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ABSTRACT

This report describes two systems designed to improve teaching competencies and to develop higher level thinking abilities, and presents the evaluation design, statistical results, and a brief history of the major events which occurred during development. The McCollum-Davis Model is designed to develop understanding of and skill in relating a structure of learning process to a structure of knowledge. It consists of the teaching model, relationship of process to knowledge, and teaching mode. The Duvall Model is intended for teachers or administrators who take the training so that they can teach others and for teachers who wish to apply the higher level thinking ability strategies in their classrooms. There are no specific prerequisites for program participants in either model. The rationale for the evaluation design is explained and the efficiency and effectiveness criteria are discussed. Data collection instruments and methods are described for measuring both workshop and program effectiveness, and results are examined which indicate workshop efficiency and program effectiveness, with details of the various systems used in analyzing the data. Results indicated that individual application of the thinking tasks of concept formation, interpretation of data, and application was more successful than the use of all three in concert. The instructional formats for both models are included. (MBM)

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Research and Evaluation Division

Higher Level Thinking Abilities

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PREFACE

This document is the sixth in a series of technical reports to be issued by the Research and Evaluation Division of the Northwest Regional Educational Laboratory. The reports are published to provide people outside the Laboratory, e.g., funding personnel, potential users and professional colleagues, with data to indicate the quality of Laboratory products.

"Taba method" was a name given to teaching strategies developed by the late Dr. Hilda Taba. This method was chosen by the Laboratory to be the basis of a component in its program to improve teaching competencies. Work in the component, called Development of Higher Level Thinking Abilities, resulted in two systems. One was developed by Dr. John McCollum and Rose Marie Davis, Southern Oregon College (Ashland) and the other by Alice Duvall, former staff member of the Laboratory.

This report contains a description of the two systems, a presentation of the evaluation design and statistical results, and a brief history of the major events which occurred during development.

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DESCRIPTION OF THE SYSTEMS

The descriptions in this section are based on those written by the developers of two systems for developing higher level thinking abilities (McCollum-Davis and Duvall) for inclusion in their manuals. The areas covered are objectives, course content, instructional format and prerequisites for trainers and participants.

McCOLLUM-DAVIS MODEL

Objectives

The program is designed to develop understanding of and skill in relating a structure of learning process to a structure of knowledge. The latter refers to a hierarchy starting with (a) factual data, proceeding to the organization and categorization of factual data according to (b) concepts, then to the analysis of relationships between concepts and the discovery and expression of (c) generalizations which can be logically supported by the data.

The structure of learning process related to this hierarchy of knowledge begins with (a) recall of previously learned or memorized data, moves to (b) the translation or organization of specific data according to concepts, to (c) the interpretation and statement of relationships, generalizations, inferences and principles and finally to (d) the application of discovered knowledge to new or different situations.

The following objectives are expectations held for two groups of participants: (a) teachers or administrators who take the training so that they can teach others

and (b) teachers who wish to apply the higher level thinking ability strategies in their classrooms. Some participants may be members of both groups simultaneously.

Participants will evidence the following understanding and skill as a result of involvement in the program.

1. Understanding of and skill in using three thinking processes: concept diagnosis, interpretation of data and application of knowledge
2. Understanding of and skill in the processes of analyzing a body of knowledge for its structure and applying the above thinking processes
3. Understanding of and skill in the processes of programing an instructional unit which systematically develops the thinking abilities of students

The three general areas of understanding and skill will be demonstrated by use of the following teaching techniques.

1. Able to lead students through an analysis of a body of data resulting in their perceiving and verbalizing relationships and applying these to new situations
2. Able to establish and maintain the classroom conditions which allow productive verbal interaction to happen
3. Able to make an application of both cognitive and affective strategies to the planning and implementation of curriculum

The last category, application of strategies, includes the following specific behavioral objectives.

1. Identify and classify statements into one of three categories: data, concepts or generalizations
2. Select generalization statements for instructional unit development which meet the following criteria:
    a) Contain two or more definable, teachable concepts
    b) Inclusive of much data
    c) Stated in terms of probability
3. Analyze a body of subject matter content and present a hierarchy of data, concepts and generalizations evident within the content
4. Analyze a generalization and develop an illustrative model of the relationships between data and concepts within the generalization
5. Select learning activities for instructional unit development which meet the following criteria:
    a) Serve to develop the generalization being taught
    b) Serve a justifiable and identifiable function
    c) Provide for multiple learnings within each learning activity
6. Sequence learning activities for instructional unit development which meet the following criteria:
    a) Provide a balance among the four objectives: (1) knowledge, (2) skill, (3) attitude and (4) cognitive process

b) Arranged in sequential order; each experience must provide a foundation for the successive experience

c) Increase the pupil's ability to think and to perform and refine the required skills by proceeding in small increments

d) Provide an opportunity for the pupil to apply old knowledge in new contexts

e) Contain systematic rotation of intake of information and a means of expressing the new concept or reorganized concept

f) Provide for learning by many diverse means

7. Identify and state various ways in which students will acquire and display data which effectively facilitates their comparing and contrasting relationships within the data.

Content

The program has three basic characteristics which are presented as the training model, relationship of process to knowledge and teaching mode.

Training Model

Instruction is presented in a series of rotations through five steps: 1) sensitivity experiences, 2) knowledge base, 3) simulation experiences, 4) laboratory experience and 5) application. Understanding of the higher level thinking process and skill in its application are developed by progression through the total training model.

1. Sensitivity experiences. Each cognitive process is introduced through role-playing, with the instructor taking the role of a classroom teacher

and the participants that of students. The purpose of the activity is to provide initial encounters with the various cognitive processes which will involve participants both emotionally and intellectually.

2. Knowledge base. Following each sensitivity experience, a short didactic presentation is given on the theoretical and research base for each process. The purpose of the activity is to provide additional encounters which will serve as a basis for subsequent activities.

3. Simulation experiences. Each of the thinking processes is broken down into its component parts and simulated. In other words, a specific strategy within a thinking process is studied by participants engaged in the process itself. Active dialogue takes place between participants when they are confronted with a problem situation. For example, participants at one point are given a set of randomly organized questions designed to be used for interpreting feelings and values. Working in small groups, participants are asked to sequence and refine the questions to achieve their intended goal, then verbalize a rationale for what was done. Specific criteria for self-evaluation evolve from the group.

4. Laboratory experiences. These experiences involve each participant in teaching each of the processes in a classroom setting. Teaching is done under observation with systematic data collection and feedback on teaching behavior. This is considered an essential component of the training model.

5. Application. Each participant is asked to program an instructional sequence which utilizes the processes presented. He may use any curriculum area.

Relationship of Process to Knowledge

To illustrate very specifically how a structure of process can be related to a structure of knowledge, a model curriculum sequence operates as an instructional sample throughout the training program. A junior high school social studies unit, which compares and contrasts Japan and India, is used for this purpose. All sensitivity experiences, curriculum development activities and knowledge base presentations are related to this sample. Applications to other curriculum areas and instructional modes are made from this framework.

Teaching Mode

The training program consists of a method to develop autonomous inquirers--learners who have the understanding and skill to function independently of a highly controlled learning environment. Consequently, the same learning conditions are created for participants in the program through open and active dialogue, with freedom to inquire, explore and accommodate according to individual needs and abilities.

It may first appear to the instructor that the materials used in the program are structured and developed to the point that in their presentation he has only a mechanical function of memorization. However, question sequences, explanations, etc., are to be used only as prototypes or models of presentation, and the leader is encouraged to adapt them to his own style of instruction. Furthermore, because the program has a central concern with the learning process and the effective structuring of that process, it attempts to exemplify within itself an effective structure. Because effectiveness depends crucially upon control of sequences, the steps of the program are developed in sufficient detail

to establish the important sequential structure within each step. Although style of presentation may be whatever is most comfortable for the instructor, a compromise in presentation of the sequences does not support the underlying basis of the program.

Instructional Format

The program is designed so that it may be used in any one of three instructional formats. (See Appendix A for a detailed, step-by-step description of each design.)

1. Workshop format. Gives an intensive program of involvement; participants uninterrupted by regular professional responsibilities.

2. Extension course format. Gives instruction on evenings and Saturdays over a period of time; participants are involved in regular ongoing professional responsibilities.

3. Methods course format. Gives instruction to students enrolled in a teacher preparation methods course.

Prerequisites

There are no specific prerequisites for program participants. Attendance is usually voluntary and emphasis is placed on making the program available to anyone who desires to participate. To ensure that the program will be of interest and use, trainers planning a workshop attempt to provide adequate information about the training.

The McCollum-Davis model does not have specific prerequisites for instructional leaders, e.g., advanced degree held, other training experience. However, leaders usually are designated as being on one of three levels of competency.

Level one: Instructors without previous involvement and experience in a Higher Level Thinking Ability program. Given systematic and sequential presentation, the program materials are designed to produce a high level of participant achievement even though the instructor has no previous involvement and experience. It is essential, however, that level one instructors have thorough familiarity with the total program prior to initiating instruction. They are urged to become aware of the details of the training manual and to try out all exercises and activities with other individuals and/or small groups.

A level one instructor can effectively conduct knowledge base presentations, simulation experiences, demonstrations and laboratory experiences. A high degree of competency is required of the leader in four sensitivity experiences: concept diagnosis, interpretation of data (literature), interpretation of data (information display) and application of knowledge. Thus, level one instructors may need to practice each process found in these experiences more than once in a laboratory-practicum setting before they are competent to present them as an instructor.

Level two: Instructors who have been participants in a Higher Level Thinking Ability program. These instructors should be able to conduct all activities with a clear understanding of their intent and with ease of

implementation. They do need to reexamine the details of the manual before initiating instruction.

Level three: Instructors with previous leadership experience in a Higher Level Thinking Ability program. Those whose experiences have included participating in the program, testing the processes over an extended period of time in the classroom and instructing others in the processes should find the program an extension and refinement of their previous experiences without need for additional preparation.

DUVALL MODEL

Objectives

The following objectives are expectations held for two groups of participants: (a) teacher or administrators who take the training so that they can teach others and (b) teachers who wish to apply the higher level thinking ability strategies in their classrooms. Some participants may be members of both groups simultaneously.

The first group of objectives refers specifically to goals established for the training sessions.

1. To heighten a teacher's awareness of the impact of teaching behaviors on student learning, e.g., trust or distrust, acceptance or rejection, control or facilitation
2. To provide a teaching model in the training sessions by exemplifying both attitudes and procedures advocated for the classroom

3. To strengthen teacher competency through the acquisition of specific, instructional skills

4. To reinforce the educational goal of developing self-actualizing individuals

The second group of objectives refers to behaviors expected after completing 50 to 60 hours of instruction.

1. Name the thinking tasks presented in the workshop and the thought skills that students perform in each: concept formation--classifying; interpretation of data--inferring/generalizing; application--predicting/hypothesizing

2. Demonstrate the discussion strategies referred to in the training as the "mechanics"

3. Identify the teacher behaviors, classified as responses to:

    a) The student's feelings

    b) The content of a student's statement

    c) The needs of the discussion design

4. Name the discussion strategies that create a climate conducive to student participation. Among those named should be:

    a) Accepting responses without judging them as right or wrong

    b) Refraining from overrewarding words, such as "good, fine, right"

    c) Seeking causality with a choice of words other than a single "Why?"

5. Construct an inductive sequence of questions, approximating the workshop model, to interpret:

    a) Factual material from a limited source, such as a film, field trip, graph, etc.

    b) Feelings

6. Interpret a retrieval chart containing data on the three thinking tasks

7. Evaluate on a scale from 1-9:

    a) The usefulness of the thinking strategies

    b) The value of the workshop

    c) The degree of self-involvement

8. Describe specifically (by activity, date, situation, feelings):

    a) What was worthwhile/not worthwhile

    b) What helped/hindered involvement

Content

Three thinking tasks are investigated in depth: how students form concepts, how they make inferences or generalize from raw data and how they apply what they know to seeing relationships in new situations. Each task is presented through encounter, theory, systematic analysis and application. Participants learn what mental operations are involved and what discussion strategies elicit desired types of response.

The participants proceed through a similar succession of experiences for each of the three tasks: (a) they take the role of students as the workshop leader conducts a discussion using the appropriate strategies, (b) they observe a demonstration with children and examine critically a typescript of a tape-recorded

discussion and (c) they practice the task in an actual classroom for instant feedback on their skills. Both large and small group sessions emphasize involvement.

Most of the activities concentrate on discussion patterns that assist students to process information. Throughout the training there is also a focus on classroom climate that permits a student to contribute freely at his level of understanding, independent of any pressure to find authoritative "right" answers. Some attention is given to curriculum organization and learning experiences designed to provide the structure which supports the thinking tasks. In addition, participants practice the skill of planning inductive question sequences for content discussion of films and stories.

Instructional Format

The program's training requires between 50 and 60 hours of instructional time, which is approximately 12 days. The program is designed so that it may be presented in any one of four formats. (See Appendix B for a detailed, step-by-step description of each format.)

1. Four week-end sessions
2. Three sessions of three and one-half days each
3. Twelve consecutive days
4. Four sessions including Saturdays

The program developer believed the ideal time schedule to be three sessions of four days each, with a month's interval to practice. However, this plan is quite costly to individual school districts if a large number of teachers are involved.

Prerequisites

The Duvall model does not have specific prerequisites for becoming a participant. However, instructors using this model have greater responsibility for communication of concepts, instructional goals and workshop timing than those using the McCollum-Davis model. Thus, before assuming primary responsibility for conducting a workshop, instructors should have the equivalent of level three in the McCollum-Davis designations of competency: previous leadership experience in a Higher Level Thinking Ability program.

EVALUATION DESIGN

RATIONALE

The evaluation design for the Higher Level Thinking Abilities component was devised in 1969 after much of the field testing was completed. The original data collection focused on the participant's reaction to the workshop, his change in attitudes and cognitive understanding, and the effect of the workshop materials on those changes. The data were gathered to be used as a feedback loop involving the developer, his instructional system and actual field tryouts during the development cycle. No attempts were made to do a comprehensive collection of data on whether and how the changed teacher behavior affected children in the classroom. Given participant- and material-oriented data, it was determined by the Research and Evaluation Division that the design shown in Table 1 was the most useful way to present the previously gathered data (1966-1968). Additional data were obtained in 1969 and 1970 by returning to some of those participants who had been in previous workshops and by collecting situation-specific data for case analysis on several trials of a shortened version of the McCollum-Davis system.

Available data on the Higher Level Thinking Abilities component were organized into a multidimensional-multimeasurement evaluation strategy to test two sets of performance criteria. This strategy was necessary to take into account the effects of the numerous variables in program development, implementation, feedback and dissemination, such as type of workshop, at what point in development cycle a workshop was held, characteristics of participants

and which system, i.e., McCollum-Davis or Duvall, was used. Cutting across these dimensions, the two sets of criteria were represented in (a) data analyzing internal efficiency of the workshops and (b) data analyzing the external effectiveness of the content of the component.

EFFICIENCY CRITERIA

The performance criteria related to the internal efficiency of the Taba instructional system centered around two basic questions: Did the training workshops teach what they were designed to teach? What were some variables that determined workshop efficiency? Although the data were collected to meet specific needs of the developer, in this report they are presented as evidence to demonstrate the degree to which the workshops met the stated objectives.

The participant reaction to workshop structure was a dimension which yielded data from the earliest to the latest stage of program development. The attitudinal and cognitive dimensions were later additions to the design and reflected the impact of a more highly developed system.

EFFECTIVENESS CRITERIA

The set of criteria related to the effectiveness of the program as it was used in the field centered around two basic questions: Were second-generation trainers[1] able to adequately train others in the system? Were teachers able to

[1]In 1966, the term "second-generation trainers" was used to describe workshop leaders who had received training from the original developers of the materials. By 1970, the term applied to leaders who received training from anyone who had demonstrated their competence as trainers and were identified as "expert", "senior" or "advanced" trainers.

use the system productively after training?

Questions of effectiveness were equal in importance to those of efficiency; if adequate knowledge and attitude taught by workshops were not matched by the ability to put the system into action, resources were wasted. The questions of effectiveness were more complicated because of the range of variables that influenced quality of use, e.g., trainer sophistication, personal characteristics of the participants, organizational characteristics of the district in which a trainee operated.

These dimensions were evaluated in several ways to provide an adequate test of system effectiveness. Teacher performance was seen from the perspective of students, from two methods of analyzing teacher-pupil interaction and from the perspective of teachers themselves. The ability of second-generation trainers to teach others was evaluated by objective performance measures and self-report questionnaires. Most of these modes of evaluation appeared late in the development of the Taba system; thus, they present a comprehensive assessment of system effectiveness.

EFFICIENCY/EFFECTIVENESS OF ONE WORKSHOP

An extensive analysis of one workshop was done for two reasons. The first was that the workshop represented a new development in instructional strategy. Held for the training of college-level instructors, it required less instructional time, while the longer self-help practicums were implemented without the presence of a trainer. It was held that if the shorter model proved to be as efficient as the longer model, it would be an economical alternative for use in other settings.

A second reason for doing the analysis was that the evaluation data from that particular workshop were more extensive along the internal criteria dimension than from any other workshop. The influence of background, attitude and laboratory involvement were viewed in relation to dependent measures of performance and to actual and projected system use.

The evaluation design for Higher Level Thinking Abilities is summarized in Table 1.

TABLE 1

EVALUATION DESIGN FOR NORTHWEST REGIONAL EDUCATIONAL LABORATORY'S PROGRAM IN HIGHER LEVEL THINKING ABILITIES (HLTA)

Instrument	Administration	Subjects	Data output
Level A: data measuring efficiency of workshop			
Postmeeting reaction forms	Post	Selected sample of workshop participants (1967 to 1969) from five Northwest states	Measured degree of involvement; list of workshop strengths and weaknesses
Taba comprehension test	Post	HLTA advanced trainers; participants in workshops for college instructors at Ellensburg, Bellingham and Seattle (Washington)	Measured participants' postworkshop knowledge of Taba system and compared findings with that of more experienced trainers
Teaching situation reaction test	Pre/post	19 participants who received training from a second-generation trainer in Billings (Montana)	Measured change in attitude on three dimensions: structure, dogmatism and human relations

(Continued)

TABLE 1

EVALUATION DESIGN FOR NORTHWEST REGIONAL EDUCATIONAL LABORATORY'S PROGRAM IN HIGHER LEVEL THINKING ABILITIES (Continued)

Instrument	Admin-istration	Subjects	Data output
Level B: data measuring effectiveness of program			
Flanders analysis of teacher-student classroom inter-action	Pre/ post control	Selected sample of 102 teachers who completed training in Taba, Suchman or Flanders, and controls; data collected in Alaska and Montana	Measured change in teacher classroom behavior; analyzed effect of demographic and personality variables on teacher use of training
Taba analysis of teacher-student classroom inter-action	Pre/ post	Selected sample of teachers who received training from a second-generation trainer in Billings (Montana)	Demonstrated teacher use of system after training; indicated ability of a second-generation trainer to evoke change in teacher behavior
Student questionnaire	Pre/ post control	Students from 25 elementary and 25 secondary classrooms selected at random from 240 classrooms where teachers had received training in a "TV-Taba" workshop; compared with controls; workshop held at Spokane (Washington)	Indicated changes in student perception of school and student perception of changes in teacher behavior; reflected effectiveness of program to change teacher behavior in classroom; demo-graphic variables influential
Value, use and comprehension test	Post (1-4 years)	Selected sample of teachers trained in the McCollum-Davis system in Alaska, Washington and Oregon	Measured extent to which participants value, use and understand the system

(Continued)

TABLE 1

EVALUATION DESIGN FOR NORTHWEST REGIONAL EDUCATIONAL LABORATORY'S PROGRAM IN HIGHER LEVEL THINKING ABILITIES (Continued)

Instrument	Administration	Subjects	Data output
Level B: data measuring effectiveness of program (continued)			
Advanced trainer questionnaire	Post	Sample of 37 advanced trainers identified as having the requisite skills to conduct HLTA workshop; from five Northwest states	Indicated trainer involvement in program development, number and kind of workshops conducted and planned; related influence of role and subsystem of training to activity in the field
Level C: data measuring efficiency/effectiveness of one workshop			
Background questionnaire	Pre	22 college instructors who completed a Taba workshop in Bellingham (Washington) under a new design	Provided data: age, sex, previous involvement with Laboratory programs
Teacher perception questionnaire	Pre	Same as above	Provided baseline information on extent open classroom techniques were used by participant prior to training
Teacher influence questionnaire	Pre	Same as above	Measured participant attitude on three dimensions
Postmeeting reaction forms	Post	Same as above	Measured degree of involvement; list of workshop strengths and weaknesses

(Continued)

TABLE 1

EVALUATION DESIGN FOR NORTHWEST REGIONAL EDUCATIONAL LABORATORY'S PROGRAM IN HIGHER LEVEL THINKING ABILITIES (Continued)

Instrument	Admin-istration	Subjects	Data output
Level C: data measuring efficiency/effectiveness of one workshop (continued)			
Practicum questionnaire	Post	22 college instructors who completed a Taba workshop in Bellingham (Washington) under a new design	Measured worth of practicum to trainee
Taba comprehension test	Post	Same as above	Measured participants' postworkshop knowledge of Taba system and compared findings with scores of participants in two other workshops and of advanced trainers
Final questionnaire	Post	Same as above	Indicated participants' evaluation of worth of workshop procedure and intended use

DESCRIPTION OF DATA COLLECTION INSTRUMENTS AND METHODS

INSTRUMENTS AND METHODS MEASURING WORKSHOP EFFICIENCY

Postmeeting Reaction Forms

Nine postmeeting reaction forms were used between 1967 and 1969. Form and content were determined by the type of feedback the developers desired at various times in the development cycle. Generally, the forms asked for reactions to and comments about the workshop structure and content, the degree of involvement in the experience and the overall worth of the workshop. Form items were open-ended in all but one instance. A summary of workshop ratings from a sample of 290 participants has been analyzed for this study. This reaction summary generated data about how participants perceived workshop efficiency.

Taba Comprehension Test

This instrument was a questionnaire developed by Laboratory staff. Twelve items indicated a participant's general cognitive understanding of the Taba system. Items contained questions on concept formation, generalization of knowledge and application of principles, as well as on some of the system's processes. A sample of test form is question three:

3. The three basic moves of "concept diagnosis" are: (check three)

_____ generalizing	_____ mapping
_____ labeling	_____ interpreting
_____ substantiating	_____ grouping
_____ lifting	_____ supporting
_____ listing	_____ conceptualizing

The test was administered to two groups: a sample criterion group of advanced trainers, i.e., those identified as capable of teaching the system to others, and new trainees after three workshop sessions. The hypothesis was that if new trainees scored as high as the advanced trainers, the instructional system was efficient in providing an adequate knowledge base for potential system users.

Teaching Situation Reaction Test (TSRT)

This instrument provided a measure of a respondent's attitudinal orientation toward classroom situations along three dimensions: structure, dogmatism and human relations. The test was made up of 48 items: 14 measured human relations orientation, 10 measured structure and 12 measured dogmatism. Twelve additional items, which did not refer directly to any of those dimensions, measured general attitudes.

The TSRT measured the ability of a Taba workshop experience to change participant attitudes along the three dimensions listed. If attitudes did change between the pre- and postadministrations of the test, the workshop experience would be said to carry an impact for its participants. The TSRT respondents analyzed for this part of the study were 19 participants in a workshop led by a second-generation trainer. The administration of this test also gave a rough measurement of the ability of a second-generation trainer to provide a meaningful experience for participants.

Summary

Instruments and methods used to measure workshop efficiency provided indication of participant response to workshop structure and content on a

positive-negative dimension, participant understanding of the system after training and degree of change in participant attitudes as a result of training. The data resulting from the administration of these instruments measured the extent to which Taba workshops met the objectives of the efficiency category.

INSTRUMENTS AND METHODS MEASURING PROGRAM EFFECTIVENESS

Flanders Analysis of Teacher-Student Classroom Interaction

The Flanders method of coding classroom interaction contains ten classifications of teacher-student behavior. (See Table 2.) Interaction is grouped into three categories: teacher talk, student talk and silence or confusion.

Teacher talk is subdivided into indirect and direct influence. Characteristics of indirect influence include the following:

1. Teacher accepts and clarifies the feeling tone of the students in a nonjudgmental manner
2. Teacher praises or encourages student action or behavior
3. Teacher accepts or uses ideas of a student
4. Teacher asks questions about content or procedure with the intent of a student response

Characteristics of direct influence include the following:

1. Teacher lectures
2. Teacher directs or commands
3. Teacher criticizes or justifies his authority

The two categories of student talk are (a) student speaks in response to teacher and (b) student initiates verbal interaction.

Outputs from this classification scheme result in measures of amount and quality of teacher influence, amount and quality of student participation and an overall measure of classroom climate (Amidon and Flanders, 1967). These outputs were of significance to this study because certain classroom interaction patterns which are identified by the Flanders system approximate those expected as the result of Taba training. Two examples are classroom openness and acceptance by the teacher of student talk.

TABLE 2

CATEGORIES FOR FLANDERS INTERACTION ANALYSIS[2]

1. Accepts Feeling. Accepts and clarifies the feeling tone of the students in a nonthreatening manner. Feelings may be positive or negative. Predicting or recalling feelings are included.

2. Praises or Encourages. Praises or encourages student action or behavior, jokes that release tension, but not at the expense of another individual. Nodding head or saying, "um hum?" or "go on" are included.

3. Accepts or Uses Ideas of Student. Clarifying, building or developing ideas suggested by student. (As teacher brings more of his own ideas into play, shift to category five.)

4. Asks Questions. Asks a question about content or procedure with the intent that student answer.

5. Lecturing. Gives facts or opinions about content or procedures. Expresses own ideas. Asks rhetorical questions.

6. Giving Directions. Gives directions, commands or orders to which a student is expected to comply.

[2]Adapted from Amidon, Edmund J. and John B. Hough. Interaction Analysis: Theory, Research and Application. Reading, Massachusetts: Addison Wesley, 1967, page 125. (See also Amidon, Edmund J. and Ned A. Flanders. The Role of the Teacher in the Classroom. Minneapolis: Amidon and Assoc. 1963.)

TABLE 2

CATEGORIES FOR FLANDERS INTERACTION ANALYSIS (Continued)

7. Criticizing or Justifying Authority. Uses statements intended to change student behavior from nonacceptable to acceptable pattern. Bawling someone out. States why the teacher is doing what he is doing. Extreme self-reference.

8. Student Talk--Response. Talk by students in response to teacher. Teacher initiates the contact or solicits student statement.

9. Student Talk--Initiation. Talk by students which they initiate. (If teacher calls on student only to indicate who may talk next, observer must decide whether student wanted to talk. If he did, use this category.)

10. Silence or Confusion. Pauses, short periods of silence and periods of confusion in which communication cannot be understood by the observer.

Flanders categories were applied to 11 teachers by analyzing tapes of 12 discussion sessions held before and after training in the Taba system (six pre- and six posttraining). An additional 23 teachers from whom tapes were obtained during the same time period received no treatment, but served as controls. The control group allowed for correction of observed change due to factors other than the treatment itself. Demographic data and personality variables were included in the analysis. For this study, scores on selected Flanders variables relevant to the Taba system were analyzed in three comparisons: (a) the Taba group pre/post, (b) control group pre/post and (c) a Taba/control comparison of pre/post gain scores.

These data were collected in Alaska and Montana in 1966-67 and evaluated the initial cycles in the program's development. The hypothesis was that if teachers indicated classroom behavior changes at an early stage in

development, then subsequent clarification of objectives and methods would result in a product even more effective in evoking such changes.

Taba Analysis of Teacher-Student Classroom Interaction

There is currently no verified method for coding classroom interaction with Taba categories. However, a method to code taped classroom discussions was devised specifically for this study. The criteria were set by defining the attributes of a "perfect Taba teaching session" and comparing each tape to those criteria along several dimensions.

Taba Coding Dimensions

1. Percent of teacher talk
2. Number of questions by teacher requiring a specific answer
3. Number of times teacher gives information or opinion
4. Number of times teacher indicates dissatisfaction with student response
5. Number of times teacher verbally accepts student response or initiation
6. Number of recognizable examples of three thinking tasks
7. Number of times teacher repeats or rephrases student response
8. Number of times teacher asks for clarification
9. Coder rating of subject as a Taba teacher (1-6)

The subjects for this section of the study were 28 teachers trained in the Duvall system by a second-generation trainer. Participants were taped at two classroom discussions before training and four after training. An advanced trainer in the Taba system coded typescripts of the discussions. The identity

of the participants and the time of recording (pre- versus posttraining) were not known by the coder.

This analysis to test the effectiveness of the system measured the degree to which trainees were able to use the Taba system in their classrooms. The data also tested the ability of a second-generation trainer to give effective instruction in the strategies of Higher Level Thinking Abilities.

Student Questionnaire

The student questionnaire was developed by Laboratory staff especially for the Spokane (Washington) television workshop. It consisted of two dimensions each for older and younger students. One dimension indicated student perception and feelings about school and the other indicated student perception about specific teacher behaviors. Different tests were devised for early elementary and older students. Although the 22 test items were the same, the forms of the tests were slightly different.

The instrument used a semantic differential form which indicated frequency or amount of student feeling or student-perceived teacher behavior for each item. Examples of items for the student feeling dimension were: "The teacher really understands how students feel" and "School work is more often fun than not fun." The teacher behavior dimension items reflected the degree to which teachers exhibited behaviors expected of a Taba trained teacher, e.g., "The teacher says 'No, that's wrong', or something like that when I say something or answer questions"; "When we talk about lessons and things in this class, we say whatever we think and ask or answer any question we want to."

The test was administered before and after training to a randomly selected sample of 25 elementary and 25 secondary classrooms in which the teacher had participated in the television training program. Complete classroom data from both before and after training were received from 40 trainees.

Advanced Trainer Questionnaire

This questionnaire was developed by Laboratory staff to assess the field activities of advanced trainers, i.e., those who had sufficient experience with the system to conduct training workshops of their own. The ten-item instrument identified trainer participation in program development, the nature of additional training taken by the individual, the number and kind of workshops conducted and the trainer's perception of strengths and weaknesses of the instructional system's content and method. A sample of 37 advanced trainers completed the questionnaire. The data were supplemented by documentary evidence collected by Laboratory staff.

Value, Use and Comprehension Test

This test was devised by Laboratory staff to measure the extent to which teachers trained in the Taba system (a) believed the system had value as an instructional tool, (b) actually used system strategies in their classrooms and (c) were knowledgeable about system content and structure. The interrelationships among value, use and comprehension also were considered. The test was in questionnaire form and contained 12 items: 3 each on value, use and comprehension, 1 on the respondent's background and 2 on general reactions and suggestions. Each objective item had a corresponding open-ended question

for examples, suggestions for improvement and critical remarks. The following is a sample item.

2a. To what extent have you found the process of "concept diagnosis" to be a valuable strategy to use in the classroom? (check one)

_____ not at all

_____ usable on rare occasions

_____ usable as an introduction to unit instruction

_____ usable in a number of contexts

_____ extremely usable in almost every aspect of my teaching

A sample of 37 teachers trained in the McCollum-Davis system from 1 to 4 years prior to administration took part in this phase of the study. An analysis of the responses provided a measure of the effectiveness of the product as it was used by trained teachers.

Summary

The instruments and methods described in this section measured the effectiveness of the Taba instructional system by the ability of second-generation trainers to conduct workshops and the ability of trained teachers to use the teaching techniques in their classroom.

INSTRUMENTS AND METHODS MEASURING EFFICIENCY/EFFECTIVENESS OF ONE WORKSHOP

Instruments included in this section measured the background and personal characteristics of participants, prior attitudes about teacher behavior in the classroom and actual classroom techniques used. Certain outcome criteria were measured after the workshop, such as participant understanding of Taba system

and anticipated and actual use of the system. Postsession rating forms indicated the degree to which the participants found the workshop involving and meaningful. These sets of internal measures and criteria were related to each other. Subjects were 22 college methods instructors who attended a workshop in Bellingham (Washington). The subjects' responses were compared on some measures with those of participants trained in similar workshops in Ellensburg and Seattle (Washington).

Background Questionnaire

This questionnaire was developed by Laboratory staff to evaluate training given to college methods instructors. It provided information on participants experience with other Laboratory instructional systems, age, previous experience teaching in public schools, length of time teaching college methods courses, understanding of the content in the training system and teaching style. The instrument yielded data about trainees that predicted the potential for successful involvement in the training program.

Course Information Questionnaire

This instrument, also developed by Laboratory staff, contained three items. The first asked for a description of the courses taught by the respondent: lower division, upper division, graduate or Division of Continuing Education (DCE). A second item asked the respondents to evaluate the relative importance of content versus process in their classes. A third item had two parts that represented a respondent's attitudes about teacher influence in the classroom as related to student motivation to learn and student classroom performance. Data from this

form related the degree to which a participant's behavior and attitude were congruent with the behavioral implications of the Taba instructional system and expectations for classroom use.

Adapting Teacher Questionnaire

This instrument also was developed by Laboratory staff. The 22 items were on a six-point semantic differential scale which described various teacher classroom behaviors. The instructions read: "The following statements describe what some teachers do in the classroom. Please describe the behaviors you are teaching the teachers you are training to exhibit in relation to these statements by checking the appropriate space on the scale following each description." The following is a sample item.

7. The teacher directs the students to the correct answers.

My courses have nothing to do with this. _____

I am training teachers to do this invariably. | | | | | | | I am training teachers to do this rarely, if ever.

The statements described behaviors that were appropriate or inappropriate for classroom openness, teacher use of judgment and other Taba strategies. Responses to the items reflected the degree to which a participant's training actions were like or unlike those actions implied in training.

Postmeeting Reaction Forms

A description of these forms can be found on page 23. Both a postmeeting form and a postpracticum form were included for this section of the study. These were taken as indicators of the degree to which the training sessions and practicum

experience were involving for trainees. Although degree of involvement could be determined partially by the actual worth of training experiences, the data were indicative of how attractive the new strategies were and how comfortable the trainees were with them.

Taba Comprehension Test

A description of this test can be found on page 23.

Final Questionnaire

This instrument, developed by Laboratory staff, was concerned with a participant's reactions to the training, his actual use of the system during the practicum and his anticipated use of the system after training. This form and the performance test presented criteria for analyzing their relationship to prior participant characteristics and workshop involvement.

RESULTS INDICATING WORKSHOP EFFICIENCY

POSTMEETING REACTIONS OF PARTICIPANTS

The postmeeting reaction forms were administered at the conclusion of 13 workshops in Higher Level Thinking Abilities, with a total of 290 respondents. A preliminary analysis of the forms revealed that variations in participant response were more indicative of the stage of program development (early to late) than such variables as trainer sophistication or which system (McCollum-Davis or Duvall) was receiving tryout. Thus, the data were summarized across the variables of time of workshop in program development cycle, trainer sophistication (developer or second generation), type of instrument used and which system was used.

Responses to the open-ended items were divided into three groups.

1. Evaluation of the instructional strategies of the workshop.

    a. Working in groups. Any comments made about the strategy of working with peers in the learning situation.

    b. Learning activities. Any comments made about the demonstrations, laboratory experiences (practice sessions and role playing) or the thinking tasks activities.

    c. Materials. Any comments made about the set of materials, printed handouts (including theory input articles, work forms, transcripts and instructions), films and tapes.

    d. Management. Any comments about timing, sequencing of activities, trainer roles, facilities and so forth.

2. Evaluation of the Taba technique itself. Any comments specifically

referring to one or more of the three thinking tasks central to the conceptualization and methodology of the Taba system.

3. Evaluation of outcomes. Any comments concerning perceived change in student or teacher classroom behavior which was a result of using Taba instructional strategies when participants were interacting with their pupils.

The first group of evaluative comments, related to the instructional strategies of the workshop, was classified into two categories: (a) totally positive on all counts and (b) some criticism or suggestions for change in one or more aspects of the training. The overall reaction to the workshops (See Table 3) was highly favorable, with 75% of the 290 respondents entirely pleased and satisfied with the training they received. Because the majority of those who made criticisms or gave suggestions for improvements were enthusiastic in their response to the training, they would have been considered to have a positive reaction if the classification criteria had not been so stringent. Less than 5% of all respondents were considered to have a negative reaction to the training program. There were no flatly negative comments, e.g., "It was a waste of time." "There was nothing I didn't already know and do." "Just the same old stuff served up the same old way." Such comments ordinarily occur with infrequent but predictable regularity in participant evaluation of workshops and conferences.

General positive comments, i.e., no reference to particular events, activities or procedures, were made by 30% of the 190 teachers and 25% of the 28 administrators. The following are examples of typical comments in that group: "I wish I had had this training years ago; it really opened my eyes."

"This training should be required of all teachers." "One of the most worthwhile and productive workshops I've ever attended." "It was so helpful just the way it was, I don't see how it could be improved."

TABLE 3

OVERALL REACTION TO THE WORKSHOPS

Group	Comments	
	Totally positive	Some criticisms or suggestions for change
Teachers (N=251)	76% (190)	24% (61)
Administrators (N=39)	72% (28)	28% (11)
Total (N=290)	75% (218)	25% (72)

The analysis of evaluative comments made about the specific instructional strategies used in the workshop (See Table 4) included separate tabulations for participants whose comments were totally positive and those whose comments contained criticism or suggestions for change. These were further subdivided into the responses of teachers and administrators. Thus, the 190 teachers and 28 administrators in the first group made a total of 150 and 24 comments respectively. From the second group 61 teachers and 11 administrators made a total of 84 and 17 comments respectively.

The learning activities of the workshops garnered the most frequent comments from the administrators and teachers who gave totally positive responses. While 45% of the teachers who made critical comments or suggestions were also concerned with learning activities, only 6% of the administrators from

the critical group shared that concern. Administrators, however, made the greatest percentage of both positive and negative comments about the strategies used in small group work. Very few teachers and no administrators in the totally positive group made comments about the materials used and management of the workshops. However, materials and management accounted for 47% of the teachers' critical comments and suggestions and 65% of the administrators.

TABLE 4

EVALUATIVE COMMENTS ON INSTRUCTIONAL STRATEGIES OF THE WORKSHOP

Category	Totally positive		Some criticism or suggestions for change	
	150 teacher comments	24 admin. comments	84 teacher comments	17 admin. comments
Working in groups	18%	38%	7%	29%
Learning activities	79%	62%	45%	6%
Materials	2%	0%	18%	29%
Management	1%	0%	29%	36%

The critical comments and suggestions regarding materials were usually specific enough to be useful to the developers while making revisions: "The instructions for [a particular activity] are [confusing], [unclear], [need rewording]." The sound track of the film on [a particular demonstration] is hard to understand." "The materials in [a particular section] need to be [preceded by ---], [interfaced with --], [amplified by --], [edited and cut to

essential points]." "Why use such unique terms and definitions for ordinary things?"

The critical comments and suggestions regarding workshop management also were usually quite specific: "We needed much more time to complete [particular activity] than was allowed." "It seemed to drag in [section]." "The leader repeated instructions too often." "The leader gave ambiguous instructions." "It should be held at a time of the year when we're not so busy." "The physical facilities left something to be desired." "Make allowances for coffee breaks."

None of the evaluative comments which gave criticisms and suggestions for change related to the instructional strategies used in the workshop were considered to be of a magnitude which questioned the overall usefulness of the major strategies, i.e., co-learning in peer work groups and using specifically designed activities to reach defined performance objectives.

The second group of responses from the postmeeting reaction forms related to participant evaluation of the Taba teaching techniques, which are the learning content of the program. Three thinking tasks--concept formation (Task 1), interpretation of data (Task 2) and application of knowledge (Task 3)--form the basic structure of the Taba teaching strategy. Participants in 10 of the 13 workshops were not specifically asked to evaluate the value or usefulness of the three tasks. Even so, 20%[3] of the 251 participants in those 10 workshops volunteered the specific information that they had found learning one or more of

[3]This figure represents the specific naming of one or more of the three thinking tasks. Indirect references to these tasks were not included in the tabulation, although they were made by almost all participants in their comments about particular activities or procedures. All of the indirect references were positive.

the three thinking tasks to be valuable and useful in their teaching. Only 3% of the 251 participants made comments critical of the thinking tasks.

The evaluative instrument used in three of the 13 workshops asked specifically about classroom use of the three thinking tasks. Of the 48 respondents, 73% reported using Task 1, 41% used Task 2 and 38% used Task 3. All who reported use also reported satisfaction with the results.

The third group of responses from the postmeeting reaction forms related to outcomes, i.e., changes in student and/or teacher classroom behavior. As was true with the three thinking tasks, participants in 10 of the 13 workshops were not specifically asked to evaluate outcomes. Thus, it was significant that almost 40% of the 251 participants in those 10 workshops voluntarily reported changes in their own and/or their students' behavior in the classroom as a result of applying the techniques they learned in the workshop: 27% reported specific changes in their own behavior as teachers; 31% reported changes in their students.

Those reporting changes in themselves as teachers mentioned such things as: "Discovered I had been constantly correcting the student and saying 'No, that's wrong.'" "I stopped asking for the 'one right answer.'" "It's made me really listen to the children." Some reported they had discovered that too much negative reinforcement had long-term detrimental effects. Others found they had been unconsciously pressing for an immediate "right" answer. They reported that lessening such stress broadened and deepened learning experiences in both the cognitive and affective domains. Still others noted that as they became less directive in the classroom, students increased self-direction in the accomplishment of learning tasks.

Teachers reported that a typical change in student behavior was increased participation. This was especially true of students designated as "slow" or "nonparticipators," who became more actively engaged in classroom activities when the teacher used Taba techniques. Another change occurred when teachers used Taba strategies to encourage students to think for themselves--they usually were able to do so far beyond the teacher's expectations. Other reported changes included increased motivation to learn and increased cognitive understanding of the material, particularly on the part of "slow" learners or previously uninvolved students.

Summary. An analysis was done of open-ended responses to questionnaires administered at the end of 13 workshops in Development of Higher Level Thinking Abilities. A summary of data from these postmeeting reaction forms provided an overall evaluation of the efficiency of the workshop structure and content. Of the 290 respondents, 75% reported totally positive reactions to the training program; none reported totally negative reactions. From the 75% who made only positive comments, 79% of the comments made by teachers and 62% of these made by administrators concerned the specific learning activities programmed into the instructional system. From the 25% whose comments contained some criticism or suggestions for change, 47% of the critical comments made by teachers and 65% of those made by administrators concerned materials used (films, tapes, printed handouts) or the management of the workshop (time, leadership, etc.). Participants from 10 workshops were not asked specific questions about changes in classroom behavior. Nevertheless, 40 of the 251 participants voluntarily reported changes in their own and/or their students' behavior as a result of applying the teaching skills learned in the workshop.

TABA COMPREHENSION TEST

The Taba comprehension test was administered posttraining to college instructors of teaching methods who participated in three separate workshops and to a group of HLTA advanced trainers who were considered highly knowledgeable about the system. The test measured gain of cognitive understanding of the content and method as a result of workshop training.

The workshops were conducted during the late stage of product development. The workshop design, devised specifically for use with the college instructors of teaching methods, was an extension of the McCollum-Davis model. It included 36 hours of independent and team learning in which more work was done cooperatively to achieve learning goals. This instructional design marked a radical departure from previous workshop designs in which an instructor had to be present for approximately 60 hours.

The specific hypothesis was that there would be no significant differences in the postworkshop Taba comprehension test scores of the three groups of college instructor participators and those obtained by advanced trainers. Such results would indicate that the shorter instructional design was as efficient in teaching cognitive skills as the longer workshop and similar designs could be developed for a variety of workshop settings. The hypothesis was tested via a t test and for differences between independent means.

The results, displayed in Table 5, indicated there were no significant differences between the means of the three training groups and the mean of the group of advanced trainers. Given the possibilities of variation, it was significant that the means for all groups were so highly similar. A wider dispersion of

scores was noted in the standard deviations of Groups 1 and 3 as compared to Groups 2 and 4, which indicated more probability of workshop success for some of the participants and less for others. The three groups of trainees exhibited competence on the comprehension test equal to that of the advanced trainers. This was especially significant given the shorter duration of these workshops.

TABLE 5

SUMMARY DATA FOR TABA COMPREHENSION TEST

Population	N	Mean	Range	S. D.	t for difference between trainee group and advanced trainers[a]
Group 1	10	38.00	26-45	6.87	n.s.
Group 2	16	38.81	30-45	4.15	n.s.
Group 3	11	36.72	26-43	6.00	n.s.
Group 4 (trainers)	13	37.46	29-43	4.05	

Note.--There was a total of 47 points possible.
[a] t for independent means.

On the basis of the statistical treatment, the hypothesis of no difference between comprehension test scores for participant and trainer groups was accepted. It was evident that (a) the instructional system was efficient in providing workshop participants with adequate knowledge of the Taba content and method and (b) the shortened workshop design was an effective procedure.

TEACHING SITUATION REACTION TEST (TSRT)

The TSRT was included to be a postmeasure of change in participants' attitudes along three dimensions: human relations, structure and dogmatism. The test was administered at the late stage of development in the Duvall system, before and after a workshop led by a second-generation trainer. Although great alterations in attitude were not expected to result from a two-week workshop experience, a direction toward less dogmatism and structure and more human relations orientation was a legitimate expectation.

Two specific hypotheses were stated in the null form:

1. Ho: There would be no change in workshop participant scores between pre and post on any of the three dimensions considered: human relations, dogmatism or structure.

2. Ho: There would be no change in workshop participant scores between pre and post on overall TSRT test form.

The hypotheses were tested by a t test for correlated means for differences between pre- and posttest scores. Results are displayed in Table 6, which separately presents the outcomes for each dimension and the total test.

Workshop participants showed a change in attitude on all three scales. Posttraining differences were not large, with changes ranging less than two points on each scale. There was no significant t score for any scale, and the hypothesis of no difference was accepted for each of the three TSRT scales. Total pre/post differences, however, were significant for this population, and the hypothesis of no difference was rejected for overall TSRT results. The results indicated that the workshop carried a significant impact for the

participants and was efficient in changing attitudes toward a generally more open structure. Significance also was attached to the fact that it was a second-generation trainer in the Duvall system, not the developer herself, who conducted the workshop and was effective in causing a participant change in the attitudinal dimension.

TABLE 6

PRE- AND POST- MEANS AND STANDARD DEVIATIONS AND t's FOR EACH TSRT ATTITUDINAL DIMENSION AND TOTAL TEST SCORE (N=19)

Scale	Total possible	Pre		Post		
		$\bar{X}$	S. D.	$\bar{X}$	S. D.	t
Human relations	84	56.1[a]	1.408	54.2	1.018	.948
Structure	60	43.1	.812	41.1	.901	1.101
Dogmatism	72	47.8	.838	46.2	1.047	1.290
Total test	288	169.6	2.427	167.4	2.407	2.632*

[a]Lower scores in right direction.
*$p < .01$.

RESULTS INDICATING PROGRAM EFFECTIVENESS

FLANDERS ANALYSIS OF TEACHER-STUDENT CLASSROOM INTERACTION

The Flanders data were collected at the earliest stage of product development from field test sites in Alaska and Montana. Although the instructional time of the workshops had been set at 60 hours, materials and methods were not thoroughly developed. The knowledge gained about timing, sequence, presentation and expectations of participants at the early workshops was used by the developers in their initial revisions of the manual. At that point--1966-67--only one system had been developed.

Predictions of gain between pre- and posttapes can be made categorically for the Flanders analysis. The data gathered in this instance, however, were not expected to indicate a large amount of gain, primarily because of the early stage of program development. If gains were made, then it would be assumed that participants would gain as much or more on the same dimensions in subsequent workshops. These gains would be attributed to improvements in the system which were expected to increase with each cycle of testing and revising.

Table 7, Flanders Analysis of Teacher-Student Classroom Interaction Data for Taba Trained Teachers and Controls, contains a list of variables which were derived from Flanders categories. These variables represented areas where change in classroom behavior could be expected to result from training in Taba teaching strategies. An increase in frequency of

behavior was expected in 21 categories, e.g., indirect teacher talk, student talk, teacher use of student ideas followed by student initiation, student response followed by teacher using student idea and student initiation followed by teacher using student talk. A decrease in frequency of response was expected in 9 categories, e.g., sum of all teacher criticism, direct teacher talk, student response followed by silence and student initiation followed by silence. If such increases and decreases were evident, the hypothesis of no effect would be rejected and the inference made that the treatment was effective in changing teacher classroom behavior.

The scores reported in Table 7 were t's for gain scores between pre- and posttapes of Taba and control teachers. Gain scores were computed by subtracting the average of pretape coded behaviors from the average of posttape coded behaviors, minus a correction factor for variance among tapes. If no change occurred as the result of training, the gain score would equal zero and the t would be zero. Pre/post differences were reported for Taba teachers, control teachers and Taba teachers versus control teachers. The reported t's were for correlated means for the experimental group and uncorrelated means for the control group.

TABLE 7

FLANDERS ANALYSIS OF TEACHER-STUDENT CLASSROOM INTERACTION DATA FOR TABA TRAINED TEACHERS AND CONTROLS

Flanders summative categories	Expected direction of change	t for correlated means: Taba pre/post[a]	t for Taba control difference in gain scores[b]	t for correlated means: control group pre/post
Sum of all praise variables	-	1.350	-1.334	-.276
Sum of all use of student idea	+	.199	.524	-1.773
Sum of all teacher asks questions	+	.755	1.007	-.762
Sum of all teacher lectures	-	-1.386	1.332	.199
Sum of all teacher criticism	-	-2.516**	1.376	-2.031*
Sum of all student response	+	1.797*	1.633	-1.007
Sum of all student initiation	+	1.426	1.642	-.821
Sum of all silence	+	.726	.496	.650
Indirect teacher talk	+	.725	1.231	-1.346
Direct teacher talk	-	-1.981*	1.649	-.292
Student talk	+	1.023	.228	.897
Total teacher talk	-	-1.298	.570	-1.227

(Continued)

[a]Sign indicates observed direction of change.

[b]Minus sign indicates control group gain in expected direction exceeded that of treatment group; no sign indicates treatment group gain exceeded that of control group in the expected direction.

*p < .05.

**p < .01.

TABLE 7

FLANDERS ANALYSIS OF TEACHER-STUDENT CLASSROOM INTERACTION DATA FOR TABA TRAINED TEACHERS AND CONTROLS (Continued)

Flanders summative categories	Expected direction of change	t for correlated means: Taba pre/post[a]	t for Taba control difference in gain scores[b]	t for correlated means: control group pre/post
Teacher/student talk ratio	-	-1.780*	.528	-1.268
Teacher accepting student idea	+	1.324	1.658	-1.087
Average lecture length	-	-1.943*	1.098	-1.377
Abstracted Flanders categories				
Silence* student response[c]	+	-.409	-.806	1.285
Silence* student initiation	+	.632	.854	-1.278
Silence* silence	+	.345	.225	.300
Teacher use of student idea* teacher asks questions	+	.245	.959	-2.272*
Teacher use of student idea* student response	+	1.238	1.771*	-1.841
Teacher use of student idea* student initiation	+	1.693	2.613**	-2.551**
Teacher asks question* silence	+	.391	-.223	.669

[a]Sign indicates observed direction of change. (Continued)

[b]Minus sign indicates control group gain in expected direction exceeded that of treatment group; no sign indicates treatment group gain exceeded that of control group in the expected direction.

[c]Each asterisk in the first column means "followed by."

*p<.05.

**p<.01.

TABLE 7

FLANDERS ANALYSIS OF TEACHER-STUDENT CLASSROOM INTERACTION DATA FOR TABA TRAINED TEACHER AND CONTROLS (Continued)

Abstracted Flanders categories	Expected direction of change	t for correlated means: Taba pre/post[a]	t for Taba control difference in gain scores[b]	t for correlated means: control group pre/post
Student response* teacher uses student idea	+	1.393	1.611	-.854
Student response* teacher asks questions	+	.361	.329	.058
Student response* student initiation	+	-.186	-.428	.501
Student response* silence	-	.981	.249	2.310*
Student initiation* teacher uses student talk	+	1.623	2.812**	-3.794**
Student initiation* student response	+	.556	1.089	-.939
Student initiation* student initiation	+	1.886*	1.767*	-.110
Student initiation* silence	-	.468	-.389	.273

[a]Sign indicated observed direction of change.
[b]Minus sign indicated control group gain in expected direction exceeded that of treatment group; no sign indicated treatment group gain exceeded that of control group in the expected direction.
[c]Each asterisk in the first column means "followed by."
*$p < .05$.
**$p < .01$.

The results presented in Table 7 show that, considering the Taba group alone, 25 of the 30 pre/post differences were in the predicted direction. Of these differences, 10 approached significance at the .05 level, five were significant at the .05 level and one was significant at the .01 level. Treatment of Taba pre/post did not take into account differences due to factors not related to the treatment variable, such as time of tape recording, maturation of subjects and reactivity of the data collection method. These factors, which may have affected results, were accounted for by the control group. The t test for Taba/control group difference did show the amount of variation remaining due to treatment when the effects of extraneous variables were removed. As Table 7 shows, in 25 of 30 treatment/control comparisons, the Taba trained group exhibited more change than the control group. Of these changes, 11 approached significance at the .05 level, two were significant at the .05 level and two were significant at the .01 level.

It was considered significant that such a large number of the pre/post differences were in the predicted direction despite the early stage of development. The most significant gains due to treatment occurred in four categories: (a) teacher use of student idea followed by student initiation, (b) teacher use of student idea followed by student response, (c) student initiation followed by teacher use of student talk and (d) sum of all student initiation. A greater amount of free interaction was noted between student and teacher in the fourth category, perhaps because the students felt more free to respond to the teacher and initiate new ideas after the teacher used the ideas of students. These outcomes were strengthened by the near significant differences noted for three variables: (a) sum of all student

response, (b) sum of all student initiation and (c) teacher acceptance of student idea. Further, a reduction was observed in direct teacher talk, total teacher talk and average lecture length.

These pre/post differences for Taba-trained teachers reflected the main themes of the system: an open classroom characterized by free exchange between teacher and student, use of student resources and little direct influence by the teacher. The significant and near-significant results indicated the degree of influence Taba training had in making effective teacher behavior changes in the classroom. In addition, it was believed that because of workshop format and program revisions, later workshops would be even more effective in altering the behavior of participating classroom teachers in the specified direction.

Additional data were collected at these early workshops which measured the influence of various demographic and personality characteristics on a participant's ability to benefit from the program. Demographic variables included age, sex, tenure, years of teaching experience, highest degree obtained and membership in professional organizations. Personality variables included self-concept and dogmatism.

In a 1969 analysis of the data, Echternacht[4] used multiple regression equations to determine the actual influence of these characteristics. His analysis showed that potential positive benefits were best predicted by (a) years of experience as a teacher, (b) tenure, (c) membership in professional organizations and (d) holding only an undergraduate degree. Personality factors were shown not to have an influence on training outcomes.

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[4]Echternacht, Gary. "The Estimation of the Effects of Three Workshops to Improve Teacher Competencies." Research Report 21, Northwest Regional Educational Laboratory, Portland, Oregon. 1969. (Mimeo)

Echternacht did not interpret his results. However, the variables predicting positive outcome were clustered around a general factor of commitment to the role of teacher. Successful use of the system after training appeared to depend on a desire to stay in the teaching role and to perform effectively in that role.

TABA ANALYSIS OF TEACHER-STUDENT CLASSROOM INTERACTION

These classroom interaction data were collected during the late stage of product development. Subjects were 28 teachers from whom audiotapes were collected before and after participation in a workshop led by a second-generation trainer in the Duvall system. The taped classroom discussions were coded by counting frequency of occurrence of eight specific teacher behaviors expected of Taba-trained teachers. In addition, the expert coder rated each tape on a six-point scale reflecting degree of approximation to an ideal Taba teaching-learning pattern. Four behaviors were expected to decrease between pre- and posttraining, with increase expected in four behaviors. A significant increase in scale rating also was predicted. Limited information was provided about the ability of a second-generation trainer to conduct training which would have significant impact on teacher classroom behavior.

As shown in Table 8, pre/post changes were noted for all analyzed behaviors. Three categories were significant at the .001 level, one at the .01 level and two at the .05 level. Two categories were in the predicted direction, but not significant. One category, expected to increase, showed a significant decrease by a two tail test.

TABLE 8

TESTS OF SIGNIFICANCE BETWEEN PRE- AND POSTCODED JUDGMENTS OF TEACHER CLASSROOM BEHAVIOR (N=28)

Teacher behavior	Expected direction of change	Pre		Post		
		Mean	S.D.	Mean	S.D.	t score[a]
Percentage of teacher talk	-	53.6	15.66	47.4	11.48	1.83*
Asking questions requiring a specific answer	-	29.6	16.0	9.7	7.2	6.7***
Giving information or opinion	-	14.7	9.6	5.3	4.8	5.5***
Expressing dissatisfaction with response	-	3.7	4.0	1.3	1.3	2.2*
Expressing verbal acceptance	+	14.1	10.7	12.6	9.5	-2.0[c]
Asking questions allowing for varied responses	+	15.3	7.2	17.5	7.5	.43
Repeating or rephrasing a response	+	4.8	4.6	9.8	7.1	.647
Asking for clarification	+	1.23	6.4	5.7	1.65	3.48**
Rating of how close teacher behaviors approximated those of Taba teacher[b]	+	1.71	.79	3.8	1.08	9.51***

[a] t test for correlated means, one tailed tests.
[b] Six-point scale.
[c] Significant in wrong direction @ $p < .05$, two tail.
*$p < .05$.
**$p < .01$.
***$p < .001$.

All four behaviors which were expected to decrease after training in the Taba strategies did, in fact, decrease significantly: (a) percentage of teacher talk, (b) asking questions requiring a specific answer, (c) giving information or opinion and (d) expressing dissatisfaction with response. Of the four behaviors expected to increase, only asking for clarification increased significantly. One of the four, expressing verbal acceptance, decreased to a significant extent and the remaining two showed no significant change. The rating of how closely teacher behavior approximated that of a Taba teacher also increased significantly, as was predicted.

Not only did the decrease in total teacher talk and expression of dissatisfaction follow the pattern of the earlier Flander's analysis study, but it was significant that the two question-asking categories showed the shift in questioning strategy for which the system trains: a shift from an average of almost 30% questions asking for specific answers and about 1% asking for clarification to a pattern averaging approximately 10% "right answer" questions and 6% seeking clarification. Questions allowing varied responses remained approximately constant between 15 and 17%. The Flander's categories were not refined enough to reflect such shifts. With the decrease in "right answer" questions, it seemed that the questions allowing multiple responses were allowed to carry more of the discussion, permitting increased student participation and a more student-centered learning activity.

Thus, the data showed that (a) teachers could apply the Taba teaching strategies and (b) a second-generation trainer could effectively teach those strategies.

STUDENT QUESTIONNAIRE

The student questionnaire reflected student perceptions and feelings about school and about specific teacher behaviors. The data which resulted were intended to indicate (a) the effectiveness of the Taba program and (b) the effectiveness of television as an alternative instructional model for teaching Taba strategies.

The questionnaire was administered three times: prior to, three months after and nine months after training was received via closed circuit television and individual school sessions. The pretest and three month posttest were used in the analysis. The questionnaire was administered to a randomly selected sample of 25 elementary and 25 secondary classrooms in which the teacher had participated in the television Taba program and to a comparison group who received no treatment. The comparison group was used in an effort to control the effects of variables other than the treatment itself. Correlated t tests for the difference between groups were used to test the hypothesis of no difference. If significant pre/post differences occurred between the two groups, the hypothesis of no effect would be rejected and the conclusion made that the treatment did have an effect.

Tables 9, 10, 11 and 12 present the results of the analysis. Each table lists gain scores on each variable for both treatment and comparison groups; the standard deviation for the gain scores; a correlated t for the difference between the gain scores for the two groups; and a sign indicating the direction of the t test for each variable, i.e., positive=right direction, negative=wrong direction. Gain scores were computed on the amount of change between pre/post

administration: no change in score equaled zero gain; positive change was noted by no sign; negative change was noted by a negative sign.

The first group of results indicated negligible gains by the total treatment group, i.e., elementary and secondary combined, in comparison to the nontreatment group. (See Table 9.) Of the 22 items considered, 9 of the treatment/control comparisons were in the wrong direction and 13 in the predicted direction. Significant gains ($p < .05$) were seen for only three of the 22 variables: "I like this class," (increase); "Teacher asks for the correct answer," (decrease) and "Teacher calls on us only when we are ready," (increase). Four items had near significant gains for change in the classroom: a decrease in the amount of teacher talk, an increase in teacher discussion of student ideas, a decrease in the teacher act of saying "wrong" and a reduction in student perception that keeping quiet in class was important.

All of the significant and near significant improvements in teacher behavior displayed in Table 9 were directly reflective of the training input. Although the results were not as positive as had been predicted, there were indications that change could be seen as the result of training. It was noted that, in general, the changes were in variables related to student-perceived teacher behavior, rather than attitude toward school. It was conjectured that (a) even though behavior changes were noticed quickly by the students, it might take longer to be translated into changes in student attitudes and (b) the application of the Taba teaching strategies was not sufficient by itself to stimulate changes in student feelings about school.

TABLE 9

PRE/POST GAINS AND t SCORES FOR ELEMENTARY-SECONDARY AND COMPARISON GROUP STUDENT QUESTIONNAIRE

Variables	Elementary-secondary combined (Taba)		Comparison group		t scores	Direction
	Mean of pre/post differences	SD	Mean of pre/post differences	SD		
School work is fun	-.163	.391	-.300	.564	.941	+
Asking teacher for help is good	-.036	.350	-.033	.541	.021	-
Teacher lets students work together	-.186	1.004	-.147	.544	.132	-
Teacher understands how students feel	-.180	.490	-.117	.508	.388	-
Not important for students to keep quiet	.133	.421	.346	.580	1.377	+
Students can help each other	.011	.497	-.012	.821	.119	+
I like this class	-.226	.587	-.615	.641	1.973*	+
I am interested in class	-.345	.552	-.182	.533	.912	-
Teacher praises student answers	.015	.346	-.010	.649	.112	+
Teacher lets students help each other	.130	.596	.197	.701	.359	-
I work hard in this class	-.278	.380	-.165	.486	.753	-
Teacher seldom criticizes student responses	-.040	.438	-.229	.373	1.368	+

*p < .05.

(Continued)

TABLE 9

PRE/POST GAINS AND t SCORES FOR ELEMENTARY-SECONDARY AND COMPARISON GROUP STUDENT QUESTIONNAIRE (Continued)

Variables	Elementary-secondary combined (Taba)		Comparison group		t scores	Direction
	Mean of pre/post differences	SD	Mean of pre/post differences	SD		
Teacher questions for the correct answer	-.014	.433	.304	.577	2.017*	+
Students can say what they think	-.081	.532	.017	.435	.542	-
Teacher questions for student ideas	.010	.582	-.213	.413	1.250	+
Teacher calls only on volunteers	.023	.494	-.304	.712	1.780*	+
Teacher gives accepting response to student talk	-.037	.475	.045	.701	.462	-
Amount teacher versus student talk	-.045	.413	.088	.348	1.028	+
Score student attitude toward class questions	-.647	2.235	-.771	2.292	.169	+
Score classroom openness questions	-.060	.993	-.197	.883	.433	+
Score use of judgment questions	-.071	.640	-.217	.780	.657	+
Score student participation questions	-.266	.985	.094	1.035	1.103	-

*p<.05.

TABLE 10

PRE/POST GAINS AND t SCORES FOR ELEMENTARY AND SECONDARY STUDENT QUESTIONNAIRE

Variables	Elementary (Taba)		Secondary (Taba)		t scores	Direction
	Mean of pre/post differences	SD	Mean of pre/post differences	SD		
School work is fun	-.274	.413	-.045	.338	1.733*	+
Asking teacher for help is good	-.060	.344	-.011	.365	.399	+
Teacher lets students work together	-.471	.967	.115	.981	1.728*	+
Teacher understands how students feel	.171	.430	-.190	.560	.112	-
Not important for students to keep quiet	.051	.335	.221	.493	1.168*	+
Students can help each other	-.003	.649	.026	.278	.173	+
I like this class	-.095	.551	-.364	.610	1.378	-
I am interested in class	-.369	.575	-.320	.545	.250	+
Teacher praises student answers	.033	.294	-.003	.402	.300	+
Teacher lets students help each other	.088	.490	.174	.554	.470	+
I work hard in this class	-.495	.275	-.156	.383	2.328*	+
Teacher seldom criticizes student responses	-.064	.542	-.014	.309	.317	+

*p<.05.

(Continued)

TABLE 10

PRE/POST GAINS AND t SCORES FOR ELEMENTARY AND SECONDARY STUDENT QUESTIONNAIRE (Continued)

Variables	Elementary (Taba)		Secondary (Taba)		t scores	Direction
	Mean of pre/post differences	SD	Mean of pre/post differences	SD		
Teacher questions for the correct answer	-.174	.460	.155	.365	2.270*	-
Students can say what they think	.076	.611	-.171	.480	1.124	+
Teacher questions for student ideas	.060	.631	-.042	.540	.499	-
Teacher calls only on volunteers	.111	.604	-.070	.336	1.058	+
Teacher gives accepting response to student talk	-.070	.571	-.002	.362	.402	-
Amount teacher versus student talk	-.025	.513	-.066	.286	.280	+
Score student attitude toward class questions	-1.006	1.675	-.265	2.714	.959	-
Score classroom openness questions	.032	.986	-.160	1.022	.550	+
Score use of judgment questions	-.125	.789	-.013	.448	.494	-
Score student participation questions	-.324	.887	-.204	1.106	.346	-

*p<.05.

A second group of results from the student questionnaires indicated a relationship between the grade level taught by the trainee and his ability to apply the Taba teaching strategies. As shown in Table 10, student perceptions of the teaching behaviors of Taba-trained elementary teachers and Taba-trained secondary teachers indicated more frequency of positive gains for the latter group. The increased gains for secondary teachers were noted on 14 of the 22 items, while elementary teachers made more gains on the remaining eight items. Five gains for secondary over elementary teachers were significant: the student feeling that school work was fun, that he worked hard in class, that the teacher asked for the "right" answer to a lesser degree, that the teacher put less emphasis on keeping quiet and that the teacher allowed students to work in groups more often.

The results, which seemed to indicate a greater applicability of the Taba system in secondary schools than in elementary schools, were not uniformly supported when treatment-comparison group differences were considered. (See Tables 11 and 12.) Although pre/post gains for elementary and secondary groups showed that trained elementary teachers differed as expected from their controls on 12 of the 22 items, while trained and untrained secondary teachers differed as expected on 15 of the 22 items, five of the differences were significant for elementary teachers compared to only one for the secondary teacher groups.

Elementary teachers showed significant gains in five areas (See Table 11): students perceived that keeping quiet in class was less important, that the "right" answer was expected less often and that teachers called on students only when they volunteered; students liked class more and worked harder than before.

TABLE 11

PRE/POST GAINS AND t SCORES FOR ELEMENTARY AND COMPARISON GROUP STUDENT QUESTIONNAIRE

Variables	Elementary (Taba)		Comparison group		t scores	Direction
	Mean of pre/post differences	SD	Mean of pre/post differences	SD		
School work is fun	-.274	.413	-.300	.564	.147	+
Asking teacher for help is good	-.060	.344	-.033	.541	.165	-
Teacher lets students work together	-.471	.967	-.147	.544	1.089	-
Teacher understands how students feel	-.171	.430	-.117	.508	.312	-
Not important for students to keep quiet	.051	.335	.346	.580	1.752*	+
Students can help each other	-.003	.649	-.012	.821	.033	+
I like this class	-.095	.551	-.615	.641	2.384*	+
I am interested in class	-.369	.575	-.182	.533	.911	-
Teacher praises student answers	.033	.294	-.001	.649	.194	+
Teacher lets students help each other	.088	.497	.197	.701	.501	-
I work hard in this class	-.495	.275	-.165	.486	1.807*	-
Teacher seldom criticizes student responses	-.064	.542	-.229	.373	.939	+

*p<.05.

(Continued)

TABLE 11

PRE/POST GAIN AND t SCORES FOR ELEMENTARY AND COMPARISON GROUP STUDENT QUESTIONNAIRE (Continued)

Variables	Elementary (Taba)		Comparison group		t scores	Direction
	Mean of pre/post differences	SD	Mean of pre/post differences	SD		
Teacher questions for the correct answer	-.174	.460	.304	.577	2.531*	+
Students can say what they think	.076	.611	.017	.435	.254	+
Teacher questions for student ideas	.060	.631	-.213	.431	1.334	+
Teacher calls only on volunteers	.111	.604	-.304	.712	1.738*	+
Teacher gives accepting response to student talk	-.070	.571	.045	.701	.497	-
Amount teacher versus student talk	-.025	.513	.088	.348	.685	+
Score student attitude toward class questions	-1.006	1.675	-.771	2.292	.325	-
Score classroom openness questions	.032	.986	-.197	.883	.662	+
Score use of judgment questions	-.125	.789	-.217	.780	.319	+
Score student participation questions	-.324	.887	.094	1.035	1.193	-

*p<.05.

Fewer significant gains were noted for secondary teachers than for elementary teachers when comparison group gains were accounted for. (See Table 12.) A significant gain appeared only for the student perception that the teacher less frequently said the student response was "wrong." Also, near significant gains occurred in four areas: students said that school work was more fun, that they liked school better, that teachers had improved in their questioning style and that the teacher talked less.

Summary. Fewer significant differences were found in teacher classroom behavior and student perceptions about school, as a result of the television-Taba training, than were predicted. Although a slight advantage was noted for secondary over elementary teachers, they had fewer significant gains than the elementary group when comparison was made to the nontreatment group. Thus, the hypothesis of no treatment effect was accepted. However, the data clearly indicated a direction toward treatment effect. Improvement in teaching methods resulted in more student enthusiasm, increased classroom openness, improved teacher questioning style and teacher use of student ideas. This was congruent with the results of the Flander's data.

Two conjectures were made related to the results obtained from the student questionnaire data. The first was that the television format of the training was not involving enough to develop the knowledge of concepts and procedures required for successful application in the classroom. The second conjecture was that the format was involving enough, and successful, but that problems of design and measurement interfered with the reflection of that success in the data.

TABLE 12

PRE/POST GAINS AND t SCORES FOR SECONDARY AND COMPARISON GROUP STUDENT QUESTIONNAIRE

Variables	Secondary (Taba)		Comparison group		t scores	Direction
	Mean of pre/post differences	SD	Mean of pre/post differences	SD		
School work is fun	-.045	.338	-.300	.564	1.507	+
Asking teacher for help is good	-.011	.365	-.033	.541	.134	+
Teacher lets students work together	.115	.981	-.147	.544	.863	+
Teacher understands how students feel	-.190	.560	-.117	.508	.363	-
Not important for students to keep quiet	.221	.493	.346	.580	.623	+
Students can help each other	.026	.278	-.012	.821	.179	+
I like this class	-.364	.610	-.615	.641	1.077	+
I am interested in class	-.320	.545	-.182	.533	.686	-
Teacher praises student answers	-.003	.402	-.001	.649	.012	+
Teacher lets students help each other	.174	.554	.197	.701	.100	-
I work hard in this class	-.156	.383	-.165	.486	.055	+
Teacher seldom criticizes student responses	-.014	.309	-.229	.373	1.791*	+

*p<.05.

(Continued)

TABLE 12

PRE/POST GAINS AND t SCORES FOR SECONDARY AND COMPARISON GROUP STUDENT QUESTIONNAIRE (Continued)

Variables	Elementary (Taba)		Comparison group		t scores	Direction
	Mean of pre/post differences	SD	Mean of pre/post differences	SD		
Teacher questions for the correct answer	.155	.365	.304	.577	.849	-
Students can say what they think	-.171	.480	.017	.435	1.040	-
Teacher questions for student ideas	-.042	.540	-.213	.413	.922	+
Teacher calls only on volunteers	-.070	.336	-.304	.712	1.167	+
Teacher gives accepting response to student talk	-.002	.362	.045	.701	.237	-
Amount teacher versus student talk	-.066	.286	.088	.348	1.312	-
Score student attitude toward class questions	-.265	2.714	-.771	2.292	.534	+
Score classroom openness questions	-.160	1.022	-.197	.883	.105	+
Score use of judgment questions	-.013	.448	-.217	.780	.883	+
Score student participation questions	-.204	1.106	.094	1.035	.745	-

*p<.05.

There was no method available to test the accuracy of the first conjecture. However, two problems were evident in design and measurement. First, the timing of the questionnaire administration seemed to have a definite negative influence. The administration prior to workshop training was at the beginning of the school year, when student attitudes and attendance usually are at their peak, but the three-month posttraining administration occurred immediately before Christmas vacation, when student attitudes and attendance tend to decline. A second problem was the type of questionnaire used. Because such forms usually are quite reactive, the result can be that they are not taken seriously by the students or taken with greater or lesser degree of seriousness at the various grade levels. For example, the differences shown between elementary and secondary data might indicate nothing more than increased orientation and sophistication toward questionnaire forms.

VALUE, USE AND COMPREHENSION TEST

This test, in questionnaire form, measured the extent to which teachers trained in the Taba system (a) believed the system had value as an instructional tool, (b) actually used system strategies in their classrooms and (c) were knowledgeable about system content and structure. The responses of 37 trainees were analyzed by considering each of the three variables, as well as their interrelationships. All respondents had participated in workshops during the early stage of program development and the time lapse between training and testing ranged from one to four years.

Three test items indicated the extent to which teachers perceived the three Taba thinking strategies, i.e., concept diagnosis, interpretation of data and application of knowledge, to have value as procedures for their classroom. (See Table 13.) Concept diagnosis was seen as the most valuable strategy, with 89% of the respondents rating it as "usable frequently," "usable in a variety of situations" or "extremely usable." Application of knowledge was rated as very usable by 74% of the teachers; 22% reported that the procedure was "extremely usable," while the other two strategies had a 13% and 9% response in the same category. Interpretation of data was perceived to be the least useful of the three procedures. Although 55% rated it in one of the three highest categories, the remaining 45% rated it as usable only on rare occasions or not at all.

TABLE 13

VALUE OF THREE TABA THINKING STRATEGIES AS PERCEIVED BY TRAINED TEACHERS (N=37)

Responses	Taba strategies		
	Concept diagnosis	Interpretation of data	Application of knowledge
Not at all	0%	4%	8%
Usable on rare occasions	9	41	17
Usable frequently	33	33	30
Usable in a variety of situations	43	13	22
Extremely usable in every aspect of teaching	13%	9%	22%

Frequency of actual use of the three Taba thinking strategies was reported in responses to three other questionnaire items. (See Table 14.) Concept diagnosis and interpretation of data were used slightly more often than application of knowledge. Monthly or more frequent use was reported by 85% and 83%, respectively, for concept diagnosis and interpretation of data. In comparison, 30% reported using application of knowledge relatively infrequently or never. However, 26% reported using that strategy almost every day. A summary of scores showed 77.8% frequently used (monthly or more) all three strategies, 19.7% reported use of all three almost every day and 20.8% said that they rarely used all three. Often, however, the three strategies were not used in concert. Descriptive reports indicated that one of the strategies might be applied at a particular stage of a learning activity quite apart from prior or subsequent use of the other strategies for completion of the learning sequence.

TABLE 14

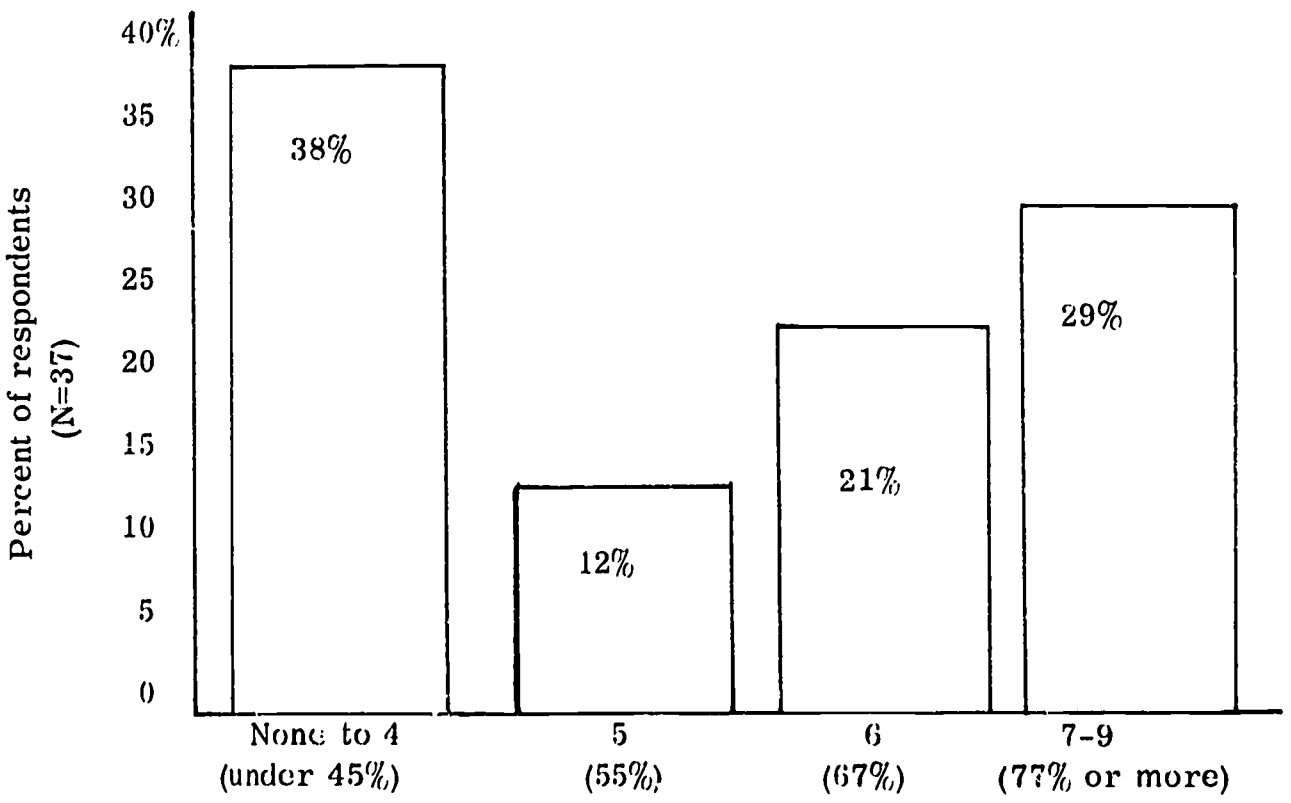
REPORTED FREQUENCY OF USE OF THREE TABA THINKING STRATEGIES BY TRAINED TEACHERS (N=37)

Responses	Taba strategies		
	Concept diagnosis	Interpretation of data	Application of knowledge
Never	6%	8%	10%
Several times a year	9	9	20
Monthly	31	36	15
Weekly	30	30	29
Almost every day	24%	17%	26%

Accurate recognition of nine key concepts from the Taba teaching strategies was tested in three of the questionnaire items. (See Table 15.) Of the 37 respondents, the extremes were one who had 100% accuracy and two who had 11% accuracy. Fifty percent accurately recognized at least 67% of the concepts. Given a time span of test administration from one to four years after workshop training, the findings indicated that the training did provide a majority of participants with adequate knowledge of Taba concepts.

TABLE 15

ACCURACY OF RECOGNITION OF
TABA CONCEPTS



Summary. Seventy-three percent of the teachers trained in Taba strategies found the system valuable, understood it and actually used it in their classrooms. This result was believed to be especially significant because the test administration time varied from one to four years posttraining. A relationship was found between believing the instructional model to be valuable and actually using it. Thus, it seemed necessary for workshop trainees to gain the requisite attitudes to ensure system use. It was concluded that the Taba system, as taught to these trainees, had been effective in working change in teacher behavior.

In addition, the majority of the responses to open-ended items gave anecdotal evidence that the system was actually used and beneficial in the classroom. However, rarely did the teachers report using the entire Taba sequence in a given subject area or any one part of the sequence in all subject areas. Rather, they reported flexible use on an "as needed" basis. Many teachers mentioned that the full sequence, if used repeatedly, often bored the students. Although many reported that the Taba sequence resulted in wider student interest, participation by a variety of student and autonomous learning, others believed the system's structure was an interference to achieving those same goals. Respondents comments were readily grouped into two broad statement categories: (a) about half reported the system "useful in conjunction with other teaching methods, but not alone," and (b) the remainder reported the system as "useful in subject matter introduction or conclusion."

ADVANCED TRAINER QUESTIONNAIRE

A sample of 37 advanced trainers in the Taba system was drawn from a list of those who had been trainers and had been sent the first revisions of materials. The percentage of McCollum-Davis trainers as compared to Duvall trainers in the sample was approximately equal to the actual number trained in each model: McCollum-Davis--69% and Duvall--31%. However, males and females in the sample were not proportionate to those who received training: males were overrepresented--68% (25) and females were underrepresented--32% (12). The implication was that more males than females actually became advanced trainers, despite the larger number of females who received initial training.

Data from the advanced trainer questionnaire were organized and analyzed around response categories, including: (a) job roles, (b) additional preparatory experiences, (c) extent of involvement in training activities, (d) description and number of workshops led, (e) relationship between job roles and continued involvement in training activities, (f) relationship between model in which training was received and continued involvement in training activities, (g) workshops planned and conducted by advanced trainers themselves and (h) workshops planned by others through stimulation of advanced trainers.

Responses in the first category, job roles, revealed that trainers were represented at all levels of educational instruction. (See Table 16.) However, despite the fact that a greater number of teachers received initial training, teachers, curriculum consultants and principals had equal representation. This higher representation of teachers was the result of two factors: (a) The original

workshop plan required each district to send teams of four--at least two teachers, preferably from the same building, and two nonteachers, e.g., principal, curriculum coordinator or central office administrator. The purpose was to develop a dissemination team which could organize and conduct workshops in that particular school disctrict. (This requirement was later relaxed.) (b) More teachers attended workshops conducted at the local level by a dissemination team than any other group.

Those advanced trainers who held jobs as curriculum consultants, principals, superintendents or college instructors were approximately equal to the proportion trained. There was less attrition from "the number of potential advanced trainers," as determined by the number of each role-type who received initial training, than from the teacher group. College instructors, while not part of the local dissemination teams, hosted Taba workshops where personnel from school districts could be trained.

TABLE 16

JOB ROLES OF ADVANCED TRAINERS

Role	Representation percentage
Teacher	18.9%
Curriculum consultant	18.9
Principal	18.9
Superintendent	10.9
College professor	21.6
Other	9.9
	99.9%

The role composition of the advanced trainers did not differ when two factors of initial training were considered: (a) the stage of product development and (b) the use of a particular system, i.e., McCollum-Davis or Duvall.

Nearly 100% of the sample reported additional experiences after participation in initial Taba workshops before becoming advanced trainers: 37.8% had one additional experience, 56.8% had more than one type of experience and 5% did not respond to the question. Teachers and superintendents reported about half the amount of involvement in additional preparatory activities as did principals and curriculum consultants. The latter two groups were the most involved. College instructors reported involvement in proportion to their numbers. Table 17 indicates how the responses were categorized, the distribution of types of experiences for those reporting only one experience and those reporting two or more, and the total responses in each category.

Co-training in a workshop was the experience mentioned most frequently (41%). When considering the group with only one additional experience, this figure rose to 50%. Although advanced trainer status in the Duvall system required co-leadership of a workshop, only 54% of the sample (8 responders) mentioned it as an additional preparation; 66% (14 responders) of the advanced trainers in the McCollum-Davis system mentioned it. No relationships were noted between the two systems and the other responses given.

Another question concerned the extent of advanced trainers' involvement in training activities by asking for a summary of the number of workshops of various types which had been planned and conducted by the sample. Responses were believed to be especially important because of the program's emphasis on

the dissemination cycle, i.e., advanced trainers functioning in that role with consistent frequency.

Only five of the responders (14.3%) reported that they had not assumed major responsibility for at least one workshop, while 85.7% reported that they had been involved in "at least some training activity." This result was considered to be especially significant because there was no normative structure to influence trainers to conduct their own workshops.

TABLE 17

ADDITIONAL PREPARATORY EXPERIENCES
OF ADVANCED TRAINERS

Experience	Percent of experiences reported		
	Only one experience (N=14)	Two or more experiences (21 persons, 42 experiences)	Total (56 experiences)
Participated in additional workshop	14%	19%	18%
Co-trained in a workshop	50	38	41
Worked with Northwest Laboratory	7	28	23
Part of a team	7	5	5
Used system in classroom	14	10	11
Observed others	7	0	2
	100%	100%	100%

The advanced trainers reported assuming responsibility for a large number of workshops in a variety of settings, with an average of 7.5 workshops per trainer. (See Table 18.) Although the sample reported a total of 225 workshops, the number of participants who received training at these workshops was not included in the responses. However, it was estimated that 5,625 school personnel were trained between the beginning of 1967 and the end of 1969 by this sample of 37 advanced trainers. This figure was derived by using an estimate of 25 participants for each workshop reported, and multiplying it times the total number of workshops. The 25 participant figure was considered conservative, because workshops had as few as 15 to as many as 240 participants. Thus, the results demonstrated the ability of advanced trainers to disseminate the Taba instructional system to a large number of school personnel in a variety of settings.

Another analysis of the advanced trainers' responses indicated that job role influenced the extent of involvement in training activities. (See Table 19.) Curriculum consultants and college professors held more workshops than any other role-type: although only 18.9% of the sample were curriculum consultants, they reported conducting 39.5% of the total number of workshops; college professors also conducted more workshops in proportion to their numbers (30.6% to 21.6%). On the other hand, a lower percentage of teachers and principals were involved in training experiences than would be expected from their percentage of the total sample: 18.9% of the teachers were qualified, but only 5.2% held workshops; principals also were 18.9% of the qualified group, but reported only 6.2% of the workshops. The combined group of superintendents, researchers and central office personnel led workshops in approximate proportion to their numbers.

TABLE 18

WORKSHOPS LED BY ADVANCED TRAINERS (N=30)

Description	Number conducted	Percentage of trainers[a]
Workshop for school personnel from more than one district	44	77%
Inservice instruction for personnel from more than one building of a school district	51	67
Workshop for school personnel from the same building	26	40
Workshop for personnel outside the formal educational system	12	20
Course(s) for student teachers or other preservice educators	19	30
Extension courses, primarily for teachers	58	50
Other	15	20
	225 (Total reported)	

Note.--Workshops took place during 1967, 1968 and 1969.
[a]Trainers conducted workshop type one or more times.

The analysis of these results led to three speculations about the relationship between job role and number of workshops conducted. First, consultants and professors had contact with a larger number of personnel who either qualified as potential trainees or had influence in the power structure for making decisions supportive of the training program. Secondly, teachers and principals may be handicapped in conducting training for two reasons: (a) within their own building, status and role relationships conflict with use of their expertise

and (b) they are not recognized, cutside of their school, as having expertise because of the relative isolation of individual school buildings within school districts. Third, the original composition of the dissemination team was based on the expectation that the two non-teachers would be influential in initiating and stimulating participation in workshops and the two teachers would actually lead them. The first part of the expectation was accurate, as principals, superintendents and curriculum consultants accounted for two-thirds of all influential activities in workshop establishment and participation. However, except for principals, those with more influence were also more active in conducting workshops.

TABLE 19

RELATIONSHIP BETWEEN JOB ROLE AND INVOLVEMENT IN TRAINING ACTIVITIES (N=37)

Job role	Representation		Percentage involvement[a]
	Percentage	Number	
Teacher	18.9%	7	5.2%
Curriculum consultant	18.9	7	39.5
Principal	18.9	7	6.2
College professor	21.6	8	30.6
Other (superintendent, central office, research)	21.6	8	18.7
	99.6%	37	100 %

[a]Percentage of total number of workshops conducted by each role-type.

An analysis also was done of the relationship between the particular system in which the sample group received their initial training and the number of workshops conducted. The 15 respondents who had been trained in the Duvall system were responsible for 59.4% or 132 of the workshops reported, while the 22 respondents who had been trained in the McCollum-Davis system were responsible for 40% or 93 of the total reported. A *t* test for the difference between groups showed no significant relationship (*t* = .714). However, a trend was evident in that the advanced trainers in the Duvall system conducted more workshops in proportion to their numbers than did the McCollum-Davis advanced trainers.

Two other questions were related to the involvement of advanced trainers in training activities: plans for workshops to be held in 1970 and stimulation of the involvement of others. Responses to these questions also had been obtained from a similar questionnaire given to advanced trainers in four other Northwest Regional Educational Laboratory instructional systems; all five sets of responses were presented together for comparative purposes.

The results dealing with future workshop plans showed that more workshops had been planned by advanced trainers in Taba than any of the other systems. (See Table 20.) Thus, Development of Higher Level Thinking Abilities appeared to be the most viable system when applying the criterion of advanced trainers making training available to a large number of school personnel. However, the exact number of workshops each respondent planned to conduct was not determined.

TABLE 20

1970 WORKSHOP PLANS OF ADVANCED TRAINERS
IN FIVE LABORATORY SYSTEMS

Workshop plans	Instructional systems				
	Taba[a] (N=30)	Inquiry[b] (N=22)	Interaction[c] (N=31)	RUPS[d] (N=31)	SOAI[e] (N=16)
Yes	76.7	59.1	51.6	67.6	56.3
Uncertain	6.7	4.5	12.9	6.7	0.0
No	16.7	36.4	35.5	22.6	47.3

Note.--The five systems are components in the Northwest Regional Educational Laboratory's program to improve teaching competencies.
[a]Taba system's full name is Development of Higher Level Thinking Abilities.
[b]Inquiry system's full name is Facilitating Inquiry In The Classroom.
[c]Interaction system's full name is Interaction Analysis.
[d]RUPS is an acronym for Research Utilizing Problem Solving.
[e]SOAI is an acronym for Systematic and Objective Analysis of Instruction.

The second question was stimulation of others to conduct or to become involved in the Taba training program. The results were viewed as one measure of program success, i.e., if the participants found the training worthwhile, they would be more likely to inform others of their experience and encourage them to become involved in the program. (See Table 21.) Using this criterion, advanced trainers stimulated involvement in Research Utilizing Problem Solving (RUPS), Inquiry and Systematic and Objective Analysis of Instruction (SOAI) more than either Taba or Interaction Analysis. The differences could result from reactions to either the content or the training model. Although a comparison of the five training models was not done, a quick review was made of the materials used

in the three programs which had higher percentage ratings than Taba. RUPS and Inquiry had a greater number of (a) activities which required active involvement of the participants and (b) simulation of activities which promoted ease of applicability and understanding of the programs' teaching strategies. However, the 62% of "yes" responses from the Taba group was considered a significant indication of positive response to the training received and the continued encouragement of others to become involved in the program.

TABLE 21

RESPONSES OF ADVANCED TRAINERS IN FIVE LABORATORY SYSTEMS TO QUESTION ABOUT STIMULATING INVOLVEMENT OF OTHERS

Workshop plans	Instructional systems				
	Taba[a] (N=37)	Inquiry[b] (N=27)	Interaction[c] (N=49)	RUPS[d] (N=41)	SOAI[e] (N=18)
Yes	62.2%	74.1%	59.1%	82.9%	72.2%
No	24.3	14.8	38.8	14.6	16.7
No response	13.5	33.7	2.0	2.4	11.1

Note.--The five systems are components in the Northwest Regional Educational Laboratory's program to improve teaching competencies.
[a]Taba system's full name is Development of Higher Level Thinking Abilities.
[b]Inquiry system's full name is Facilitating Inquiry In The Classroom.
[c]Interaction system's full name is Interaction Analysis.
[d]RUPS is an acronym for Research Utilizing Problem Solving.
[e]SOAI is an acronym for Systematic and Objective Analysis of Instruction.

RESULTS INDICATING EFFICIENCY/EFFECTIVENESS OF ONE WORKSHOP

The workshop chosen for intensive evaluation used a training program which had been developed as an extension of the McCollum-Davis model. (See Appendix A for the workshop format.) Although the basic content was similar, the design of the workshop was considerably different: laboratory, i.e., group, instructional time was three days of introduction and one day of debriefing, with 30 hours of practicum based on self- or peer-help activities. This represented a reduction of approximately six days of laboratory instructional time.

The efficiency of this shortened design as related to acquisition of knowledge about the content and method of the Taba system was presented in Table 5, Summary Data for Taba Comprehension Test. Participant responses to one follow-up questionnaire item also indicated the success of the training procedure: 65% reported the design worked well for them, 18% reported the design worked fairly well and 12% reported it did not meet their expectations. These results were much better than participants' preworkshop expectations: 38% reported, before training, that they did not expect the design to work.

Workshop effectiveness was indicated in two of the final questionnaire items. The first was prediction of classroom use of the Taba system: 88% reported that they would definitely use the system, 6% said that they would consider using it and 6% said that they had not considered the matter. There were no reports that the system would not be used at all. These predictions of use were considered stable, because the responders had already had many opportunities to apply the system in their classrooms between laboratory periods: 81% of the trainees reported that they had used the strategies at least "occasionally" between laboratory introduction and debriefing.

The responses to a second questionnaire item, "How well prepared do you feel to teach the system?", also indicated workshop effectiveness. No participant reported that he felt ill-prepared to teach Taba to others: 63% reported that they felt well prepared and 37% said that they were at least "half-way prepared." Another outcome demonstrated the initiation of the diffusion process. Half of the trainees indicated that they had plans to teach the system to others and 31% said that they had no immediate plans or were uncertain of their plans.

The positive results in performance, satisfaction with training and plans for both classroom and training use of the Taba method indicate the efficiency and effectiveness of the shorter training design. Part of this success was attributed to positive involvement in the training itself: 88% of the trainees rated the workshop's productivity, clarity and working effectiveness at least five on a six-point scale; 78% of the trainees rated the satisfaction, productivity and effectiveness of the practicum experience, teaching in a public school classroom, at least five on a six-point scale.

Data were collected before training on seven variables of participant characteristics that were thought to influence involvement in training activities as well as training outcomes of conceptual understanding of the system and anticipated use after training. The variables and their corresponding measurement modes were: (a) prior attitude (course information questionnaire, teacher perception questionnaire); (b) number of years experience teaching in public schools (background questionnaire); (c) age (background questionnaire); (d) previous classroom style (course information questionnaire); (e) previous knowledge of system's purpose (background questionnaire) and (g) extent to which the participants knew each other before training (background questionnaire).

TABLE 22

CHI-SQUARE ANALYSIS OF RELATIONSHIPS AMONG SELECTED PARTICIPANT CHARACTERISTICS, TRAINING INVOLVEMENT AND TRAINING OUTCOME (N=18)

Variables	Involvement during training	Post-training knowledge of system	Anticipated use of system	
			Classroom	Training
Selected participant characteristics				
Age	2.03	2.95	1.47	2.44
Prior classroom style	4.42*	1.68	5.51*	6.72**
Prior attitude	6.85**	2.96	1.67	.94
Previous knowledge of system's purpose	1.24	.95	1.34	1.27
Expectations of success of training design	.97	.21	1.23	1.17
Number of years taught in public school	4.41*	.84	5.53*	3.21
Acquaintance with other participants	2.04	.38	.31	.45
Interaction during training				
Involvement with training design	-	5.21*	4.45*	5.19*
Training outcome				
Posttraining performance	5.21*	-	2.24	1.28
Plans for classroom use	4.45*	2.24	-	5.47*

Note.--Figures shown are obtained chi-squares for relationships among variables. All figures reported are for 2X2 chi-squares tests with 1 df.
*$p < .05$.
**$p < .01$.

A chi-square analysis was done to relate the variables to (a) the degree to which the trainees became involved in the workshop, as measured by ratings of both the training itself (postmeeting and postpracticum) and the score of the knowledge test and (b) the training outcomes of performance and anticipated use of the system, as measured by the final questionnaire. No prediction was made of how or in what direction the variables would influence either involvement with the training design or training outcomes.

The results, as displayed in Table 22, were seen as indicative rather than inclusive. A first result from the complex pattern of relationships was that the degree to which a participant found the program involving for him was related to the amount he learned about the system ($p < .05$), the amount he anticipated using the system in his own teaching ($p < .05$) and the amount he anticipated teaching the Taba method to others ($p < .05$). The measure of involvement included such items as the degree to which the participant perceived the training to be productive, effective and satisfying. This perception was related to prior attitude ($p < .01$), prior classroom style ($p < .05$) and the number of years the participant taught in public schools ($p < .05$). If a participant's attitudes and prior style were congruent with the implications of the Taba method as applied in the classroom, it was more likely that he would find the training program an involving experience. The number of years a participant had taught in public schools was shown to have a negative relationship to involvement in training: the more teaching experience, the less productive, effective and satisfying the training program was reported to be. The implication was that program dissemination would be most efficient if the training program were opened only

to those who already had attitudes and classroom styles congruent with training goals and who did not have extensive teaching experience. However, more testing would be required to determine if such an implication were valid.

Another result was that four of the variables--age, previous knowledge of system's purpose, expectations of success of the training design and acquaintance with other participants--did not have a relationship to involvement in the program, the amount learned about the system or anticipated use. The implications for workshop planners and possible participants were that (a) all age groups could benefit from training, (b) no unusual benefits would be derived from extensive information about the program before the workshop, (c) negative expectations did not preclude actual benefits and (d) participants could benefit from receiving training with either a group of strangers or co-workers.

Two of the variables seemed to influence a participant's anticipated use of the system: prior attitudes ($p < .05$) and prior classroom style ($p < .05$). Such an indication supported the suggestion that these characteristics were important to the success of the training program. None of the variables related directly to knowledge of the system. In addition, the amount known about the system did not relate significantly to either plans to use the Taba method in the classroom or plans to teach the system to others. These results corresponded to the results of the value, use and comprehension questionnaire: the extent to which the system's teaching strategies were used in the classroom was related more highly to the amount it was considered to be valuable than to the amount known about it.

SUMMARY OF RESULTS AND CONCLUSIONS

EFFICIENCY CRITERIA

The performance criteria related to the internal efficiency of the Higher Level Thinking Abilities instructional system centered around two questions: Did the training workshops teach what they were designed to teach? What were some variables that determined workshop efficiency? Although the data were collected to meet the specific needs of the developer, in this report they were presented as evidence to demonstrate the degree to which the workshops met the stated objectives.

1. An analysis was done of open-ended responses to questionnaires administered at the end of 13 workshops. A summary of data from these post-meeting reaction forms provided an overall evaluation of the efficiency of the workshop structure and content. Of the 290 respondents, 75% reported totally positive reactions to the training program; none reported totally negative reactions. From the 75% who made only positive comments, 79% of the comments made by teachers and 62% of those made by administrators concerned the specific learning activities programmed into the instructional system. From the 25% whose comments contained some criticism or suggestions for change, 47% of the critical comments made by teachers and 65% of those made by administrators concerned materials used (films, tapes, printed handouts) or the management of the workshop (time, leadership, etc.). Participants from 10 workshops were not asked specific questions about changes in classroom behavior. Nevertheless, 40 of the 251 participants voluntarily reported changes in their own and/or their

students' behavior as a result of applying the teaching skills learned in the workshop.

2. The Taba comprehension test was administered posttraining to college instructors of teaching methods who participated in three separate workshops and to a group of HLTA advanced trainers who were considered highly knowledgeable about the system. The test measured gain of cognitive understanding of the content and method as a result of workshop training.

The results indicated there were no significant differences between the means of the three training groups and the mean of the group of advanced trainers. Given the possibilities of variation, it was significant that the means for all groups were so highly similar. The three groups of trainees exhibited competence on the comprehension test equal to that of the advanced trainers. This was especially significant given the shorter duration of these workshops. It was evident that (a) the instructional system was efficient in providing workshop participants with adequate knowledge of the Taba content and method and (b) the shortened workshop design was an effective procedure.

3. The Teaching Situation Reaction Test (TSRT) was administered pre/post to participants in a workshop led by a second-generation trainer. The test was included to be a measure of change in participants' attitudes along three dimensions: human relations, structure and dogmatism. Although great alterations in attitude were not expected to result from a two-week workshop experience, a direction toward less dogmatism and structure and more human relations orientation was a legitimate expectation.

Workshop participants showed a change in attitude on all three scales. Posttraining differences were not large, with changes ranging less than two points on each scale. There was no significant t score for any scale, and the hypothesis of no difference was accepted for each of the three TSRT scales. Total pre/post differences, however, were significant for this population, and the hypothesis of no difference was rejected for overall TSRT results. The results indicated that the workshop carried a significant impact for the participants and was efficient in changing attitudes toward a generally more open structure. Significance also was attached to the fact that it was a second-generation trainer in the Duvall system, not the developer herself, who conducted the workshop and was effective in causing a participant change in the attitudinal dimension.

Summary. The data which were collected for the efficiency criteria revealed high efficiency for the Higher Level Thinking Abilities instructional system. This efficiency was indicated from participant reactions to the content and structure of the workshops they attended, from attitude change as the result of training and from the acquisition of knowledge about the content and processes of the Taba system. The efficiency was shown to be independent of such variables as time of training, i.e., early to late stage of development cycle, particular manual used in training, i.e., Duvall or McCollum-Davis, background of trainer, i.e., developer or second-generation, and workshop format. The shortened design, used at a workshop for college instructors, proved to be an effective method of instruction, which would suggest it as an economical alternative for other settings.

EFFECTIVENESS CRITERIA

The set of criteria related to the effectiveness of the content of the system, as it was used in the field, centered around two basic questions: Did second-generation trainers have the ability to disseminate the instructional model to school personnel through their conducting of workshops? Did teachers, after training, have the ability to apply the teaching strategies productively in their classrooms? Teacher performance was seen from the perspective of students, from two methods of analyzing teacher-pupil interaction and from the perspective of teachers themselves. The ability of second-generation trainers to teach others was evaluated by objective performance measures and self-report questionnaires.

1. The Flanders method of coding classroom interaction contains ten classifications of teacher-student behavior. Some of these categories approximate classroom interaction patterns expected as a result of Taba training; thus, scores of selected Flanders variables relevant to the Taba system were analyzed in three comparisons.

It was considered significant that 25 of the 30 pre/post differences were in the predicted direction even though data were collected in the early stages of development. The most significant gains due to treatment occurred in four categories: (a) teacher use of student idea followed by student initiation, (b) teacher use of student idea followed by student response, (c) student initiation followed by teacher use of student talk and (d) sum of all student initiation. These outcomes were strengthened by the near significant differences noted for three variables: (a) sum of all student response, (b) sum of all

student initiation and (c) teacher acceptance of student idea. Further, a reduction was observed in direct teacher talk, total teacher talk and average lecture length.

These pre/post differences for Taba-trained teachers reflected the main themes of the system: an open classroom characterized by free exchange between teacher and student, use of student resources and little direct influence by the teacher. The significant and near-significant results indicated the degree of influence Taba training had in making effective teacher behavior changes in the classroom.

2. Audiotapes were collected from 28 teachers before and after participation in a workshop led by a second-generation trainer. These classroom discussions were coded by counting frequency of occurrence of eight specific teacher behaviors expected of Taba-trained teachers. In addition, the expert coder rated each tape on a six-point scale reflecting degree of approximation to an ideal Taba teaching-learning pattern.

Four behaviors which were expected to decrease after training in the Taba strategies did, in fact, decrease significantly: (a) percentage of teacher talk, (b) asking questions requiring a specific answer, (c) giving information or opinion and (d) expressing dissatisfaction with response. Of four behaviors expected to increase, only asking for clarification increased significantly. One of the four, expressing verbal acceptance, decreased to a significant extent and the remaining two showed no significant change. The rating of how closely teacher behavior approximated that of a Taba teacher also increased significantly, as was predicted.

Not only did the decrease in total teacher talk and expression of dissatisfaction follow the pattern of the earlier Flander's analysis study, but it was significant that the two question-asking categories showed the shift in questioning strategy for which the system trains: a shift from an average of almost 30% questions asking for specific answers and about 1% asking for clarification to a pattern averaging approximately 10% "right answer" questions and 6% seeking clarification. Questions allowing varied responses remained approximately constant between 15 and 17%. The Flander's categories were not refined enough to reflect such shifts. With the decrease in "right answer" questions, it seemed that the questions allowing multiple responses were allowed to carry more of the discussion, permitting increased student participation and a more student-centered learning activity.

Thus, the data showed that (a) teachers could apply the Taba teaching strategies and (b) second-generation trainers could effectively teach those strategies.

3. The student questionnaire was administered to a randomly selected sample of 25 elementary and 25 secondary classrooms in which the teacher had participated in the television Taba program and to a comparison group who received no treatment. Responses reflected student perceptions and feelings about school and about specific teacher behaviors.

Fewer significant differences were found than were predicted. Although a slight advantage was noted for secondary over elementary teachers, they had fewer significant gains than the elementary group when comparison was made to the nontreatment group. Thus, the hypothesis of no treatment effect was accepted.

However, the data clearly indicated a direction toward treatment effect. Improvement in teaching methods resulted in more student enthusiasm, increased classroom openness, improved teacher questioning style and teacher use of student ideas. This was congruent with the results of the Flander's data.

4. The value, use and comprehension test measured the extent to which teachers trained in the Taba system (a) believed the system had value as an instructional tool, (b) actually used system strategies in their classrooms and (c) were knowledgeable about system content and structure.

Seventy-three percent of the teachers found the system valuable, used it in their classrooms and understood it. This result was believed to be especially significant because the test administration time varied from one to four years posttraining. A relationship was found between believing the instructional model to be valuable and actually using it. Thus, it seemed necessary for workshop trainees to gain the requisite attitudes to ensure system use. It was concluded that the Taba system, as taught to these trainees, had been effective in working change in teacher behavior.

In addition, the majority of the responses to open-ended items gave anecdotal evidence that the system was actually used and beneficial in the classroom. However, rarely did the teachers report using the entire Taba sequence in a given subject area, or any one part of the sequence in all subject areas. Rather, they reported flexible use on an "as needed" basis. Many teachers mentioned that the full sequence, if used repeatedly, often bored the students. Although many reported that the Taba sequence resulted in wider student interest, participation by a variety of students and autonomous learning, others believed the system's

structure was an interference to achieving those same goals. Respondents comments were readily grouped into two broad statement categories: (a) about half reported the system "useful in conjunction with other teaching methods, but not alone," and (b) the remainder reported the system as "useful in subject matter introduction or conclusion."

5. The field activities of advanced trainers were assessed to identify trainer participation in program development, nature of additional training taken by the individual, number and kind of workshops conducted and trainer's perception of strengths and weaknesses of the instructional system's content and method.

It was found that teachers, curriculum consultants and principals had equal representation as advanced trainers, despite the fact that a great number of teachers received initial training. Nearly 100% of the sample reported additional experiences after participation in initial Taba workshops before becoming advanced trainers: 37.8% had one additional experience, 56.8% had more than one type of experience and 5% did not respond to the question.

Responses indicated that job role also influenced the extent of involvement in training activities. Curriculum consultants and college professors held more workshops than any other role-type: although only 18.9% of the sample were curriculum consultants, they reported conducting 39.5% of the total number of workshops; college professors also conducted more workshops in proportion to their numbers (30.6% to 21.6%).

A large percentage of the sample had planned and conducted workshops of various types: 14.3% reported that they had not assumed major responsibility for at least one workshop, while 85.7% reported involvement in "at least some

training activity." This result was considered to be especially significant because there was no normative structure to influence trainers to conduct their own workshops. The sample also reported an average of 7.5 workshops per trainer. Although the sample reported a total of 225 workshops, the number of participants who received training at these workshops was not included in the responses. However, it was estimated that 5,625 school personnel were trained between the beginning of 1967 and the end of 1969 by this sample of 37 advanced trainers. Thus, the results demonstrated the ability of advanced trainers to disseminate the Taba instructional system to a large number of school personnel in a variety of settings.

Questionnaires were given to advanced trainers in five Northwest Regional Educational Laboratory instructional systems and the five sets of responses were presented together for comparative purposes. Responses indicated that more workshops had been planned by advanced trainers in Taba than any of the other systems. In addition, 62% of the Taba advanced trainers responded "yes" to a question about stimulating others to become involved. Even though the "yes" response was higher for three other systems at 82.9%, 74.1% and 72.2%, the Taba group percentage was considered a significant indication of positive response to the training received and the continued encouragement of others to become involved in the program.

Summary. Analysis of teachers' classroom use of Taba strategies had both positive and negative results. Classroom use appeared to be most extensive with those teachers who attended workshops which were held during the later stages of development. Participants in both early workshops and the television adaptation

indicated less application. Early workshops used materials which were in the prototype development stage, and as the materials were refined and made more explicit through revisions, positive gains were accelerated in teachers' classroom behavior toward more acceptance of diverse responses, classroom openness, freedom of student response and orientation to process.

Teachers trained in the Taba system reported they found it more valuable and useful to individually apply the thinking tasks, i.e., concept formation, interpretation of data and application, than to use all three of the strategies in concert. The latter process was reported to be structured and cumbersome to the point that student interest was lost. Thus, the flexible approach to use of the Taba strategies resulted in parts of them being applied in many classroom situations. This method of application was believed to be a desirable outcome. This result also indicated that workshop training taught participants the skills to use either the more rigid or more flexible approach in application of the teaching strategies found in the Taba method.

Results showed that over 75% of the second-generation trainers in Taba had specific plans for conducting workshops, which made it the most viable when compared to the dissemination plans for the other systems in teaching competencies. These results were found to be independent of the particular manual used and the stage of its development when training occurred. Job role differences were noted for the extent of involvement in dissemination activities: curriculum consultants and college instructors were found to be most involved, while teachers and principals were least involved.

HISTORY OF THE SYSTEMS

The following section contains a historical sketch of the design and development of two systems in Higher Level Thinking Abilities by the Northwest Regional Educational Laboratory.

RESEARCH BASE

The instructional systems are based on a study of thinking conducted by the late Dr. Hilda Taba of San Francisco State College. This study, reported in two U. S. Office of Education documents (Cooperative Research Project No. 2404, 1964 and 1966) and a number of research articles, examined the development of thought in elementary school children by analyzing planned classroom discussions. Dr. Taba hypothesized that formal thinking might occur earlier than deemed possible if the curriculum were designed for the inclusion of thinking tasks and if teachers were specifically trained in strategies focused on these tasks.

Three cognitive or thinking tasks were identified: (a) grouping and classifying (concept formation), (b) generalizing and inferring (interpretation of data) and (c) predicting consequences of new conditions by applying known facts and ideas (application). Successful discussion patterns developed by teachers in regular classrooms were analyzed to discover which procedures produced what results and why this happened. These discussion skills proved teachable to others.

Dr. Taba's research revealed that "the most marked single influence on cognitive performance seemed to reside in the impact of the teaching strategies ...the nature of the questions asked...the timing of these acts...the whole

pattern of teacher acts." Those particular "teaching strategies" became known as the "Taba program" or the "Taba method." The strategies were no longer tied to elementary curricula, because they had been demonstrated to have value at all age levels, with different ability groups and in any subject area.

INSTRUCTIONAL SYSTEM DEVELOPMENT

Initial Instructional Model

A four-year Ford Foundation grant (1962-1966) was made to the Oregon State Department of Education to improve public education; the activities became known as the Oregon Program. A number of conferences, workshops and training sessions were held in teacher education, which was a major emphasis in the program. Among the consultants brought to Oregon was Dr. Hilda Taba who, in the summer of 1964, trained 20 Oregon educators in the strategies she had developed during her research project. After the training program, Dr. John McCollum,[5] Southern Oregon College (Ashland) and Dr. James Hills, San Francisco State College, collaborated in designing an instructional system which incorporated the Taba strategies. The initial model included: (a) lectures on the research and theoretical basis of each cognitive process, (b) classroom demonstrations of each process, (c) exercises designed to result in application of each process to hypothetical teaching situations, (d) practice of each process in a practicum laboratory setting and (e) an application of the processes to a curriculum sequence.

[5]Dr. McCollum previously had worked with Dr. Taba when he was Curriculum Director at Berkeley (California) Public Schools, 1958-1963.

A 15-day training workshop which used this initial model was conducted for 60 teachers selected from throughout Oregon during the 1965 Southern Oregon College summer session. At the conclusion of each five days of instruction, participants were asked to evaluate materials and processes. Evaluative data, which were subjective, indicated a positive attitude toward the general content, format and value of the program. Also included were many suggestions for the improvement of specific activities and materials. To revise and refine the initial model, Dr. McCollum conducted several training sessions in Oregon during the subsequent academic year.

Northwest Regional Educational Laboratory Development

The Northwest Regional Educational Laboratory was funded under Title IV of the Elementary and Secondary Education Act (1965). During the next year, Laboratory staff conducted a needs assessment in the states of Oregon, Washington, Montana, Idaho and Alaska, working with regional, state and local education and lay leaders. The improvement of teaching competency was one of the areas selected for major development efforts. The teaching strategies that promote growth in thought processes were chosen as the basis for one of several components in the teaching competency program.

The Laboratory employed Dr. John McCollum and Mrs. Alice Duvall[6] as field trainers for the first two workshops. Held in the fall of 1966, the workshops used materials patterned after the model developed at Southern Oregon College. A series of workshops then were conducted in Alaska and southern Oregon by Dr. McCollum and throughout Montana by Mrs. Duvall, both of whom

[6]Mrs. Duvall had worked with Dr. Taba during the Contra Costa (California) Social Studies Project from 1957-1966.

had become full-time employees of the Laboratory in the winter of 1967. In each of the workshops they conducted, an attempt was made to collect data which would indicate both participant reaction and achievement in relation to each segment of instructional material and process used. Thus, throughout the 1966-67 academic year a continual process of refinement and revision was applied to the system. The result was a model which included: (a) ten days of instructional activities, (b) knowledge base presentations with integrated illustrative materials, (c) programed materials and procedures for learning activities, (d) a specific outline of procedures for classroom demonstrations and (e) programed laboratory experiences.

Evaluative data collected at these workshops continued to indicate positive participant attitude and achievement. To use the developed model effectively, however, required high level, and expensive, leadership skills. Consequently, the decision was made to develop two leadership manuals. One would be an "advanced" manual for those who had developed the skills necessary to function autonomously as instructional leaders; the other could be used by those without previous leadership training, with precise presentation of all content and processes so that the leader would function as a "facilitator and coordinator" of instruction. Mrs. Duvall was given the responsibility of developing the "advanced" leadership manual and Dr. McCollum and Mrs. Davis were to design and develop the "self-instructional" manual.

During the 1968-69 academic year, Dr. McCollum and Mrs. Davis designed, developed and field tested a system with three major characteristics:

1. Instruction was presented by a series of rotations through five steps:

a) Sensitivity experience. Each cognitive process was introduced through a role-play activity designed to develop emotional and intellectual awareness of the process.

b) Knowledge base presentation. Following each sensitivity experience, a didactic presentation was given on the theoretical and research base for each process. It was presented on audiotape and keyed to written materials which were used later in going through the process.

c) Simulation experiences. Each cognitive process was broken down into its component parts and simulated; 16mm sound films were developed to demonstrate the processes.

d) Laboratory experiences. Each cognitive process was taught in a practicum laboratory setting; teaching was done under observation with feedback on teaching behavior.

e) Application to curriculum. A curriculum development model was presented to build the understanding and skills necessary for application of the cognitive processes to a participant's chosen curriculum area.

2. The instruction was inductive, with illustrations of each process, and freedom for participants to explore, inquire and accommodate according to individual needs and abilities.

3. The instruction presented a curriculum sequence which illustrated the application of the processes to a structure of subject matter knowledge.

Data continued to be collected on the McCollum-Davis model during the 1968-69 field testing. Final testing occurred when the manual was used by an instructor who had no previous leadership training. Participants were asked to respond to each piece of material and all instructional processes. Audiotape recordings were made of group discussion and analyzed for clarity of participant understanding and personal attitude. All materials relating to participant achievement were collected and analyzed. A trained observer was employed throughout the instruction period to collect data which indicated participant understanding, attitude and achievement.

As a result of all data collected, further revisions were made during the summer of 1969 and distributed to previously trained leaders. Examples of revisions:

- Addition of content to theoretical and research base of the program
- Addition of typescript to assist participants in analyzing demonstration films
- Revision of curriculum development model for more explicit illustration of interpretation processes
- Addition of a model curriculum sequence to illustrate the application of cognitive processes to subject matter content
- Addition of content to give explicit indication of rationale, intent, teacher action and student action for each strategy move
- Addition of suggested techniques for successful implementation of each laboratory experience

During the fall of 1969, feedback from those who used the McCollum-Davis revised manual indicated that it was effective in producing higher level thinking abilities. However, it was also evident that the system was not "self-instructional." Successful implementation depended upon an instructional leader who had become thoroughly familiar with the content and processes of the program before attempting to teach others. Since it was obvious that not all potential instructional leaders would have the opportunity to develop this needed skill by experiencing the material as a workshop participant, a supplemental course called, "Leadership Training Program for Instructors of Teaching Methodology" was written by Dr. McCollum to be included as an addendum to the instructor's manual.

This leadership training program consists of 36 hours of learning activities in which potential instructional leaders may obtain some of the same understanding and skill as a participant in a total workshop program. The program was conducted during the winter and spring of 1970 by two college education department faculties. Evaluative data indicated it was effective in producing understanding and achievement. As a result, the McCollum-Davis model has been released by the Development Division of the Laboratory as an interim model.[7]

During this same period of time (1967-70), the Duvall model also was being tested at workshops throughout the five Northwest states, with a concentration of testing in Montana. Workshops were conducted under a design where second-generation instructional leaders received at least one opportunity to be a co-trainer with a more experienced leader. This procedure was intended to ensure skills and cognitive understanding necessary for the future leaders to operate effectively when alone in a workshop. The co-training system evolved so that advanced second-generation leaders could train potential advanced leaders without the presence of the developer.

The product development cycle for the Duvall model was similar to that of the McCollum-Davis model: revisions were made on the basis of postmeeting reaction forms administered to workshop participants at field test sites, and impressions and reactions of instructional leaders. Another mode of

[7]All products of the Northwest Regional Educational Laboratory are at one of three levels of development: 1) Prototype products have been developed through pilot testing and are ready for field trial. They are not for distribution to groups other than those involved in field testing. 2) Interim products have undergone field trial, evaluation and revision and are ready for final field testing by the Laboratory. They may be released for further testing by other individuals or groups. 3) Final products have been completed and require no additional development funds from the Laboratory. They are ready for widespread dissemination.

feedback was established through frequent meetings of experienced trainers with the developer and several experts in the areas of cognitive processes and instructional methods. These advisory group meetings proved important in determination of revisions incorporated into the interim model. This model also has been released by the Development Division of the Laboratory.

In addition to her manual, Mrs. Duvall also was instrumental in the adaptation of her instructional model to a television format used with elementary and secondary teachers in Spokane (Washington). She worked with two second-generation trainers to design a lower-cost method of training larger numbers of teachers without requiring the presence of a highly skilled trainer. Conceptual information and introductions to exercises were taped by the developer and shown in individual schools via closed circuit television. The exercises were then carried out and debriefed in each school for a total instructional time of 50 to 60 hours.

APPENDIX A

McCOLLUM-DAVIS INSTRUCTIONAL FORMATS

WORKSHOP FORMAT

HIGHER LEVEL THINKING ABILITIES

Sequence	Time	Group	Activity
First Day			
A.M.	60	LG	Orientation
	30	LG	Rationale for Change
	20	SG	Reaction to Rationale for Change
	20	SG	Analysis of Group Process
	30	LG	Overview of the Processes
P.M.	20	LG	Rationale for Curriculum Development
	20	SG	Classification of Knowledge
	30	SG	Analysis of Generalizations
	30	SG	Selecting a Structure of Knowledge
	30	SG	Building an Illustrative Model
	20	SG	Directions for Developing an Instructional Unit
Practicum Groups:			Identification of a generalization and building an illustrative model to be developed prior to the next session
Second Day			
A.M.	30	SG	Evaluation of Generalizations and Illustrative Models
	90	SG	Sensitivity to Questions
	40	SG	Sensitivity to Concept Diagnosis
	20	SG	Analysis of Process
P.M.	30	LG	Processes in Concept Diagnosis
	30	SG	Exercise on Opening Questions
	30	SG	Exercise on Listing Process
	30	SG	Exercise on Grouping Process
	20	SG	Exercise on Labeling Process
	20	SG	Directions for Application of Concept Diagnosis to the Instructional Unit
Practicum Groups:			Develop a concept diagnosis task for the instructional unit prior to the next session

Sequence	Time	Group	Activity
Third Day			
A.M.	20	SG	Evaluation of Concept Diagnosis Opening Questions
	60	LG	Demonstration of Concept Diagnosis
	60	SG	Plan Laboratory Experience
P.M.	120		Laboratory Experience in Concept Diagnosis
	30	SG	Reaction to Laboratory Experience
Fourth Day			
A.M.	45	SG	Sensitivity to Interpretation of Data--Literature
	20	SG	Analysis of Process
	15	LG	Processes in Interpretation of Data
	5	SG	Analysis of Typescripts
	20	SG	Interpreting the Typescripts
	20	SG	Analysis of Question Sequences
	20	SG	Scrambled Question Sequence--Literature
P.M.	30	LG	View Film
	15	SG	Interpreting the Film
	45	SG	Constructing Question Sequences
	30	SG	Sharing and Refining Sequences
	15	SG	Assignment of Laboratory Experience
Practicum Groups:			Plan laboratory experience using either literature or film
Fifth Day			
A.M.	60		Laboratory Experience--Literature or Film
	30	SG	Reaction to Laboratory Experience
	15	LG	Processes in Learning Experiences
	30	SG	Selecting Learning Experiences
	30	SG	Programing Learning Experiences
P.M.	15	SG	Directions for Selecting and Programing Learning Experiences for the Instructional Unit
	90	SG	Organizing an Information Display
	30	SG	Sensitivity to Interpretation of Data--Information Display
	20	SG	Analysis of Process

Sequence	Time	Group	Activity
Practicum Groups:			Begin process of selecting and programing learning experiences for instructional unit
Sixth Day			
A.M.	10	LG	Processes in Interpretation of Data--Information Display
	15	SG	Exercise with Restricting Words
	20	SG	Exercise--Two Colonies of People
	20	SG	Exercise--Scrambled Question Sequence
	30	SG	Exercise--Pursuing an Individual Response
	20	SG	Exercise--Evaluating Generalizations
	15	SG	Directions for Constructing a Sample Information Display and an Interpretation Question Sequence for Instructional Unit
P.M.	60	LG	Demonstration of Interpreting an Information Display
	15	SG	Assignment of Laboratory Experience
	60	SG	Plan Laboratory Experience
Practicum Groups:			Construct a sample information display and an interpretation question sequence for the instructional unit
			Plan for laboratory experience
Seventh Day			
A.M.	120		Laboratory Experience--Interpretation of Data--Information Display
	30	SG	Reaction to Laboratory Experience
	30	SG	Evaluation of Information Displays and Question Sequences
P.M.			Work in practicum groups on the construction of instructional unit
Eighth Day			
A.M.	40	SG	Sensitivity to Application of Knowledge
	20	SG	Analysis of Process
	30	LG	Processes in Application of Knowledge
	30	SG	Exercise--Analysis of Opening Questions
	30	SG	Exercise--Discussion of Techniques

Sequence	Time	Group	Activity
P.M.	60	LG	Demonstration of Application of Knowledge
	15	SG	Directions for Constructing an Application of Knowledge Task for the Instructional Unit
	60	SG	Plan Laboratory Experience
Practicum Groups:			Plan laboratory experience and complete instructional units
Ninth Day			
A.M.	120		Laboratory Experience--Application of Knowledge
	30	SG	Reaction to Laboratory Experience
P.M.	60	SG	Evaluation of the Instructional Units
	60	SG	Review of the Processes

EXTENSION COURSE FORMAT

HIGHER LEVEL THINKING ABILITIES

Sequence	Time	Group	Activity
1.	30	LG	Orientation
	30	LG	Rationale for Change
	20	SG	Reaction to Rationale for Change
	20	SG	Analysis of Group Process
	60	LG	Overview of the Processes
2.	20	LG	Rationale for Curriculum Development
	20	SG	Classification of Knowledge
	30	SG	Analysis of Generalizations
	30	SG	Selecting a Structure of Knowledge
	30	SG	Building an Illustrative Model
	20	SG	Directions for Developing an Instructional Unit
Practicum Groups:			Identification of a generalization and building an illustrative model to be developed prior to the next session
3.	30	SG	Evaluation of Generalizations and Illustrative Models
	60	SG	Sensitivity to Questions (Distribute for home study "Question Strategies and Discussion Skills")
	45	SG	Sensitivity to Concept Diagnosis
	15	SG	Analysis of Process
4.	30	LG	Processes in Concept Diagnosis
	30	SG	Exercise on Opening Questions
	30	SG	Exercise on Listing Process
	30	SG	Exercise on Grouping Process
	20	SG	Exercise on Labeling Process
	15	SG	Directions for Application of Concept Diagnosis to the Instructional Unit
Practicum Groups:			Develop a Concept Diagnosis task for the instructional unit prior to the next session

Sequence	Time	Group	Activity
5.	20	SG	Evaluation of Concept Diagnosis Opening Questions
	30	LG	Demonstration of Concept Diagnosis
	20	SG	Reaction to Demonstration
	40	SG	Typescript Analysis of Concept Diagnosis
	20	SG	Discussion of Typescript
	15	SG	Assignment of Laboratory Experience
Practicum Groups:			Plan and conduct laboratory experience-Concept Diagnosis
6.	30	SG	Reaction to Laboratory Experience
	45	SG	Sensitivity to Interpretation of Data-Literature
	15	SG	Analysis of Process
	15	LG	Processes in Interpretation of Data
	5	SG	Analysis of Typescripts
	20	SG	Interpreting the Typescripts
	20	SG	Analysis of Question Sequences
	15	SG	Scrambled Question Sequence - Literature
	5	SG	Assign Laboratory Experience - Literature
Practicum Groups:			Plan and conduct laboratory experience-Literature
7.	30	SG	Reaction to Laboratory Experience
	30	LG	View Film
	15	SG	Interpreting the Film
	30	SG	Constructing Question Sequences
	30	SG	Sharing and Refining Sequences
	5	SG	Assign Laboratory Experience - Films
Practicum Groups:			Plan and conduct laboratory experience-films
8.	30	SG	Reaction to Laboratory Experience
	15	LG	Processes in Learning Experiences
	30	SG	Selecting Learning Experiences
	30	SG	Programing Learning Experiences
	15	SG	Directions for Selecting and Programing Learning Experiences for Instructional Units
Practicum Groups:			Begin process of selecting and programing learning experiences for instructional units

Sequence	Time	Group	Activity
9.	30	SG	Evaluating Selection and Programing of Learning Experiences
	60	SG	Organizing an Information Display
	40	SG	Sensitivity to Interpretation of Data-Information Display
	20	SG	Analysis of Process
10.	10	LG	Processes in Interpreting an Information Display
	20	SG	Exercise - Restricting Words
	20	SG	Exercise - Two Colonies of People
	20	SG	Exercise - Scrambled Question Sequence
	30	SG	Exercise - Pursuing an Individual Response
	20	SG	Exercise - Evaluating Generalizations
	15	SG	Directions for Constructing a Sample Information Display and an Interpretation Question Sequence for Instructional Units
Practicum Groups:			Construct a sample information display and an interpretation question sequence for the instructional unit
11.	45	SG	Evaluation of Sample Information Displays and Interpretation Question Sequences
	15	SG	Predemonstration Sequences
	30	LG	Demonstration of Interpretation of Data-Information Display
	30	SG	Reaction to Demonstration
	30	SG	Assign and Plan Laboratory Experience
Practicum Groups:			Plan and conduct laboratory experience-interpretation of data- information display
12.	30	SG	Reaction to Laboratory Experience
	45	SG	Sensitivity to Application of Knowledge
	20	SG	Analysis of Process
	30	LG	Processes in Application of Knowledge
	30	SG	Exercise - Opening Questions

Sequence	Time	Group	Activity
13.	30	SG	Exercise - Discussion Techniques
	15	SG	Predemonstration Discussion
	30	LG	Demonstration of Application of Knowledge
	30	SG	Reaction to Demonstration
	15	SG	Directions for Constructing an Application of Knowledge Task for Instructional Unit
	15	SG	Assignment of Laboratory Experience
Practicum Groups:			Plan and conduct laboratory experience-application of knowledge Complete instructional units
14.	30	SG	Reaction to Laboratory Experience
	60	SG	Evaluation of Units
	60	SG	Review of the Processes

METHODS COURSE FORMAT

HIGHER LEVEL THINKING ABILITIES

Sequence	Time	Group	Activity
1.	30	LG	Orientation
	30	LG	Rationale for Change
	20	SG	Reaction to Rationale for Change
	20	SG	Analysis of Group Process
	60	LG	Overview of the Processes
2.	20	LG	Rationale for Curriculum Development
	20	SG	Classification of Knowledge
	30	SG	Analysis of Generalizations
	30	SG	Selecting a Structure of Knowledge
	30	SG	Building an Illustrative Model
	20	SG	Directions for Developing an Instructional Unit (The unit should be developed for the grade level in which microteaching will be conducted)
Practicum Groups:			Identification of a generalization and building an illustrative model to be developed prior to the next session
3.	30	SG	Evaluation of Generalizations and Illustrative Models
	60	SG	Sensitivity to Questions (Distribute for practicum group study "Question Strategies and Discussion Skills")
	45	SG	Sensitivity to Concept Diagnosis
	15	SG	Analysis of Process
4.	30	LG	Processes in Concept Diagnosis
	30	SG	Exercise on Opening Questions
	30	SG	Exercise on Listing Process
	30	SG	Exercise on Grouping Process
	20	SG	Exercise on Labeling Process
	10	SG	Directions for Application of Concept Diagnosis to the Instructional Unit
Practicum Groups:			Develop a Concept Diagnosis task for the instructional unit prior to the next session

Sequence	Time	Group	Activity
5.	20	SG	Evaluation of Concept Diagnosis Opening Questions
	45	LG	Demonstration of Concept Diagnosis
	15	SG	Reaction to Demonstration
	30	SG	Typescript Analysis of Concept Diagnosis
	20	SG	Discussion of Typescript
	20	SG	Assignment of Laboratory Experience-Concept Diagnosis
Practicum Groups:			Plan laboratory experience - Concept Diagnosis
6.	60		Laboratory Experience - Concept Diagnosis
	30	SG	Reaction to Laboratory Experience
	45	SG	Sensitivity to Interpretation of Data-Literature
	15	SG	Analysis of Process
7.	15	LG	Processes in Interpretation of Data
	5	SG	Analysis of Typescripts
	20	SG	Interpreting the Typescripts
	20	SG	Analysis of Question Sequences
	15	SG	Scrambled Question Sequence
	30	SG	View Film
	15	SG	Interpreting the Film
	20	SG	Constructing Question Sequences
	20	SG	Sharing and Refining Sequences
	10	SG	Assignment of Laboratory Experience-Literature or Film
Practicum Groups:			Plan laboratory experience - interpretation of data - literature or film
8.	60		Laboratory Experience - Interpretation of Data - Literature or Film
	30	SG	Reaction to Laboratory Experience
	15	LG	Processes in Learning Experiences
	20	SG	Give directions for practicum groups to work on exercises, "Selecting Learning Experiences" and "Programing Learning Experiences"
Practicum Groups:			Work on exercises, "Selecting and Programing Learning Experiences"

Sequence	Time	Group	Activity
9.	30	SG	Complete exercises, "Selecting and Programing Learning Experiences"
	15	SG	Directions for Selecting and Programing Learning Experiences for Instructional Units
	60	SG	Organization of an Information Display
	30	SG	Sensitivity to Interpretation of Data-Information Display
	15	SG	Analysis of Process
Practicum Groups:			Begin process of selecting and programing learning experiences for instructional units
10.	30	SG	Evaluation of Selection and Programing of Learning Experiences
	10	LG	Processes in Interpretation of Data-Information Display
	20	SG	Exercise - Restricting Words
	20	SG	Exercise - Two Colonies of People
	20	SG	Exercise - Scrambled Question Sequence
	20	SG	Exercise - Pursuing an Individual Response
	20	SG	Exercise - Evaluating Generalizations
	10	SG	Directions for Constructing a Sample Information Display and Interpretation Question Sequence for Instructional Units
Practicum Groups:			Construct a sample information display and interpretation question sequence for the instructional unit
11.	30	SG	Evaluation of Sample Information Displays and Interpretation Question Sequences
	15	SG	Predemonstration Discussion
	30	LG	Demonstration - Interpretation of Data-Information Display
	30	SG	Reaction to Demonstration
	45	SG	Assign and Plan Laboratory Experience-Interpretation of Data - Information Display
Practicum Groups:			Plan laboratory experience - information display

Sequence	Time	Group	Activity
12.	60		Laboratory Experience - Interpretation of Data - Information Display
	30	SG	Reaction to Laboratory Experience

It is suggested that this point represents a natural break in the instructional program. It would be unfortunate not to provide students enrolled in teacher preparation programs experiences with the process, "Application of Knowledge." However, if, because of limitations in time, it is necessary to limit the instructional program, it is suggested that students complete their units at this point by selecting and programing learning experiences and culminating the unit with an appropriate expression activity.

	45	SG	Sensitivity to Application of Knowledge
	15	SG	Analysis of Process
13.	30	LG	Processes in Application of Knowledge
	30	SG	Exercise - Opening Questions
	20	SG	Exercise - Discussion Techniques
	15	SG	Predemonstration Discussion
	30	LG	Demonstration of Application of Knowledge
	10	SG	Directions for Developing an Application of Knowledge Task for Instructional Units
	10	SG	Assignment of Laboratory Experience-Application of Knowledge
Practicum Groups:			Plan laboratory experience Complete instructional units
14.	60		Laboratory Experience - Application of Knowledge
	30	SG	Reaction to Laboratory Experience
	60	SG	Review of the Processes

APPENDIX B

DUVALL INSTRUCTIONAL FORMATS

INSTRUCTIONAL STEPS

1. Orientation	2. S Rationale for Change	3. I Overview	4. S Participant Experience I	5. I Concept Formation
6. I Task I Strategies	7. A Typescript I	8. A Demonstration	9. A Planning I	10. A Laboratory Experience I
11. E Sharing Lab Experience	12. I Question Sequences (facts)	13. (optional) I Introduction to Retrieval Charts	14. (optional) S Participant Experience Continuation of Step 13	15. E Feedback I
16. I Generalizations	17. I Task II Strategies	18. S Participant Experience II	19. I Discussion Skills	20. A Typescript II
21. A Demonstration II	22. A Planning II	23. A Laboratory Experience II	24. E Sharing Lab Experience	25. I Question Sequences (feelings)
26. (optional) I Curriculum Main Ideas	27. (optional) I Curriculum Learning Experiences	28. E Feedback II	29. (optional) I Question Categories	30. S Participant Experience III
31. I Thinking Task III Strategies	32. A Review Strategies	33. A Typescript III	34. A Demonstration III	35. A Planning III
36. A Laboratory Experience III	37. E Sharing Lab Experience	38. A Question Sequences (feelings)	39. A Review	40. E Workshop Evaluation

I = input S = sensitizing A = application E = evaluation

SAMPLE SCHEDULE: FOUR WEEKEND SESSIONS

NOTE: This schedule provides one month between each session to allow participants to practice in their own classrooms. Either their building partner should observe or the lab experience should be recorded on audiotape and brought to the next session. Although this plan has only minimum hours of instruction, with nothing on curriculum planning, it does not require additional students or substitute teachers.

	Session 1	Session 2	Session 3	Session 4
Fri. 4-5 6-8 p. m.	Step 2. 1 hour Rationale for Change Step 3. 2 hours Overview of Thinking Tasks	Step 15. 1 hour Feedback on Task I Step 16. 1 hour Generalizations Step 17. 1 hour Thinking Task II	Step 28. 1 hour Feedback on Task II Steps 12 and 25. 2 hours Question Sequences	1 hour Feedback on Task III 1 hour Excerpts from Participants' Tapes 1 hour Review of Three Thinking Tasks with Retrieval Chart from Step 39.
Sat. 9-12 a. m. 1-4 p. m.	Step 5. 1 hour Concept Formation Step 6. 1 hour Thinking Task I Step 7. 1 hour Typescript Analysis Step 8. 1-1/2 hours Demonstration and Reaction Assignment 1/2 hour	Step 18. 1 hour Participant Experience Step 21. 1-1/2 hours Demonstration and Reaction Step 19. 1 hour Discussion Skills Step 20. 1 hour Typescript Analysis Assignment 1/2 hour	Steps 31 and 32. 1-1/2 hours Thinking Task III Review Strategies Step 30. 1 hour Participant Experience Step 33. 1 hour Typescript Analysis Step 34. 1 hour Demonstration Assignment 1/2 hour	Step 38. 1-1/2 hours Question Sequences Step 39. 2 hours Review of Workshop Learnings Step 40. 1 hour Workshop Evaluation

SAMPLE SCHEDULE: THREE SESSIONS OF THREE AND ONE-HALF DAYS EACH

	Day 1	Day 2	Day 3	Day 4
a. m.	Step 1. Orientation Step 2. Rationale for Change	Step 6. Thinking Task I Step 7. Typescript Analysis	Step 10. Lab Experience	Step 13. Introducing Retrieval Charts
p. m.	Step 3. Overview of Thinking Tasks (with film) Step 5. Concept Formation	Step 8. Demonstration Step 9. Planning the Lab Experience	Step 11. Sharing the Lab Experience Step 12. Question Sequences	Step 14. Participant Experience

	Day 5	Day 6	Day 7	Day 8
a. m.	Step 15. Feedback Step 16. Generalizations	Step 19. Discussion Skills Step 20. Typescript Analysis	Step 23. Lab Experience II	Step 26. Curriculum Step 27. Curriculum
p. m.	Step 17. Thinking Task II Step 18. Participant Experience	Step 21. Demonstration Step 22. Planning the Lab Experience	Step 24. Sharing the Lab Experience Step 25. Question Sequences	

	Day 9	Day 10	Day 11	Day 12
a. m.	Step 28. Feedback Step 29. Question Categories	Step 32. Review Strategies Step 33. Typescript Analysis	Step 36. Lab Experience III	Step 39. Review Step 40. Workshop Evaluation
p. m.	Step 30. Participant Experience Step 31. Thinking Task III	Step 34. Demonstration Step 35. Planning the Lab Experience	Step 37. Sharing the Lab Experience Step 38. Question Sequences	

SAMPLE SCHEDULE: TWELVE CONSECUTIVE DAYS

	Day 1	Day 2	Day 3	Day 4
a. m.	Step 1. Orientation Step 2. Rationale for Change	Step 5. Concept Formation Step 6. Thinking Task I	Step 8. Demonstration	Step 10. Lab Experience
p. m.	Step 3. Overview of Thinking Tasks (Participant Experience)	Step 7. Typescript Analysis	Step 9. Planning the Lab Experience	Step 11. Sharing the Lab Experience Step 12. Question Sequences

	Day 5	Day 6	Day 7	Day 8
a. m.	Step 13. Introducing Retrieval Charts	Step 17. Thinking Task II Step 18. Participant Experience	Step 20. Typescript Analysis Step 21. Demonstration	Step 23. Lab Experience
p. m.	Step 14. Participant Experience Step 16. Generalizations	Step 19. Discussion Skills	Step 22. Planning the Lab Experience	Step 24. Sharing the Lab Experience Step 25. Question Sequences

	Day 9	Day 10	Day 11	Day 12
a. m.	Step 26. Curriculum Step 27. Curriculum	Step 32. Review Strategies Step 33. Typescript Analysis	Step 36. Lab Experience	Step 39. Review
p. m.	Step 30. Participant Experience Step 31. Thinking Task III	Step 34. Demonstration Step 35. Planning the Lab Experience	Step 37. Sharing the Lab Experience Step 38. Question Sequences	Step 40. Workshop Evaluation

NOTE: This plan is less meaningful than the others because the participants do not have time to assimilate the strategies nor a chance to practice in their own classrooms.

SAMPLE SCHEDULE: FOUR SESSIONS

Day 1	Day 2	Day 3	Day 4 (Saturday)
a.m. 1. Orientation 2. Rationale for Change	6. Thinking Task I 7. Typescript Analysis	10. Lab Experience I	13. Introducing Retrieval Charts 14. Participant Experience
p.m. 3. Overview of Thinking Tasks (with film) 5. Concept Formation	8. Demonstration 9. Planning the Lab Experience	11. Sharing the Lab Experience 12. Question Sequences	Assignment for intervening month

Day 5	Day 6	Day 7 (Saturday)
a.m. 15. Feedback I 16. Generalizations	19. Discussion Skills 20. Typescript Analysis	25. Question Sequences 26. Curriculum
p.m. 17. Thinking Task II 18. Participant Experience	21. Demonstration 22. Planning the development of a retrieval chart for taped discussion assignment	27. Curriculum Assignment for practice in their own classrooms

Day 8	Day 9	Day 10 (Saturday)
a.m. 28. Feedback II Review discussion skills and Task II strategies	23. Lab Experience II	30. Participant Experience 31. Thinking Task III
p.m. Analysis of selected assignment tapes 22. Planning Lab Experience	24. Sharing Lab Experience 34. Demonstration III	33. Typescript Analysis Assignment for practice in their own classrooms

Day 11	Day 12 (Saturday)
a.m. Feedback III 32. Review Strategies 35. Planning Lab Experiences	38. Question Sequences 29. Question Categories or Analysis of Selected tapes
p.m. 36. Lab Experience III 37. Sharing Lab Experience	39. Review 40. Workshop Evaluation

NOTE: Utilizing Saturdays reduces the cost of substitute teachers but poses problems when students are required for the Demonstration and Lab Experience. The advantages of additional practice and review for the participants, plus an opportunity for feedback on Task III, probably outweigh this plan's disadvantages.

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