations.

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Instructional Objective 11.1

The learner will identify the components of instructional strategy decision making.

Instructional Objective 11.2

The learner will define the variables for a learning situation and select alternative strategies which are appropriate for that situation.

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**PERFORMANCE OBJECTIVE 11**

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Identify the components of instructional strategy decision making and select alternative strategies for given learning situations.

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Instructional Objective 11.1

The learner will identify the components of instructional strategy decision making.

Learning Activity 11.1-a

Read the following narration on the components of instructional strategy decision making, then complete the formative check which follows.

COMPONENTS OF INSTRUCTIONAL STRATEGY DECISION MAKING

Previous experiences, study, and research about teaching suggest that there are many elements associated with "great" teaching. One of these elements is the ability to identify and utilize instructional strategies that are appropriate to a given educational purpose. Thus, the general rationale and one of the overall goals of this module is to prepare the curriculum specialist to be able to make rational decisions when selecting instructional strategies and to facilitate the curriculum team in this endeavor. To do this, the curriculum specialist must be able to match strategies with educational goals and objectives and with particular learning situations.

Every prospective lesson can be examined in terms of the variables at work in it.

### The Components of a Learning Situation

#### WHO variables:

- The teacher
- The students

#### WHAT and WHY variables:

- The content or subject matter
- The goals and objectives

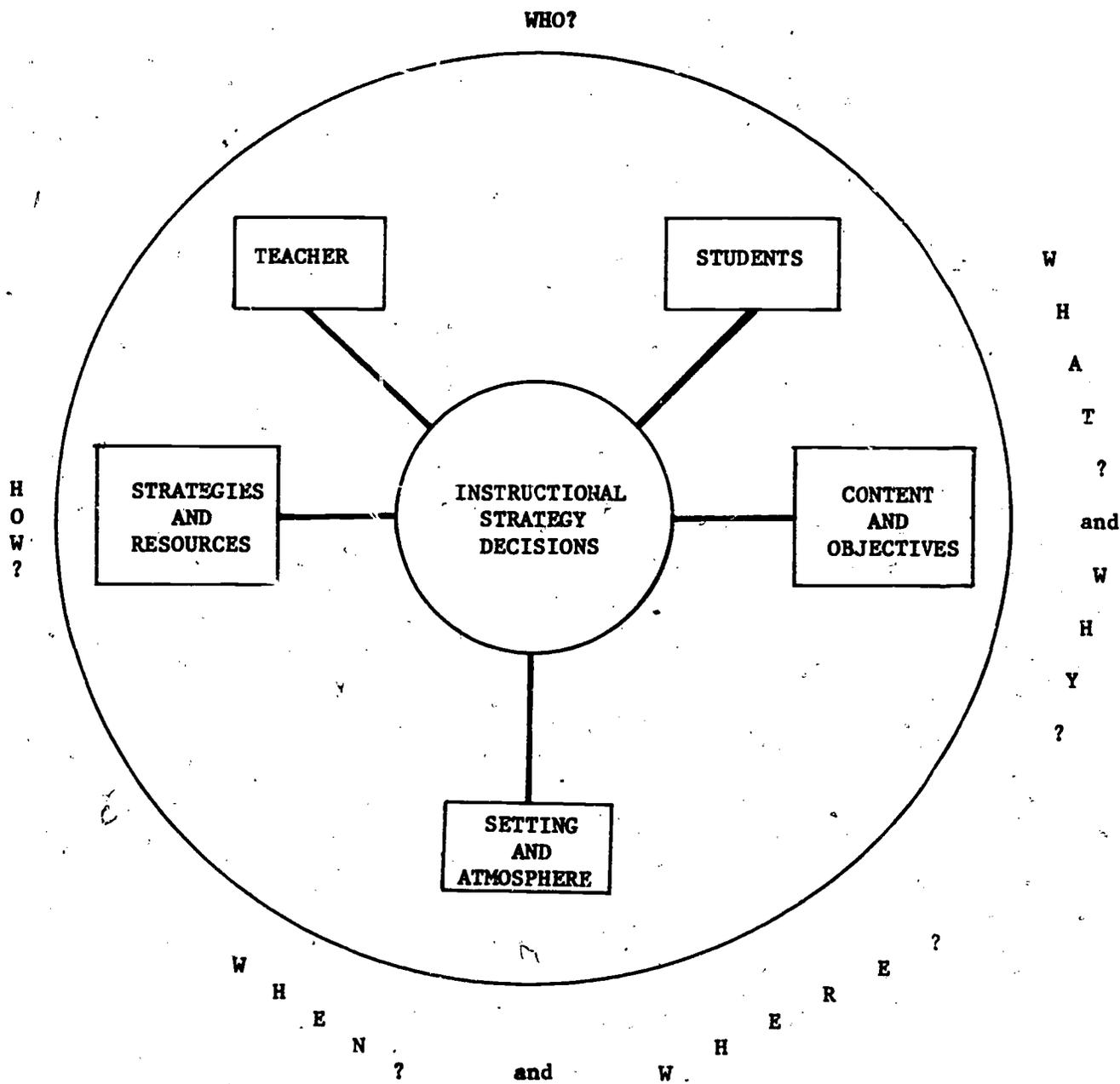
#### WHEN and WHERE variables:

- The setting and atmosphere

#### HOW variables:

- The strategies
- The resources

The model which follows identifies the names and relationships of the variables which are essential components of the instructional strategy decision making process.



**Model for Instructional Strategy Decision Making**

WHO

Suit the teachers--their interests, abilities, knowledge of subject matter, skills, and attitudes. Although there is considerable agreement that the teacher is one of the most significant elements in the instructional process, all kinds of mysticism surround the topics of effective teaching. Perhaps you have heard such statements as: "Good teachers are born, not made," "Good teachers are experts in their content areas," "Good teachers are like hot biscuits; great to have but difficult to describe." All of these descriptive statements, though perhaps at least partially valid, provide an incomplete and narrow picture of the who in the teaching process. Instead of helping instructors increase their competencies, they seem to imply that either the teacher "has it" or "doesn't have it."

But teachers can consciously make decisions about their own behaviors, ones that will positively affect learners, the learning environment, and learning outcomes. Each teacher can identify personal strengths and skills, and then draw on these when selecting instructional strategies. These strategies, like the shoes we wear, should fit comfortably.

This does not mean that teachers should use only a limited number of methods and techniques. Even if a teacher's personal inclination and preferences are for the lecture approach, the instructor needs to make a continuous effort to develop an expansive repertoire of additional strategies. With practice, the teacher can feel comfortable with an extensive selection of strategies.

Suit the learners--their interests, needs, abilities, knowledge, and values. Learners, too, are integral "who" variables. Each student enters the classroom with personal characteristics, interests, learning styles, skills, and abilities. Probably no two will be at the same level of readiness, will be motivated identically, or will respond to the teacher in the same way. Thus, when making decisions

about instructional strategies, it is absolutely essential to give careful consideration to the learners themselves. If a student is fearful of delivering statements in front of the entire class, then the instructor will want to modify this strategy, adopt a new one, or provide the learner with activities that will gradually lead her/him to attain this skill.

#### WHAT AND WHY

Suit the subject matter and objectives of the lesson. All curricular endeavors have a purpose. This purpose, the desired end of the educational experience, involves both the objectives and the subject matter of the lesson. The selection of appropriate strategies requires consideration of the purpose of the lesson: is it learning skills, learning knowledge, or learning attitudes and values?

For instance, lectures may be very effective in meeting cognitive objectives, but are generally much less appropriate for learning attitudes or psychomotor skills. If the teacher wants to teach the students to be honest, the strategy should involve opportunities for the student to exhibit honesty. To teach students the effects that oxygen has on metals, it would seem inappropriate to set up a debate on the issue—demonstrations or laboratory exercises would be more to the point. Similarly, the method appropriate for teaching the effects of advertising will differ from those for teaching how to operate a calculator.

#### WHEN AND WHERE

Suit the time and place context of the teaching situation. For example, if it is 2:00 p.m. on a Friday afternoon, and the class is comprised of tenth graders who have a sophomore prom that evening, it would be unwise to choose a method that requires the students to sit quietly and attentively for 50 minutes. A method that involves student participation or comparatively free movement for the students would probably be better suited to the students' mood. The amount of time available to teach the lesson is another "when" variable to consider.

Since the instructional strategy is often related to where instruction takes place, the teacher should consider the question, "Is this environment the best one for the strategy planned?" For lectures, students need comfortable chairs that make note-taking easy, placed so that students can hear and see the lecturer. Discussions and inquiry lend themselves to the more flexible environment, where students can interact in small groups. Laboratory and field experiences require special environments which may or may not be available. Selection of an instructional strategy should be made with knowledge and consideration of the appropriate learning environment.

#### HOW

Suit the resources and strategies available. Most instructional strategies rely to some extent on various material or human resources. Obviously, the selection of strategies requires an analysis of such resources--what are they, and are they available?

The most critical human resource is a teacher who is trained in using the strategy--who defines the strategies that are available. But there are other human resources that are important: discussion leaders, field experience supervisors, guest speakers, and consultants. Material resources include physical plant, equipment, print and non-print instructional materials. These resources must be available for the strategy to be effective.

The "how" variable is a critical variable in selecting instructional strategies. A teacher may know why, what, when, and where to teach, but how to teach must also be considered as an essential element for effective learning.

#### Summary

This category doesn't provide answers for making decisions about instructional strategies. Instead, it stimulates questions--questions which should be asked by the curriculum specialist/teacher when choosing an instructional strategy for a given lesson.

## FORMATIVE CHECK

## Learning Activity 11.1-a

Match the descriptive phrase on the left with the appropriate name of the component on the right. The answer key follows on the next page.

- |  |                          |
|--|--------------------------|
| _____ 1. The purpose of the lesson is for students to be able to .....                     | a. <u>Who</u> variable   |
| _____ 2. Some of the students seem to catch on slowly.                                     | b. <u>Why</u> variable   |
| _____ 3. Learning activity packages are available.   | c. <u>How</u> variable   |
| _____ 4. The instructor has a timid voice which makes lecturing difficult.                 | d. <u>When</u> variable  |
| _____ 5. It's the first day of school.   | e. <u>Where</u> variable |
| _____ 6. A local industry has offered field experience for students within their facility. | f. <u>What</u> variable  |
| _____ 7. The subject is grading meat.  |                          |

**Key - Learning Activity 11.1-a**

1. b
2. a
3. c
4. a
5. d
6. e
7. f

Instructional Objective 11.2

The learner will define the variables for a learning situation and select alternative strategies which are appropriate for that situation.

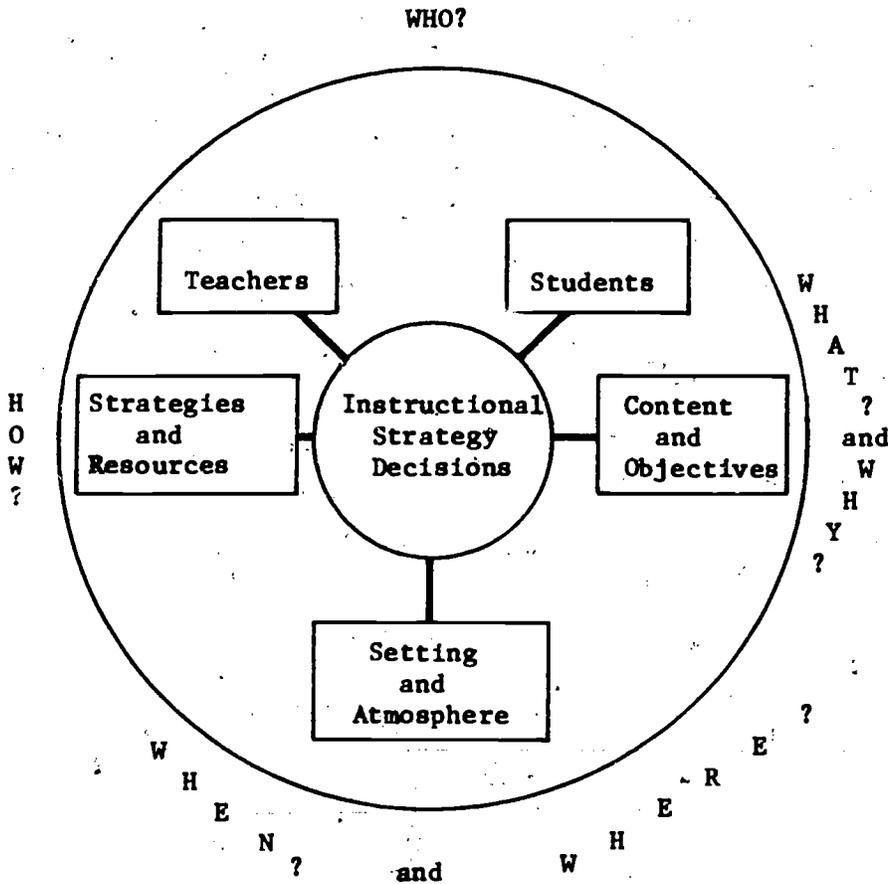
Learning Activity 11.2-a: Part I

Read the following discussion about making strategy decisions, then participate in the activity which follows.

STRATEGY DECISIONS

Where Do You Start?

The relationships of the variables in this strategy decision making process can be illustrated by the circular model discussed previously. Such a model indicates that there is no one best starting point, and that all variables are essential to the decision making process.



In many cases, the process starts with an objective. For vocational education, a task analysis often determines goals, which are further defined and specified, eventually resulting in behavioral objectives which are used by the teacher as the basis for classroom lessons. Let's consider such a case.

Patsy Takamura teaches a community college course for training medical laboratory technicians. An objective for her students is: Given clean glass slides, heparinized blood, and a capillary tube, the learner will prepare a minimum of five thin smears which have feathered edges and cover at least one-half the length of the slide.

Using this objective as her focus, Patsy decides on using demonstration as the instructional strategy, followed by student practice. She then considers this strategy against the other variables, to confirm the appropriateness of her choice:

Teacher:

Patsy herself is qualified to perform the demonstrations, since she is proficient at making smears, confident at speaking before a group, and has proven effective in giving demonstrations.

Students:

Having completed an introductory unit on laboratory techniques, the students are familiar with using capillary tubes to manipulate liquids and with handling blood specimens safely. Since making proper blood smears is a prerequisite to their hospital-based experience, students are motivated to learn the skill.

Setting and Atmosphere:

Although the student laboratory doesn't have enough bench space for all students to work at the same time, Patsy can set up two folding tables in the back of the room which would provide the additional space. A one-hour laboratory period can be devoted to this activity.

Resources:

Capillary tubes and clean glass slides are available. Students will draw

blood samples from each other, thus practicing a previously learned skill. So, using the student's objective as a starting point, Patsy seems to have made an appropriate choice of strategies.

But let's investigate another approach, such as the who variable. Bob McLoflin is a high school electronics instructor. He has two students in his high school class who are exceptionally bright and interested in his course. Using a demonstration/practice approach works fine for the rest of the class, but these two exceptional students always finish early. To meet the special needs of these students, Bob needs another strategy. Here's a classic case where the student provides the entry into the strategy decision making process.

For various situations, the other variables can also serve to initiate the process of strategy decision making.

- You met a commercial materials salesperson at a conference and charmed her into sending a self-instructional module. In this case it's the how (the resource) that determined the strategy.
- It's the first part of the school year and students don't know each other well—you need a strategy that allows students to interact and get to know each other. Here's a when variable combined with a who.
- There's an identified need for a commercial art program in your community. but the school has no facilities nor money to develop them. A job shop in your town has volunteered to take students in a co-op program. This is an example of the where variable influencing the strategy decision.

Remember that regardless of which variable initiates the decision making process, all variables must be considered before the decision is made.

Learning Activity 11.2-a: Part II

1. Find a curriculum guide for a discipline you have taught or are teaching.
2. Select six objectives which are significantly different-- representative of cognitive, psychomotor, and affective types.
3. For each objective, define (from your own experience) a who, when, where, and how variable.
4. Select an instructional strategy (or several strategies, if needed) for each objective and analyze its (their) appropriateness for the conditions you've described, then
5. List two alternative strategies for the same objectives or give a rationale for the reasons no other strategies are appropriate.

The following worksheet may help you in developing this activity.

Worksheet for Learning Activity 11.2-a

The Behavioral Objective:

---

---

---

The WHO variables:

teacher: \_\_\_\_\_

student(s): \_\_\_\_\_

The WHEN variable:

---

---

The WHERE variable:

---

---

The HOW variable:

---

---

The strategy:

---

---

Alternative Strategies:

---

---

**APPENDIX A**

**MICROTEACHING**

## MICROTEACHING

### Description

The microteaching sessions will be conducted in groups of 7-8 peers (other VECS graduate students). The group will be responsible for the organization of the microteaching sessions including the video taping.

Microteaching is a scaled-down sample of teaching. It is essentially an opportunity for teachers to develop and/or improve specific teaching strategies with a small group of students (4-5) by means of brief single-concept lessons. These lessons are recorded on video tape for reviewing and analyzing teacher behavior in relation to a very specific teaching process or processes.

Not every topic or concept automatically lends itself to every technique. If you are uncertain that the concept which you selected will be appropriate for the assigned strategy, you may want to confer with other learners or your instructor.

A modified form of microteaching will be used for the categories in this module. Since it is not always possible to obtain school age students for the teaching sessions, other graduate students will play the role of the students.

### Performance Objectives and Tasks

Within the time limitation, and using the identified instructional strategy, the learner will teach a pre-selected concept, skill, or idea to a peer group of approximately five students. Other peers can operate the video equipment or serve as evaluators.

To accomplish the above objective, the following tasks must be performed in conjunction with each microteaching session. The learner shall:

1. Write a lesson plan. Make 4 copies--one for the instructor, one for the learner's use while teaching, and two for the evaluators.

2. Write an objective or a set of objectives for the lesson (state them in performance terms). Identify the tasks that the pupil must accomplish to reach the objectives.
3. Teach the lesson to the peer group.
4. Evaluate student achievement of the stated performance objectives by a specific evaluation device. (Identify this evaluation strategy on your lesson plan.)
5. When not teaching, play the role of a student, operate the recording equipment, or evaluate other microteaching performances.
6. Critique the teaching of the other peers in the group. Each group should provide an immediate oral critique following each micro-lesson. Both content and interaction process observations should be made.

### Evaluating Your Microteaching

Research indicates that microteaching can provide the opportunity to develop and improve specific teaching behaviors. The use of the video tape recorder can allow the "teacher" to view the sessions others do, and immediate replay is useful for self-evaluation and diagnosis.

The microteaching evaluation should be related to the following criteria:

1. What was the quality of "teacher" preparation and presentation? For example, did the lesson appear well prepared and creative? How were the teacher's voice and mannerisms?
2. What was the quality of "student" involvement?
3. Were the teacher's objectives reached?
4. Was the cognitive level appropriate?

In preparing for the microteaching presentation, we suggest that the areas which follow on the next page be considered. A form to evaluate teacher effectiveness in microteaching lessons for various instructional strategies is given on

MICROTEACHING PREPARATION FORM

1. Student Performance Objectives: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

2. Concept I will teach: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

3. Steps needed to reach the performance objective (i.e., learning task analysis): \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

4. Strategy(s) I will use: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

5. Student experiences I will provide: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

6. Materials I will use: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

7. How the lesson is to be evaluated: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

MICROTEACHING EVALUATION FORM

Outstanding	Satisfactory	Weak
-------------	--------------	------

Comments \_\_\_\_\_

Presenter/Instructor

A. Establishing Rapport

1. Preparation for activity/statement of objectives
2. Poise and self-control
3. Tone and quality of voice
4. Inclusion of audience with eye contact


B. Effects of Appearance

1. Grooming
2. Posture
3. Mannerisms/Gestures
4. Enthusiasm


C. Method of Gaining Audience Interest

1. Analogy
2. Central object/Single word/Quotation
3. Problem situation
4. Visual aids
5. Other \_\_\_\_\_


D. Method of Presentation

1. Facility expedites strategy used
2. Organization/Sequence
3. Appropriate language
4. Emphasis of major ideas
5. Definitions of technical/difficult terms
6. Use of supplementary materials
7. Challenged audience
8. Closure/Summation


**APPENDIX B**

**DEMONSTRATION PLANNING GUIDE**

DATE \_\_\_\_\_ CLASS \_\_\_\_\_ TITLE \_\_\_\_\_

1. STATE OBJECTIVE:

2. PRE DEMONSTRATION CLASS ACTIVITIES:

3. DEMONSTRATION OUTLINE (Including equipment, supplies and materials):

4. EVALUATION (self evaluation, student achievement):

5. POST DEMONSTRATION CLASS ACTIVITIES:

DEMONSTRATION SCORE CARD

	Poor 1	Fair 2	Good 3	Excellent 4	COMMENTS
<b>1. PREPARATION:</b>					
A. Topic appropriate to demonstration method					
B. Knowledge about the topic					
C. Necessary supplies and materials ready ahead of time					
D. Room arranged so all could see and hear					
<b>2. PRESENTATION</b>					
A. Introduction--gained attention, provided motivation, stated objective clearly					
B. Organization logical					
C. Visual aids effective					
<b>3. INDIVIDUAL EVALUATION</b>					
A. Poise and grooming					
B. Voice and grammar					
C. Eye contact					
D. Skillful workmanship organized enthusiastic					

Total Points \_\_\_\_\_

**APPENDIX C**

**INDIVIDUALIZED INSTRUCTION**

**CURRENT EXEMPLARY PROGRAMS IN INDIVIDUALIZED INSTRUCTION**

- I. The nation's largest individualized learning project, Individually Prescribed Instruction (IPI) was developed at the University of Pittsburgh in cooperation with the USOE regional laboratory (1964). Materials have been developed in elementary mathematics and language arts. Provisions for continued diagnosis and pupil progress and regular feedback are provided.
- II. Project PLAN (Program for Learning in Accordance with Needs), the nation's second largest effort to individualize instruction, has been in existence since 1967. PLAN was created by Westinghouse Learning Corporations and American Institutes for Research, Palo Alto, California. The program involves all grade levels in language arts, reading, social studies, mathematics, and science and incorporates available commercial materials.
- III. LAP's were developed as a part of the NOVA project at Nova High School, Fort Lauderdale, Florida. LAP's were designed to guide a student through a highly structured program of learning activities. Nova developed materials in the area of science and mathematics, since this approach has been implemented in all areas.
- IV. Individually Guided Education (IGE), designed for elementary school, has been under development by the Wisconsin R & D Center for Cognitive Learning and cooperating educational agencies since 1965.
- V. The Individualized Mathematics System (IMS) is a low-cost, brightly illustrated mathematics curriculum for grades 1-6. Its developers contend that it provides maximum creativity and flexibility for teachers

and pupils, and does not penalize pupils if they are not proficient in reading. IMS has been developed over the past several years by the Center for Individualized Instructional Systems in Durham, NC.

- VI. An example of computer-assisted instruction--PLATO (Programmed Logic for Automated Teaching Operations) was developed by the Computer-Based Education Research Laboratory at the University of Illinois in Urbana. PLATO is adaptable to all subject areas and all grade levels.
- VII. The Duluth Plan for Individualization (DPI) was started in Duluth, Minnesota at the elementary level in 1964 and has since been adapted to the junior and senior levels. The Duluth plan is a multimedia approach that puts the student under contract on each classroom assignment, in the areas of language arts, English, social studies, science and mathematics.

**CHECK LIST FOR EVALUATING  
TEACHER-MADE LEARNING GUIDES<sup>1</sup>**

One of the chief aids to individualized instruction in the classroom is the teacher-made learning guide. This is a learning package or self-instructional guide covering a fairly brief learning unit. The guide typically consists of (1) a statement of purpose, (2) one or more instructional objectives, (3) a pretest, (4) a list of learning materials and activities, (5) self-tests for monitoring progress, and (6) a posttest for measuring terminal achievement.

The following checklist was designed to evaluate the adequacy of a teacher-made learning guide. It can, of course, also provide direction for preparing such a guide.

CHECK LIST

	Yes	No
<u>Purpose of the Unit</u>		
1. Is the topic of the unit clearly stated?	_____	_____
2. Is the reason for studying the unit clearly explained?	_____	_____
3. Is the language simple and clear?	_____	_____
4. Does the statement of purpose provide a motivating quality?	_____	_____
<u>Instructional Objectives</u>		
5. Are the instructional objectives educationally significant?	_____	_____
6. Is each instructional objective stated in measurable (observable) terms?	_____	_____
7. Is each instructional objective limited enough to be attained during a brief learning unit?	_____	_____
8. Is each instructional objective relevant to a more general (terminal) course objective?	_____	_____

<sup>1</sup>

Norman E. Grunlund, Individualizing Classroom Instruction, (New York: Macmillan Publishing, 1974) pp. 65-66.

Pretest and Posttest

9. Are the directions clearly stated?
10. Do the items provide direct measures of all tasks described in the instructional objectives?
11. Has a reasonable standard of mastery been set?

Learning Materials and Activities

12. Are the directions for procedures clearly stated?
13. Do the materials and activities contribute to achievement of the instructional objectives?
14. Is there a variety of types and levels of learning materials?
15. Do the learning activities provide alternate procedures for achieving the instructional objective?

Self-Tests

16. Are the directions clearly stated?
17. Do the test items aid in mastering the learning materials and in checking on progress?

Enrichment Activities (Optional)

18. Is a wide range of activities listed?
19. Do the activities provide for greater depth or breadth of learning?
20. Are the directions sufficiently clear for independent study?

## What Is A Learning Package?<sup>1</sup>

A learning package is an instructional kit designed to assist the learner in the step by step development of a skill or competency. The learning package can be multi-media in design, it can have a self-contained or non-self-contained format, and it generally consists of all or most of the following components: 1) unit objectives, 2) performance objectives, 3) rationale for the objectives, 4) pre-instructional test, 5) learning activities, and 6) post-instructional test.

### Eight-Step Model for Developing Learning Packages

1. Identify and analyze life or job tasks which point to the need for a course of study.

The life or job task analysis will enable clear identification and statement of unit objectives and performance objectives. For example:

Clear communication requires that a person be able to speak and write effectively. To speak and write a language effectively, a person must often use a standard dictionary of that language. Therefore, the many skills involved in using a dictionary should be learned by the speakers and writers of a language.

These are some of the skills involved in using a dictionary:

1. Finding words in their alphabetical order.
2. Looking up the sound represented by diacritical marks in order to learn how a word is pronounced.
3. Knowing the various kinds of information available in a dictionary.

2. Select and write unit objectives.

A unit objective is a broad, general objective or a goal of the total unit of instruction. For example:

At the completion of this unit study, the student will be able to effectively use a standard dictionary.

---

1

Clark Jones, "What Is A Learning Package?" Washington State Adult Basic Education, 1973. (Mimeographed.)

The unit objective is based directly on the life or job task which makes instruction necessary.

3. State each performance objective.

Write a set of performance objectives, each consisting of one element of knowledge or skill that forms part of the broader unit objective. Performance objectives tell specifically what the student must be able to do. For example:

The student will be able to find words in their alphabetical order.

The student will be able to identify the preferred spelling of a word which can be spelled more than one way.

The student will be able to divide a word into syllables.

4. Analyze the subject matter and the skills required to learn it.

Break down the performance objectives into sets of sub skills. Sub skills are all of the skills or knowledge the student must have in order to achieve the performance objectives. For example:

Performance objective: The student will be able to find words in their alphabetical order.

Sub skills students must have before they can learn to perform the task:

1. The student must know the order of the letters in the alphabet.
2. The student must have a close idea of the spelling of the word he/she is looking up.

5. Design a pre-instructional test of what the student knows and of what he/she needs to learn. (This test may be oral, written, or "hands-on" in nature.

It must be designed so it doesn't discourage or threaten the student.)

The pre-test serves two purposes: 1) it tells whether or not, a student already has the necessary (sub) skills to begin working on the learning package, and 2) it tells how much the student already knows about what the package is designed to teach.

In our example, one of the sub skills is a knowledge of the order of the

alphabet. To find out if a student knows the order of the alphabet, you might ask him in the pre-test to write or recite the alphabet in correct sequence. If he demonstrates that he has this sub skill and other necessary sub skills, then test him to see if he can accomplish the performance objective.

The performance objective in the example calls for the student to find words in their alphabetical order in the dictionary. To test a student on this skill, you might simply ask him to look up six commonly-used words in a standard dictionary.

#### 6. Design Learning Activities.

You must select alternative forms of media and design relevant learning activities through which students may achieve the performance objectives. Learning activities must reinforce mastery of sub skills as well as help the student learn to demonstrate new skills or knowledge. Design learning activities specifically on the basis of each performance objective. For example, for the performance objective, "find words in their alphabetical order", students might go through these learning activities:

1. View a sound filmstrip on dictionary use which explains how to use guide words to find other words.
2. Practice looking up a list of commonly used words.

#### 7. Design the post-instructional test.

A post test measures whether or not a student has mastered the performance objectives and thereby achieved the unit objectives of the learning package. It is a criterion-referenced test based on the performance objectives of the package. Unlike the pre-test, it does not include sub-skill test items.

#### 8. Try-out the learning package.

After you have completed the learning package, try it out on one or two

students. This is the "de-bugging" phase and it should help you locate weak points in the package's design. Revise the package if necessary and try it out again on a group of students. You will probably want to revise the package continually to keep it current.

UNIT 4XN-00-01-022

LONG BEACH CITY COLLEGE  
Occupational Preparation Center

OCCUPATION REFIRGERATION - AIR CONDITIONINGMODULE Refrigeration-Air Conditioning HelperUNIT IDENTIFY, DISASSEMBLE, ASSEMBLEPERMANENT SPLIT CAPACITOR MOTOR

## PRODUCTION TEAM:

R. Hennessee - G. Luhmann  
Dana Winters  
Clark DeNoon

DATE \_\_\_\_\_

REVISED \_\_\_\_\_

Curriculum Projects Office  
Long Beach Community College District

Success in the job you have selected demands that you be able to accomplish the objectives listed below. Read instructions very carefully, and ask questions of the instructor or proctor whenever you need to do so.

GIVEN:

A permanent split capacitor type motor (PSC), a center punch, a screwdriver, a nut runner, a rawhide mallet, an ohmmeter, a megger, a cold chisel, a test cord, a ball-pein hammer, an oil can with #10 SAE oil, and a wipe cloth.

YOU WILL BE ABLE TO:

Identify, disassemble, assemble a permanent split capacitor type motor.

SO WELL THAT:

The motor will function without loss of efficiency when compared to the motor name plate rating.

GO ON TO THE NEXT PAGE

## THEORY

In order to achieve your goal, you will need to do some reading or see and listen to a taped program. First, perform the tasks listed below, and then the exercises on the pages following. Ask your instructor or proctor for help if you need it.

1. Read: Modern Refrigeration and Air Conditioning by Althouse. Chapter 7, sections 37 and 39.
2. View Sound/Slide Learning Unit #4XN-00-01-022, Identify, Disassemble, Assemble Permanent Split Capacitor Motor."

GO ON TO THE NEXT PAGE

## PROGRESS CHECK

Answer the following questions. When you have finished, ask your instructor to check your work. Circle the letter which indicates your correct answer.

1. A permanent split capacitor motor starts and runs
  - a. As a single phase motor does.
  - b. As a two phase motor does.
  - c. As a four phase motor does.
  - d. As a shaded pole motor does.
  
2. A permanent split capacitor motor does not require (two answers)
  - a. An oil reservoir.
  - b. A starting relay.
  - c. A rotor.
  - d. A stator.
  
3. When disassembling the motor, the shaft is first cleaned because
  - a. It prevents an electrical discharge.
  - b. The end bell will better slip off without damage to bearing surfaces.
  - c. It will then be easier to inspect the run winding.
  - d. None of these.
  
4. A permanent split capacitor motor is noted for its
  - a. High efficiency.
  - b. Very high speed.
  - c. Its great torque.
  - d. Its low cost.
  
5. A permanent split capacitor motor requires
  - a. A starting relay.
  - b. A run capacitor.
  - c. Always direct current.
  - d. 220 volts only
  
6. When used for a compressor drive, the system
  - a. Must equalize before starting.
  - b. Must be geared down to at least 80%.
  - c. Must utilize two transformers.
  - d. Must use DC only.

7. A capacitor is checked to make sure it has
- a. Three terminals.
  - b. No grounds and no opens.
  - c. A name plate on it.
  - d. A working battery.

SCORE \_\_\_\_\_

GO ON TO THE NEXT PAGE WITH PERMISSION

Now you are ready to perform job steps that should lead you to reach the objective. When you have completed all steps and accomplished the objective, ask the instructor to check your progress before moving to the next study unit.

**OBJECTIVE:**

Identify, disassemble, assemble permanent split capacitor type motors.

TASKS	MATERIALS AND EQUIPMENT NEEDED
1. Clean motor shaft.	You will need a wipe cloth.
2. Use a center punch to mark end bells of motor so that it can be reassembled exactly as it was before it was taken apart.	You will need a center punch and a small ball-pein hammer.
3. Use screwdriver and nut runner to loosen motor through bolts.	You will need a screwdriver and a nut runner.
4. Remove end bells one at a time. Be careful to count spacers on the motor shaft at each end. NOTE: Spacers hold the motor rotor in the correct magnetic field position. If not returned to their proper place on the shaft, the rotor will be out of its position and the motor efficiency will be impaired.	
5. Inspect bearings and their surfaces for wear or defects. Replace with new ones if necessary.	
6. Use an ohmmeter to check both run and phase windings. Position first test wire clip, then second test wire clip.	You will need an ohmmeter, a pencil, and paper.
Read and record findings.	
7. Install a megger and check the winding insulation for leakage. NOTE: Your reading should be ten megohms or better. A low reading means that the motor should be rewound.	

## TASKS

## MATERIALS AND EQUIPMENT NEEDED

8. Connect the motor capacitor to a capacitor analyzer, and read its capacitance. Check to determine that it has not "grounds" or "opens" in its circuit.
9. Reassemble the motor by placing the rotor inside the stator. Be very careful in placing the spacer washers on the shaft.
10. Guide the end bells over the shaft being careful not to damage the bearings.
11. Tap end bells lightly to insure that they seat against the stator.
12. Insert and tighten through bolts in end bells and stator. Bolts should be tightened evenly. Check the shaft to see that at all times it turns freely without binding.
13. Oil bearings.
14. Test capacitor after it has been connected to determine if it has the name plate capacitance.
15. Apply proper voltage and turn on motor. Determine if the efficiency of the motor equals that of name-plate rating.

You will need an oil can with  
SAE #10.

ASK YOUR INSTRUCTOR TO CHECK YOUR WORK

129 609 627