

ED 031 803

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EA 002 475

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Comments on Professor Alkin's Paper Entitled "Evaluating the Cost-Effectiveness of Instructional Programs."

California Univ., Los Angeles. Center for the Study of Evaluation of Instructional Programs.

Spons Agency-Office of Education (DHEW), Washington, D.C. Bureau of Research.

Report No-CSE-R-25

Bureau No-BR-6-1646

Pub Date May 69

Contract-OEC-4-60061646-1909

Note-13p; From the Proceedings of the Symposium on Problems in the Evaluation of Instruction (Los Angeles, December, 1967).

EDRS Price MF-\$0.25 HC-\$0.75

Descriptors-\*Cost Effectiveness, Decision Making, Environmental Influences, \*Evaluation Techniques, Input Output Analysis, \*Instructional Programs, Methodology, \*Organizational Climate, \*Systems Approach

Cost-effectiveness represents an attempt to apply one methodology to decision-making in education. Three recent trends in the behavioral and social sciences are apparent: Rationalization in the decision process, institutionalization of research in education, and the beginning of a general theory of organizational behavior. The problem posed is how to combine the decision process of cost-effectiveness with the behavioral processes of institutional decision-making. A general theory of instructional evaluation is needed to unify evaluations. Questions are raised about the specific problem area of concern, the relevant variables, and the environmental influences of the school. The openness of the school system is affected by its interactions with other systems, by the criteria used in evaluation, and by feedback. Cost-effectiveness is only a part of the systems approach in the evaluation of instructional programs. Related documents are EA 002 407 and EA 002 534. (MLF)

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DR-1-1646  
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"EVALUATING THE COST-EFFECTIVENESS OF  
INSTRUCTIONAL PROGRAMS"

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From the Proceedings of the  
SYMPOSIUM ON PROBLEMS IN THE EVALUATION OF INSTRUCTION

University of California, Los Angeles  
December, 1967

M. C. Wittrock, Chairman

Sponsored by the Center for the  
Study of Evaluation

*The research and development reported herein was performed pursuant to a contract with the United States Department of Health, Education, and Welfare, Office of Education under the provisions of the Cooperative Research Program.*

CSE Report No. 26, May, 1969  
University of California, Los Angeles

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE  
OFFICE OF EDUCATION

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EA 002 475

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COMMENTS ON PROFESSOR ALKIN'S PAPER ENTITLED  
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Marvin Hoffenberg

The "games discussants play" are many, and I have chosen the "savants game," the presumptuous one of donning the scholar's gown. I prefer this "game" for this Conference since I think it important to relate Professor Alkin's paper to the diverse strains of intellectual thought that underlie the acceptance of methodologies to assist in choosing between alternative actions. Professor Alkin's paper represents one attempt--through cost-effectiveness--to apply such methodologies to decision-making in education.

In reading Professor Alkin's paper, one can discern three recent trends in the applied behavioral and social sciences. First, there is an increasing effort toward rationalization--in the economist's meaning of the term--in the decision process in both the public and private sectors. Over the past two decades various approaches and techniques have been developed as aids (crutches may be a more appropriate term.) for a decision-maker to rationalize his decision process. Included here are the programming techniques, extensions of benefit-cost analysis (often referred to as cost-effectiveness or cost-utility analysis), simulation, operations analysis, systems analysis, and program budgeting. Whatever term is used, the common property of them all is that they aid in choosing between alternatives on the basis of relative merit.

In government, we see the developing Federal planning-programming-budgeting system and its imperialistic spread to subnational units, as well as the Department of Defense's cost-effectiveness approach to the analysis of military problems. In industry, it is now commonplace to choose corporate objectives through a systematic search of alternatives and to implement plans based on maximizing the opportunity of goal attainment, at least cost and risk. That complex questions such as Federal budgeting, military effectiveness, and corporate strategy can be attacked through rational processes of analysis no longer seems to be questionable.

There is a difference between attacking a problem and solving a problem. Social, and I would include educational problems here, are rarely "solved" (depending on the definition of "solved"); more commonly, they are transformed into more tractable problems. The grand optimum is difficult, if not impossible, to handle in an analytical manner. The problem is broken down into sub-analysis, based on lower order criteria that are hopefully consistent with the higher order ones--a sub-optimization (Hitch, 1959). Sub-optimization is greatly influenced by the hierarchical level at which choice is to be made. (The scope of the decision-making power may be another definition of sub-optimization.) Professor Alkin's paper does not clarify just who is the decision-maker, the school administrator, the school board, and so on.

This point needs further elaboration since it is an important one. The methodologies for assisting in rational choice require decision rules. For example, in dealing with a grant program the U. S. Office of Education may well want to choose on the basis of total social costs and total social benefits for a wide geographic area. On the other hand, the local school board is likely to choose on the basis of minimizing local budget costs and to rank programs according to how little money they have to match federal funds. It does make a difference whose ox is being gored.

A second theme reflected in Professor Alkin's paper is the institutionalization of the search for problem areas and for alternative means to handle such problems. Decision-making is concerned only with the future and with alternatives. No decision about past events is necessary; they are "sunk costs," and no decision is necessary if there is no alternative. The "name of the game" in cost-effectiveness is alternatives. Such methodologies as cost-effectiveness, systems analysis, etc., are no cure-all; at best they are organized methods for conceptualizing multi-dimensional problems and selecting more objectively among open alternatives. They are no better than their simulations, no better than the ingenuity of their designers who must, after all, invent the alternatives to be tested. Incorrect models, unrealistic boundaries, ill-conceived alternatives, and false objectives can lead to choices which may be worse than choosing at random.

At this point we must recognize that in applying rational methodologies and in institutionalizing research in education, we must place these elements into an institutional framework and cease thinking of individuals as individuals making choices. The fact that what we are considering is, in actuality, institutional decision-making leads to a third current intellectual theme: the beginning of a general theory of organizational behavior. (I prefer the term organizational behavior to the more pejorative one, bureaucratic behavior.) A general theory is relevant to large, complex organizations in any field, both in the public and private sectors. I assume from casual empiricism that school systems are large, complex organizations.

The problem posed here by Professor Alkin, since he explicitly recognizes that he is dealing with organizational behavior, is how to combine the "rational" decision process of cost-effectiveness with the behavioral processes of institutional decision-making. I would prefer to look at this problem not as the "rational" versus the "nonrational" but as two "rational" approaches with different decision rules.

If all members of the organization shared the same values, desired the same objectives, and had complete information, if there were no uncertainty, if the school system were relatively closed,

and so forth, the two rationalities could yield practically identical choices. But we know that such necessary and sufficient conditions do not exist. There are cognitive limits to rationality as exemplified by the cost-effectiveness approach (March and Simon, 1958). Organizations have no operational goals; their members do. In such cases where resources are scarce and where subunits (individuals) have different preference functions, exchange will take place. This situation leads to a definition of an organization as a coalition bargaining over side payments. A critical role for cost-effectiveness in such a situation is to aid in defining the meaningful boundaries for bargaining or adversary proceedings.

Professor Alkin has posed for us a problem of profound complexity in his following statement:

The model maintains that evaluation cannot take place without considering the nature of the instructional parameters in the program being evaluated, without understanding and quantifying the impact of individual and organizational contexts that infringe upon the program, and without considering a multiplicity of outcome measures.

I infer from this statement that he is looking at education not as a single problem nor as a simple aggregation of problems but rather as an aggregation in which the elements (or sub-elements) are dynamically integrated because society perceives them as an entity. For example, a characteristic reaction to the Coleman Report was "What the hell. Why give these educational people any more money? Give it to Sargent Shriver"--a direct recognition of the integrative nature of poverty

and educational performance. Analytically, I would like to look at Professor Alkin's statement as a trinity whose sacredness should be left to the reader's judgment. First, there is the specific problem area of concern. The stated problem area is the evaluation of instructional programs; and the focal unit is, at the minimum, the individual school. Here, the school is viewed as a system, i.e., composed of connected elements. The element of connectiveness should be of major interest. But what is the system definition for the unit, and what is connected?

Professor Alkin correctly implies that he deals with open systems. Open systems operate with continual inputs and outputs, with dynamic functions and everchanging states. Such systems may not be self-regulating, and findings concerning them may not be replicable. Direct intervention at various decision points may be necessary to regulate the system and keep it within tolerable bounds. Difficult methodological problems are raised by such a conceptualization. What I suspect is needed is the subject matter of this conference: a general theory of instructional evaluation in order to unify evaluations.

The first point leads to the second point of my trinity, the methodologies of evaluation. Professor Alkin has "zeroed in" on cost-effectiveness as an evaluation technique. What I assume he means by that term are the various techniques developed for decision-making under conditions of scarcity and uncertainty. By uncertainty,

I include both statistical uncertainty (errors of observation and estimation) and, what is more important, the uncertainty of future events.

In dealing with the evaluation of instructional programs, for let us say, the single school, there is the problem of identifying the instructional variables. The school is the "black box" receiving inputs and spewing out outputs which, in turn, lead to certain outcomes. This is a transformation process involving a production function: the relation of inputs of productive services per unit of time to outputs of products per unit of time. To the best of my knowledge, there is considerable controversy over the relevant variables--on both the input and output sides--to be included in the production function for primary and secondary education.

One illustration of our difficulties was an interchange at this session on the question of interactions being an intervening variable. I was following the argument until another comment was made which struck me from an entirely different point of view. This comment was that the intervening variable had to do with the solution of differential equations to measure how well an individual would perform as an adult in his future life experiences. As the discussion progressed, it became clear to me that the intervening variable was, as used, a proxy variable, although what it was a proxy for remained undefined. I suspect that much of the current uncertainty about the production function hinges on the distinction between a proxy and an intervening variable.

Questions concerning proxy variables often relate to the environment external to the school. I will not say school "system" in the systemic meaning of the term since external elements may be brought into the "system" through the connectiveness of the educational process network. I now have an entry point to mention the third element of my trinity, the environmental matrix. Professor Alkin, in his model formulation, sets the school in an environmental matrix. This step logically follows from the openness of his school "system" in that it constantly interacts with the society around it. I hasten to add that there is both interaction and feedback in this systems network.

There is one striking feature about the environmental matrix for education today--its turbulence. The revolutionary times we live in have introduced increasing uncertainty into our mental projections of future society--uncertainty about its values, its technological requirements, the knowledge that will enable an individual to work and live adequately in it. The openness of the school system is profoundly affected by the turbulent system it interacts with and, more directly related to this conference, by the core of evaluation--the criteria used. As one example, let us be aware of the conflict between the black community and the schools over evaluating the processes and outcomes of our current instructional programs.

The preceding line of thinking leads, in my opinion, to a systemic approach to the evaluation of instructional programs, that is, to what is loosely referred to as systems analysis. What is technically termed cost-effectiveness (benefit-cost, cost utility) is only a part of the systems approach. The backlog of systems studies in physical domains has helped create a new attitude toward dealing with complex questions about complex systems and is being transferred to problems involving people systems. Our experience with this transference is ambiguous, and it is apparent that much more needs to be learned about dealing with people systems. At this point in time, this need is particularly pronounced concerning the educational system and the evaluation of that process and its output. We still need to proceed on a lower level of abstraction with specific elements. However, we can and should begin to work on the systems problems since methodologies need to be developed to integrate the various elements.

Let us remember that social facts are political, in the best sense of the term, and should be so recognized in our evaluations. As an example, one can review the history of the "Moynihan Report" (Subcommittee on Executive Reorganization Hearings, 1966). The very selection of facts and the evaluation of such facts are part of our value systems. They influence how we select, how we evaluate, and how we appreciate the facts. They also mean that, especially in education, we are dealing with multivalued outputs.

In the paper presented here, Professor Alkin has laid out for us a process for evaluating instructional programs; he has left the operations for further research. If my interpretation of what underlies his presentation is correct, then I remain sympathetic. As I have intimated, there are difficult and stimulating problems in making his model operational. The informational requirements are great: the criteria problems, tough setting; the objectives, difficult. But, as an outsider, I must ask what has been going on in research in education over the years.

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