THE ADMINISTRATION DECISION GAME: A SIMULATION FOR DEVELOPING PLANNING SKILLS IN EDUCATIONAL MANAGERS

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ABSTRACT

The Administration Decision Game, a flexible computer simulation which can be used to depict, study or teach decision approaches in educational management, has been developed to introduce administrators to quantitative thinking and planning awareness.

The Administration Decision Game (ADG) inputs includes a set of school variables and certain system constraints. Administrative behavior is represented as symbolic actions or "moves". Moves take place within the constraints defined for the system and are used to determine status, analyze data, and allocate resources.

ADG simulates the educational process impacts. Specified as general outcomes are a set of student achievement scores.

ADG derives from a generated data base, a computer model of instructional processes, and a set of analytic routines. System parameters, input as data, control random number based generating routines, and thus the size and character of the data base. The FORTRAN implemented model was developed so that, through a specified series of function parameters, scaling parameters, and weights, it is possible to alter the relationship between any pair of variables or any multivariate set. It is also possible to manage stochastic events by setting the percent of variance that will be tolerated in function calculations. Resident data display and analytic routines enable the player to determine system state at any given time, to compare system states at different times (e.g., after an intervention), or to "discover" relationships in the data base.

This design facilitates developmental levels of interaction ranging from introduction of quantitative approaches through model description and prediction exercises, to model design itself.

INTRODUCTION

Education in the United States is an enterprise of considerable size. Recent estimates put public school enrollments in the United States at about 45,000,000 students. Schools employ about two and a half million teachers and have a total work force of over 4,000,000. This enterprise requires an annual outlay of over $80 billions of dollars or about 40% of all local and state government expenditures to maintain. Not only is the cost of public education in the United States increasing, but it is increasing at a rate considerably greater than inflation. Yet, despite the complexity and costliness of this vast educational enterprise one is struck by the lack of formal planning and the little use of relatively common decision-assisting methods. For example, it is reported that in a staff meeting of a large eastern school system recently the suggestion was made by a junior aide that the school attendance boundary options could be studied through computer-modeling. In that the district was under court order to integrate, he thought it proper to see if there was a set of boundaries that would be useful in meeting court requirements. It was made quite clear to the aide that his suggestion was out of order and that the superintendent had no intention of "trusting computers" with this or any other important problem facing the district. Needless to say, the aide quickly "forgot" how computer modeling might assist school decision-makers.

This paper suggests that simulation gaming may be useful to developing better planning skills and perspectives in educational managers.

There are a number of definitions of planning processes. Perhaps the most elemental is supplied by Robert M. Fulmer who describes planning as "the preliminary state in decision-making".[1] Koontz and O'Donnell further emphasize the primacy and pervasiveness of planning. "Planning," they say, "logically precedes the execution of all managerial functions".[2] If one accepts the pivotal importance of planning, analysis of practice would suggest that educational managers do not, in fact, employ or engage in systematic planning and that managerial functions in education are, therefore, poorly performed.

There are probably many reasons for poor "predecision" behavior in educational management. The technology of education is poorly developed, and the educational production function is not well understood. The quantitative methods are new, and conservative leadership of a vulnerable public institution are slow to accept new methods. There is not the apparent cost advantage of planning technology to education as in other competitive industries. Many school systems got "burned" in early experiments with computer-decision technology. Private consulting firms made extravagant promises for pupil scheduling, transportation, planning, and enrollment forecasting services, but failed to deliver. In short, the advantage of better or more efficient planning and decision methods are less obvious to those funding education and to those managing it.

Though early experiences were far from satisfactory, that is not to say that there have been no advances. In 1974, Hentschke was able to identify seventeen simulations which addressed some aspect of educational planning. [3] All were published. It is safe to assume that there are others built by school systems for particular service and never reported. These efforts suggest that the methods are applicable to educational problems.

It would appear, then, that in the failure to employ simulation, forecasting algorithms, and other quantitative techniques regularly in educational management is mainly due to lack of demand. Educational managers are usually not trained in these methods nor do they see them being successfully applied to solve problems by administrative colleagues. There is distrust of these methods, particularly when they seem to treat or include in their analysis only some of the multiple variables thought operant in the educational arena. It is probably not that these quantitative techniques are unsuited for analytic use in educational planning and decision making. But rather it is that those who are in a position to require their use do not yet recognize their utility.

It is likely that without systematic intervention the cycle will continue. Unless the mindset of educational managers is in some way modified the demand for planning techniques will continue to be low.

Data flows to or follows demand. Data bases become increasingly sophisticated and efficient to users who demand information from them. Data deficiencies, therefore, are mostly the function of user deficiencies. The rather haphazard nature of data in educational administration and the difficulty of using it in planning and decision problems is due in part to administrators being unable to call for or put data in a form that can be useful.

It is my contention that simulation and other technologies available for planning have not been widely employed, particularly in the primary and secondary sectors of education largely because the managers of these educational enterprises are either lacking in knowledge of the technologies or are afraid of them. Therefore, in this paper I will describe a pedagogical simulation which has been developed in an attempt to break down some of the prejudices and to enlighten school managers as to some of the utility in quantitative, analytic techniques. The pedagogical simulation is the Administration Decision Game.

INSTRUCTIONAL OBJECTIVES

In general, it is hoped that the Administration Game can create an environment for school administrators to try various predecision and decision approaches. The ADG environment is sufficiently representative of reality so that players will find it natural to extend the procedures learned to their work situation. In ADG, there are four general skill areas emphasized. They are:

1. Ability to Set Goals and Define Them Operationally

There are many different goals, such as student attainment, personnel satisfaction, community support, minimizing educational costs, etc. which a school system can pursue. The various possible objectives may not be compatible with each other. It is important for managers of educational enterprises to be able to operationally define a set of goals to serve as a basis for planning and assessment within conflicting goal sets.

2. Ability to Abstract, Organize, and Use Information from a Complex and Diffuse Environment

Administrators function in an environment which lavishes information on them but affords them little time and little guidance for its use. A key function of the educational administrator is to discover the pertinence of various data, to isolate problems and to kdentify constraints which must be observed in seeking solutions.

3. Ability to Discover Patterns in Complex Systems

Administration is usually believed, except in moments of despair, to be more of a "game of skill" than a "game of chance". It is important for the administrator to seek broad "cause-effect" relationships in available data, and to specify additional data needed to "decode" the system or discover variable relationship patterns. Implicit is the need to be able to develop hypotheses about relationships among variables and to systematically test the hypothesized relationships.

4. Ability to Forecast and to Plan

The complexity of school system operation and the time lags that occur before the effects of a decision are realized require that an administrator be able to look ahead. The effective administrator must recognize at an early stage both the immediate and cumulative effects of his actions (or lack of action). He should be able to predict the consequences of his decisions so he can measure what he accomplishes against what he planned to achieve.

DESIGN OF THE GAME

Schultz and Sullivan point out that simulation games used for instruction have two essential components: an environmental model and a model of role enactments. Teaching simulations, they point out, are "generally designed to help the participant learn about the system--either how it operates or how to be an effective part of it".[4]

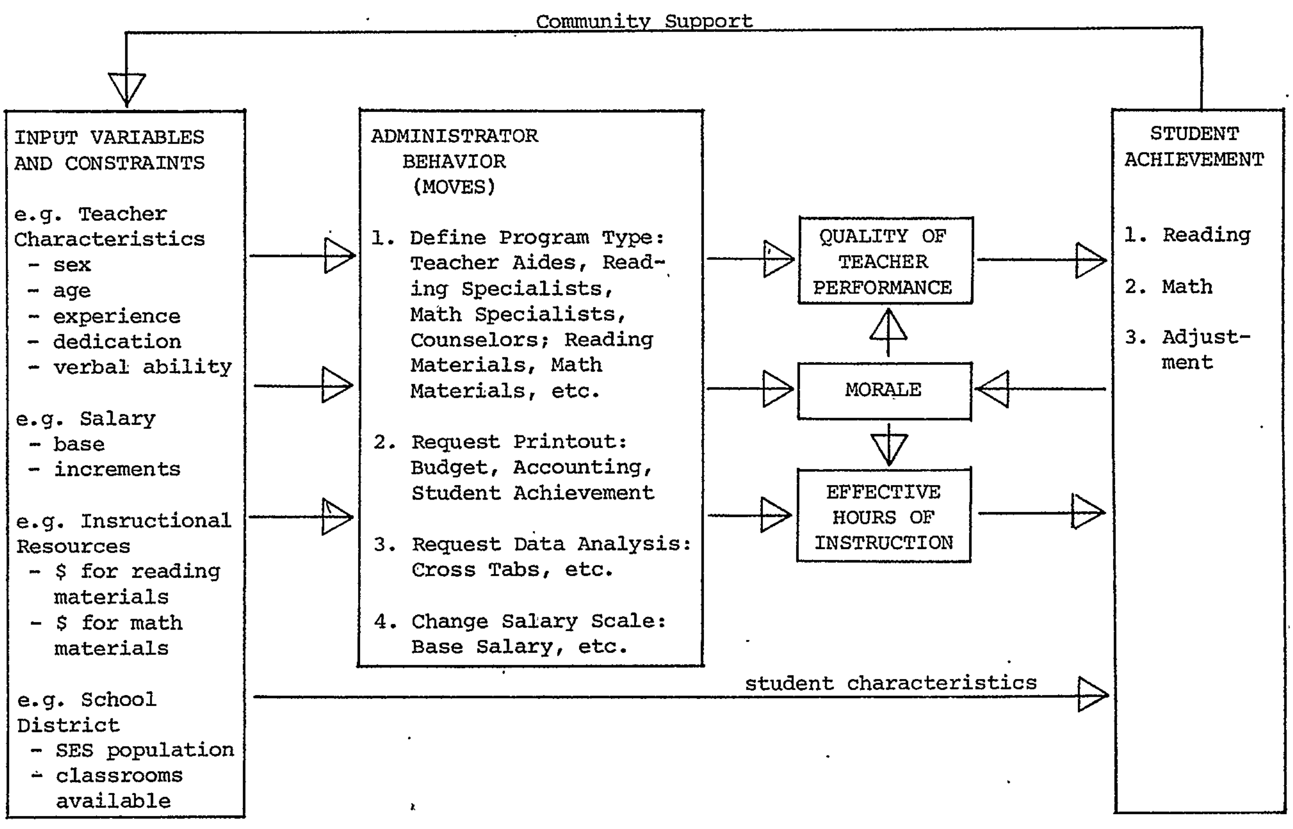
Administrative behavior is conceptualized for the purposes of the game as a set of moves that the player can make. In the game, as in administrative life, the player can move within certain constraints to staff, to assign other resources and to ask for information. At the most basic administrative unit, the school building, a building principal can act to hire, fire and transfer teachers. Usually he or she can select teachers who will be coming into his building and hiring criteria can be established according to the instructional needs of the building. With the advent of site budgeting, a building principal can often assign a variety of resources. He can secure discretionary funds for teachers' individual use or he can use funds to hire specialists to assist classroom teachers such as reading specialists, he or she can sometimes secure teacher aids to relieve teachers of some of their tasks, additional clerical help can be provided. Usually resources are limited and the principal must allocate resources in ways he or she feels best accomplish instructional objectives. The conception of the administrator, therefore, is one of resource allocation and the game is so structured.

Systems thinking has also influenced the structure of the game and lead to the view of the administrative decision-making arena in system terms. The administrator may be considered as a decision-maker who is given a set of resources by an environment. These resources are allocated by the administrator to various programs which impact the educational attainment of students. They do not impact the educational attainment of students directly for an administrator's behavior cannot, in fact, directly impact student's behavior for he works through a series of intermediaries, teachers, aides, specialists, etc.

Figure 1 depicts the basic components and interactions of the Administration Decision Game. Game inputs include a set of variables (teacher characteristics, pupil characteristics, salary schedules and the like), and certain system constraints (demographic characteristics of the community, distribution of socio-economic status, residential patterns, pupil population and the like). These variables and constraints may be thought of as the environment in which an administrator works. As stated, in the game, we conceptualize the administrator as an individual who manipulates game variables through a set of administrative moves to achieve certain specified ends. His activities take place within the constraints defined for the system. Administrative moves are of several types.

FIGURE 1

ADMINISTRATION DECISION GAME SYSTEM MODEL



First are those which define the configuration of the instructional program. Examples are in the set of moves detailing the nature of classroom types. In the game, we ask the player to specify instructional environments he wishes to create through the "Define a Program Type" series of moves. In this sequence, he assigns personnel, allocates instructional resources, etc. As an output of these "Program Type" decisions, the player establishes the degree of instructional homogeneity he wishes to characterize the school or school system. He may also specify student types to be assigned to room types in an effort to "match" instructional environments to students. Program type definition moves, attempts at student-environment matching, and all other moves are subject to game constraints (e.g., the number of available classrooms, dollars available, student population parameters, teachers available, etc.). Within these constraints, however, the moves allow the player immense flexibility in designing his instructional systems. In addition to those which define the instructional unit, there are a series of variables which define staff member skills, attitudes and rewards. These include salaries, in-service training, and the like. These variables are likewise subject to player influence through administrative moves. A third general type of move is provided to enable the player to perform the analyses necessary to discover relationships among variables. These are the "Request Data Analysis" procedures provided.

The Administration Decision Game has specified two general outcomes: (1) A set of student achievement scores, namely reading achievement, achievement in mathematics and adjustment to school; and (2) the amount of community support for education. As shown by the system diagram, student achievement has consequences for community support and community support has consequences for the amount of resources made available to the administrator for his programs.

Three system states are specified which have consequences for community support and student achievement to which the player may pay attention as he designs his moves. They are quality of teacher performance, teacher morale, and the effective hours of instruction. As a player seeks to maximize the quality of teacher performance, he will naturally seek and assign teachers with the most impressive credentials. In the game, as in real life, there are some pitfalls to the simple notion of "hire the best". First, the administrator-player begins the game with a set of teachers already in place. If he replaces these teachers, he must be prepared to pay the consequences in terms of staff morale and absorb the salary cost increment if he chooses teachers of higher levels of training and experience. Not only does the player risk higher costs, he is also plagued by a prior question of what teacher qualities are predictive of classroom teaching performance. Inasmuch as he is not provided with a single estimate of the quality of the teacher performance, he must derive estimates from a set of teacher attributes whether intuitively or with the assistance of a regression analysis.

As shown in Figure 1, student achievement is a function of the quality of teacher performance, the effective hours of instruction and student characteristics. Hours of instruction are subject to the policy control of administration: instructional days can be shortened or lengthened and the instructional year can be manipulated within certain ranges. In the game, hours of effective instruction depend not only on the amount of time children spend in the classroom, but on the size of the class and the ability of the teacher to maximize instructional time and minimize managerial and discipline time expenditures.

Figure 1 also specifies that performance and the resultant levels of achievement are in part a function of the capabilities of the instructional staff and in part a function of their motivation or desire to perform (as indicated by their morale). Low morale not only reduces the quality of teaching performance, but it increases the likelihood of rapid staff turnover and reduces the number of applicants who will apply or accept teaching assignments in a school or school system. Thus, the player must not only attend to instructional performance, but he must also give consideration to the effect of his various actions on the morale of his staff. In the game, quality of teacher performance, morale and effective hours of instruction are complex functions (or more properly, equations) which define the values of these variables. Student achievement is a function of the quality of teacher performance, the effective hours of instruction and the set of student characteristics.

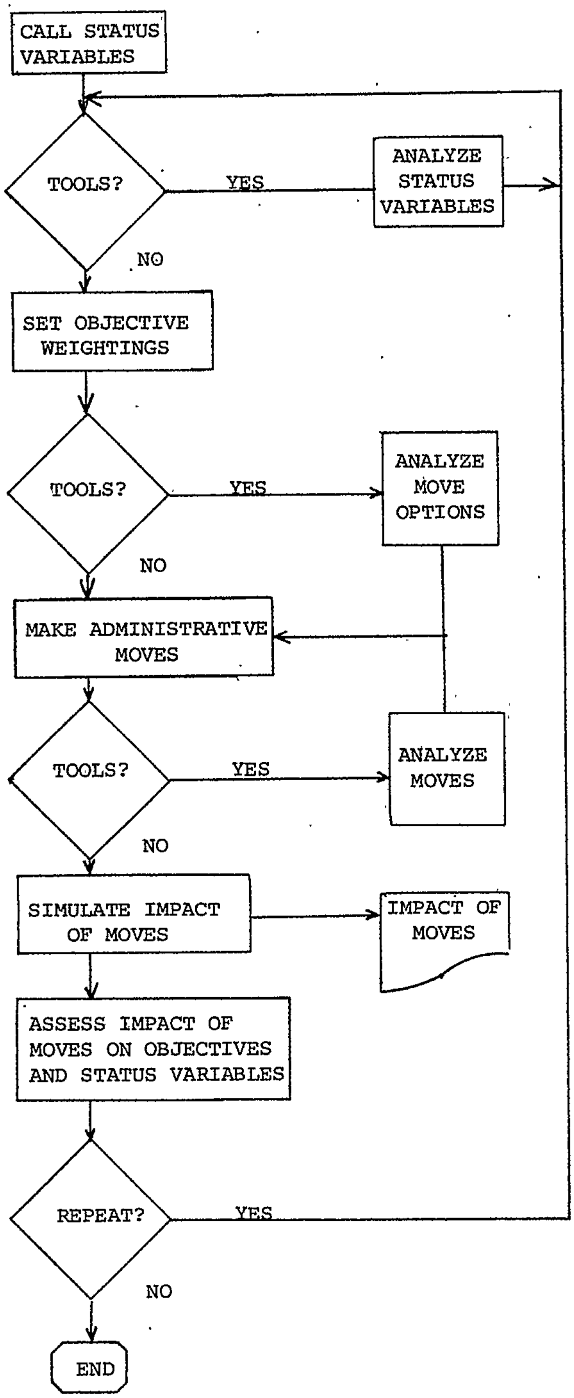
The use of analytical tools was to be an integral part of the instructional system. Three common ones are included for player use: cross-tabs, correlation and regression. These are common statistical techniques which are available to most seeking to analyze data, and provide a great deal of flexibility in analysis. The ADG data base is passed directly to the analytic routines within the computer programs. Thus the player needs only to specify the type of analysis that he would like and the variables he would like analyzed, e.g., cross-tabulated. This is felt to be consistent with administrative behavior. In most cases an administrator would not perform the analysis directly, but would ask his research staff or someone else, an outside consultant, perhaps, to perform the statistical analysis. He would and should maintain control over the specification of variables to be included in the analysis. He should as well be able to read computer printouts from these types of analyses, and should know of their strengths and weaknesses.

ADG: Player Perspective

To the player the Administration Decision Game is a simulated school or set of schools and a series of planning and decision problems. Though the problems in some cases specify the use of various analytic tools to examine the data base for

FIGURE 2

FLOWCHART OF PLAYER BEHAVIOR



relevant information, the player is not made acutely aware of the fact that he is being given instruction in the use of quantitative tools. He is confronting a school(s) and asked to seek various changes within certain constraints. Interaction is through a set of pre-punched computer cards. The student studies the data base which is presented in the form of student achievement data, teacher data, and resource distribution data. He formulates a tentative hypothesis and converts that into some programmatic response to the decision problem. ADG then simulates the impact of these decisions and reports them to the player. As an alternative, he may request information to help him search the data base more comprehensively for clues as to relationship between resources and achievement.

It is likely that, given resource constraints, the player cannot expect to achieve dramatic gains in all output scores. Often an administrator must choose between competing demands for scarce resources. If he uses available funds for an instructional materials center, they will not be available for classroom aides. So it is with the Administration Decision Game. Players must not only seek efficient use of resources, but they must focus on certain objectives. At a certain stage of play, therefore, players are required to assign weights to some or all of the output variables, thus indicating relative importance. At this stage they may also be asked to submit estimates of changes that can be induced with available resources. These estimates and weights form a basis for evaluating players performance.

To the player, ADG resembles a fairly typical administrative situation. He is presented a series of decision problems, data, and a set of tools for discovering relationships in the data. His actions take the form of setting objectives and weights, analyzing data and allocating resources. These player behaviors are reflected in Figure 2.

ADG stresses allocation of resources by program. Programmatic alternatives are presented in the form of Hollerith cards which carry numerical information in columns 1 through 20 that instructs the computer as to the value change intended and in columns 25 to 80 contains an alphameric description of the move. The player instructs the computer as to his decisions by assembling a "decision deck". This deck consists of cards selected from the array of decision alternatives in the 600 move cards. A sample players input for two program types is shown in Figure 3.

Output from ADG contains scores which may be compared with the results of other player's or team's efforts. It also may contain program by program cost and achievement data which may be used by the player to construct cost/benefit profiles. The presence of these scores has been shown to be a very powerful motivator and one which spurs competitive instincts. Often teams will work for hours to discover the best or optimum resource distribution pattern to maximize their scores. Once the player learns to manage the cards, ADG becomes largely self instructional for he or she gets numeric feedback about the adequacy of their

FIGURE 3

ALLOCATION OF RESOURCES IN THE
ADMINISTRATION DECISION GAME

PLAYER CARD	0	1	33	2	DEFINE PROGRAM TYPE 1
PLAYER CARD	1	10	1	2	ASSIGN 10 HOURS OF TEACHER AIDE PER WEEK
PLAYER CARD	2	15	1	2	ASSIGN 15 HOURS OF READING SPECIALIST PER WEEK
PLAYER CARD	3	15	1	2	ASSIGN 15 HOURS OF MATH SPECIALIST PER WEEK
PLAYER CARD	4	5	1	2	ASSIGN 5 HOURS OF COUNSELING PER WEEK
PLAYER CARD	5	5	1	2	ASSIGN 5 HOURS OF CLERICAL STAFF PER WEEK
PLAYER CARD	6	40	1	2	ALLOCATE 40% OF TEACHER'S TIME TO READING
PLAYER CARD	7	30	1	2	ALLOCATE 30% OF TEACHER'S TIME TO MATH
PLAYER CARD	8	30	1	2	ALLOCATE 30% OF TEACHER'S TIME TO COUNSELING
PLAYER CARD	9	30	1	2	SET $30 MAXIMUM FOR READING MATERIALS
PLAYER CARD	10	30	1	2	SET $30 MAXIMUM FOR MATH MATERIALS
PLAYER CARD	11	15	1	2	SET $15 MAXIMUM FOR COUNSELING MATERIALS
PLAYER CARD	0	1	2	2	INCLUDE ROOM # 1
PLAYER CARD	0	10	2	2	INCLUDE ROOM #10
PLAYER CARD	0	0	999	2	E N D O F T Y P E
PLAYER CARD	0	2	33	2	DEFINE PROGRAM TYPE #2
PLAYER CARD	1	10	1	2	ASSIGN 10 HOURS OF TEACHER AIDE PER WEEK
PLAYER CARD	2	30	1	2	ASSIGN 30 HOURS OF READING SPECIALIST PER WEEK
PLAYER CARD	3	10	1	2	ASSIGN 10 HOURS OF MATH SPECIALIST PER WEEK
PLAYER CARD	4	20	1	2	ASSIGN 20 HOURS OF COUNSELING PER WEEK
PLAYER CARD	5	10	1	2	ASSIGN 10 HOURS OF CLERICAL STAFF PER WEEK
PLAYER CARD	6	60	1	2	ALLOCATE 60% OF TEACHER'S TIME TO READING
PLAYER CARD	7	20	1	2	ALLOCATE 20% OF TEACHER'S TIME TO MATH
PLAYER CARD	8	20	1	2	ALLOCATE 20% OF TEACHER'S TIME TO COUNSELING
PLAYER CARD	9	85	1	2	SET $85 MAXIMUM FOR READING MATERIALS
PLAYER CARD	10	20	1	2	SET $20 MAXIMUM FOR MATH MATERIALS
PLAYER CARD	11	20	1	2	SET $20 MAXIMUM FOR COUNSELING MATERIALS
PLAYER CARD	0	11	2	2	INCLUDE ROOM #11
PLAYER CARD	0	20	2	2	INCLUDE ROOM #20
PLAYER CARD	0	0	999	2	E N D O F T Y P E.

decision strategy. They can immediately assess if one strategy produces better results than another, and are encouraged to seek data analyses to give them information to increase their scores. ADG reports achievement data on a classroom by classroom basis. It also provides achievement breakdown by socio-economic status for students in a given classroom. There are no data available for individual students. An example of a student achievement printout is shown as Figure 4 in the appendix. By examining achievement data reports from before and after a simulated year of school operation, the player can determine the effects of his moves. He can also ascertain the basic composition of the school. Used in conjunction with a printout of Teacher Characteristics (Figure 5' Appendix) and listing of other resources provided each classroom (Appendix Figure 6: Instruction Facility Data), the player can formulate preliminary hypotheses and determine effects of changes in resource patterns. To assist the player with program cost/benefit analyses, category and total costs for each program type may be requested. An example is included as Appendix Figure 7.

Data Base Management

The data base for the Administration Decision Game is generated through the use of random number generators and FORTRAN routines. Distribution and population parameters are controlled by means of a set of game master move cards, similar in nature to the player's move cards. By identifying himself or herself at the outset as a game master with a special first card, the instructor may either initialize a complete data base or modify an existing data file by changing selected parameters. It is by this mechanism that the number of students are established, that the mean and standard deviations are input for generation of the teacher population, that initial reading and other achievement scores are initially generated and maximum amounts or rates of increment are established. Resource unit costs are also set in this manner. The standard version of the game, for example, specifies a mean of 32 years and a standard deviation of 8 years as parameters for the gaussian generation of teacher ages. To make the data realistic, there are FORTRAN statements which will convert any generated age below 22 years to 22, and anything above 65 to 65 in that we assume that teachers may not have completed training prior to about 22 years of age and that they will retire at age 65. The game master need only enter the card labeled "INPUT OR CHANGE SYSTEM PARAMETERS" and follow it with a list of values for the system parameters. Appendix Figure 8 provides a sample data parameter input.

Using the system parameters the game master may create a school or schools which have small class sizes and are predominantly populated by middle class and upper-middle class children. At the other extreme he/she might just as easily create a school with very large class sizes and a high preponderance of lower-class children. Reading and math achievement scores can be initialized appropriate to the kind of school he/she seeks to create as can teacher populations. Salary rates are also established through this mechanism and can be set to reflect local pay scales.

Model Management

The environmental used in ADG model is not true to any research based conception of school outcomes, thus it is not necessary to argue for the validity of this particular model. Since the instructional purposes are to learn to use data in planning and decision making, the nature of the model is not very material to that exercise. We have devised the initial game model to reflect some generalized assumptions about what causes achievement, but these are easily changed.

Subtle or substantial changes among variable relationships is easily accomplished through a system of game master moves which control the various mathematical functions used to calculate values. The environmental model is defined by a series of function parameters, scaling parameters and weights. It is possible to alter the relationship between any pair of variables or any multivariate sets. By setting the weights given to variables in the calculation of outcome variables, for example, it is possible to create a model wherein one variable completely dominates. Or it is possible to weight them evenly so that each has an equal effect. Using the function parameters, it is possible to transfer the relationship between two variables from linear to curvilinear or to change the shape or intensity of the curvilinear relationship. This is done by means of exponents which are read in as data. It is also possible to establish the degree of chance by establishing the percent of variance which will be tolerated in the calculating of Y from X, in effect setting the width of the stochastic band. It is possible, therefore, to have a completely deterministic game or one in which there is a great deal of chance at work. A game with a large stochastic term is much more difficult to decode using analytic tools because of the error term built in. On the other hand, such a model does represent more accurately, the kind of field data one might be expected to encounter.

SUMMARY AND CONCLUSION

The Administration Decision Game has been presented as a simulation/gaming vehicle for developing planning need awareness and skills in school administrators. ADG offers an environment and role enactment opportunities consistent with the real world of schools and at the same time emphasizes planning and data based decision-making. The model upon which ADG is based is very easily changed to represent a different theoretical view of the instructional process, and the data base can be modified to almost any student/teacher configuration. The role perspective employed is of manager as planner/ resource allocator. Preliminary instructional trials have been promising, and suggest that a man/machine simulation-game-like ADG can be an effective teaching tool.

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APPENDIX

FIGURE 4

EXAMPLE ADG OF STUDENT ACHIEVEMENT DATA PRINTOUT

A D M I N I S T R A T I O N   D E C I S I O N   G A M E
BASIC CLASSROOM DATA

SCH	RM	TOTAL N	TOTAL READ AVE	TOTAL READ CHG	TOTAL MATH AVE	TOTAL MATH CHG	TOTAL ADJ AVE	TOTAL ADJ CHG	SES 1 N	SES 1 READ AVE	SES 1 READ CHG	SES 1 MATH AVE	SES 1 MATH CHG	SES 1 ADJ AVE	SES 1 ADJ CHG
1	1	23.	-.6	.6	-.1	.5	5.7	1.2	2.	.8	.9	1.7	.8	6.4	.7
1	2	27.	.9	.7	.1	.6	3.7	.6	4.	.5	.9	-.9	.8	3.2	.3
1	3	26.	.4	.6	-.7	.5	2.9	.4	3.	2.3	.8	2.5	.7	3.8	.3
1	4	27.	-.9	.6	.0	.5	1.6	.3	7.	.9	.9	.4	.8	6.4	1.3
1	5	27.	-.2	.7	-.7	.6	3.6	.4	5.	1.7	1.0	-.1	.8	4.3	.3
1	6	27.	-.3	.5	.2	.5	4.2	.2	4.	.7	.7	.8	.6	4.3	.1
1	7	27.	-.3	.6	-.0	.5	.9	.0	4.	-.1	.9	1.3	.8	3.3	.1
1	8	26.	1.2	.7	-.1	.6	2.3	.3	3.	1.3	1.0	2.0	.9	5.2	.3
1	9	26.	-.9	.5	.0	.4	4.1	1.2	2.	1.6	.7	.3	.6	4.1	.6
1	10	27.	.1	.5	-.3	.5	2.9	.3	7.	2.0	.7	.7	.7	6.2	.5
1	11	27.	-.8	.6	-.3	.5	2.8	.4	3.	.4	.9	1.1	.8	4.3	.3
1	12	26.	-.7	.7	-.2	.6	2.4	.2	7.	.1	.9	1.3	.8	4.9	.3
1	13	27.	-.6	.8	-.4	.6	3.5	.5	7.	.6	1.0	.7	.9	4.4	.3
1	14	27.	-.6	.7	.1	.6	3.5	.9	4.	1.0	.9	1.1	.8	2.7	.3
1	15	27.	.5	.7	.2	.6	4.0	.2	3.	.3	1.0	2.2	.9	5.8	.1
1	16	27.	.5	.6	-.3	.5	3.3	.4	4.	.4	.9	1.6	.7	4.3	.2
1	17	27.	-.8	.7	-.1	.6	3.1	.2	6.	.4	.9	1.3	.8	4.1	.1
1	18	26.	-.1	.6	-.8	.5	3.5	1.4	3.	1.1	.9	1.6	.8	4.6	.9
1	19	26.	.8	.6	-1.2	.5	1.8	.2	3.	1.6	.9	1.6	.8	3.8	.3
1	20	27.	.6	.7	-.2	.6	2.3	.3	4.	.9	1.0	1.9	.8	3.6	.2
AVERAGE		26.	-.1	.6	-.2	.5	3.1	.5	4.	.9	.9	1.1	.8	4.5	.4

SCH	RM	SES 2 N	SES 2 READ AVE	SES 2 READ CHG	SES 2 MATH AVE	SES 2 MATH CHG	SES 2 ADJ AVE	SES 2 ADJ CHG	SES 3 N	SES 3 READ AVE	SES 3 READ CHG	SES 3 MATH AVE	SES 3 MATH CHG	SES 3 ADJ AVE	SES 3 ADJ CHG
1	1	13.	-.5	.6	.4	.5	5.7	1.2	8.	-1.2	.5	-1.4	.5	5.4	1.3
1	2	12.	2.9	.7	2.4	.5	4.6	.8	11.	-1.2	.6	-2.1	.6	3.0	.5
1	3	15.	1.1	.6	-1.0	.4	1.9	.3	8.	-1.6	.5	-1.5	.5	4.5	.7
1	4	11.	-1.5	.6	-.3	.4	.5	.2	9.	-1.7	.5	.2	.4	-.9	-.2
1	5	14.	-.9	.7	-.2	.5	4.2	.6	8.	-.4	.6	-2.0	.5	2.0	.3
1	6	12.	-1.0	.5	-.1	.4	5.1	.3	11.	.2	.4	.3	.4	3.1	.1
1	7	11.	-.7	.7	-.2	.5	-1.5	-.1	12.	-.1	.5	-.3	.5	2.3	.1
1	8	14.	2.5	.7	-.1	.5	1.1	.1	9.	-.7	.6	-.8	.6	3.3	.5
1	9	16.	-1.7	.5	2.0	.4	4.5	1.3	8.	.0	.4	-4.1	.4	3.3	1.1
1	10	11.	-.6	.5	-.4	.3	1.0	.2	9.	-.7	.4	-1.0	.4	2.7	.5
1	11	13.	-1.1	.6	1.0	.5	3.2	.5	11.	-.8	.5	-2.2	.5	1.8	.3
1	12	11.	-.2	.7	.7	.5	.9	.1	8.	-2.2	.5	-2.6	.5	2.3	.3
1	13	11.	-.3	.8	-.1	.6	6.3	1.0	9.	-1.9	.5	-1.8	.5	-.6	-.1
1	14	15.	-.7	.7	.2	.5	4.3	1.1	8.	-1.2	.6	-.6	.6	2.3	.7
1	15	12.	1.0	.7	-1.6	.5	5.7	.4	12.	.0	.5	1.6	.5	1.7	.1
1	16	13.	1.1	.6	.6	.5	3.8	.5	10.	-.2	.5	-2.1	.5	2.2	.3
1	17	13.	-1.2	.7	-1.0	.5	2.2	.2	8.	-1.1	.6	.1	.5	3.7	.3
1	18	15.	.4	.6	-1.3	.5	3.5	1.4	8.	-1.3	.5	-.7	.5	3.1	1.6
1	19	14.	2.4	.6	-.3	.4	1.2	.2	9.	-1.9	.5	-3.6	.5	2.2	.3
1	20	14.	1.2	.8	.1	.5	3.1	.4	9.	-.3	.6	-1.6	.6	.5	.1
AVERAGE		13.	.1	.7	.0	.5	3.1	.5	9.	-.9	.5	-1.3	.5	2.4	.4

A D M I N I S T R A T I O N   D E C I S I O N   G A M E
BASIC CLASSROOM DATA

PLAYER: VAC2
ROUND NO. 1

SCHOOL ID NO. 1
TEACHER CHARACTERISTICS

							EXPER		*** EDUCATION ***				**** T R A I T ****					VERB
										IN-SERVICE		TRG						
SCH	RM	TCH	SEX	RACE	AGE	MART	TOT	DIST	GRAD	READ	MATH	ADJ	CONT	DEDI	FAIR	TRAD	REAC	ABIL
1	1	1	F	W	28	M	6	5	5	0	0	0	4	4	2	4	7	0
1	2	2	F	W	45	M	10	10	6	0	0	0	3	8	2	5	6	5
1	3	3	F	W	49	M	10	10	6	0	0	0	0	1	4	5	4	3
1	4	4	F	W	35	M	10	10	6	0	0	0	5	5	0	1	3	2
1	5	5	F	B	45	M	10	10	6	0	0	0	2	5	4	9	8	6
1	6	6	M	W	22	S	0	0	0	0	0	0	6	9	7	6	3	0
1	7	7	F	W	27	M	4	4	4	0	0	0	3	9	7	9	4	3
1	8	8	F	W	46	M	10	10	6	0	0	0	2	7	4	9	4	4
1	9	9	F	W	22	M	0	0	0	0	0	0	8	5	1	9	1	5
1	10	10	F	W	22	M	0	0	0	0	0	0	5	7	3	4	2	4
1	11	11	F	W	29	S	5	5	5	0	0	0	6	3	3	4	5	5
1	12	12	F	W	29	M	6	6	6	0	0	0	4	5	5	8	6	1
1	13	13	F	W	30	M	6	6	6	0	0	0	3	9	3	9	8	3
1	14	14	F	W	33	M	10	10	6	0	0	0	2	9	1	7	3	3
1	15	15	F	W	46	M	10	10	6	0	0	0	0	8	7	5	2	2
1	16	16	F	W	24	M	2	2	2	0	0	0	7	8	6	9	4	6
1	17	17	F	W	28	S	5	5	5	0	0	0	0	4	6	9	3	4
1	18	18	F	W	35	M	10	10	6	0	0	0	5	3	0	0	5	7
1	19	19	F	W	46	M	10	10	6	0	0	0	0	2	4	6	4	4
1	20	20	F	W	34	M	10	10	6	0	0	0	6	7	4	8	5	9

FIGURE 5
EXAMPLE OF ADG TEACHER CHARACTERISTICS PRINTOUT

FIGURE 6

EXAMPLE OF ADG RESOURCE ALLOCATION PATTERN

A D M I N I S T R A T I O N   D E C I S I O N   G A M E

BASIC CLASSROOM DATA

PLAYER: VAC2
ROUND NO. 1

SCHOOL ID NO. 1

INSTRUCTION FACILITY DATA

			INSTRUCTIONAL TIME				INSTRUCTIONAL			TEACHING	ASSISTANCE			
			EFF ALLOACTED TO:				MATERIALS				SPECIALISTS			
SCH	RM	TCH	HRS	READ	MATH	ADJ	READ	MATH	ADJ	AIDE	READ	MATH	COUN	CLER
1	1	1	16	39	29	29	30	30	15	10	15	15	5	5
1	2	2	21	39	29	29	30	30	15	10	15	15	5	5
1	3	3	17	39	29	29	30	30	15	10	15	15	5	5
1	4	4	16	39	29	29	30	30	15	10	15	15	5	5
1	5	5	21	39	29	29	30	30	15	10	15	15	5	5
1	6	6	17	39	29	29	30	30	15	10	15	15	5	5
1	7	7	21	39	29	29	30	30	15	10	15	15	5	5
1	8	8	22	39	29	29	30	30	15	10	15	15	5	5
1	9	9	13	39	29	29	30	30	15	10	15	15	5	5
1	10	10	14	39	29	29	30	30	15	10	15	15	5	5
1	11	11	16	59	19	19	85	20	20	10	30	10	20	10
1	12	12	19	59	19	19	85	20	20	10	30	10	20	10
1	13	13	21	59	19	19	85	20	20	10	30	10	20	10
1	14	14	22	59	19	19	85	20	20	10	30	10	20	10
1	15	15	22	59	19	19	85	20	20	10	30	10	20	10
1	16	16	18	59	19	19	85	20	20	10	30	10	20	10
1	17	17	19	59	19	19	85	20	20	10	30	10	20	10
1	18	18	16	59	19	19	85	20	20	10	30	10	20	10
1	19	19	18	59	19	19	85	20	20	10	30	10	20	10
1	20	20	22	59	19	19	85	20	20	10	30	10	20	10

PRIN	TCH		SALARY	
RATE	SES	MOR	AMT	RAISE
3	1	4	13000	0
4	1	4	15500	0
3	2	3	15500	0
3	1	3	15500	0
4	1	4	15500	0
2	2	4	7500	0
4	1	5	11500	0
4	1	4	15500	0
2	2	3	7500	0
2	1	4	7500	0
3	1	3	12500	0
4	1	4	13500	0
4	1	5	13500	0
4	1	3	15500	0
4	2	4	15500	0
3	1	4	9500	0
4	2	4	12500	0
3	1	3	15500	0
3	1	3	15500	0
4	1	4	15500	0

FIGURE 7

AN EXAMPLE OF ADG PROGRAM ACCOUNTING

****

ACCOUNTING INFORMATION FOR SCHOOL ID. 1

****

PROGRAM TYPE	I	II
SALARIES OF TEACHERS	124500.	139000.
SALARIES OF SPECIALISTS	194400.	259200.
SALARIES OF COUNSELORS	27000.	108000.
SALARIES OF AIDES	18000.	18000.
SALARIES OF STAFF	7200.	14400.
COST OF INSERVICE PROG.	0.	0.
ADMIN. & SUPPORT COST	2500.	2500.
COST OF MATERIALS	19725.	33375.
TOTAL COST OF PGM. TYPE	393325.	574475.

THE CURRENT YEAR OPERATING EXPENDITURE FOR SCHOOL ID. 1 IS $ 967800.

FIGURE 8

AN EXAMPLE OF ADG SYSTEM PARAMETERS INPUT

LIST OF SYSTEM PARAMETERS

550.00	.00	.00	1	1	XNPUP	TOTAL NO. PUPILS
1.10	.00	.00	1	2	VERSON	VERSION NO. OF GAME
.20	-.60	-1.30	3	3	XREAD	READ,MEAN,SES 1,2,3
.60	.80	.60	3	6	SDREAD	READ,SD, SES 1,2,3
.50	-.50	-1.50	3	9	XMATH	MATH,MEAN SES 1,2,3
1.00	1.00	1.00	3	12	SDMATH	MATH,SD SES 1,2,3
5.00	4.00	3.00	3	15	XADJ	ADJ,MEAN SES 1,2,3
1.00	1.50	1.75	3	18	SDADJ	ADJ,SD SES 1,2,3
5.00	5.00	5.00	3	21	XREA	REACT,MEAN,SES 1,2,3
2.50	2.50	2.50	3	24	SDREA	REACT,SD, SES 1,2,3
.20	.40	.40	3	27	PSES	PRPORTION IN SES 1,2,3
.80	.00	.00	1	30	TPAR(,1)	TCHR,,FEMALE
.85	.00	.00	1	32	TPAR(,2)	TCHR,, WHITE
32.00	8.00	.00	2	34	TPAR(,3)	TCHR, AGE
.70	.00	.00	1	36	TPAR(,4)	TCHR, MARRIED
3.00	2.00	.00	2	38	TPAR(,5)	TCHR,EXPERIENCE
2.00	1.50	.00	2	40	TPAR(,6)	TCHR, YRS IN DIST
2.00	1.50	.00	3	42	TPAR(,7)	TCHR,EDUCATION
3.50	3.00	.00	2	44	TPAR(,8)	TCHR,CONTROVERSIALITY
6.00	2.00	.00	2	46	TPAR(,09)	TCHR,DEDICATION
4.00	2.00	.00	2	48	TPAR(,10)	TCHR,FAIRNESS
6.00	3.50	.00	2	50	TPAR(,11)	TCHR,TRADITIONALTIY
5.00	1.50	.00	2	52	TPAR(,12)	TCHR, REACTIVITY
5.00	2.50	.00	2	54	TPAR(,13)	VERBAL ABILITY
.10	.65	.25	2	56	TPAR(,14)	% TCHRS IN SES 1 @ 2 &3
100.00	.00	.00	1	59	XMAXR	MAX AMT FOR READR MAT
100.00	.00	.00	1	60	XMAXM	MAX AMT FOR MATHR MAT
100.00	.00	.00	1	61	XMAXJ	MAX AMT FOR COUN MATT
.50	.00	.00	1	62	PTIMER	% TCHR TIME FOR READING
.40	.00	.00	1	63	PTIMEM	% TCHR TIME FOR MATH
.10	.00	.00	1	64	PTIMEJ	% TCHR TIME FOR COUSELING
.00	.00	.00	1	79	RDEXPP	ROUND EXPENDITURE PER PUPIL
18.00	.00	.00	1	80	SPSAL	HOURLY RATE FORSPECIALISTS
15.00	.00	.00	1	81	CSAL	HOURLY RATE FROCOUNSELORS
5.00	.00	.00	1	82	ADSAL	HOURLY RATE FORAIDES
4.00	.00	.00	1	83	STSAL	HOURLY RATE FOR STAFF
900.00	.00	.00	1	84	EXPP	EXPENDITURE PER PUPIL
50.00	.00	.00	1	85	RGMAXR	MAX REG AMT READ
50.00	.00	.00	1	86	RGMAXM	MAX REG AMT MATH
50.00	.00	.00	1	87	RGMAXJ	MAX AMT FOR COUNS MAT
8500.00	.00	.00	1	88	RGBASE	REGIONAL BASE SALARY
600.00	.00	.00	1	89	RGINED	REGIONAL INCRE FOR ED
400.00	.00	.00	1	90	RGINEX	REGIONAL INCRE FOR EXP
7500.00	.00	.00	1	91	MBASE	BASE SALARY
500.00	.00	.00	1	92	INCRED	SAL INCRE FOR ED
500.00	.00	.00	1	93	INCREX	SAL INCRE FOR EXPER
20.00	.00	.00	1	94	NRMS	TOT NUMB ROOMS IN DIS
1.00	.00	.00	1	95	NSCH	NUMB SCHOLS
.00	.00	.00	1	96	NORND	CURRENT ROUND NO.
100.00	.00	.00	1	97	NCAN	INIT. NO. CAND.
1.00	.00	.00	1	98	NXTCAN	ID OF NXT CAND.
123.00	.00	.00	1	100	IX	RANDOM NUMBER BASE
.00	.00	.00	0	999		END OF PARAMETER LIST