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AUTHOR Clark, Richard; Rosenbach, John
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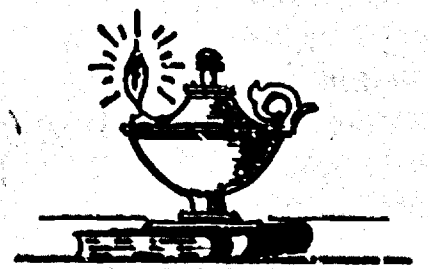
ABSTRACT

Accountability is an outgrowth of rising demands by legislators and taxpayers that programs do actually achieve what they purport to achieve. This handbook is one of six summaries of workshops (see TM 000 138) on the development of solutions for evaluating the effectiveness of educational programs under ESEA Title III at all levels within the state of New York. The first part considers the sources from which solutions might emerge and the translation of ideas into operating programs. Attention then focuses on the analysis of proposed solutions that may show positive effects, as contrasted with those that seem appealing but have little chance of making a real difference. The task of making solutions more relevant to objectives is approached in the reporting of sources of exemplary and innovative programs, relating proposed programs to theory, and the questions to consider in program implementation. An appendix includes the various exercises that were presented; a brief summary, where appropriate, of some of the responses obtained; and an outline of the specific chronology followed during the workshops. Although funded by Title III, the content of the workshop sessions is considered appropriate for use with other Titles and large program evaluative problems. (TA)

PROGRAM EVALUATORS HANDBOOK

Developing Solutions

ONE OF THE TRAINING
AND REVIEW SERIES
IN
E.S.E.A. TITLE III



The University of the State of New York
THE STATE EDUCATION DEPARTMENT
Albany, New York 12224

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FOREWORD

Increased competition for the tax dollar has and will continue to cause more rigorous evaluations in all fields of education, particularly at the Federal level. Increasingly, legislators and their constituent taxpayers are demanding hard data which will indicate whether a costly program is achieving that which it has purported to achieve. Under these conditions evaluation at all levels must satisfy the criteria elements of significance, credibility, and timeliness. Within this framework evaluative techniques in the future must be strengthened.

Appropriate deparmental personnel believed that strengthening the evaluative effort of the State might start with the Elementary and Secondary Education Act (ESEA) in general and Title III of that Act in particular. Further, they believed that the 16 existing Regional Centers contained evaluators who might be in a strategic position to disseminate information gained through a workshop approach to the problem on the State level.

Leo D. Doherty, Supervisor of Education Research, of the Division of Evaluation was asked to organize some review and training sessions appropriate for the task. He selected people from within the State to prepare and conduct formal lessons accompanied by simulated experiences and related materials. This document is one in a series of six summaries of sessions completed in a 3-month period terminating in February of 1969.

While the sessions were paid for out of Title III funds, the contents are appropriate for use with other Titles such as I, or other large program evaluative problems such as those encountered in N.D.E.A. Title III, Urban Education and the like.

This document on Development of Solutions was prepared by Richard Clark and John Rosenbach, State University of New York at Albany.

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Introduction

The first two topics for the Evaluator's Workshop—development of objectives, and development of solutions—were planned independently. However, several meetings were held to discuss the material to be presented and the general format to be followed for the total 3-day period. Efforts were made to relate one section to another.

A similar division was made in the section on the development of solutions. The first part of the material is basically concerned with the sources from which solutions might emerge and the planning necessary to translate an idea into an operating program. Attention was then focussed on the analysis of proposed solutions from a psychological point of view, raising questions about the kinds of solutions that have the possibility of showing positive effects contrasted with solutions that seem appealing but have little chance of making a real difference. In both parts of the section on solutions much reference was made back to the work done on objectives.

The actual conduct of the workshop involved short lectures, presentation of a work problem to small groups, and total group discussion of the problem presented in the stimulus material. The following narrative suggests major points raised in the lectures. Included as appendix material are the various exercises which were presented, and when appropriate, a brief summary of some of the responses obtained. The specific chronology followed is also included.

Relating Solutions to Objectives

Because the specific program activities which make up Title III activities must begin with the purposes to be achieved, an effort was made to provide a clear link between the sections on establishing objectives and planning the pro . Thus, a first step in the section on deriving solutions started with the use of several statements labeled as "objectives" in proposals written under Title III (Appendix - Exhibit A). Evaluators were asked to suggest the kind of program activity that emerged from each objective and to consider the logic by which the activity was seen as a possible solution.

It soon became clear that several items listed as objectives did not fit the definition established earlier in the program. Also apparent was the difficulty of arriving at a defensible set of activities from an inadequate set of objectives. Stress was placed on the notion that clearly identified problems lead to clear objectives. In turn, clear objectives tend to suggest clear direction in seeking solutions as well as a clear framework for evaluation.

Assuming objectives are clear, where does one find the solutions that might form the activity of a Title III program? This was the next question to be considered.

Sources of Exemplary Programs

The two general concerns of Title III, the development of exemplary programs, and the development of creative solutions to persistent problems, suggest that different sources of solutions will emerge from each general concern. An exemplary program may be innovative in the sense that it is a departure from present practice in the area in which it is instituted.

It is assumed, however, that the program has been employed and found effective in another region and/or in some type of pilot study.

The channels of communication through which educators find out about programs which might be exemplary have been explored and discussed by Brickell (2), by Miles (6), and by many others. Brickell indicates that conventional models of communication, professional journals, research reports, speeches, and the like, are not effective means of bringing about change. Brickell's data were collected, however, prior to the passage of ESEA. One may speculate that the visible support provided by ESEA might have made educators more alert to a serious consideration of ideas encountered in conventional models of communication. Hopefully, such channels as ERIC and the network of regional laboratories have also helped to provide information about programs that might be considered exemplary.

Once a program has been identified by an area or a region as potentially exemplary and as offering solutions for problems which have been identified, then a process of adaptation is necessary. Presented below is a suggested set of questions which should be answered in a proposal of an exemplary program.

Adapting an Exemplary Program in a New Setting

I. Does the program fall within the scope of Title III?

   A. Is it promising in terms of solving a clearly identified problem?

   B. Is it innovative for the area suggesting the program?

   C. Is the area suggesting the program in a position to display and/or demonstrate the program to others in the region?

II. What kind of modification is necessary from the old to the new setting?

A. Are there differences in the types of pupils with whom the program will be employed?

B. Are there differences in the expected outcomes?

C. Are there differences in the qualifications of those who will carry out the program?

III. What specific steps must be taken to implement the program in its new setting?

A. How will target pupils for the program be identified?

B. How will those carrying out the program be selected and/or trained?

C. What provisions are planned for physical space, needed materials, and the like?

IV. What plans are necessary for evaluation and dissemination?

A. Are objectives stated in a clear enough way for evaluative criteria to logically emerge?

B. Is there a logical relationship between the project timetable and the evaluation timetable?

C. Are appropriate dissemination channels and procedures identified?

Sources of Innovative Programs

The fact that an innovative, creative solution has within it an element of uniqueness suggests that it is impossible to describe specific sources of innovative ideas. Any list of potential sources can only be partial and tentative, and the following list should be so considered:

1. Creative solutions may emerge from the intuitions of individuals working closely with specific problems. Perhaps individual teachers, administrators, or school psychologists have visualized possible programs that seemed exciting but not possible to bring about. From these individuals may come creative solutions which Title III funds would make feasible.

2. Creative solutions may emerge from the collective thinking of a group of people. It is possible that the brainstorming techniques described by Parnes (7) and others might be used by people concerned with an identified problem.

3. Creative solutions may emerge from a new extension of an existing theory. For example, the current literature of educational psychology shows new uses of an operant conditioning model in school classrooms. These new uses, when they first emerged, could certainly be described as innovative, even though the theory from which they emerged was well established.

4. Creative solutions may emerge from a restructuring of a technique used in one area for use in another area. For example, use of computer assisted instruction in an area in which it had not been previously used might be classed as innovative. However, to bring together four or five tested programs might provide an exemplary program but not an innovative one.

It is clear from the above list that a proposed solution can not be classed as "innovative" or "not innovative." Rather, judgments will differ and disagreements will be common.

Relating Proposed Programs to Theory

To what degree does the theory one adopts influence the program which will be planned to meet a problem? To explore this question

participants in the workshop were presented with an illustrative problem and one of two companion theories (Appendix - Exhibit B).

Each group was asked to develop suggestions for program activities which emerged from the theory which was selected. Then a comparison was made between the "solutions" which emerged from each theory. The discussion which followed tended to confirm the point which had been intended—that a theoretical position will have a profound influence on the activities planned as part of a program.

While some Title III projects derive their activities from a specific theoretical base, many projects are eclectic and atheoretical, giving one the impression that if enough different things are tried, something is bound to work. An argument was made for developing Title III solutions from a clearly stated theoretical basis as well as from clearly stated objectives. It was contended that theory helps to arrive at program elements and evaluation models which allow more accurate generalization than can be obtained from shotgun approaches. If an atheoretical approach to a problem includes 10 program elements and the total program seems to be effective, then generalization is limited to the total package and no special insight is gained about the relative effects of parts of the program.

Although a complex program may emerge from theory if the program proves successful, a firmer base has been established for the hypotheses of the next study. The long-range search for understanding and for generalized solutions seems better served from projects designed to test theory than from putting together "solutions" which have no underlying rationale.

Questions to Consider in Implementing Programs

One model suggested as a guide to program planning was borrowed from the five "W's" and the "H" which newspapermen attempt to include in the

lead of a news story. This model suggests that program planners need to consider the following factors:

Who? The "who" questions concern the criteria which will be used to identify those who will receive the services offered by the program as well as the identification of those who will provide the services. A problem with many Title III proposals concerns the use of a global label for proposed subjects (i.e. "slow learners," "children with learning problems," etc.) which does little to suggest the specific criteria which will be used to determine those who will take part in the program.

A related question, and of much concern to those administering Title III projects, is the identification of those who will provide the services if the proposal is funded. Ideally, a proposal will spell out in detail the job specifications for those who will carry out the proposal and these specifications will generally describe the proposal writer's model of the best possible person. However, the model person described in a proposal is often not available in the flesh, and often compromises are necessary. Perhaps an effort to divide criteria concerning who should provide services into an "essential" and "desirable" list would help in making compromise decisions on a more valid basis.

What? The question of what is to be done as program activity constitutes the heart of the proposal. One should be able to see a clear relationship between the problem identified, the solution suggested, and the description of what will be done in carrying out the program.

When? A persistent problem related to carrying out Title III projects is the development of a realistic timetable of sequential events. Often a project requires a period of training for those who will actually work with children which will then be followed by an implementation stage.

Many events can occur which make the maintenance of a time schedule difficult or impossible, yet if a project demands a series of sequential activities then the planned order must be maintained even if later activities need to be deferred.

Questions of "when" must be closely tied to plans for evaluation. For example, if most of the first year of a project is devoted to training professionals then evaluation must stress changes in these professionals. Long range goals for the project may involve behavior change on the part of children, but the timetable established for the project will also dictate the sequence of evaluation activities.

Where? The "where" questions to be answered include consideration of the geographic area to be covered in the project as well as decisions about the specific locations of project activities. When appropriate, the question of administrative responsibility may also fall in this category.

Why? In order to answer the "why" question in a Title III proposal, it is necessary to look simultaneously at the problems identified as critical in a given area or region and the purposes identified for Title III by the Federal Government. The proposal writer needs to consider two questions: 1. Why is the problem we have identified important for us to solve? and 2. Why is the problem we have identified of concern under the guidelines of Title III? Certainly every school and every area has persistent problems which demand constant effort but which do not fit under Title III. The proposal should make clear that the problem described is of high priority in terms of local conditions and also in terms of Federal trusts.

In addition to answering "why" for the problem which is stated, the proposal should make clear why the suggested solution seems to be the most appropriate one available.

How? To the degree possible a proposal should provide some detail concerning how the proposed activities will actually come about. While the most frequent problem is for the writer to be too general in describing how activities will be carried out, it is also possible to be too specific. Graph 1 was prepared to illustrate what we conceive to be extreme, and a middle-of-the-road position.

Graph 1

Writing Procedures

Too Little?	Enough?	Too Much?
Local businessmen will be asked to help.	The following letter requesting help will be sent to members of the Chamber of Commerce.	The following letter will be sent to each of the following businessmen .....
An achievement test will be used.	Form W of the Iowa Test of Basic Skills will be used.	Form W of the Iowa Test of Basic Skills will be used, tests will be given in the morning between 9:00 and 11:00 A.M. and test will be scored using the XYZ machine in Podunk Center.
Everyone will be told about the program.	Information about the program will be communicated by direct mail, public service announcements on radio, and by display ads in the local newspaper.	The following letter will be mailed on June 9 to each address ..... Spot public service announcements will be broadcast on .... and will state ..... The following display ad will appear .....

As a check on whether a proposal answers the five "W's" and "H" the following list of questions has been prepared:

Check List Concerning Who, What, When, Where, Why, and How

I. Who?

Who will be the target subjects for the project?
Who will actually carry out the program?
Who will administer the program?
Who will carry out necessary training activities?
Who will be responsible for evaluation activities?

II. What?

What will be done to be certain all eligible pupils have a chance to be part of the program?
What will be done to prepare those who will work with the program?
What program activities will be carried out?
What data will be collected?
What evaluative criteria will be employed?

III. When?

When will project staff be available?
When will eligible subjects be identified?
When will training activities, if necessary, begin and end?
When will the program itself begin and end?
When will each item of desired data be collected?
When will evaluations be made?

IV. Where?

Where will the subjects for the study come from?
Where will program activities take place?

V. Why?

Why is the problem suggested of high priority?
Why is the program suggested to solve the problem chosen over alternative possibilities?
Why is the program to be considered either exemplary or innovative?

VI. How? (Tend to answer with more precision and detail questions of "what")

How will necessary staff be recruited?
How will pupil selection be carried on?
How will the program actually operate?
How will evaluation activities be carried on?
How will dissemination take place?

Selecting Educational Treatments

In the abstract, the development or selection of educational treatments appears orderly and straightforward: an educational or educational/social need is identified, objectives are determined, and activities (treatments) are designed (or selected) to achieve these objectives. Unfortunately, we have already seen how complex and difficult it is to identify needs and to state objectives; treatment design, and selection, if anything, is even more complex and difficult.

Obstacles to effective educational program development are, of course, many and varied and range from social-psychological considerations to those of a political-economic nature. In this discussion, however, we will focus on factors that bear directly on educational efforts to effect change in pupil behavior. Three sources contributing to problems of designing and selecting treatments will be considered:

1. the strong tendency for human behavior to resist change,
2. the powerful contribution to certain behaviors of certain classes of variables, often nonmanipulative and of an "input" type, and
3. insufficient knowledge concerning relationships of educational interventions (independent variables) to hoped for outcomes (dependent variables) for individual students; in other words, a knowledge or theory gap.

Resistance to Change

All educational efforts, innovative or traditional, rest on some assumptions, usually implied, about the changeability of human behavior. That behavior change is axiomatic, indeed, the very concept of learning

rests on the notion of change. What is less clear, however, is the nature, rate, and extent of behavioral change and, moreover, the principles and laws governing the conditions under which change occurs.

The nature of behavioral change, which will be discussed more fully below in respect to a knowledge or theory gap, can be conceived of in terms of "content," i.e., cognitive, affective, perceptual-motor for example. It can be readily demonstrated, in this regard, that change, or learning of certain content, will occur only when an individual is exposed to (taught?) certain stimuli. Thus, for example, one will never learn to speak Russian if his sole exposure to language is in an English speaking environment. This fact is so obvious it is frequently overlooked, or at least underestimated in importance, in planning educational programs. Indeed, the mark of many, if not most, innovative activities is process (conditions) designed to accelerate and extend change.

Efforts to speed up rate and extent of learning, however, through varying processes, have not been especially successful. Over the years, educational researchers have reported, almost with monotonous regularity, "no significant difference," when comparing various treatment conditions against achievement outcomes. An excellent review of such studies can be found in a recent work by Stephens (12), a brief summary of which is shown in graph 2.

Graph 2

"Treatments" and School Achievement

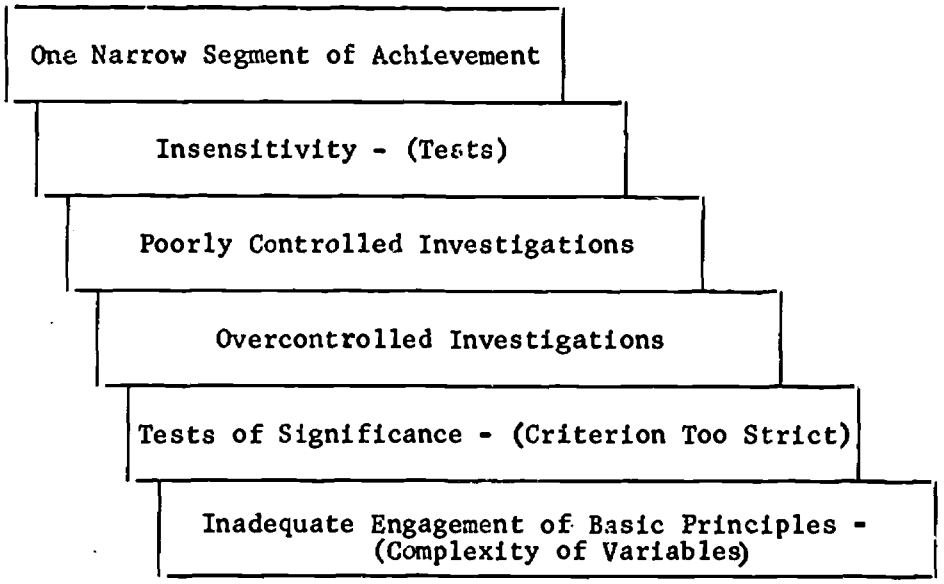
(Based on J.M. Stephens, The Process of Schooling, Pp. 72-82, N.Y.: Holt, Winston, 1967)

Attendance	- With intelligence held constant, R = .10 to .20
Television	- Of 393 studies, 255 no difference, 83 favored television, 55 favored regular classroom.
Independent Study	- Generally little difference, although seemingly related to self-selection.
Class Size	- Generally unrelated. One review: 222 no difference, 22 favored small class, 37 large class.
Counseling	- Mixed findings (with random samples).
Distraction	- Negligible.
School Size	- Mixed results.
Selection and Training of Teachers	- Overwhelmingly negative results.
Easing the Teacher's Load	- No differences.
Ability Grouping	- No consistent advantages
Differences in Policy or General Approach	- No consistent differences
Discussion vs. Lecture	- No consistent differences
Programmed Instruction	- No differences, except perhaps in time.

One can attempt to account for these "no difference" findings in a variety of ways. Stephens (12), for example, points out that, in some instances at least, "negative results" may occur from intrinsic limitations in research designs: oftentimes the criterion variables are too limited, the measuring instruments too crude, the studies too loosely or in some cases too rigidly controlled, inappropriate levels of significance are used (for example the .01 level), or the studies are over-simplified, failing to reflect the underlying complexity of variables contributing to human behavior (graph 3).

Graph 3

Interpreting Negative Results



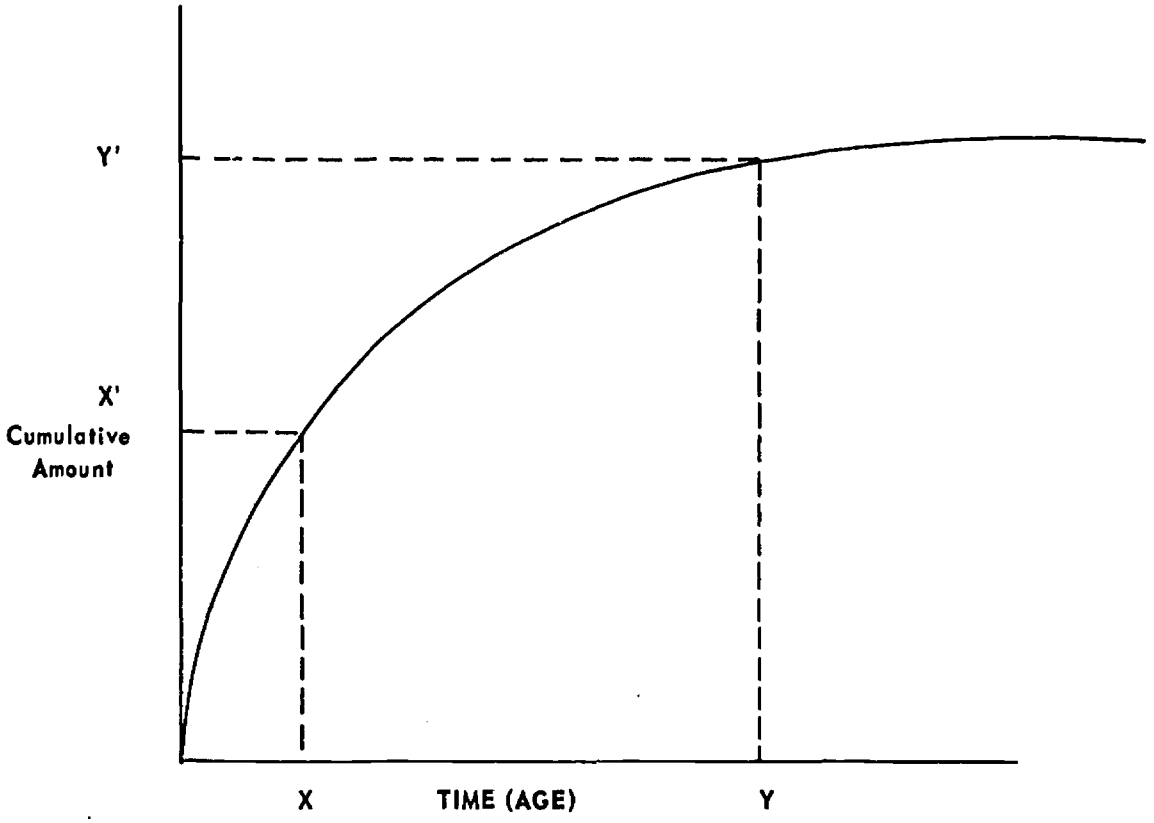
Another way of viewing negative results is in terms of what we know about the changeability of various human traits. Perhaps the best review of this work is presented by Benjamin Bloom in Stability and Change in Human Characteristics (1). The most striking conclusion one reaches from this work is the almost astonishing stability, and corresponding resistance to change, of many human characteristics, including mental ability and scholastic achievement, both of which tend to develop in a negatively accelerating fashion (graph 4). Traits that follow this growth pattern show extremely rapid development in their early stages, then gradually decrease in rate until an asymptote is reached.

The educational implications of these findings are profound:
1. final growth is highly predictable from early performance (for example, in graph 4 point Y' can be predicted from knowing point X'); 2. a large proportion of total growth is accomplished at an early age (for example, Bloom estimates that as much as 50 percent of total mental ability is attained by age 4 and 50 percent of academic achievement by grade 3); and 3. because such small variance remains at later stages of development, intervention programs introduced at this age have little to work on.

Bloom argues, and persuasively, that if efforts to produce marked change in such characteristics are to be successful, they should be introduced at an early stage of development when growth is rapid and/or the "change environment" should be powerful, with intense exposure (for example, some form of environmental immersion).

Graph 4

Growth Curve

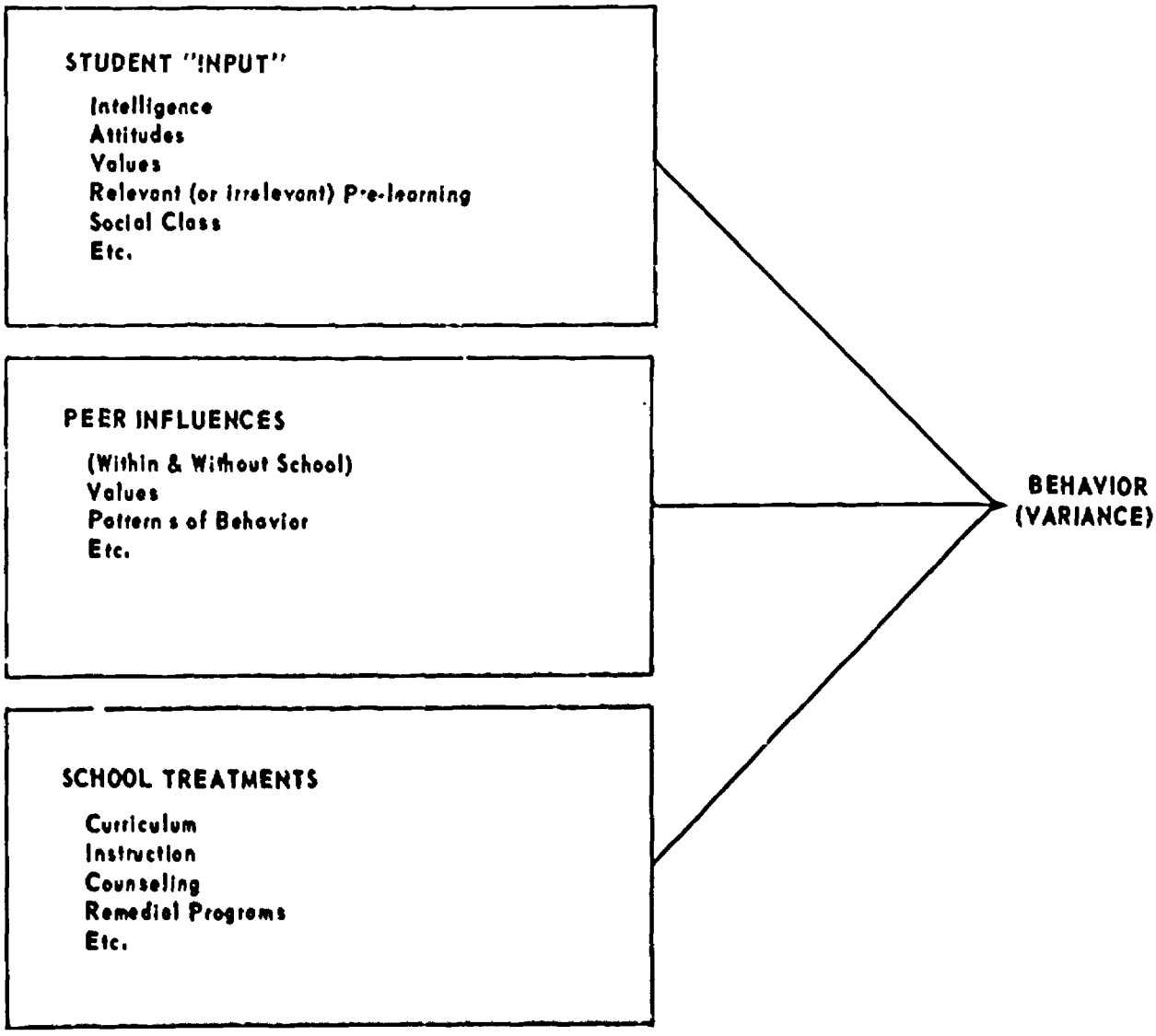


Variables Contributing to Criterion Behavior

An extremely helpful, yet infrequently used step in planning educational treatments is to analyze the criterion (hoped for outcome) in terms of those variables which contribute to it (graph 5). Too often the educational planner

Graph 5

Sources of Variance



proceeds from the naive assumption that the most powerful determinant of outcome is the educational activity or activities which he intends to introduce. Unfortunately, for the planner at least, this is rarely the case.

Study after study has revealed the persistent and potent influence of so-called "input" variables. Perhaps the most dramatic of these studies is the Coleman Report (3), which demonstrated the overwhelming effects on school achievement of such variables as ability, family background, and social factors, in contrast with the limited contribution of such school variables as class size, teacher differences, number of books in the library, and so forth.

But, the results of the Coleman Report should not have been surprising to anyone who had had any familiarity with past educational research—see again, graph 2. That research interest, however, continues along this line was evidenced by several papers presented to the recent national meeting of the American Education Research Association (February 1969). The results, incidentally, continue in the same vein, as illustrated by the following quote from a paper prepared by Rock, Centra, and Linn on, "The Identification and Evaluation of College Effects on Student Achievement" (Pp. 166 - AERA Abstract); "Approximately 80 percent of the between-college GRE (Graduate Record Examination Areas Tests) output variance was predictable from SAT (Scholastic Aptitude Test) input scores." (8)* Furthermore, the two variables which accounted for a significant proportion of the remaining 20 percent of variance were income per student and proportion of faculty with doctorates.

*The sample for this study was composed of 84 colleges. Variables studied included SAT, GRE, income per student, number of books per student, faculty-student ratio, proportion of faculty with doctorates, number of students, and percentage of students in various major fields of study.

The powerful contributions of input and other noneducational factors to achievement outcomes are well documented; the educational planner, if he hopes to demonstrate independent effects of treatments, must give special attention to the nature of outcomes and to how the treatments can be expected to affect these outcomes. This issue will be discussed in a later section.

Knowledge and Theory Gaps

Most, if not all of us, professional and laymen alike, have a variety of models or "theories" which we employ to describe and explain behavior. Some of these are of a common-sense, garden-type variety; some represent a form of intuition; some are passed on by unquestioned authority; some are borrowed from other fields or disciplines; and some are the result of systematic study and research.

Within education we have many examples from each category; and although creative and penetrating insights may occasionally derive from common-sense, intuition, or authority, it is more likely that effective educational practices will emerge from concepts and knowledge emanating from careful study. Unfortunately, it is sometimes difficult to trace or identify the source of a given idea; furthermore, if the idea is presented authoritatively and with appropriate jargon, our inclination, often, is to accept it as sound, perhaps even based on "science."

The person charged with the responsibility of selecting and planning educational treatments, however, must squarely bear the burden of sorting out the real from the apparent, the logical from the illogical, the demonstrated from the hoped-for; in short, the sound from the unsound. This task is made immeasureably more difficult in that so many, if not all, educational innovations are suggested with good intent, i.e., with deep

sincerity and with genuine concern for the welfare of children and adolescents. But good intent is not sufficient; improvements in educational practice simply will not accrue because of nobleness of purpose. This suggests that the planner must possess, in addition to a commitment to pupils, a certain amount of hard-headedness, together with a wide knowledge of research, theory, and practice bearing on the educational process.

Unfortunately, as we all are too well aware, there is not as yet a systematic and well developed body of knowledge from which to draw in designing educational programs. Contributions from supporting discipline, such as psychology or sociology, have been fragmentary and more often of a methodological than of a substantive nature. But one hopeful note, at least, is the relatively recent flourish of activity and interest, to a great extent on the part of educational psychologists, in the area of learning and instruction; in fact, we appear to be witnessing the birth of a new subdiscipline, viz, "instructional psychology," (for example, pp. 381-418, 1969 Annual Review of Psychology). Meanwhile, lacking a ready source of integrated material, the treatment planner must continue to rely on what is available, hopefully applying, however, rigorous empirical and logical tests of the soundness of suggested educational practices.

Some Illustrative Models

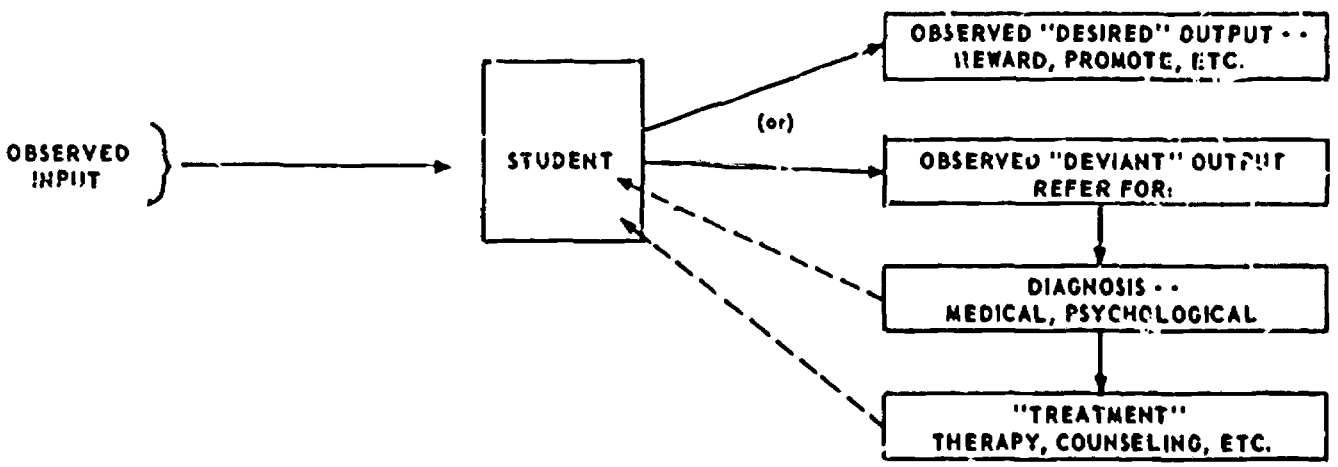
In an earlier section it was demonstrated how different theoretical models can lead to differing educational strategies. In some instances, alternate strategies can, of course, lead to identical outcomes, or perhaps to equally desirable although different outcomes. In other cases, however, a model can be defective or inappropriately applied, generating ineffective treatments.

One widely applied educational model (graph 6) has been borrowed from the medical sciences. In this model, when applied in the extreme, any observed deviancy from a desired mode of behavior leads to the inference that something is wrong with or within the individual (he is suffering from some form of "illness"). From this assumption, the next logical step becomes one of diagnosis, followed by treatment, which, if successful, should lead the student to a more normal way of behaving (or, in medical parlance, to being cured). Thus, for example, if a student is judged as "underachieving," it is assumed that there are some psychological or perhaps medical factors inhibiting his achievement. If the problem is diagnosed as psychological, he may then be referred to, say, the guidance office for personal counseling, in the belief that such action will alleviate the underlying causes of his poor academic performance. The hoped for outcome, of course, is eventual "expected" achievement.

Some serious questions, however, arise from the widespread application of this approach. The issue is not whether this is a "good" model; obviously it has worked and will continue to work in certain situations. Rather, the question is under what circumstances it is appropriate or inappropriate. Research suggests that, more often than not, it is not especially effective within an educational setting; that a more viable model would deal more directly with educational problems in terms of the instructional process. This implies that those responsible for treatment selection must not only be familiar with possible models and their corresponding strategies, but that they have a firm grasp of the theoretical foundations from which the models have been generated and the empirical research bearing on model-strategy effectiveness.

Graph 6

Medical-Educational Model



In a different vein, educational treatments are frequently chosen or developed on the basis of some model of how learning occurs. This model, incidentally, need not be consciously articulated; careful observation and analysis of a treatment can often allow one to infer the theoretical basis, however informal, from which the treatment has been derived.

Historically, the field of learning psychology, which has furnished educators with many of the conceptual bases for program planning, has been divided into two sharply different, and often fiercely competitive, camps. One school of thought, almost exclusively concerned with cognitive processes, has many of its roots in Gestalt psychology. The opposing viewpoint, behaviorism, emphasizes S-R associations; its leading contemporary proponent is, of course, B. F. Skinner.

Because of a preoccupation with its own concerns, neither side has given any especial attention, other than negative, to those variables considered important by the opponent. Interestingly enough, however, neither has been able to garner any persuasive body of research evidence to support the contention that one point of view leads to superior educational treatments (see graph 2).

If one assumes, however, that cognition and behavior are both important elements in the educational process and, furthermore, that cognitive and behavioral psychologists, each within his own sphere, have made significant contributions to our understanding of human learning, then alternative models for educational planning are suggested. One such model is illustrated, in part, in graph 7. This model is based on the premise that school learning proceeds in at least three areas—cognitive, perceptual motor, and behavioral (including affective). A second premise is that the principles or laws of learning, which suggest various conditions and

techniques, are not necessarily the same, or at least equally relevant, in each of the areas. Thus, for example, reinforcement, or reward, so essential to most S-R theories, is viewed as a primary variable within the behavioral domain, but not of direct importance in the others. Similarly, immediate knowledge of results and careful material sequencing, first-order factors in perceptual-motor learning, are not seen as immediately relevant to cognitive and behavioral learnings. Within the cognitive area, attention, cues (for knowing the "rightness" or "wrongness" of something, for example), and prior learnings are basic conditions; by implication, how material is presented, via lecture, reading, or TV, for example, is not especially significant.

To many readers this conceptual model will appear strange and apparently at odds with so much that has been written over the years about school learning. However, on the other hand it is consonant with so much that has been found in educational research (graph 2). To illustrate, contrary to traditional thought delayed knowledge of results (for example, withholding results of tests) has been found to enhance learning; within limits, people learn as well with "scrambled" as with carefully sequenced programs; or, again in programmed instruction, reinforcements have been demonstrated to be unessential.

Also consonant with this model is the recent upsurge of interest in "learning to learn," i.e., learning to behave in an educational setting such that the person can acquire scholastic skills and knowledge. Included within this category ("Behavioral" in graph 7) are such things as learning to attend selectively to relevant material; learning to persevere; learning to be motivated by school incentive; learning to organize; learning to conform to school regulations; and so forth. These various ways of

behaving, often involving some form of social imitation, are thought to be amenable to Skinnerian notions of reinforcement and shaping. A similar approach, which should prove of value to educational planners, has been developed by Ernst Rothkopf and subsumed under the rubric, "mathemagenic behaviors." These are defined as "activities which give birth to learning."*

Graph 7

Areas of School Learning, with Associated Conditions and Techniques

Area	Conditions	Techniques
Cognitive	Attention to relevants Cues Prerequisite Learnings	Lecture Films Discussion TV Reading Others
Perceptual-motor	Immediate feedback Sequencing Practice	Observation of product Guided practice Appropriate "Equipment and Materials"
Behavioral	Reinforcement Social models	"Shaping" Social interaction

Again referring to graph 7, learning at the cognitive level is dependent upon the pupil's first acquiring ways of behaving at the behavioral level. For example, unless a person has first learned to attend, cognitive learning will not occur regardless of the quality of instructional materials or teaching techniques.

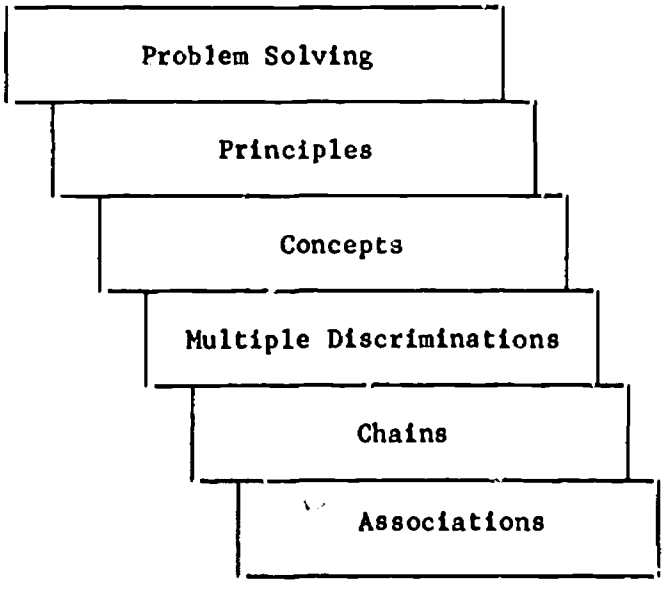
*See, for example: Rothkopf, E.Z., "Some theoretical and experimental approaches to problems in written instruction." In J.D. Krumbultz (ed), Learning and the Educational Process. Chicago: Rand McNally, 1965, Pp. 193-221. Or: Rothkopf, E.Z., "Two scientific approaches to the management of instruction." In Gagne, R. & Gephart, W., Learning Research and School Subjects. Itasca, Ill.: Peacock Publishers, 1968, Pp. 107-132.

Hopefully, this kind of model of learning should suggest to the educational planner treatments that are different from those suggested by more traditional models. This particular model, however, is not presented as "ideal" by any stretch of the imagination; it was described in order to illustrate different possibilities. The designer is urged to seek other models; perhaps he will find one more in keeping with his own theoretical and educational convictions.

Still another kind of model, in this instance highly related to cognitive learning, was devised by Robert Gagne (graph 8), who has for some time been interested in the problem of task analysis. He provides research evidence to support the contention that any learning task can be thought of as falling on some continuum within a hierarchy arranged on a dimension of simple to complex. Of special significance to the educator is his notion that learnings at any given level within the hierarchy depend on, and in some ways are composed of, learnings at lower levels. Success in mastering a task, then, is strongly related to how well the learner has acquired lower order material. In graph 8, for example, the most simple and basic learnings occur at the level of "associations" (S-R units). These simple associations form the basis of "chains" (sentences, for example), which in turn are essential for the learning of "multiple discriminations" (distinguishing among several similar units), and so forth. Assumedly, instructional programs can be enhanced by, first, analyzing the material (task) that is to be learned, thus producing a task hierarchy, then structuring learning sequences on the basis of this hierarchy. Gagne's work has attracted the attention of many workers in curriculum and instruction, as well as in educational psychology.

Graph 8

Task Hierarchy



In summary, the models described here were presented in order to illustrate different approaches available to the person responsible for treatment development or selections. There are, of course, almost innumerable possibilities from which to choose; sound judgments are not apt to be made without a broad knowledge of research, theory, and practice.

Some Additional Considerations

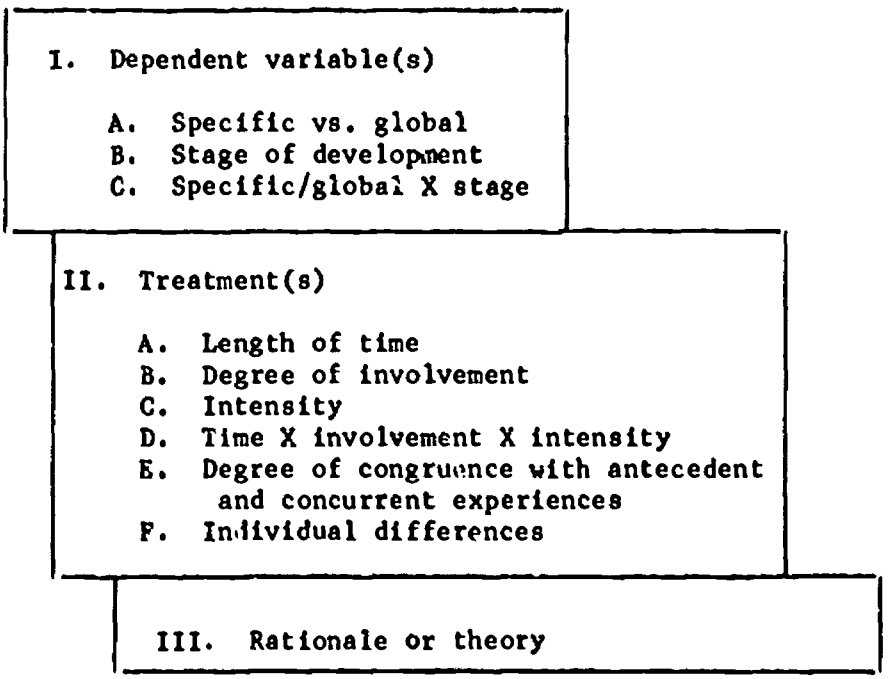
As we have seen in an earlier section a great many of the efforts to effect achievement through varying treatments have produced little, if any, measurable differences. These findings, of course, can be interpreted in many ways. One could, for example, accept these findings at face value and conclude that treatments do not differentially affect outcome. Those who take this tack often affect an extreme pessimism. Or, one could, as suggested by Stephens, argue that many of these studies have suffered from a variety of deficiencies in design, such that "real" differences are not

revealed. Still further, these two arguments might be combined as follows: in certain instances, perhaps more than we would like to admit, treatments have not produced hoped for outcomes but in many others, potential effects have been obscured through faulty research and evaluation, as well as through ineffective execution of treatments (i.e., the described procedures have not actually been carried out).

In graph 9 are listed some of the factors that should be considered in the process of designing or selecting treatments. As indicated earlier, the first step should be one of specifying and analyzing outcome.

Graph 9

Designing and Selecting Treatments



If the project goals are stated very broadly or globally (example, "to increase intelligence") the possibility of demonstrating reliable effects is poor. For not only do we immediately encounter measurement problems, but on a more fundamental level we are faced with the serious question of just

how much behavior, within a broad domain, we can realistically hope to modify. Too many educational projects have been mounted without adequate consideration of this issue. Change is much more likely to occur, and at the same time be amenable to measurement, if the outcome is stated precisely, perhaps even somewhat humbly, so that treatment activities can be focussed on specific areas of behavior.

A second consideration relates to the developmental stage of the variable or variables which we hope to change. If our intervention program is to be introduced at an early stage of development (graph 4), as contrasted with later stages, we can anticipate greater potential effects. Or, put somewhat differently, the later we intervene in the developmental history of a given characteristic, the more powerful our intervention activities must be in order to produce comparable outcomes (if late intervention will have any effect at all).

A third consideration takes into account a kind of interaction of the first two, i.e., the degree of specificity of outcome and the developmental stages of the variables. In general, the later the intervention, the more specific the statement of outcome should be. This notion combines some of the implications of graph 4 (the general stability of characteristics at older ages) and graph 5 (the tendency for "input" variables to account for a greater proportion of criterion variance at older ages).

In paragraph number II, graph 9, are listed several factors that bear on the adequacy and potential impact of educational treatments:

A. Length of time - Often educational programs are designed to run for too short a time period; significant and continuing changes simply are not likely to occur (in many educational variables, at least) when programs last a matter of weeks or months.

For example, it is highly questionable whether a 4-week remediable reading program will effect much change with 12-year-old severely retarded readers, whose reading problems represent several years of accumulated deficits.

(B) Degree of Involvement and (C) Intensity—The importance of involvement and intensity have been demonstrated, for example, in language learning, i.e., a new language tends to be acquired most readily when the person lives in an environment (involvement) in which only that particular language is used.

(D) Time X Involvement X Intensity--For example, the greater the involvement and/or intensity within an intervention program, the less time that will be required to achieve a hoped for outcome.

(E) Degree of Congruence with Antecedent and Concurrent Experiences—Much of our recent educational effort has been directed toward groups whose social and cultural backgrounds are in sharp contrast to those of the white middle-class who have shaped most educational programs and curricula. The success of treatments will depend, in large measure, on our ability to design activities which are in some way related to the past and current experiences of pupils. This, of course, is closely tied to the factors of involvement and intensity. For some children, school activities represent an extension of the home, thus heightening involvement and intensity; for others, time in school is but a brief, daily exposure to a foreign environment.

(F) Individual Differences—There is little need to stress, again, the importance of providing for individual differences. What has been overlooked, especially in regard to program evaluation, is how various treatments affect various individuals or subclasses of individuals. A no-difference finding in treatment effect may obscure the fact that certain classes of individuals may have profited from the treatment. Such information is needed if we are to plan effective programs.

Finally, as indicated earlier, the rationale or theoretical basis (or absence of same) which we adopt is of fundamental importance. It would be helpful if, in designing and selecting treatments, a conscious effort be made to specify the assumptions and concepts underlying our position.

Using Negative Results

Too many people have been too quick to jump to the conclusion that studies showing "no significant" difference are of no value to the educator. On the contrary such studies provide us with important and helpful knowledge, if only we will take the time to reflect on how this information can be applied. Knowing that alternate treatments will yield similar outcomes, frees us to seek other means of modifying the educational setting. To illustrate, if we can be assured that certain routine achievement objectives can be obtained as well through technological means (programmed instruction, TV, film, etc.) as through conventional instruction, it now becomes possible to deploy teachers for other purposes. Or, we now open up the possibility of selecting techniques on the basis of time, cost, or sheer human enjoyment, rather than in terms of which approach produces the "best" product. Surprisingly, educational leaders have done little in using research results in this fashion.

APPENDIX

Planning the Workshop

Two primary questions which arise in planning a workshop such as the one reported here are: 1. What materials should be selected for presentation from the array of available pertinent resources? and 2. What methods of presentation will allow the workshop participants to make the most efficient use of the limited learning time available to them?

The "Outline of Workshop Activities" which follows reflects the approach used by the planners of this workshop. Materials used in small group activities were taken from documents actually submitted to Title III evaluators. A "Problem Census," taken early in the workshop, allowed participants to name areas which they thought were particularly relevant to their present activities. At the close of the workshop, participants tried to relate points made by the consultants in their presentations to relevant problem areas which the participants had cited in the "Problem Census."

Small group discussions and activities followed most presentations. Since participants at this workshop came from all parts of the State, they had had few opportunities for routine informal exchange of information and experience. The small group approach to analysis and discussion of presentations allowed participants to pool their experiences as they attempted to relate new material to their own specific concerns.

Recorders of the small group discussions reported to the entire group. Thus the consultants gained information which allowed them to revise subsequent presentation. As the consultants were not familiar with the specific problems with which each participant was dealing, this additional source of information was particularly useful.

Outline of Workshop Activities

I. "Relating Solutions to Objectives"

Small group activity using sample objectives from actual Letters of Intent—(Exhibit A)

Large group discussion

II. "Relating Proposed Programs to Theory"

Small group activity using differing theoretical bases to propose programs—(Exhibit B)

Reports and discussion

III. "Implementing Programs"

IV. "Selecting Treatments"

Discussion of treatment selection emphasizing topics cited by participants as particularly relevant to present practical problems—(Exhibit C)

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EXHIBIT A

FOCUS: THE ARTS

1A. Under this program musically-talented students in an 11-county area will be provided with opportunities to perform in orchestras under the direction of professional musicians. The students are selected by audition. The student orchestra and the professional orchestra will be available for concerts at schools during the school day and also in the evening. It is hoped that this program will stimulate area schools to expand their music education programs and that cultural exposure of students in the area will be increased through the concert series.

1B. A plan for consolidating public and private area resources into a fine arts center will be developed. A local university collection will be used to upgrade the educational and cultural opportunities of the people of the area. The center will be for use by area schools and the general public. It is hoped that this venture will result in increased cooperation among local schools, the university, and other public and private agencies.

1C. A demonstration dancing troupe of secondary school students will be organized and trained through a highly concentrated series of lessons and rehearsals in the methods and techniques of the dance of peoples of the world, including the people of Africa, Asia, and Latin America. The troupe will be available to visit other school districts and community groups for the purpose of promoting understanding and good will through the medium of the dance.

1D. This program aims at bringing the performing arts of music, dance, and drama into the schools as an integral part of the curriculum. It will provide frequent performances, utilize student participation when possible, and employ artist-in-residence programs.

IE. This project will identify students, K-12, who are talented in crafts (silver, vitreous enameling, leather, ceramics, weaving, wood, and glass) and make available to them modern craft equipment and materials. Artist-craftsmen will serve as consultants in out-of-school studio situations.

1F. A periodical will be published three times a year and will contain the works of junior and senior high school students in the areas of literature, art, and drama. This project is designed to stimulate in secondary school pupils an interest in creative writing and art. Students in the 9-county region will be encouraged to contribute to the publication. It is hoped that teachers will use the periodical as an instructional aid in academic, art, and guidance programs.

1G. The program seeks to develop a means whereby the students in rural communities can actively and creatively participate in the fine arts including music, art, drama, and dance. The program will include inservice training for teachers, jewelry making, and experimental dance for elementary students. A small resident acting company will participate in the program.

1H. A regional systems model "Festival on the Arts" as a prologue to a Statewide Regional Program, will introduce rural nonfarm students, teachers, and/or parents to the performing arts. Emphasis will be on an inresidence program on the part of the performing artists.

FOCUS: SOCIAL SCIENCES AND AREA STUDIES

2A. Students will be exposed to an intensive study experience of Asian-African cultures designed to prepare them to serve as resource personnel in their senior year to the schools and the community. The program will utilize all resources of a metropolitan area.

2B. The Center will serve as a facility to provide inservice training and enrichment for teachers in the areas of humanities, non-Western cultures, and local history. Student programs concerned with enrichment learning experiences in these areas will be coordinated through the Center. It will also serve as a centralized source of innovative techniques, curriculum development and materials and information, and research on enrichment programs.

2C. This project will survey the educational, cultural, and human resources of the area to determine to what extent they are being used and how they might be more effectively used. College museum personnel and the members of area cultural organizations will work together to relate the resources to the teaching of the social sciences in the class room. Instructional materials will be produced and evaluated. Direct educational experiences for the students in the areas of historical research and anthropological and archaeological search will be planned.

2D. Social Studies Centers will be established to provide consultant service, demonstration teaching, and lectures by specialists for social studies teachers. The centers will also provide inservice education and loan of audiovisual aids and reference materials.

2E. A polycultural center will be planned which will develop and evaluate for grades K-12, curricular materials relating to the general theme of developing an appreciation and understanding of the several cultures of the world community. The development of cultural and civic activities, radio and television programs, student and teacher exchange programs with foreign countries, and the presentation of professional artists and musicians are other services which this project provides. The elementary and secondary public and nonpublic schools in a 7-county region are cooperating in this project. Materials developed for the program will be available for use throughout the United States and other countries through a planned dissemination program.

FOCUS: SCIENCE, HEALTH, AND PHYSICAL EDUCATION

3A. This region will be provided a systematic program of dissemination and demonstration of new elementary science materials and teaching methods. The project aims at creating an awareness of new developments in elementary science education. A Regional Information Resources Center, Subunit Demonstration Center, a Teacher Retraining Coordination Center, a Consultant Service, a Resource and Evaluation Center, an Implementation Center, and a Preservice Teacher Education Coordinator Unit will be established.

3B. This program will establish a Health, Physical Fitness, and Recreation Center which will provide instruction in swimming, gymnastics, arts and crafts, tennis, and other related activities. The facilities of the center will also be available for adult use. Culturally deprived children in the area will receive small group instruction and dropouts will be encouraged to return to school to participate in the activities.

3C. A supplementary center devoted to outdoor and conservation education will be established. The 10-school districts in cooperation will organize and carry out, in concert or individually, school camping programs, field trips, an outdoor laboratory, and marine life study. It is hoped that through this project the children will develop a greater appreciation and understanding of nature, a positive attitude toward conservation, and be encouraged in the proper use of natural resources. Field laboratory experience will supplement and reinforce appropriate curriculum areas.

3D. This program is designed to make available the natural wealth of a 4-county area for the purpose of educating both students and teachers. A catalog of the resources of the area and "on-the-site" classrooms will be developed. Programs will also be included for a teachers' workshop in general conservation and conservation education for disadvantaged youth.

FOCUS: THE LEARNER

4A. New educational curriculum for disadvantaged prekindergarten children will be developed in the following areas: verbal communications, sensory training, muscular development and coordination, health training, self-awareness, and development of creative and cultural interests. Parental involvement programs, including inschool observation, will be developed to reinforce the child's educational development. Inservice teacher training programs will focus on the areas of social difference, teaching methods and techniques, individual instruction, concepts of ethnic group cultures, use of equipment and material, and evaluation of such techniques. The Institute will serve 90 prekindergarten children and will serve as a pilot demonstration program for other districts.

4B. This project will undertake a comprehensive attack on the special problems of the maturing slower learning student. Considerable attention will be given to the identification of these students through a concentration of pupil personnel services. New instructional approaches and materials for these students will be designed and implemented. Teacher education will be on a year-round basis. Banks of computer-coded materials, which have been evaluated by teachers, will be developed. Special facilities will be provided which will allow for actual doing and participation by students within simulated occupational lab rooms.

4C. The Center will provide diagnostic and remedial services to children in five rural school districts. A system of communication will be developed with students, parents, educators, and the Center staff of specialists to assure understanding and cooperation in implementing procedures. Individualized and specialized programs, reporting procedures, inservice education, and research are major aspects of the project.

4D. The Center will serve to diagnose and evaluate learning disabilities which inhibit students who appear to have sufficient mental aptitudes for the successful completion of their present elementary or secondary educational programs. It will formulate and implement special curricular programs and teaching methods for the individual during his stay at the center. A planned transition back to the home school will provide for followup programs and evaluation.

4E. A program of independent study for grades K-12 will develop and demonstrate an integrated curriculum approach, encouraging self-reliance and self-directed learning habits in students. Teachers will be encouraged to innovate and test new techniques. All aspects of administration, curriculum, personnel, and physical resources will be utilized in support of the program. Evaluation will be in terms of the development of self-directed learning habits in students.

4F. The Occupational Center is designed to keep low achievers in high school and at the same time prepare them for entry into service-type occupations. The instructional staff will seek to improve the self-image of pupils from urban and suburban areas through a team-centered approach to the problems.

4G. Thirty eighth-grade girls will participate in a program designed to improve communication and interpersonal relationships in the home and community. These girls will work directly with young children under the supervision of professionals trained in different aspects of child care and family living. This project is using an interdisciplinary approach, with health agencies, psychiatry, and counseling being included. Inschool and out-of-school activities will be coordinated in order to relate classroom curriculum and child care experiences. Resource personnel such as social psychiatrists, childhood specialists, pediatricians, public health officials, narcotics experts, and cosmetologists will be used as part of the classroom experience. It is hoped that consultation with local clergy and other community leaders will help link the program to community needs. The aim of the project is to help these girls develop a better self-image and to give them experience which may serve as a constructive influence in helping them to determine the course of future careers.

FOCUS: PERSONNEL

5A. Residents of impoverished areas will be recruited, trained to a paraprofessional level, and employed to work in classrooms in public and nonpublic schools. The recruits will be screened and trained by district school personnel. Training will be geared to the needs of each school. As the competence and experience of the trainees increase they will move from nonprofessional tasks to more direct work with children under the supervision of classroom teachers. It is hoped that the most talented of these workers would be allowed to secure further education and perhaps advance to professional status. Use of nonprofessionals will release the teacher to engage in the tasks directly relating to teaching. It is hoped that children will receive more individual attention and that teachers will be relieved of some of the discipline problems within the classroom. It is also believed this approach will help teachers become better acquainted with the cultural background of many of their students and provide new career opportunities in education for people in low income neighborhoods.

5B. Five centers will provide instruction and training for administrators and supervisory personnel as a means to enhance their effectiveness in leadership roles. This training will be for people presently in supervisory positions who have had no training and to nominees for supervisory positions.

5C. Twenty-three experienced teachers, following a 6-week summer training program, will work with children who have potential or incipient learning or behavioral problems. Consultants will assist teachers in the classroom situation and assist the children in overcoming their disturbances. They will also serve to make teachers and staff aware of detection and prevention techniques for this type of problem and the materials available for use with these children.

5D. This training program for semiprofessionals would be tailored to the individual's needs as determined through guidance services. Trainees could engage in a combination of field service training and education for 1, 2, or 3 years and stop at any level to work as a full-time clerical, technical, or professional aide. The group of professionals with whom the trainees will be working will also participate in seminars. Ultimately this program would lead to the preparation of professionally-educated and certificated teachers.

FOCUS: RESOURCES

6A. One major and three smaller special purpose resource centers will be established to serve public and nonpublic schools in this county. They will function in the acquisition, preparation, and distribution of multi-instructional media. There will be a 3-year inservice program to instruct teachers in the effective use of new materials and techniques. Mobile learning laboratories will bring to the schools the staff, materials and equipment of the resource centers. The basic aim of this project is the improvement of classroom instruction through the facilities of the centers and the inservice program. Visitations to the units by other interested educators will be encouraged.

6B. A radio broadcasting station will be operating in a semi-urban school district to encourage a better relationship between the school and community through the broadcast of special cultural programs, official school district announcements, and educational information of general interest to the community. This project seeks to involve the total community in the support of educational and cultural aims. It is hoped that use of the radio station will result in an increased awareness and understanding of the school system, its operation, programs, goals, and problems.

6C. This project will establish a regional, multicounty library support center which will serve the public and nonpublic schools in the area. Staff will be expanded to include additional librarians and specialists in media and reference. Audiovisual resources will be expanded; cataloging and processing services in the nonbook material area will be developed; and a center for examination of publications will be established. This model center will provide a scheduled delivery service as well as microfilming and copying service. A complete catalog of library holdings within the region will be compiled. Evaluation will be through a study of degree of participation, visitations to the units, use of questionnaires, and analysis of results in selected areas of the curriculum.

6D. Teachers from across the State will be involved in the development of 15 resource units in general education. These units will be stored in the computer for rapid information retrieval. It is hoped that as a result of the statewide involvement better personnel will be available, dissemination will be wider, and the needs of a greater number of students will be met. This project will be coordinated with the New York State Education Department and utilize the personnel and resources it offers. Inservice education units on data processing will also be prepared.

EXHIBIT B

64/65

Instructions

To what degree does the hypothesis you select influence the tasks that emerge? The following objectives were stated in a letter of intent. Two brief statements of theory have been taken from the literature. Half of you have been presented one theory and the rest have the alternate theory. Each of you is asked to develop whatever tasks you can to meet objective C. You will then be asked to pool your ideas with others working on the same problem. Comparisons will then be made between the tasks that emerge from each of the two theories.

Sample Objectives

AN EDUCATIONAL DISABILITIES SERVICE CENTER

Major Objectives

a. to identify, diagnose, and offer remediation or remedial prescription for selected children at all grade levels from both public and nonpublic schools whose educational progress is seriously below expectation.

b. to provide inservice instruction to teachers and administrators in identification, diagnosis, and remedial educational techniques.

c. to provide leadership in developing innovative educational approaches to instruction of children with learning disabilities.

d. to provide resources for conducting research in the area of learning disabilities at the local school level.

Theories

THEORY A

". . . some types of environments are consistently more stimulating to cognitive development than others. In general, the social class rubric yields consistent categories in this respect, with lower-class and slum environments contributing fewer or less well-timed or less adequate stimuli to congnitive development than middle—and upper-class environments."

Deutsch and Deutsch. "Theory of Early Childhood Enrichment Programs," Early Education, Aldine, 1968.

THEORY B

". . . Most of the ways of behaving which are adopted by the organism are those which are consistent with the concept of self."

Rogers, Carl. Client-Centered Therapy: Its Current Practice, Implications, and Theory, Houghton Mifflin, 1951.

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EXHIBIT C

68/69

Problem Census

Group A:

1. Is there a necessary priority in types of objectives?

   a. general or specific
   b. behavioral or other

2. Can you determine the type of project you have from the objectives as first stated, or need the objectives evolve from your program idea?

3. Have you any techniques to suggest for eliciting "true" objectives—i.e., those the client <u>really</u> means and needs?

4. What is the validity of modifying or changing program objectives after program activities are underway?

5. How do you make objectives more flexible, and are flexible objectives valid and measurable?

6. Why can't objectives be stated as hypotheses?

7. Once a problem has been determined as "real," how do you weigh the variables which determine the "best" of all possible alternative solutions?

Group B:

1. What techniques are possible to convince school districts that objectives are necessary?

2. How is a priority system of objectives set up?

3. Is it the responsibility of a Title III evaluator to make the final form of objectives?

Group C:

1. How can you practically validate center and/or project objectives in terms of the context from which they allegedly emanate?

2. How can you write project objectives that can be evaluated in terms of behavioral change?

3. To what degree and in relation to what factors is informed subjective judgment or evaluation valid?

4. Is it feasible to think in terms of developing a model at the State level for project and center evaluation?

Group D:

1. When stating an objective, how does one decide what is a reasonable expectancy of minimum behavior (or other level) for success?

2. If program adoption is one of the objectives, how does one provide for measurement of both acceptability and adoption of the program?

3. Who takes prime responsibility for final decision making relative to the development of specific objectives?

4. How can one determine the degree of innovation of a project?

Group E:

1. What are the functions and priorities of the evaluator at the center?

   a. internal evaluation
   b. external evaluation

2. What is the role of the evaluator at various stages of the project?

3. Is it necessary to have an evaluator at each center?