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Instructional Module 2.2

"Formative Evaluation Applied to Instruction"

College of Education/Florida State University

1973

INSTRUCTIONAL
MODULE: 2.2

FORMATIVE EVALUATION APPLIED TO INSTRUCTION

by

LESLIE J. BRIGGS

series editors

LESLIE J. BRIGGS
NORMAN R. DODL

First Field Test Version 6/10/73

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1973

Module 2.2

Formative Evaluation Applied to Instruction

Overview

In Module 2.1, you learned that both formative and summative evaluations can be made of:

1. The instruction itself

2. The pupil's progress on an objective or unit of instruction

3. Entire instructional systems, or entire curricula for one or many years of schooling.

This module relates evaluations to the instruction, whether accomplished by self-instructional materials, teacher-conducted instruction, or combinations of several methods of instruction.

Our principle focus, however, will be upon designing instructional materials for a lesson, since materials, unlike lectures, are stable, available for scruting at any time, and exportable. Also, when revisions are made after each tryout, there is a permanent record of exactly how the revised materials differ from the first-draft materials.

So at the close of this module, you will be asked to plan a lesson for an objective, making the maximum dependence possible on the materials rather than the teacher as the

resource used by the pupils for learning. For this purpose, if you have developed a suitable lesson in connection with work on another module, you may be able to use it for tryout, testing, and revision (formative evaluation), followed by further revision, second tryout and summative evaluation of the lesson.

In planning for this exercise, you need to be able to do the following:

1. State a performance objective for the lesson

2. Classify the objective, using an appropriate taxonomy

3. Design a suitable measure of pupil performance on the objective

4. List the instructional events and conditions of learning to be employed in the lesson. (If you have not completed Module 5.3, which shows how to do this, you may, in your own words, list the "teaching steps" you will use. These should be designed into the materials as far as possible, but some may be done by the teacher; such teaching steps can include pupil responding and activities.)

5. Prepare necessary materials, and a written plan for the entire lesson.

6. Conduct the lesson and administer the test over the objective.

7. Use relevant data to revise the lesson.

8. Conduct the revised lesson

9. *Conduct a summative evaluation of the lesson.*

Design and Evaluation of a Lesson

Selecting an Objective

You need first to select a lesson objective that can be taught (including testing or other evaluation) in the time available. You need to define that objective in such a way that one of your peers, having no information but the objective, could design a suitable test (or other form of evaluation) for the objective.

There are two methods available for writing objectives in performance terms. Both of these will be mentioned briefly.

Some years ago Mager suggested that an acceptable performance objective must have three elements:

1. Given what
2. The student does what
3. How well

If you have not previously learned to write objectives following these three criteria, refer either to Mager (1962), Writing Instructional Objectives, or to Briggs, (1970), Handbook of Procedures for the Design of Instruction, pages 18-30.

Another alternative is to now take the module on writing objectives.

A second, even more demanding form of writing objectives has been proposed by Gagne and Briggs (1974). This method contains 5 rather than 3 components, as in the Mager system. The major distinction between the two systems is that the Gagne/Briggs system uses two verbs, one to show the overt action the pupil engages in during a testing situation; the quality and consistency of such actions are used to infer an internal generalized capability for performing a whole class of actions, of which the test performance is a sample. For example an action of typing a business letter, under a given simulated business situation, such as a shipping matter, if properly done, leads one to infer also the capability for composing such letters, since the letter typed was composed by the pupil, not someone else. Thus the five components are:

1. A situation -- a business letter is received which requires a reply.

2. The learner generates the letter, rather than typing a letter composed by somebody else.

3. An object -- the letter in reply which is composed and typed by the student.

4. An action -- typing the letter.

5. Tools and Constraints (the "Given" in the Mager system) -- an electric typewriter; paper and carbon paper; a one page letter is the assigned limit.

Note that the "how well" is not included as a component of the objective, as in the Mager system. Rather, the how well, or the criterion performance indicating mastery, is considered as related to the test rather than to the objective. Thus in the letter example, above, there would probably be criteria setting minimum required standards for:

(1) Content of the letter

(2) Accuracy, and neatness

(3) And a time limit.

You may wish to refer to Chapter 5 of Principles of Instructional Design, Gagne and Briggs (1974), if you wish to use this method of writing your objective. So several sources are available in the event you have not had prior instruction on writing performance (behavioral) objectives.

Classifying the Objective

Having selected and written an objective in performance terms, the next step is to classify the objective according to a taxonomy. If you have had modules 5.1 and

5.3, you know that some taxonomies are for only one domain of learning, while that by Gagne and Briggs covers five domains of learning.

If your objective is in the cognitive domain, you may classify it by use of the Bloom taxonomy or by use of the Gagne/Briggs (G/B) taxonomy. If you use Bloom, you might use a classification such as "analysis", "synthesis", or "comprehension". If you use the G/B taxonomy, you may use such categories as "multiple discriminations", "concepts", or "problem solving", or "attitude".

While there may be little basis for preference between the Bloom and the G/B taxonomies for the purpose of classifying objectives or classifying test items for the purpose of <u>designing instruction</u> the G/B taxonomy has the advantage of concretely specifying the <u>instructional events</u> and <u>conditions of learning</u> for each domain and sub-domain of the taxonomy. Also the G/B taxonomy includes information on how to deal with structure and sequence of objectives, and how to analize intellectual skill objectives into their subordinate competencies (enabling objectives).

For the purpose of this module, your objective for the lesson should be classifyable as representing only one type of learning. If, upon examination, it seems to require several kinds of learning, it needs to be redefined, or broken down into separate objectives, <u>each of which</u>

represents only one type of learning. Then you must consider whether only one of these can be taught in the time available. If time available would permit more than one objective, a separate lesson plan should be made for each, if they represent different kinds of learning, because the conditions of learning would differ between objectives.

Now review the classification of your objective, with the above points in mind. If possible, check your classification with the instructor. Also you might estimate the time needed to be ready to teach the lesson, so it can be scheduled in advance.

Designing a Performance Measure

You need a test over the objective of your lesson in order to know how well it succeeded. By "test" we mean any appropriate way of assessing the performance of the learners on the objective after the completion of instruction. This may be a written test; or a performance, such as a speech or a written report; or a product, such as a work of art. In any event write the test, or, give the directions to the pupils if a performance or a product is the way to evaluate the success of the learners. Also, prepare an answer key, or describe how the product or performance may be evaluated as "satisfactory" or "needs more study".

If you feel uncertain as to how pupil performance should be evaluated for the chosen lesson objective, you might work through pages 46-73 in Handbook of Procedures for the Design of Instruction, Briggs (1970).

Now present to the instructor:

1. The test (or directions for a performance or product)

2. The scoring key (or checklist for evaluating the performance or product)

3. A minimum standard for grading a pupil's performance as "satisfactory".

4. A design objective; a statement of what proportion of pupils must be rated "satisfactory" for you to conclude that your lesson is a success.

Planning the Lesson

If you have completed Module 5.3 you have learned how to plan a lesson for an objective by (1) Specifying the instructional events and conditions of learning and (2) how each event or condition will be accomplished.

If you have not completed module 5.3, you may want to stop work on this one and do 5.3 next. If not, you have two other choices:

(1) Read pages 97-101 in the Handbook previously mentioned. If you do this, note this dual terminology or difference between the terms used here and those in the Handbook:

Instructional Events= General Instructional Events in Handbook

Conditions of Learning= Special Instructional Events in Handbook

(2) If you have not had module 5.3 and do not think the few pages referred to in option 1, above, is sufficient for you to know how to use the general and special instructional events, then just make a list of "teaching steps", and continue with this module.

Preparing Necessary Materials

The remaining step in preparing to teach the lesson is to prepare all materials described in the second column of your lesson plan.

Recall that we wish you to use instructional materials to do as much of the teaching as possible because materials do no "vanish" as does a teacher activity. But for preliminaries such as relating the new lesson to prior lessons, you need not hesitate to act as "teacher". A second reason for asking you to use materials rather than teacher-conducted instruction, when possible, if the

teachers need to develop their own materials when they are not otherwise available. A third reason is that individually paced study is often better than group-paced procedures. The more a teacher can use individualized, self-paced materials, the more time he has for helping individual students and monitoring and guiding pupil progress.

When your lesson plan and all other items previously specified, including the instructional materials are ready, check them with the instructor.

As indicated above, you may organize your lesson plan around the general and specific instructional events listed in the Handbook, or you may organize it around your list of "teaching steps".

The next step is to give a brief description of the materials, methods, and student activities for the lesson. This can be done in a two column format used for the sample lesson plan in Module 5.3. This format is:

Event (Teaching Step)	How accomplished
1. Stating the objective of the lesson	1. To be written on chalk-board by the teacher
2. Presenting a model of desired performance	2. Teacher demonstrates a correct performance of the objective

3. Stimulate relevant recall	3. Review test and remedial programmed text
4. Present the stimulus; provide feedback	4. Written text and self-test questions, with answer key (contains all new information needed for mastery of the objective)
5. Assess attainments	5. Adminster and score the evaluation test or exercise.

Conducting the Lesson and Administering the Test

The lesson plan has been the vehicle for your preparation to conduct the lesson. You will want to be sure to review it as a check on all materials you should take.

Don't forget the test. This lesson you are teaching is for the purpose of learning to do a formative evaluation, and the test is a crucial way of gathering data for this purpose.

However the test is not the only way to gather information helpful in revising your lesson. Some other sources are:

1. Watch and listen. When you are not conducting a teaching step yourself, and are not engaged with an individual student, keep alert for signs of restlessness, inattention, puzzlement, or unwillingness to do the assigned

study and exercises built into the materials. Also look for signs of enjoyment of the lesson. If pupils say "I liked this part". or "I didn't understand this part", make a note of it.

2. Check answers to any self-tests, exercises, or programmed booklets. Even though such questions are designed to help the student learn, not to evaluate him, any errors made by large numbers of pupils suggest need for revision of the materials or the questions.

3. After the test has been given, if time permits, ask students which parts were difficult, easy, dull, or interesting.

4. Consider a brief questionnaire covering some of the good points.

5. Explain that you are going to use their test scores and comments to revise the lesson to make it better. Ask them to give suggestions as to how to do this.

Revising the Lesson

Do an item analysis of your test as well as recording a score for each pupil. You need both kinds of data to answer two separate questions:

1. How well did the lesson work? To answer this question, you note how many pupils met the standard for

"satisfactory" on the test. You also consider pupil reactions.

2. Where does the lesson need improvement? Here is where you want to know how many pupils missed each quesion on the test. If many pupils miss a question, revise the part of the lesson (or materials) which dealt with that question.

Using all information available, revise the lesson and materials and prepare for teaching the lesson to another group.

Teaching the Revised Lesson

Follow the same overall procedures as in the first teaching of the lesson, except for changes you made during the revision of your plans and materials. Administer test instruments as before.

Conducting a Summative Evaluation

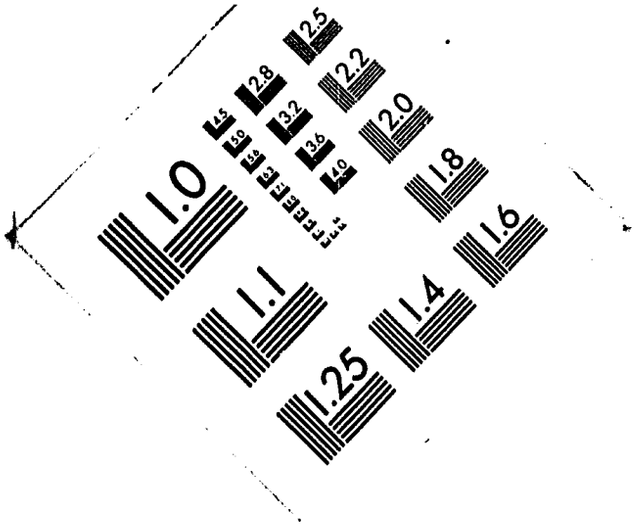
This amounts to asking:

1. Did I reach my design objective in terms of number of students getting "satisfactory" on the test?

2. Did my revision help? Compare the two sets of results for this.

3. What changes are still needed? Use the item analysis and other information for this.

LJB/alp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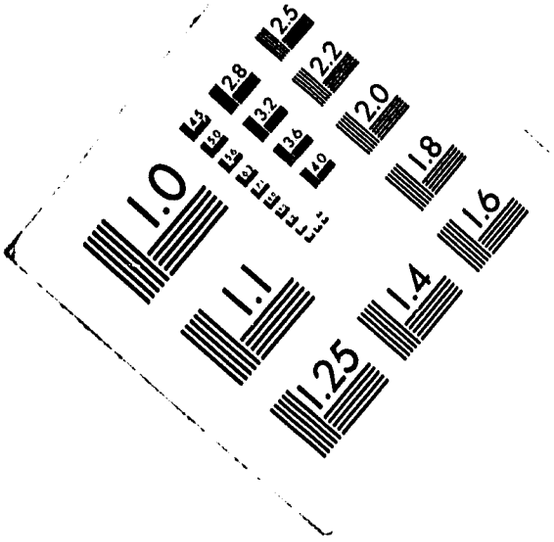
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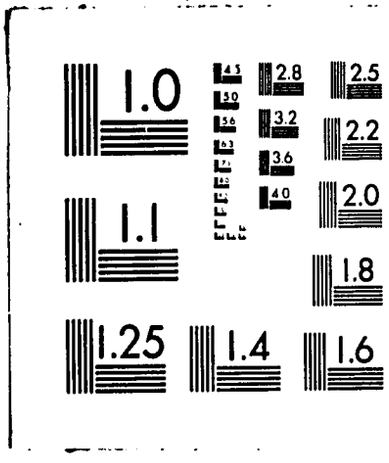
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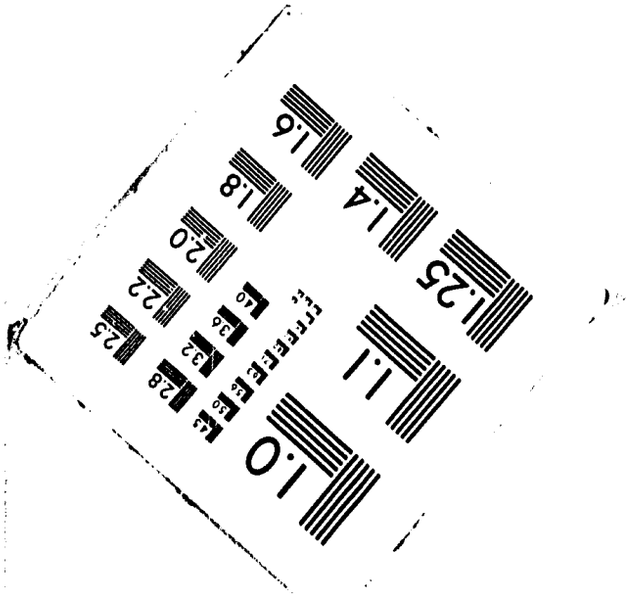
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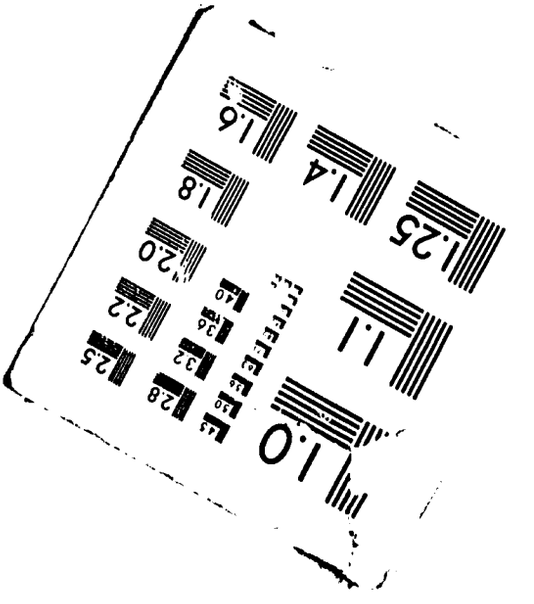
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Instructional Module 4.1

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College of Education/Florida State University

1973

INSTRUCTIONAL
MODULE 4.1

OUTCOMES: PLANNED; POSSIBLE; UNPLANNED.

by

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NORMAN R. DODL

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Note to Student:

Explanation of Types Styles

In this module, three type styles are used to help you be aware of the different functions of each part of the module. These functions are next summarized, in the type style used for each in the module.

1. *This type style is used to give directions to you, and to explain the purposes of the module -- in short to make clear what you need to do. So this type style helps you answer the questions: "Where am I going in this module? What am I to learn? What am I to do?".*

2. This type style is used for the instructional materials which are designed to show you how to get to where you are going in the module, e.g. to enable you to get to where you are going. This tells you "How will I get there?".

3. This type style is used for self-tests or practice exercises. While these self-tests are to help you decide whether you think you have mastered the objective of the module, other tests will enable the instructor to verify that you have indeed arrived. Both kinds of tests help you answer the question: "How will I know when I've

arrived?" (Mastered the objective.)

To Summarize:

This type style is used for	-- answering this question:
1. *This type style*	-- "*Where am I going?*"
2. This type style	-- "How will I get there?"
3. This type style	-- "How will I know I've arrived?"

Generalizing suggestion: In planning your own teaching, you might find the above three questions useful to keep in mind. Any lesson, like any module, should involve all three.

Module Objective

After completing this module you will be able to define, discuss, and give examples of the following three kinds of outcomes of instruction:

1. *Planned outcomes*
2. *Possible outcomes*
3. *Unplanned outcomes*

You should also be able to identify each of the three kinds of outcomes in a written case study, or from watching a lesson being taught and the evaluation of it. Ultimately you will make evaluations to detect all three kinds of instructional outcomes from you own teaching.

The Three Kinds of Outcomes

Meaning of Outcomes of Instruction

By outcomes of instruction we mean "the effects of the instruction upon the learner". This refers to what he thinks, feels, says, and does at the end of (a) a single lesson, (b) a unit of instruction, or (c) even an entire year or entire curriculum.

These outcomes do not refer to the process or method of instruction or to what the teacher did during the instruction. They refer to the results of the instruction as seen in the subsequent behavior of the learner on a test, in conversations, or in actions following the completion of the

instruction. Mainly, these outcomes are observed after the instruction, but some early signs of such outcomes may be noticable also during the instruction. A teacher watches for these outcomes at all times, and often she uses these observations to change her methods or procedures either (a) in the middle of a unit of instruction, or (b) to modify plans for the next unit for her present group of students, or (c) to replan this same unit for the next group of learners.

To the extent that the observed outcomes are exactly the outcomes planned by the teacher, the instruction has met its objective. But if the outcomes are unexpected by the teacher, we have another situation. In fact, as see earlier, we find it useful to discuss three kinds of outcomes.

Three Kinds of Outcomes

(1) Planned outcomes are those that the teacher deliberately intended to bring about by the instruction. These may have been stated in writing beforehand in the form of behavioral objectives for the learners to achieve; in this case, an outside observer provided with a list of such objectives and with evidence of the learners' performance (test scores or other relevant data) could certify that the desired outcomes were indeed reached by

the pupils. If this were the case, the results are public rather than private, and they could be used as evidence of successful accountability on the part of the teacher for bringing about the planned outcomes. When the planned outcomes are "only in the teacher's mind" before the instruction, no such direct public accountability is easily achieved. But as long as the intended or planned outcomes did take place as seen in the learner's subsequent behavior, the instruction would be deemed successful insofar as planned outcomes are concerned.

(2) Possible outcomes are those which the teacher could forsee in advance as possible indirect or side effects of the instruction. For example (and a simple one, indeed), the teacher may have planned that at the end of a unit the pupils can accurately find the square root of 8 out of 10 whole numbers not exceeding eight digits. It is of course easy to make a test to see if this planned outcome did take place. But, in addition, the teacher may have "hoped" that mastery of this unit would make the class more interested in math and more eager than before for the next math unit. Or, she may have forseen the possibility that mastery of square root would lead some pupils to begin asking what alegebra is like, or what physics is like. She could of course check to see if

these possible outcomes did occur simply by listening to the class.

(3) Unplanned outcomes, when observed, of course come as a surprize to the teacher, since they were neither deliberately planned nor anticipated as possible outcomes. Such outcomes may, of course, be either desirable, undesirable, or of neutral value in the teacher's estimation. Suppose, for example, that during the unit on computing square root, the boys discovered that they were learning faster than the girls, and that in fact the boys outscored the girls on the subsequent test. Suppose this leads to bickering as to whether girls or boys are "smarter", a not unusual kind of reaction at certain ages. Suppose, further, that this bickering leads also to fierce competition between the boys and the girls in all class activities whether related to math or not. If unforseen as a possible result of the square root unit, this is classified as an unplanned (unexpected) outcome. It may of course be argued that this sex rivalry is not an outcome of the instruction but rather a fact of child development. But if not observed before for this group, and if observed under one method of instruction but not under another, then it must be faced and dealt with as an outcome.

In the above example, the teacher deserves credit for succeeding in her planned objective that the student would learn to compute the square root of whole numbers. The teacher was probably also pleased if this unit resulted in (possibly expected) greater interest in math or physics. Was she pleased or displeased with the unplanned outcome of an outburst of sex competition? That is up to the teacher, of course, but the fact of the occurrence might lead the teacher to do one of three things:

(a) encourage sex rivalry in school work

(b) discourage sex rivalry by keeping private the records of the pupils

(c) discuss the evidence as to the achievements of boys vs. girls in many school subject areas, distinguishing achievement from intelligence and from interests and effort.

As a consequence of the square root unit, then, the teacher would need to review the behavior of the class on all three types of outcomes (planned; possible; unplanned), and then decide upon the future course of action for the present group and for the next group to be taught to calculate square root.

LJB/alp

Progress Check

In order to enable you to check your progress so far in this module, please complete the following exercise, then check your answers with the following page.

1. Define planned outcomes, and give an example.

2. Define possible outcomes, and give an example related to question 1, above.

3. Define unplanned outcomes, and give an example related to question 1, above.

Answers to Questions on Previous Page

1. Planned outcomes are those the teacher deliberately intended to bring about. If put into writing, these are the objectives of the instruction, and can be used to be accountable for the planned instruction.

Example: Any relevant objective, such as the following: recite poem X; compute the area of rectangles; find a solution to problem X, etc.

2. Possible outcomes are forseen or hoped for "side effects" of teaching to the objectives. These may be "increased interest", "lively debate", "voluntary further study", etc.

3. Unplanned outcomes are those not forseen by the teacher, and hence come as a surprize to her. Examples: heated debate with personal remarks; fighting; questioning the value of the objective; refusal to study for the objective; truancy; a sudden burst of interest in the subject; unsolicited follow-up study and report of results to the class; a sudden change in class climate or change in personal relationships among a few pupils; change in attitude toward the teacher, the subject, or the class; revision in personal values expressed in new kinds of communications.

If your answers do not compare favorably with the above feedback, re-read the material and try again. If you still feel uncertain, check with the instructor.

Now that you have had a brief glimpse of the three kinds of outcomes of instruction, we will review them in terms of their broader significance in the overall instructional setting.

Significance of the Three Kinds of Outcomes

Planned outcomes. Earlier we used the example of computing square root as an easy-to-describe and easy-to-test for planned outcome (objective) of instruction. This would be a brief period of instruction. Other planned objectives such as "being a mature reader" represent almost a lifelong objective; as least no great improvement would be noticable in a few weeks or months of schooling. While it is useful in planning an entire K-12 curriculum to state such broad objectives, the classroom teacher, within a one-year period, may think in a more limited way in terms of amounts of gain in vocabulary, reading speed, reading comprehension, etc. These are all "cognitive" or "intellectual" skills.

Other planned objectives may refer to development of social and motor skills, to learning of factual material, or to attitudes and values. It is not always easy to define short-term objectives in some of these domains of learning. But some planned objective need to be stated for short-range (single lesson or unit) periods of learning as well as for year-long improvements. Standardized tests are often used to measure gains in year-long periods, while a teacher usually makes his own tests and evaluations for single lessons or brief units of instruction.

One cluster of modules deals with classifying planned objectives into different categories representing different "domains" or "types" of learning. Doing this is especially useful in designing instructional strategies, and in checking to see how many domains are covered when objectives are sorted by domains. While it will be useful if you have completed that group of modules, the next step in this cluster of modules is for you to learn how to write worthwhile objectives and how to do a task analysis to break a larger objective down into smaller ones to facilitate learning and evaluation of pupil progress.

So, whether your planned objectives represent intellectual skills like reading, arithmetic, and simple science observations, or other domains like cognitive strategies, information, or attitudes, you need to learn to describe the objectives well enough that the instructor can judge your teaching strategy and the validity of how you evaluate the pupil's progress in regard to the objectives.

Possible outcomes. In the early example of learning to extract square roots, the intended or planned objective was an intellectual skill, but the anticipated possible side-effects related to interest in or an attitude toward math and other academic subjects. Another possible expectation would be that those who rapidly learned to extract

square roots would master later math units rapidly also. Such pupils might even show a gain in motor skill -- precision in writing numbers and radicals due to the larger number of practice problems they did during the learning period. And the facility in doing a rather routine intellectual operation (following fixed rules for computation) might even enhance to a small degree their ability to develop strategies on their own when the procedural rules are not directly taught.

It would appear likely, then, that in thinking about some of these possible (indirect) effects of instruction, one would do well to look in domains different from that represented by the planned objective as well as in the same domain.

Unplanned outcomes. While a teacher might clearly expect that a careful teaching plan will result in the pupils' achievement of the intended objective, and perhaps some of the forseen possible side-effects, it is the unforseen, unplanned outcomes that may not only come as a surprize but may also be downright upsetting for the teacher and possible also for the pupils. As is true in all social interaction, one's words and actions often result in reactions from others that are entirely unexpected. Not even a skilled social scientist or practical politician can always predict how his hearers will react

to his message. This is equally true of the teacher, who perhaps has more personal knowledge of his pupils than a politician has for his individual "constituents". Also, in the classroom situation there may be individual reactions which trigger further reactions in a manner unlike the citizen sitting at home watching the candidate on TV, making only a private reaction to the message.

This is not to say that the most explosive reactions of pupils are as a result of the instruction -- they may be the result of tensions among the members of the class. These latter tensions, may interact, however, for better or worse, with the instructional effort, resulting in surprizing situations.

Negative unplanned reactions of the group possibly represent the most anxiety-producting situations a teacher has to face. His ability to cope with them may be an extremely important determiner of his being able to contine the instruction successfully.

LJB/alp

In the Progress Check on page 6, you were able to check yourself on part of the objective of the module. But you now need to identify each of the three types of outcomes from a written case history.

Case Study Test

Directions: In the following passage, underline once the planned outcomes; underline twice the possible outcomes; underline three times the unplanned outcomes.

Caution: Do not confuse objectives with outcomes. Underline only the three kinds of outcomes.

Do not underline at all any material not related to any of the three types of outcomes.

Key: Planned; Possible; Unplanned.

Case Study

Miss Jones agreed to have her fifth-grade class participate in a research project on teaching by computer.

Miss Jones first taught the pupils to convert fractions to decimals by her normal, teacher-led, group method of instruction. But she saw in the computer a possible means by which her pupils could acquire speed and facility in accurately doing practice problems in converting fractions to decimals. She hoped that such a new experience would get the children more excited over math, and would reduce the amount of inattentiveness and slacking off which she observed in regular practice periods with paper and pencil. So after some initial group instruction, the pupils were assigned to spend 30 minutes per day on a computer terminal. She alternated such practice periods with teaching the next skills in the planned curriculum.

It turned out that the children gained in speed and accuracy in converting fractions to decimals twice as fast per unit of time in the computer practice as compared to the revious pencil and paper mode of practice.

During the computer practice, the children were extremely attentive to the task, not wasting a minute, and not paying attention to anything that went on around them.

On the way to and from the computer terminals, pupils stopped to compare notes on "how may right answers" each obtained in the last 30-minute computer practice session. The children then began placing bets with each other on who would get the most right answers in the next session. Less affluent children put up their lunch money to back up the bets, and several fights broke out when pupils accused each other of false reporting of results.

End of case study. When you have finished the underlining as directed, check your work with the next two pages.

Key: Planned; Possible; Unplanned.

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During the computer practice, the children were extremely attentive to the task, not wasting a minute, and not paying attention to anything that went on around them.

On the way to and from the computer terminals, pupils stopped to compare notes on "how may right answers" each obtained in the last 20-minute computer practice session. The children then began placing bets with each other on who would get the most right answers in the next session. Less affluent children put up their lunch money to back up the bets, and several fights broke out when pupils accused each other of false reporting of results.

Follow-on to Case Study

Well! This teacher (and no doubt the researcher) may have been surprized at some of the outcomes of the use of the computer in drill and practice in converting fractions to decimals.

Since this case study is a hypothetical situation, you may decide for yourself how plausible it might be as an indication of what would really happen in such an experiment. Many actual computer studies have been carried on with less dramatic unplanned outcomes than those reported in our hypothetical situation. So this is not a prediction on our part of what would happen; the case was designed to test your ability to recognize the three kinds of outcomes of instruction.

But suppose the case were real instead of hypothetical. What should be done? There would seem to be a great number of possible alternatives. You might think of other alternatives, but here are some we thought of:

1. The teacher, the researcher, and the principal might confer on how to change the way the computer practice is arranged, seeking to retain the planned and possible outcomes but to correct the unplanned ones.

2. The teacher might stop the experiment at once.

3. The teacher, independently, might apply contingency management techniques to correct the undesirable unplanned outcomes.

4. The teacher might try "reasoning" with the children, trying to persuade them to utilize the advantages of the computer for self progress; e.g. try to get each pupil to improve his own performance rather than competing with others.

5. The teacher might exact promises not to fight or bet, while not discouraging otherwise the spirit of competition among pupils.

6. And of course, the offending children might be sent to the principal for discipline.

In any event, the researcher has the responsibility to cooperate with the teacher in overcoming negative effects of the experiment, whether or not the teacher decides to go on with it, using one of more of the above kinds of corrections.

If the teacher and researcher agree on a corrective procedure, and institute changes, this represents a formative evaluation of the experimental program. If, after a year or two of use, the corrected procedure appears to have resolved all problems, then a summative evaluation of the experimental program might be undertaken.

Module Test

Now pick an instructional objective you would like to teach, recording the planned and possible outcomes you anticipate. Then either:

(a) Discuss the 3 types of outcomes with the instructor, or,

(b) If a group is available, teach the objective and evaluate the outcomes, sharing the results with your instructor.

LJB/alp