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ABSTRACT

In this paper, the author develops a funding decision model that is appropriate to the evaluation of specific educational projects in an urban school system. He has attempted to develop a model that the central administration of a school district could use to compare projects and estimate which projects would be more likely to provide the most effect for the dollars spent. The model is mathematical in nature and utilizes the Delphi technique to rate the relevance of various project proposals. (Author/DN)

A MODEL OF THE FUNDING DECISION MAKING PROCESS*

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I. Introduction

A. Statement of the Problem

The conceptual base underlying education decision needs to be stated at the outset. Although other system models have been developed for evaluating the success of tangible products, there are few adequate conceptualizations of the decision-making processes for funding in education. Therefore, the major aim of this paper is to try to develop a funding decision model that is appropriate to specific educational projects in the urban school system under consideration.

B. Decision Defined

Decision means the process of selecting one action from a number of alternative courses of action through formal means, such as operations research, survey research and the use of judgmental analyses to supply rational bases for making judgments of alternative courses of action. This means there are two or more alternative courses of action possible and only one of these lines of action can be taken. The process of decision will select, from these alternative actions, a single course of action which will actually be carried out. The selection of a course of action is to be made so as to accomplish some designated purpose.

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In program evaluation, the school administration must know which products are likely to provide the most effect for dollars spent. Any funding decision model must, therefore, help the school administration decide where the funds will be most effective.

C. The Nature of the Model

The model may be defined as a representation of the system under study; from such a model it should be possible to predict the effect of changes in the system.

There are three types of models which could be used in educational decision; an iconic model, an analogue model and a symbolic model. An iconic model pictorically represents what the system looks like as does a photograph or a school model. An analogue model employs one set of properties to represent some other set of properties the same as this system being studied possesses. A symbolic model is one which employs symbols to designate properties of the systems under study by means of mathematical equation or a set of such equations. Of the three types of models to be considered, the iconic, the analogue, and the symbolic, the latter is of particular importance. By proper mathematical or logical operations, the symbolic model can be used to formulate a solution to the problem at hand.

The model presented in this paper is a mathematical model.

D. Scope and Limitation

The scope of the present model is limited to an overall project evaluation in the school district under consideration. We are understanding that several levels of decision-making are constantly in process where educational projects operate. Each requires a different kind of information. Two levels of decisions are most crucial for probable success of a project.

At the project operational level, information which is required to help field administrators achieve or alter stated goals and purposes must be supplied. At the central administration level, information must be provided which will permit enlightened funding decisions.

Furthermore, in this evaluation we deal with the criteria of validity and desirability only, although we are concerned with understanding that the context of evaluation should include the criteria of fakability (to determine whether the provided information is truthful or correct), probability (to determine whether the accomplishment of the program is feasible or not), and reliability (to decide whether the information is reproducible and the program activity is replicable).

II. The Funding Decision Model

The major purpose of this study is to provide the information which will permit enlightened funding decisions of the projects within the urban school district. To do so we have constructed the funding decision model so that some meaningful selection can be made from all of the projects. The basic model for this selection is a form of:

$$V = f(Xi, Yi)$$

Where V = The measure of the value of the program
Xi = The variable of money spent
Yi = The variable of effect obtained
f = The function relationship between independent variables (Xi and Yi), and the dependent variable V.

The model is divided into R major dimensions each containing S sub-categories, thus providing RS items upon which projects may be compared.

For each of the RS items a judgment will be made as to the relevance of the project on a five point scale ranging from Very Low Relevance,

through Very High Relevance, using the Delphi Method.[1] The ratings will be made by personnel who are attuned to the problems and needs of the School District under consideration (including researchers, project administrators, and supervisory personnel). The sum of these ratings for each of the R dimensions will be computed according to the following equation and then be used in determining the overall effect rating of the project.

$$V = (W_1 \sum_{i=1}^{M} \sum_{j=1}^{N} \sum_{k=1}^{R} \sum_{l=1}^{S} T_{ijkl} + W_2 \sum_{i=1}^{M} \sum_{j=1}^{N} \sum_{k=1}^{R} \sum_{l=1}^{S} T_{ijkl} + \text{----------} + W_R \sum_{i=1}^{M} \sum_{j=1}^{N} \sum_{k=1}^{R} \sum_{l=1}^{S} T_{ijkl})$$

Where V = Value Index

T_{ijkl} = Value Rating

R = Categories of need
S = Sub-categories of need
N = Number of Raters
M = Number of Projects

$W_1 W_2 \ldots W_r$ = Weight for rating which is decided by decision-makers

Because the interval of the rating scale may not be equal, standard score scales have been developed to serve this purpose. The standard scores of the Effect Index would be computed from the following equation.

$$SE = \frac{E - ME}{OE} \times 100 + 500$$

Where ME = Mean of the Effect Index
OE = The standard deviation of the Effect Index
SE = The standard score of the Effect Index

In addition to the project Effect Index, the project Cost Index may be obtained by the following equation.

$$C = (PCI/SAI)$$

Where PCI = Project Cost for given project
SAI = Number of students affected for given project

[1] See footnote page 7

The standard scores of the Cost Index could be computed from the following equation following the rationale behind the standard score used in computing the Effect Index.

$$SC = \frac{CC - MC}{OC} \times 100 + 500$$

Where = Cost Index
MC = Mean of the Cost Index
OC = Standard deviation of Cost Index
SC = Standard score of the Cost Index

Finally, the Cost-Effect Index may be produced by dividing the Effect Index by the Cost Index as in the following equation.

$$CE = SE/SC \times 100$$

This index may be used as one measure of Cost-Effect of the projects. (See Chart I).

III. Conclusion

These models were developed over a period of several months. An attempt was made to develop a model which the central administration could use to compare projects and estimate which projects are likely to provide the most effect for dollars spent. The model was developed for use in the urban school district, but experience, changes in the magnitude and scope of the evaluation, decentralization, etc. may necessitate modifications in the model.

CHART I

THE OVERALL COST-EFFECT OF PROJECTS

Project No.	Input					Grand Total Effect	Cost Per Student	Cost Effect Index
	Need 1	Need 2	.....	Need R	Total			
1								
2								
3								
4								
5								
6								
7								
8								
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Footnote

The Delphi technique is a method of eliciting and refining group judgments. The rationale for the procedures is primarily the age-old adage "Two heads are better than one," when the issue is one where exact knowledge is not available. The procedures have three features: (1) Anonymous response -- opinions of members of the group are obtained by formal questionnaire. (2) Iteration and controlled feedback -- interaction is effected by a systematic exercise conducted in several iterations, with carefully controlled feedback between rounds. (3) Statistical group response -- the group opinion is defined as an appropriate aggregate of individual opinions on the final round. These features are designed to minimize the biasing effects of dominant individuals, of irrelevant communications, and of group pressure toward conformity.