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THE UNIVERSITY OF ALBERTA

# THE DEVELOPMENT OF A SIMULATION FOR RESEARCH ON ADMINISTRATOR DECISION MAKING IN EDUCATION

by

John Anthony Riffel

A THESIS

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The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies for acceptance, a thesis entitled "The Development of a Simulation for Research on Administrator Decision Making in Education," submitted by John Anthony Riffel in partial fulfillment of the requirements for the degree, Doctor of Philosophy.

Supervisor

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## ABSTRACT

A simulation of part of the information environment of the Alberta high school administrator was developed and validated. A description of a hypothetical school and community was prepared; three administrative tasks were included in the simulation--selecting a teacher, setting up teacher timetables, and dealing with a discipline problem. The simulation was programmed in Coursewriter II and was run on an IBM 1500 Instructional System.

In its programmed form the simulation was limited to rationalized, step by step procedures for information search, information processing and sequential decision making. Because of this, the format of the simulation did have some common effects on the performance of the participants in the simulation. In particular, the amount of information requested and the order in which it was requested by the participants were affected by the content and the structure of the available information alternatives.

At the same time, however, there were substantial individual differences in the amounts of information requested and the length of time taken to complete the simulation. Moreover, the participants tended to behave consistently in the three segments of the simulation: those who requested an above average amount of information during the first segment of the simulation tended to request an above average amount of information in the following segments. Those who requested a below average amount of information tended to do so repeatedly.

In addition to developing the simulation some exploratory research on the decision making of educational administrators was carried out. The decision variables examined were: (a) the amount of information accumulated before making a decision; (b) the length of time taken to arrive at a decision; (c) satisfaction with the decision; (d) the ability of the participants to rationalize their decisions; (e) the ability of the participants to anticipate the consequences of their decisions; and (f) the tendency of the participants to attach qualifying statements to their decisions. The last four variables were operationalized with a dual purpose in mind: responses to the instruments were used for evaluating the simulation as well as for measuring the decision making responses of the participants. The four instruments served the first purpose effectively; they were somewhat less effective as measures of decision making.

Broadly speaking, it was found that the participants responded consistently to measures of the decision variables and that the decision variables tended to be interrelated in a theoretically meaningful way. However, the nature of the study did not permit the development of generalizations from the results.

Finally, in keeping with the exploratory nature of the study, a categorized list of researchable questions was suggested. The list dealt with topics related both to the simulation as a research tool and to the decision making of school administrators.

## ACKNOWLEDGEMENTS

The writer wishes to express his thanks to the supervisor of this study, Dr. D.A. MacKay, for his advice and encouragement at every stage of the project. Thanks are also due to the other committee members, Dr. T.O. Maguire and Dr. F.C. Thiemann.

The successful completion of this project involved the support of many people. In the early stages of programming the simulation, the writer received substantial help from Roger Cormier, whose work on this project was supported by the Donner Canadian Foundation. Dr. S. Hunka and the staff of the Division of Educational Research Services provided much assistance in presenting the simulation. The work of Dr. D. Bolton, of the University of Washington, on teacher selection made the development of the first part of the simulation an easier task.

Finally, thanks are extended to the administrators and students who participated in the study.

TABLE OF CONTENTS

Page

Page

Page

LIST OF TABLES

Table | Page

LIST OF FIGURES

# Chapter One

# The Problem

## Statement of the Problem

Even though the requirement to make decisions is one of the major demands placed upon the practicing educational administrator, relatively little is known about the ways in which an administrator responds to decision situations. Because of the crucial nature of the decision making task in education, it is important that some effort be made to fill these gaps in our understandings of how educational administrators make decisions.

The study being reported here had two main purposes:

(a) the development of a computer-based simulation of the task and information environment of a high school administrator which could be used for research on administrator decision making in education;

(b) the exploration of relationships among selected decision responses of a group of participants in the simulation. In addition to describing the responses of the participants, this analysis was also used to assess the usefulness of the simulation developed for this study.

## An Overview of the Theoretical Frame of Reference

In the narrowest sense, decision making is concerned with the selection of a single course of action from a set of given alternatives. However, this description is not an adequate model of most human decision making. In most situations, the spectrum of variables having an influence upon decision making is very broad; in such situations, decision making should be thought of as a process or sequence of activities rather than as a single event. Gore has suggested that

"decision making is primarily a means of mounting an appropriate response rather than a dramatic choice between alternatives [1962, p. 54]"; it is a process of coming to terms with a complex environment.

A useful way of interrelating the variables which have an influence upon decision making in complex situations is to describe the decision situation in terms of an information model. According to this model, the effective operation of a system is related to the ways in which it accumulates and processes information from its environment. There is a close connection between information inputs into a system and the response of the system following those inputs.

In operational terms, two concepts--information and decision response--were basic to this study. The information processing which took place in the interval between the input of information and the decision response was not studied.

## The Decision Variables

The decision variables examined in this study were assumed to be both useful in evaluating the simulation developed for this study and relevant to an exploratory study of individual decision making in education.* The variables and the ways in which they were operationalized are discussed at greater length in Chapters Two, Three, and Four of this report.

The responses of the participants to the simulated decision

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*When developing a simulation it is important to determine the general feelings of the participants for the situation being simulated and to discover their feelings of involvement and efficacy in the simulation. In this study it seemed that these things could be done at the same time as some exploratory research on administrator decision making in education was being carried out. Variables (b), (c), and (d) in the following list reflect this dual purpose.

situations were described in terms of the following variables:

(a) the amount of information accumulated before making a decision;

(b) the reasons given for having made a particular decision. In addition to providing insights into the extent to which administrators explain their decisions, analysis of this variable was used to assess the participants' feelings of efficacy in the simulation;

(c) the consequences anticipated for their decisions. Because the simulation was composed of a connected series of decision tasks, it seemed that an examination of this variable would provide some insights into the extent to which the simulation held the continuing interest of the participants and into the realism of the exercise for the participants;

(d) the qualifying statements that the participants attached to their decisions. This was looked upon as a reflection of uncertainty stemming from the complexity of the situation or from personal inability to make an unequivocal decision;

(e) their satisfaction with their decisions. In general terms, the concept of satisfaction with decision was used to refer to the degree to which the participants felt their decisions in the simulated environment met their needs as decision makers. Presumably, if a participant could look back on his decision and say, "At the time I did what I felt was necessary to make what I thought was the right decision," he was satisfied with it. On the other hand, if his responses indicated discontent or regret, he was not likely to feel fully satisfied.

(f) the consistency of their information gathering behavior in relation to the other participants over the three segments of the simulation;

Two other variables were examined. While they can be described properly as decision variables, they were looked at primarily with a view to evaluating the simulation:

(g) the amount of time taken to arrive at a decision. The time spent by the participants to complete each of the segments of the simulation was examined to determine whether simulation procedures led to reactions such as boredom among participants;

(h) the extent of the participants' knowledge of the hypothetical situation. This permitted a partial assessment of the usefulness of the background information to the simulation as a whole.

## Research Questions

The specific research questions which guided the conduct of this study were:

1. What can be said about the usefulness of the simulation method for gathering data about the ways in which educational administrators make decisions? Is the simulation developed for this study an effective instrument for discovering individual differences among the responses of participants?

2. What is the relationship between the amount of information requested by participants in the simulation and the number of (a) reasons, (b) qualifying statements, and (c) consequences given by them after they have made a decision?

3. What is the relationship between the amount of information requested by participants in the simulation and their satisfaction with their decisions?

4. Are there any relationships between the participants' experience in education and their performance in the simulation?

## Delimitations

The following considerations were outside the limits set for this study:

(a) all questions concerning the "goodness" and the "rightness" or "wrongness" of decision responses were eliminated from this study;

(b) due to the use of the simulation technique, situational factors affecting decision making in the field were held constant and not otherwise accounted for in this study;

(c) some of the measures made in this study may in fact have tapped deeply rooted psychological differences among individuals. However, because the main focus of this study was the development of a simulation, these possible psychological differences were not examined.

## Limitations

Any interpretations of the results of this study must be made with the following limitations in mind:

(a) the instruments which were used to measure the decision responses of the participants were not fully refined. A more complete discussion of the specific limitations of each of the instruments appears in Chapter Four;

(b) any assertion that the participants behaved in the simulation in essentially the same manner as they would have in real life must be made cautiously. Parallel research into decision making in real and simulated environments must be carried out before such claims can be made;

(c) the analytical techniques which were used in this study to describe the relationships between variables do not permit the development of generalizations referring to the decision responses of school administrators.

## Importance of the Study

This study was important for two reasons. First, the results of this study can help to assess the potential value of computer based simulations in research on administrator decision making in education. Second, in the literature of educational administration much has been written on the significance of personal variables in decision processes; a study such as that being reported here can have a long-term usefulness if it is followed by successively more well-defined inquiries into the effects of personal variables and if due attention is given to the incremental nature of research into individual decision making.

## Organization of this Report

This Chapter has included a statement of the objectives of this study, a review of the variables examined, and a discussion of the limits of the study. Chapter Two contains a brief discussion of the previous research which was relevant to this study. Chapters Three and Four deal with the design and validation of the simulation and the other instruments used in this study. Chapter Five is given to a discussion of the findings of the study and Chapter Six contains the conclusions drawn from this research. Suggestions for further research are discussed in Chapter Seven.

# Chapter Two

## The Theoretical Basis of the Study

Decision making has long been a favorite topic of writers and researchers in the social sciences. The decision processes have been analysed from many vantage points, and many different models of decision making have been developed. In addition to emphasizing different aspects of the decision process, the models differ in terms of their assumptions and the conceptual order which they place on relevant variables. The compatibility of these models with empirical efforts also varies greatly--some have stimulated a much greater number and variety of empirical studies than others, and some can incorporate empirical findings with fewer contradictions than others.

The theoretical basis for this study was derived from the information processing model of decision making. This model, which is summarized in the following discussion, was chosen because it has few assumptions which restrict its applicability, because it identifies and orders a large number of variables relevant to decision making in a simulated environment, and because it is oriented toward research.

### The Information Processing Model of Decision Making

Information theory provides one of the most comprehensive ways by which to describe the events that take place within a system. It stresses the interrelationships among the component parts of a system by describing the flow of information among them. It suggests that events within a system should be analysed in terms of their fundamental

information-bearing character and in terms of their effects upon the system as a whole.

## Information

Ryans (1963) defines information as "some physical and/or psychological form of action which is communicated and which, when it impinges upon a system capable of being affected, may be further communicated, stored, or transformed [p. 6]." It refers to stimuli about which agreement on meaning can be reached between sender and receiver. Meaningful information can be regarded as information which can be put to use in either present or future situations.

When dealing with human information processing, information is difficult to quantify. Schroder, Driver, and Streufert (1967) state that while the exact quantification of information now seems premature, "'bits' may roughly indicate the amount of probability change in the direction of certainty [p. 95]." That is, in a decision situation, information is quantified in terms of its effects on the receiver; consequently, this definition relates as much to the ability of the system to handle information as to the complexity of the inputs themselves. The empirical effort in quantification implied by this definition was beyond the scope of this study. In this study, information was quantified in terms of the actual number of pieces of information available to and requested by the participants in the simulation.

## Information Flow

Every system exists in a changing environment. To come to terms with that environment and to accomplish its objectives, the system must

acquire information from its environment and from its subsystems. Information flow refers both to the movement of information and to the direction and distribution of this movement. It occurs when the output from one system is sensed and received by another.

This study was concerned with the exchange of information between the computer and the participants in the simulation. It focussed on five aspects of information flow: (a) the sources of information; (b) the substance of the information; (c) the categories into which the information could be placed; (d) the destination of the information; and (e) the means by which the information was transmitted.

## Information Processing

Information processing refers to the ways in which a system acts upon the information it receives. Most taxonomies of information processing include a description of the following sequence of activities (Ryan, 1963; Miller, 1965):

(a) inputs are sensed, decoded, and temporarily stored;

(b) relevant inputs are selected and filtered out;

(c) relevant inputs are analysed, associated with information already held in storage, and brought to bear upon tasks of the system;

(d) decisions about output are made;

(e) information is prepared (encoded and programmed) for transmission to another system.

In addition, there are a number of related concepts used to describe the sensitivity of the information processing unit, its capacity for information processing, and its internal adjustment

mechanisms. An extended discussion of these concepts is beyond the scope of this Chapter. For an in-depth treatment of these matters, the reader should refer to Miller (1965).

## Information Control

A major concern in information transmission is providing the correct information to the appropriate receiver at the right time (Davis, 1964). It implies excluding irrelevant information, communicating in a code that the receiver can understand, appreciating the intended receiver's sensitivity and capacity, and taking into account situational factors which might affect the flow of information.

## Equifinality

The same final state may be reached by different systems which start from different initial positions and which operate through different processes.

## Human Information Processing

Many students of human behavior are reluctant to write about human information processing in non-human, communications engineering terminology. Schroder, Driver, and Streufert (1967) outline the basis of the psychological approach to human information processing:

> Organisms either inherit or develop characteristic modes of thinking, adapting, or responding. Such modes or adaptive orientations not only differ among species but are observed as individual differences within species, and change in the same organism as a result of change in environmental conditions.
>
> According to their theoretical preference or problem orientation psychologists refer to these adaptive strategies as response patterns, attitudes, needs, defense mechanisms, norms, and so on [pp. 3-4].

The same authors suggest that, while analogies to human thought may be made by reference to non-human systems, such analogies are far from complete since "human thought is less stimulus bound . . . human thought has more degrees of freedom [p. 5]."

When analysing human information processing it is possible to emphasize any one, or any combination of, the following points of view:

(a) how a person uses attitudes, needs, defense mechanisms, norms, and so on as tools for information processing;

(b) what the contents of a person's needs, defense mechanisms, attitudes, norms, and so on are;

(c) the responses which follow the acquisition of information and information processing. Both the magnitude and the direction of these responses may be measured. This is the position being taken in the present study.

One other characteristic of human information processing must be stressed here: differences in information processing should not be treated as errors. When the environment is sufficiently complex, "persons process information in different ways under different situational conditions, and different persons use different ways of processing information under the same conditions [Schroder, Driver, and Streufert, 1967, pp. 4-5]."

## Implications of the Information Processing Model

In this study, the information processing model of decision making was especially useful in isolating some of the information gathering aspects of decision making and treating them in a systemmatic

way. It also provided a set of guidelines for the development of the simulation used in this study. In particular, the model directed attention to:

(a) features of the interface between the participants and the computer in the simulation;

(b) the information bearing nature of this interface and the importance of the controls on information flow imposed by the computer program and by the participants themselves.

The interface between the computer and the participants was described in terms of two main activities--giving information and receiving information. When the participants were receiving information, the computer was giving it, and vice versa. Although the participants were required to gather information according to a specified procedure, the program was designed so that different persons using different ways of processing information could reach different decisions in the same simulation.

## Some Findings on Individual Decision Making and Information Processing and their Relevance to this Study

The preceding overview of the information processing approach to decision making made only brief reference to human information processing. In this section some findings of research into human information processing and decision making are described at greater length. Special attention is given to those findings which have implications for the simulation technique.

## Determinants of Information Acquisition

There are four situational variables which determine the amount of information gathered by individuals before they make decisions (Seiber and Lanzetta, 1962; Lanzetta, 1963; Kogan and Wallach, 1967):

(a) the gravity of the situation; that is, the nature of the possible positive and negative outcomes of decision alternatives;

(b) the cost of information relative to the goals and values of the decision makers. For some individuals, considerations about the cost of information override considerations about the gains to be had from the same information (Kogan and Wallach, 1967);

(c) the consistency in form and content of the information;

(d) the setting in which decision behavior is examined and measured. For an excellent discussion of the effects of the experimental setting on the study of decision making see Festinger (1964).

Over and beyond these situational factors there are "statistically significant variations among individuals in the amount of information requested in the various experimental treatments. These can be considered a reflection of individual differences [Kogan and Wallach, 1967, p. 129]." There are consistent individual preferences for greater or lesser amounts of information which are a more powerful determinant of information acquisition than any conditions thus far manipulated by experimenters.

The purpose of this study was to develop a simulation that would be an effective method for gathering data about the information processing and decision making of educational administrators. Such a simulation would have to be sensitive to individual differences among

administrators. Constraints on the behavior of participants would have to be minimized, or at least held constant, and there would have to be enough information available so that even the most assiduous information gatherer could obtain all of the information he wanted. Since the study was not concerned with the manipulation of situational variables, every effort was made to reduce both experimental pressures on the participants and situational constraints on their behavior.

The above findings led to the incorporation of the following features into the design of the simulation:

(a) the simulation entailed no risks for those who participated;

(b) the only cost of information was in terms of the time taken to accumulate it;

(c) the information was presented in a way that was as consistent as possible throughout the simulation;

(d) control over simulation time, the amount of information requested, and the order in which information was requested was given to the participants in the simulation.

## Decision Responses and Information Acquisition

Research has shown that individuals exhibit consistent overall response tendencies in decision situations. All research on individual information processing and decision making that was examined in preparation for this study showed significant positive correlations between measures on the same variables repeated over a number of tasks.

The following relationships between information acquisition and decision response have also been reported in the research on individual

decision making and information processing:

(a) the amounts of information sought and time taken in decision situations are curvilinearly related to the uncertainty generated by the problem (Seiber and Lanzetta, 1962);

(b) the number of qualifying statements given after a decision has been made increases with the uncertainty generated by the problem and with the degree to which the problem is perceived as unsolvable (Seiber and Lanzetta, 1962);

(c) information processing becomes more complex as the number of inputs increases, until the point of overload is reached. Once this point is reached, the complexity of information processing decreases (Schroder, Driver, and Streufert, 1967);

(d) if a decision has the effect of committing a person to a given course of action, there will be a re-evaluation of the alternatives in favor of the chosen one after the decision is made (Festinger, 1964).

The studies from which these findings were drawn also reported that there are individual differences in the amount of information that is given with decisions. That is, as well as stating their decisions, individuals also give the reasons for their decisions, the consequences which they expect their decisions might have, and they attach qualifying statements to their decisions. In addition to examining individual differences among the participants in the simulation, measures of these three variables were used in this study to determine the extent to which the simulation held their interest and the extent to which they regarded the simulation as realistic and life-like.

## Demographic Correlates of Decision Response

Although most discussions about the effects of demographic variables are by-products of the research rather than a part of the original research design it has been found that:

(a) older subjects tend to be more conservative than younger ones and that two indications of this conservatism are the amounts of time and information required to make a decision (Kogan and Wallach, 1967; Duncan, 1959);

(b) training and experience are effective variables for distinguishing among decision makers (Guetzkow, Forehand, and James, 1962; Bolton, 1968);

(c) sex is an important variable only when a task has a particular masculine or feminine connotation associated with it (Duncan, 1959; Wallach and Kogan, 1959).

Because of the nature of the tasks included in the simulation,* it seemed that an examination of the following variables might be productive;

(a) the administrative positions held by the participants and the administrative tasks which they performed;

(b) the types of schools in which the participants were employed.

## Simulation Methodology

Studies of decision making in simulated environments have demonstrated that the simulation method is an effective way to achieve a

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*See Chapter Three.

high level of participant interest and motivation (Cherryholmes, 1966). They have also found that:

(a) although the environment remains the same, changes in the interest level of the participants will affect the amount of information they process and the amount of time they take (Schroder, Driver, and Streufert, 1967);

(b) when the simulated task is construed as a game, participants will not take it seriously (Kogan and Wallach, 1967);

(c) it may not be feasible to assess the decision making responses of participants in novel situations where they do not know the probabilities of their success at a skill task (Kogan and Wallach, 1967);

(d) "real as opposed to imaginary pay-off conditions seem to yield greater conservatism in decision making. The conservatism increases as the magnitude of positive and negative incentives becomes larger [Kogan and Wallach, 1967, p. 143]";

(e) the findings of many studies have been influenced by a high degree of overt competition between and among participants;

(f) the defensiveness of participants and test anxiety may be eliminated by not including any feedback concerning the efficacy of an individual's decision making strategy or the appropriateness of a decision (Kogan and Wallach, 1967);

(g) sequential tasks, in which behavior in one situation is affected by what has happened in another situation, are different from non-sequential tasks and stimulate difference response tendencies in participants (Siegel, Siegel, and Andrews, 1964).

Steps were taken to account for some of the above findings in the design of this study:

(a) the simulation was not competitive;

(b) the simulation was composed of a series of three tasks. There was no feedback within tasks or between them and it was assumed that this would reduce the defensiveness of participants. Since the participants were told that their performance was not being evaluated in any way, it was assumed that test anxiety was also reduced;

(c) a number of the studies referred to in this and the preceding sections employed mechanical, non-social decision settings in their experiments. For example, Seiber and Lanzetta's (1962) subjects were asked to identify objects which were flashed on a screen for 1/1000 of a second; Siegel, Siegel, and Andrews (1964) asked their subjects to make predictions about which light of two would be flashed next; and Pruitt (1967) had his subjects work through an experiment that involved a system of lights on a pegboard. Since this study focussed on administrator decision making in education, a simulation more similar to the natural setting of the educational administrator was called for. For this reason, the simulation was made as realistic as possible and the three tasks which the participants were asked to complete were representative of the tasks of the Alberta high school administrator.

## Concluding Statement

The research which was reported in this Chapter provided many

useful insights into the design of the simulation developed for this study and suggested a number of relationships which might be examined. In the following Chapters of this report the results of some of this research will be used as benchmarks for evaluating the simulation developed in this study.

## Chapter Three

## Notes on the Design and Validation of Jarac*: A Simulation of the Information Environment of the High School Principal

Over the past decade a variety of decision making simulations have been developed in different fields. Generally speaking, they have been used for one of three purposes. First, they have been used to examine the actual decisions which people make and to determine the probability of the occurrence of a particular decision. Second, they have been used to measure the factors associated with success (when success itself can be measured, as in a zero-sum game) at decision making. Finally, they have been used to study the processes of competition and coalition-building among individuals competing for scarce resources in a simulated environment.

Some of these simulations have also been used to study individual information processing and decision making (Tuckman, 1964). However, as Streufert and others (1965) have pointed out, it is "desirable to use a type of simulation which is specifically designed to maximize differences in information processing characteristics [p. 723]." Furthermore, Kogan and Wallach (1967) have shown that a simulated environment which is unfamiliar to the participants may not be an effective way of studying information processing and decision making.

Because of these two considerations, a simulation to be used in

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*The name given to the simulation developed for this study.

the study of the decision making of school administrators should be based on a task and information content which is relevant to the job of the school administrator. Such a simulation should also contain enough information so that it will be sensitive to individual differences in the amounts of information required to make decisions. The following discussion describes the writer's efforts in developing a simulation which would meet these two standards.

## Preparation of the Simulated Environment

The simulation developed for this study, Jarac, portrays part of the task and information environment of the Alberta high school administrator. It does so at two levels: first, at the general level of the hypothetical school and community and, second, at a level specific to the tasks which the participants were asked to complete.

A written description of a hypothetical community--Bellevue, Alberta--and a hypothetical school--Bellevue Senior High School--was prepared for the participants so that they could identify themselves with the simulated situation. These materials were developed after a close examination of the background information used in other simulations. Two of these provided particularly valuable models to follow. The first was the description of the Whitman Community and School developed by Hemphill, Griffiths, and Frederiksen (1962). The second described the Norwest Community and School and was prepared by Bolton (1968).

When the preliminary version of the materials to be used in this study had been prepared, a number of Alberta administrators and teachers

were asked to evaluate them. The final version of the background materials was developed after their opinions had been collected and evaluated. The description of the community of Bellevue and Bellevue Senior High School can be found in Appendix B.

The information used in the three tasks of the simulation (the selection of a teacher, the assignment of two teachers to ten groups of students for instructional purposes, and the solution of a discipline problem, each of these tasks was contained in a separate segment of the simulation)* was assembled after a review of the literature dealing with the task areas and after a brief study of the practices of some Alberta school systems. The categories of information used in the teacher selection segment were taken from Bolton (1968); they were checked to make sure that nothing incompatible with administrative practices in Alberta was included. The information categories for the teacher scheduling segment of the simulation dealt with the characteristics of homogeneous groups of students; they were drawn from the literature on homogeneous grouping. Finally, the pieces of information made available to the participants in the discipline segment were based on the literature on teacher-student relations.

In the simulation there were 142 different pieces of information available to the participants--32 in the first segment, 70 in the second, and 40 in the third. They could request the information in any order, and if they wanted to, they could request the same piece of information more than once. The maximum amount of information that

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*This information is listed in a later section of this Chapter and is fully documented in Appendix C.

they could request in each segment was arbitrarily fixed; these limits were 36, 74, and 44 pieces of information in the three segments.

## The Simulation

### Preliminary Instructions to Participants

The participants were told that they were to play the role of James Jackson, the principal of Bellevue Senior High School. This was for convenience in programming only--at no time were the behavioral components of this "role" identified. In an attempt to prevent experimental pressures during the simulation, the participants were told that they were to "act naturally" and that their performance would not be evaluated in any way. It was assumed that under these circumstances differences in information acquisition would be a reflection of individual differences rather than an artifact of the simulation procedures. The participants expressed no difficulties in adapting to their tasks.

### Procedure

The time interval in which the hypothetical events occurred was condensed. The events extended over a period of several months, but the participants required an average time of one and one-half hours to complete the simulation.

When the participants had indicated their decisions for each of the three segments of the simulation, they were asked to complete off-line paper and pencil instruments. The same paper and pencil measures were made at the end of each segment. Although it had been assumed in the design of the study that the participants' responses after one

segment would not affect their responses after any of the subsequent segments, there is some evidence that two or three of the participants did not respond carefully to these instruments in the later stages of the exercise.

## The Computer Facilities

The simulation was programmed in Coursewriter II and was run on an IBM 1500 Instructional System. Textual material and films were presented to the participants at individual instructional stations.

The instructional station used in the simulation had three principal components: a cathode-ray instructional display with a keyboard, a light pen, and an image projector. The fourth component of the 1500 System's instructional station, the audio unit, was not available when the simulation was conducted.

The instructional display unit was used to present instructions about simulation procedures and information to the participants. Participants used the light pen to indicate both the information they wanted presented and their decisions in the first two segments of the simulation. They did so by pointing the light pen to a specified location on the cathode ray tube. The image projector was used to display information to the participants. This component holds a 9.5 x 7.1 inch screen on which black and white slides were projected from a cartridge of the 16 mm film.

Many of the reasons for running a simulation on a computer are well known. The computer processes requests for information and returns information to the participants very quickly. The data obtained from

the performance records of the participants can be handled easily. Using terminals connected to a central computing unit, a large number of persons can be accommodated at any one time. The IBM 1500 Instructional System has one special advantage--the instructional station employs a number of different media in presenting materials. Films can be projected, textual materials can be displayed, tape recorded messages can be played back, and supplementary materials can be located at the instructional station. The use of these different media can add a great deal of realism to a simulation and can increase the involvement of the participants in it.

## Operations by Participants

The operations to be performed by the participants during the simulation were kept as simple as possible. Their two main operations were:

(a) to indicate what, if any, information they wanted displayed by pointing the light pen to a specified location on the cathode ray tube;

(b) to indicate, using the space bar on the keyboard, that they were ready to continue the simulation. This gave control over simulation time to the participants.

## The Simulation Program*

The simulation program was defined by the research purposes of

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*The writer gratefully acknowledges the assistance of Roger Cormier in the early stages of programming the simulation. His work was supported by the Donner Canadian Foundation.

the simulation. The program was limited to information search, information processing, and rationalized decision procedures. All three segments were programmed according to the same pattern.

At the beginning of each segment the participants were presented with a problem that required their action. The problem was described at some length and was fixed to a particular point in time. They were then given the options of making an immediate decision or of requesting further information before making a decision. If they selected the first alternative, they were sent directly to the main decision point of the segment and asked to indicate their decisions. They were then asked to complete the off-line instruments before continuing with the next segment of the simulation.

If, on the other hand, they indicated that they wanted more information before making a decision, they were presented with a coded matrix showing the information which they could request. They were told that they could have as much or as little of this information as they wanted. Once they had decided which piece of information they wanted to have displayed, they were told to indicate their choice with the light pen. The information requested in that way was displayed to them, either on the cathode ray tube or on the image projector. After reading the information the participants indicated that they were ready to continue with the simulation. Then they were again given the options of requesting further information or of making an immediate decision. This cycle continued until the participants had accumulated all of the information they wanted or until they had requested all of the information that was available to them in the segment.

The instructional logic of the program is shown in Figure 1. It is, of course, only the basic structure of the program.

Information components of the Simulation*

In addition to the background information about the hypothetical situation, the participants were given access to information which was pertinent to each of their three tasks. In the teacher selection segment, there were sixteen pieces of information available on each of two teachers, Miss Marion Moore and Miss Dorothy Blake. Under the heading, general information, there was information about the teachers' fluency in French, the academic awards that they had received, the school activities that they were willing to direct, their participation in professional activities, their teaching experience, their teaching certificate, and their university coursework in French. Information about their personal appearance and their interest in students was presented in the form of written excerpts from the record of their interviews with the Bellevue school system's Director of Personnel, Ed Dalton. Information about their breadth of general knowledge and their aptitude for teaching was presented under the heading, excerpts from letters of reference. Finally, five pieces of information were available under the heading, excerpts from evaluation by former principal: the students' reaction to the teachers, the staff's reaction to the teachers, their cooperation with the administrators of the school, their classroom management, and their techniques of instruction.

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*This information is documented in Appendix C.

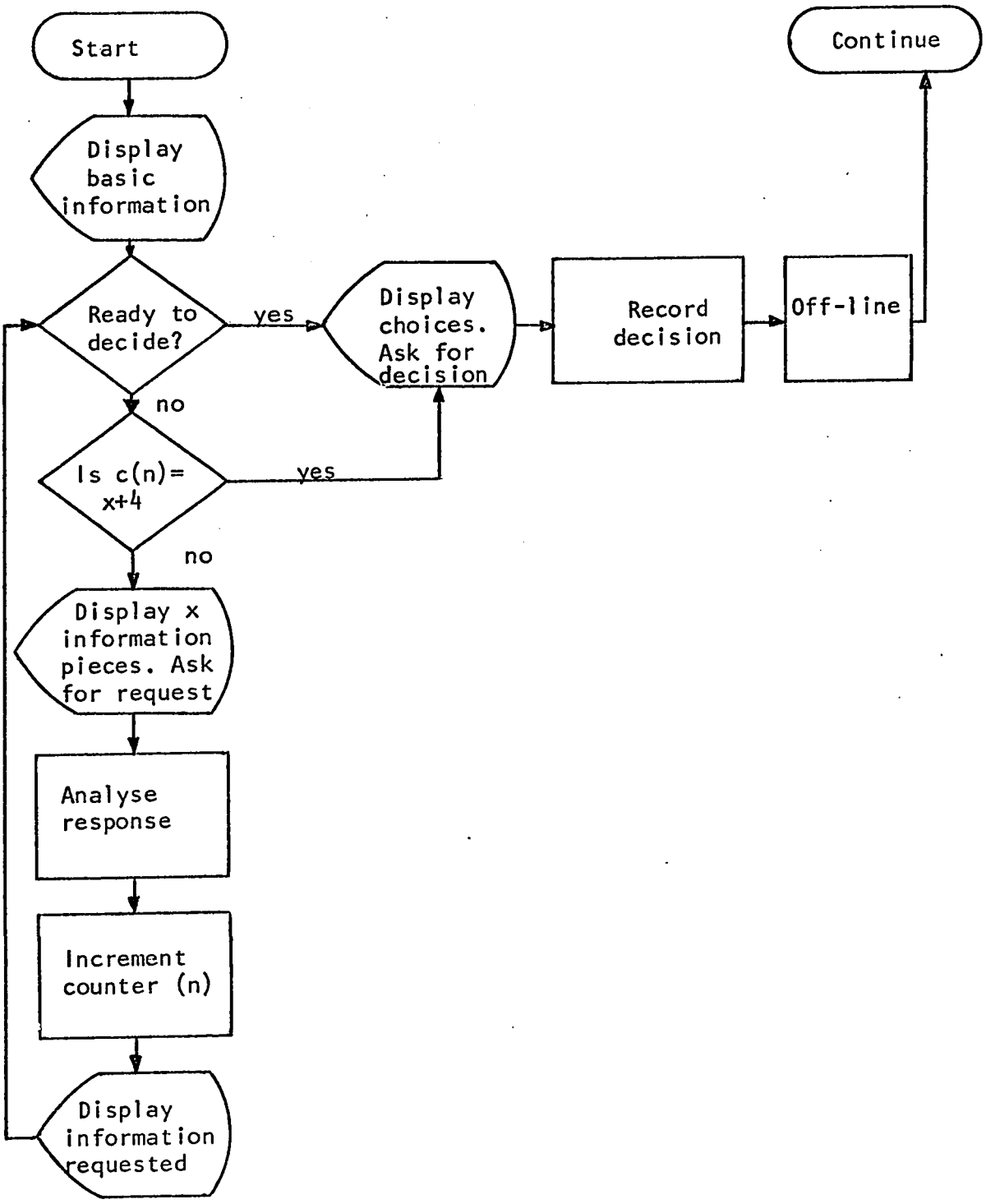


Fig. 1. The computer program in abstract form

In the teacher scheduling segment, seventy pieces of information about the student groups to which the teachers were to be assigned were made available to the participants. There were ten groups of students--four in Grade Ten, three in Grade Eleven, and three in Grade Twelve. All participants were given the enrollments of each of the ten classes. The participants then had access to seven different pieces of information about each of the student groups--the age of the students, the intelligence of the students, the reading ability of the students, their home backgrounds, their previous record in French classes, their likely response to a teacher, and comments on the exceptional students in the group. The students were grouped quite homogeneously along each of the seven characteristics.

In the final segment of the simulation there were forty pieces of information available, twenty pieces on the student involved in the discipline incident and twenty about the teacher concerned. The information about the student, Garry Murphy, was the following: age, intelligence, family background, previous record in French, criminal record, his report on the incident, record of his interview with the school's guidance counsellor, personal qualities, emotional stability, motivation, courtesy, attentiveness in class, exceptional characteristics, reading ability, his friends, participation in student activities, response to other teachers, general record in school, previous discipline problems, and attendance. There were also twenty pieces of information about the teacher available to the participants: her empathy with students, her report of the incident, her emotional stability, her interest in students, her general control of students,

her cooperation with the administration of the school, her general attitude, her adaptability to new situations, her motivation for teaching, her idiosyncracies, her sense of humor, her teaching methods, her techniques of discipline, her participation in student activities, her feelings about the student involved, her relations with other students, her view of the problem, her previous discipline problems, a report of her interview with the student's parents, and her willingness to compromise.

## Sample Terminal Session

A week before they were to take part in the simulation, all of the participants were given the background information which appears in Appendix B. They were asked to spend some time studying the contents of the material.

On the night the simulation was conducted, the participants were given some additional materials as they entered the terminal room--coded lists of the information available to them in the simulation, the Administrator Response Booklet which appears in Appendix A, and some paper on which they could make notes. Before beginning the simulation they were told to act naturally and to take as much time as they wanted; they were also told that their behavior would not be evaluated in any way. They were then asked if they had any questions about the way in which the simulation was being conducted. When their questions had been answered, they were asked to begin working through the simulation. The following discussion describes the behavior of one of the participants in the simulation.

After an introductory statement about the simulation had been presented to him, and when he had completed the forty-item true-false test of his knowledge of the background information, he was given the following instructions:

> You are now ready to begin the simulation. The decisions you will be asked to make are not difficult and you can work through them at your own speed. Remember that you are playing the role of James Jackson, the principal of Bellevue Senior High School.
>
> Your first task in this simulation is to fill the vacancy in your French Department. There are two teachers available. Both are women--Miss Marion Moore and Miss Dorothy Blake. Both are what the Bellevue Personnel Director, Ed Dalton, has called "good" applicants.

He was then asked:

> Are you ready to make a choice between these two teachers now, or would you prefer to have more information about them?

When he indicated that he wanted more information, he was given the following instructions:

> Refer to the materials you were given when you entered the terminal room. Among them you will find a sheet of paper entitled "Coded Information Grid for Teacher Selection Task." On it you will find the information that is available to you concerning this task. You may have as much of this information as you wish but you may request only one piece at a time.
>
> To make your selection, first determine the code number of the information you want. Then press the light pen to the center of the appropriate number on the matrix which will appear on the following display. When you have indicated the information you want it will be shown to you.
>
> When you have finished reading the instructions on the coded information grid, press the space bar to show that you are ready to continue with the simulation.

When he indicated that he was ready to continue the simulation, a matrix of numbers corresponding to the codes on the material he had just read was displayed on the screen. The first piece of information that he requested was Miss Blake's participation in professional

activities. After he finished reading the information and when he had shown that he was ready to continue, he was again asked:

> Are you ready to make a choice between these two teachers now, or would you prefer to have more information about them?

He indicated that he wanted more information and the coded matrix was again displayed on the screen. Following this step-wise procedure he requested a total of twenty-one pieces of information in a twelve minute period.

Figure 2, which is similar to the coded information grid, shows the information he requested and the order of his requests.

He then indicated that he was ready to make a choice between the two teachers. After he had made his choice, Miss Moore, he was given the following instructions:

> Refer to Section One of the Administrator Response Booklet which you were given when you entered the terminal room. In it you will find a number of instruments designed to describe your feelings about the decision you have just made. Complete ALL of the instruments in Section One. When you have finished, indicate that you are ready to continue the simulation by pressing the light pen to the cursor on this display.
>
> ■ Ready to continue the simulation

When he had completed the eleven-item satisfaction instrument he went on to the paragraph completion measures. This is what he wrote:

> I made this decision because, from the information given, Miss Moore stood out over Miss Blake. In areas like Personal appearance, Fluency in French, Interest in students, Techniques of Instruction, Miss Moore I feel was better qualified for the position that is vacant. Even though Miss Blake had some experience in teaching Oral French.
>
> The consequences of my decision will be that the lady remaining on staff will have to deal with Miss Moore and try to instill the idea of teaching Oral French in Grade

| | Miss Blake | Miss Moore |
|---|---|---|
| General Information | | |
| Fluency in French | 16 | 15 |
| Academic Awards Received | | 20 |
| School Activities Willing to Direct | | |
| Professional Activities | 1 | |
| Teaching Experience | 2 | 14 |
| Teaching Certificate | | 13 |
| University Coursework in French | 3 | |
| Excerpts from Interview Records | | |
| Personal Appearance | | 12 |
| Interest in Students | 4 | 11 |
| Excerpts from Letters of Reference | | |
| Breadth of General Knowledge | 5 | 17 |
| Aptitude for Teaching | 6 | 10 |
| Excerpts from Evaluation by Former Principal | | |
| Students' Reaction to Teacher | | 9, 21 |
| Staff's Reaction to Teacher | 19 | |
| Cooperation with the Administration | | 18 |
| Classroom Management | 7 | |
| Techniques of Instruction | | 8 |

Fig. 2. The information requested by the participant in the first segment of the simulation and the order of his requests.

> X and Grade XI. I don't think that Miss Moore will have much difficulty in doing this due to her bilingual background.
>
> I really prefer to have a personal interview with teachers that I am hiring.

It took the participant twelve minutes to complete these instruments. When he indicated that he was ready to continue, he received the following message:

> It is now July 15th, and you have a new teacher on your staff. Time passes quickly as you get ready for school opening in the fall. No unusual or unanticipated difficulties arise.
>
> Then,
>
> On August 15th you received a telephone call from Ed Dalton, Bellevue Personnel Director. You were informed that one of your French teachers, Mrs. Johnston, is pregnant and will not be able to teach. You were also told that the teacher whom you had not selected earlier was now assigned to your staff.
>
> You now have two new French teachers on your staff at Bellevue Senior High. Your next task is to assign them to the groups of students that they will teach. As you will recall, the students at Bellevue are grouped homogeneously. The grouping is along as many dimensions as possible. You should try to match the skills of the teachers with the needs and abilities of the students.

He was then asked if he was ready to give his two French teachers their assignments or if he wanted more information about the groups of students before doing so. When he indicated that he wanted more information he was referred to the "Coded Information Grid for Teacher Scheduling Task" in his package of materials. The instructions for requesting information were the same as those which were given at the beginning of the first segment.

A seventy item matrix was displayed on the screen showing the seventy pieces of information that were available to him. In the next twenty minutes, he chose twenty-nine of these. Figure 3, which is similar to the coded information grid, shows the information he requested and the order of his requests.

He then indicated that he was ready to give the teachers their assignments. These were his instructions:

> The following are the student groups to which you are to assign the teachers. With your light pen, indicate the five groups to which you will ASSIGN MISS MOORE. Miss Blake will be assigned automatically to the remaining Five groups.

He then assigned Miss Moore to student groups 1, 6, 3, 7, 8. When given the opportunity to change these assignments he did so: Miss Moore's assignments were changed to groups 6, 9, 10, 7, 5. He was then instructed to turn to Section Two of his Administrator Response Booklet. The directions he received were the same as those given to him after the first segment of the simulation.

After he completed the satisfaction instrument, he went on to the paragraph completion instruments. He wrote:

> I made this decision because under this circumstance I feel that it is possibly the best. It is difficult to place all the pros and cons in such a short space of time.
>
> The consequences of my decision will be that there will have to be a review of allocations later in the year.
>
> When I made this decision I was worried that not being completely acquainted with Senior High Courses, this tends to make me a novice at this type of assignment.

He then continued the simulation:

> You are now ready for the opening of school. Pre-registrations are completed and teacher assignments have been made.

| Grade | 10 | | | | 11 | | | 12 | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Student Group | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Age | 1 | 2 | 3 | 4 | 11 | | | | | 15 |
| Intelligence Level | | | 23 | 5 | 12 | | | 20 | | 16 |
| Reading Level | | | | 6 | | | | | 28 | 17 |
| Home Background | | | | 7 | | 13 | | | 29 | 18 |
| Previous French Record | | | | 8 | | | | 21 | | 19 |
| Likely Response to a Teacher | | | 24 | 9 | | 14,25 | 26 | | 27 | |
| Exceptional Students in the Group | | | | 10 | | | | 22 | | |

Fig. 3. The information requested by the participant in the second segment of the simulation and the order of his requests.

September 20th
School has been open for two and one-half weeks. Problems with student timetables have been of a minor nature and no regrouping of the students had been required. The teachers have adjusted well to their new classes. Only two or three discipline cases have required your attention, and there have not been any recurring problems.

This happy state of affairs did not last long:

For the first few weeks all went well in Miss Moore's* middle ability French 20 class--student group 6. Students liked Miss Moore and made honest efforts to do their class work. On some days, however, the class was not very enthusiastic and seemed disturbed. This mood affected their work and behavior, but such days were few and it did not seem to be a major problem.

One day a student, Garry Murphy, questioned Miss Moore's authority in class. In no uncertain terms, Miss Moore told him that she was "boss" in her class. Garry was embarrassed and didn't hide his defiance. He slammed his books on the desk and stalked angrily from the room. When approached by Miss Moore he refused to apologize and return to his desk. Miss Moore then referred the matter to you.

You now have a discipline problem in the school which must be resolved. Your next task is to devise a solution to this problem.

He then indicated that he wanted more information before making a decision. He was referred to the "Coded Information Grid for the Discipline Incident." Forty items were listed, and he requested eighteen of them in the next ten minutes. The pieces of information which he requested, and the order in which he requested them, were: the student's family background, his previous record in French, his intelligence level, his response to other teachers, his previous discipline problems, the teacher's report on the incident, her empathy

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*Other participants were presented with a discipline problem that involved Miss Blake. The teacher assigned to student group 6 by the participants in the preceding segment of the simulation was the teacher who had the discipline problem.

with students, her previous discipline problems, her general student control, her techniques of discipline, her willingness to compromise, her feelings about the student involved, the student's personal qualities, his courtesy, his report on the incident, his friends, his emotional stability, and the teacher's relations with other students.

When he was ready to make his decision, he was given the following instructions:

> In this segment, instead of choosing one decision from a number of specified options, make up your own solution to this problem. Turn to Section Three of your Administrator Response Booklet and describe the action you would take in the space provided there. When you have finished writing down your decision, continue with the other instruments in Section Three.

His decision was:

> I think an interview between the boy and the teacher involved is in order. I feel that this incident was not that serious as made out by the teacher. It was stated that it was the third time. The teacher should have talked to the boy sooner than the third incident. From the information I have received the boy seems to be quite stable and somewhat interested in work at school. He does not seem to have a period of adjustment with most teachers.

When describing his feelings about his decision, he wrote:

> I made this decision because for the amount of information present it was the best decision possible. Interviews with student and teacher may completely change my mind.
>
> The consequences of my decision will be that the harmony between teacher and student will be restored.
>
> When I made this decision I was worried that before knowing all the facts, I try to make a decision that will not be harmful to a later decision that may be contrary to the original.

This completed the simulation. The participant had requested 68 pieces of information throughout the whole simulation and he spent 85

minutes working through the exercise. Of the 85 minutes, 52 were spent on the simulation itself, and 33 were given to completing the instruments in the Administrator Response Booklet.

## The Validation of Jarac

The validation of Jarac was a multi-stage process involving the use of a number of different criteria of validity. Since the purpose of this study was to develop a simulation which would be a useful tool for research on individual decision making in education, the simulation would have to be designed in such a way that it would be an effective means for discovering individual differences in the behaviors of participants in the simulation. In this connection, Nunnally (1967) has pointed out that the objective of measurement is to develop a procedure for distinguishing among individuals or groups of individuals in terms of a particular observable characteristic and that, in the broadest sense, "a measuring instrument is valid if it does what it is intended to do [p. 75]." While some persons might argue that this approach to the validation of the simulation is not rigorous enough, it is the one that is most appropriate to the present study. More rigorous attempts to determine the predictive and construct validity of the simulation (for an example of these approaches see Frederiksen, 1966) should be made in subsequent studies.

As well as being an effective research tool, the simulation would also have to adequately picture the reality it was deisnged to model--the content would have to be appropriate and it would have to

be presented in a representative way. This problem had to be dealt with in two ways. First, steps had to be taken to ensure the objective realism of the contents of Jarac. Second, since any simulation must first of all be subjectively realistic for those who take part in it, the reaction of the participants to the simulation had to be determined.

A discussion of the results of applying these standards of validity to Jarac follows below.

## The Effectiveness of Jarac as a Research Tool

Once a simulation has been constructed it is necessary to determine whether it will do what it was intended to do and to make sure that nothing went wrong in transforming the plans for the simulation into a completed product. Table 1 shows that the amounts of information accumulated by the individual participants in the simulation varied greatly. Because of this great diversity in individual behaviors, and since the simulation was the same for all who took part in the exercise, it can be concluded that Jarac is sensitive to individual differences among decision makers and that the procedures used to construct the simulation were effective.

Table 1

Amounts of Information Requested by the Participants in the Simulation

| Participant | Amount of Information Acquired | | | |
|---|---|---|---|---|
| | Segment 1 | Segment 2 | Segment 3 | Total |
| 1 | 18 | 22 | 9 | 49 |
| 2 | 9 | 16 | 25 | 50 |
| 3 | 22 | 20 | 14 | 56 |
| 4 | 27 | 31 | 27 | 85 |
| 5 | 31 | 61 | 34 | 126 |
| 6 | 22 | 9 | 20 | 51 |
| 7 | 27 | 55 | 19 | 101 |
| 8 | 21 | 29 | 18 | 68 |
| 9 | 18 | 14 | 18 | 50 |
| 10 | 26 | 12 | 13 | 51 |
| 11 | 12 | 13 | 0 | 25 |
| 12 | 29 | 31 | 24 | 84 |
| 13 | 31 | 27 | 23 | 81 |
| 14 | 34 | 49 | 36 | 119 |
| 15 | 8 | 12 | 30 | 50 |
| 16 | 33 | 60 | 40 | 133 |
| 17 | 34 | 49 | 36 | 119 |
| 18 | 21 | 15 | 16 | 52 |
| 19 | 32 | 46 | 22 | 100 |
| 20 | 9 | 11 | 8 | 28 |
| 21 | 28 | 6 | 0 | 34 |
| 22 | 9 | 7 | 5 | 21 |
| 23 | 19 | 36 | 0 | 55 |
| 24 | 30 | 29 | 30 | 89 |
| 25 | 20 | 21 | 24 | 65 |
| 26 | 23 | 7 | 18 | 48 |
| 27 | 22 | 33 | 16 | 71 |
| Average | 22.8 | 26.7 | 19.4 | 69.0 |

## The Objective Realism of Jarac

The procedures used to make Jarac more objectively realistic have already been described in a previous section of this Chapter. In summary, they were:

(a) the development of preliminary materials for Jarac which were not incompatible with work which had been done for other simulations and which seemed to be representative of Alberta school practices;

(b) before the materials were prepared in their final form a number of teachers and practicing administrators were asked to evaluate them and to point out any part of them which could not be descriptive of educational practices in Alberta.

## The Subjective Realism of Jarac

Because the simulation program was limited to rationalized, step by step procedures for information search, information processing, and decision making, it was important to obtain the reaction of the participants to the simulation. At the end of the exercise the participants were asked to answer a series of questions about the simulation. The answers that they gave to three of these questions are worth noting here. When asked, "Were the decision sequences realistic and true-to-life?" twenty-one of the participants responded with an unqualified "yes." Two persons wrote "quite close," and three others wrote, "Yes, but the computer presented information in too fragmented a manner."

When asked the second question, "Were you asked to do things that you would not do in real life?" twenty-four participants answered "no." Two of the participants indicated that, in their school system,

they would not be involved in the selection of teachers.

Finally, they were asked, "How involved did you become in the simulation?" The question drew a variety of responses. Six persons wrote "very involved," four said "quite involved," five said "fairly involved," and one wrote "not too involved." Some of the other responses are of more immediate interest: "As though I was really James Jackson." "It could have been more involving only if I were actually the principal." "Elementary situations are more meaningful to me." "So much so that I would have liked to return to the beginning." "At first, very much."

As well as answering these specific questions, the participants were asked to respond to a series of paragraph completion instruments used for describing their feelings about the decisions they made. A representative sample of some of the things they wrote is relevant here in showing the degree to which they became involved in the simulation and the degree to which they regarded the simulation as realistic.

The following comments were made after the teacher selection segment of the simulation:

> I'll rely on Mrs. Johnson to do most of the orientation work and planning with Miss Blake.
>
> We have also found a new sponsor for the French Club!
>
> Her bilingualism and an outside interest in politics are interests of mine and I felt that this would make some common areas of interest between us.
>
> Politics is out of place in the school!
>
> I wish that someone with a few more years of experience would have applied.

> She seemed to fit into our group more easily then Miss Blake.

Some of the comments made after the teacher timetabling segment are equally interesting:

> Next year, if things need changing, this can be done in conference with the teachers and administrators concerned.
>
> I wanted both teachers to have experience in all three grades.
>
> In the poorer groups we need a teacher with a keen interest in students.
>
> I did assign one slow group to her so that she could appreciate what Miss Blake had to work with.

Finally, here are some of the comments written after the discipline segment:

> I may have to act as mediator in the dispute.
>
> I might be too hard on Garry and yielding to Miss Blake,
>
> I would recommend a solution to her and attempt to challenge her.
>
> I wondered if I shouldn't have had more help from the guidance counsellor.
>
> I have not removed her power or concept of power in her classroom and since I left the final decision to her, other staff relations should not be adversely affected.

## The Internal Consistency of Jarac

Since Jarac was composed of three separate segments, since the activities of the participants were essentially the same in each of the segments, and since the criterion of performance was the same for the three segments, it was necessary to determine whether the three segments of the simulation yielded similar results. Analysis of the data in Table I shows that the participants did tend to behave in a consistent

way over the three segments of the simulation. Nine of the twenty-seven participants requested an above-average amount of information in each of the three segments; seven of them requested a below average amount of information in each of the segments.

Table 2 shows the correlations between the amounts of information requested by the participants in the three segments of the simulation. The equivalence of $r_{12}$, $r_{13}$, and $r_{23}$ indicates that Jarac has an acceptable level of internal consistency and that the participants responded to the three segments of the simulation in a similar way.

The equivalence of the observed correlations also suggests that Jarac has an acceptable level of reliability, that it will yield the same results when used to measure an individual's behavior several times. However, the question of the reliability of the simulation deserves further attention. The preliminary nature of this study and the small number of persons who took part in the exercise point to the need for further research on the reliability of the simulation.

## Concluding Statement

The simulation developed for this study was a useful initial step in the development of a more comprehensive and representative simulation of the task and information environment of the Alberta high school administrator. In the form in which it was used in this study it was found to be an effective tool for discovering individual

Table 2

Product-Moment Correlations of the Amount of Information Requested in Each Segment of the Simulation

| | One | Two | Three |
|---|---|---|---|
| Segment One | 1.00 | .664 | .512 |
| Segment Two | | 1.00 | .640 |
| Segment Three | | | 1.00 |

differences in the behaviors of those who took part in the simulation.

## Postscript: Jarac Revised

After the data for this study had been gathered it became evident that a number of worthwhile changes could be made in the simulation. As a result, Jarac has been revised. Some of the more important features of the revised program are:

(a) the process of information acquisition is not as time-consuming and laborious as it was in the original version of the program. In the revised version, more information is presented after each request;

(b) the revised program is fully self-contained, except for the written background information. In the original version, participants were given written materials to complement the visual displays presented at the instructional stations;

(c) more attention is given to simulating the passage of time;

(d) participants are given the opportunity to retrace their steps through parts of the program. The original version was strictly sequential and allowed for little back-tracking;

(e) the true-false test at the beginning of the initial version of the program has been replaced by an optional review of the background information.

# Chapter Four

## Research Instruments and Procedures

> The principle, "Let's get it down to something we can count!" does not always formulate the best research strategy. "Let's see now, what have we here?" may point to a more promising program. Measurement in short, is not an end in itself. Its scientific worth can be appreciated only in an instrumentalist perspective, in which we ask what ends measurement is intended to serve, what role it is called upon to play in the scientific situation, what functions it performs in inquiry [Kaplan, 1964, p. 171].

### Measurement of Decision Responses

In Chapter One the variables which were examined in this project were listed. Measures of four of them will be discussed here:

(a) satisfaction with decisions;

(b) reasons given for decisions;

(c) the anticipated consequences of decisions;

(d) qualifying statements accompanying decisions.

The first was operationalized by a multi-item test. The last three were operationalized by paragraph completion instruments; because they were so similar in form and purpose they will be discussed together.

### The Satisfaction Instrument

A review of the research on individual decision making suggested that it is meaningful for people to describe their decisions in terms of their satisfaction with them and that the concept of satisfaction with decisions might be especially useful when dealing with decision making in a simulated environment. It also suggested that it would be

worthwhile to attempt to develop a multi-item measure of satisfaction. The following paragraphs document the efforts made in this study to construct a measure of individual satisfaction with decision making.

At the outset, a general statement about the concept was developed. This statement was designed to reflect the complexity of the concept and to suggest as large a number of items related to the satisfaction domain as possible. The statement about satisfaction was:

> The amount of satisfaction that exists after a decision has been made refers to the degree to which a person feels his decision met his needs as a decision maker. Presumably, if he looks back on his decision and can say, "At the time, I did what I felt was necessary to make an effective decision," he is satisfied with it. Conversely, if what he says contains indications of regret or discontent, he was not likely to feel fully satisfied.

A pool of twenty items which appeared to be related to this statement was then assembled. Later, fifteen judges were given the item pool and a set of instructions (including the above statement) for determining the relevance of the items to the statement. Using the Kuder-Richardson procedure to evaluate the pooled judgements, a final instrument of eleven items was assembled. The Kuder-Richardson reliability of this test was .834. The instrument in its final form appears at the beginning of each section of the Administrator Response Booklet in Appendix A.

The instrument was administered three times in the simulation, once at the end of each segment of the simulation. Twenty-seven participants completed it each time.

After the negative items were reflected, the test items for each administration of the test were correlated. The correlations for the

three administrations of the test are shown in Tables 3, 4, and 5.

To verify the Kuder-Richardson procedure for developing a homogeneous test and in an attempt to discover the underlying structure of the satisfaction instrument, these three correlation matrices were then factor analysed using the principal axis method. In each case, three factors with roots greater than 1 were obtained. However, for the second and third matrices, the third root was only marginally greater than 1, and it seemed that there would be little to gain from reporting such a small factor. As a result, only the first two factors for each matrix were retained.

Table 6 shows the first two principal axis factors of the three preceding correlation matrices.

These factor solutions, and in particular the second and third factor matrices, indicate that the satisfaction measure was a homogeneous test. In the second and third cases, the first factor accounted for 47.7 per cent and 45.2 per cent of the total test variance respectively. In the first case, the first factor was somewhat smaller, accounting for 32 per cent of the total test variance.

A comparison of the factor matrices in Table 6 shows that the second and third matrices are substantially the same, and that the structure of the first matrix is different from the other two. There are three possible explanations for this difference:

Table 3

Product-Moment Correlations of the Satisfaction Instrument: First Administration of the Test

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Item 1 | 1.00 | .422 | .414 | .658 | .433 | .134 | -.336 | -.080 | -.099 | .144 | .419 |
| Item 2 | | 1.00 | .217 | .299 | .218 | -.124 | -.074 | -.166 | .282 | .030 | .124 |
| Item 3 | | | 1.00 | .412 | .297 | .127 | -.301 | -.067 | .319 | .255 | .503 |
| Item 4 | | | | 1.00 | .546 | -.173 | -.303 | -.302 | .143 | .511 | .542 |
| Item 5 | | | | | 1.00 | .069 | -.173 | -.086 | .055 | .348 | .242 |
| Item 6 | | | | | | 1.00 | .132 | .315 | .037 | -.147 | .114 |
| Item 7 | | | | | | | 1.00 | .319 | -.179 | -.178 | -.172 |
| Item 8 | | | | | | | | 1.00 | -.065 | -.007 | -.179 |
| Item 9 | | | | | | | | | 1.00 | .331 | .085 |
| Item 10 | | | | | | | | | | 1.00 | .476 |
| Item 11 | | | | | | | | | | | 1.00 |

Table 4

Produce-Moment Correlations of the Satisfaction Instrument:
Second Administration of the Test

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Item 1 | 1.00 | .500 | .604 | .639 | .516 | .358 | .348 | .370 | .151 | .480 | .287 |
| Item 2 | | 1.00 | .524 | .736 | .386 | .426 | .417 | .438 | .429 | .585 | .280 |
| Item 3 | | | 1.00 | .723 | .364 | .397 | .268 | .236 | .246 | .336 | .449 |
| Item 4 | | | | 1.00 | .401 | .445 | .424 | .382 | .395 | .539 | .503 |
| Item 5 | | | | | 1.00 | .335 | .377 | .274 | .099 | .401 | .133 |
| Item 6 | | | | | | 1.00 | .636 | .512 | .429 | .475 | .33 |
| Item 7 | | | | | | | 1.00 | .664 | .263 | .623 | .183 |
| Item 8 | | | | | | | | 1.00 | .504 | .729 | .273 |
| Item 9 | | | | | | | | | 1.00 | .373 | .156 |
| Item 10 | | | | | | | | | | 1.00 | .425 |
| Item 11 | | | | | | | | | | | 1.00 |

Table 5

Product-Moment Correlations of the Satisfaction Instrument:
Third Administration of the Test

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Item 1 | 1.00 | .604 | .483 | .710 | .602 | .241 | .434 | .457 | .291 | .457 | .280 |
| Item 2 | | 1.00 | .164 | .610 | .507 | .176 | .487 | .752 | .364 | .752 | .205 |
| Item 3 | | | 1.00 | .306 | .420 | .246 | .443 | .265 | .384 | .334 | .310 |
| Item 4 | | | | 1.00 | .635 | .080 | .375 | .204 | .073 | .360 | .235 |
| Item 5 | | | | | 1.00 | .284 | .434 | .364 | .496 | .450 | .301 |
| Item 6 | | | | | | 1.00 | .487 | .318 | .243 | .422 | .019 |
| Item 7 | | | | | | | 1.00 | .354 | .314 | .615 | .101 |
| Item 8 | | | | | | | | 1.00 | .381 | .847 | .271 |
| Item 9 | | | | | | | | | 1.00 | .381 | .269 |
| Item 10 | | | | | | | | | | 1.00 | .271 |
| Item 11 | | | | | | | | | | | 1.00 |

Table 6

Principal Axis Solutions for the Three Administrations of the Satisfaction Instrument

| Item | Factor Matrices | | | | | |
|---|---|---|---|---|---|---|
| | First Matrix | | Second Matrix | | Third Matrix | |
| 1 | .724 | .225 | .709 | .395 | .781 | .377 |
| 2 | .449 | -.152 | .777 | .123 | .817 | -.022 |
| 3 | .670 | .255 | .688 | .534 | .572 | .155 |
| 4 | .867 | -.077 | .834 | .355 | .655 | .609 |
| 5 | .624 | .179 | .565 | .199 | .760 | .305 |
| 6 | -.051 | .818 | .710 | -.268 | .458 | -.512 |
| 7 | -.481 | .337 | .704 | -.428 | .700 | -.217 |
| 8 | -.315 | .693 | .722 | -.520 | .744 | -.383 |
| 9 | .312 | -.081 | .527 | -.362 | .558 | -.178 |
| 10 | .585 | .013 | .805 | -.249 | .834 | -.367 |
| 11 | .694 | .227 | .522 | .268 | .406 | .280 |
| Root | 3.53 | 1.48 | 5.25 | 1.41 | 4.97 | 1.33 |

(a) the first decision that the participants were asked to make was more ambiguous than the other two and this may have led to some inconsistencies in their responses;

(b) the results of the last two administrations of the test could be regarded as an indication of the stable responses of the participants;

(c) since the test was administered three times within a short period of time, at intervals of approximately twenty minutes, the participants may have responded to the instrument without giving much thought to the items.

For the purposes of the analysis that is to follow in Chapter Five of this report the first two explanations were assumed to be the correct ones. However, the possibility that the third explanation is a valid one indicates that more rigor in interpreting the results of the satisfaction instrument is needed than would be the case if this possibility had not emerged.

To discover the underlying structure of the items in the satisfaction measure the three factor matrices were rotated according to the varimax criterion. The structures of the three rotated matrices were then compared. Table 7 summarizes the results of this procedure. Only those loadings with an absolute value equal to, or greater than, .50 are included. Factor two in the second matrix was reflected through the origin after rotation.

The overall similarity of the three rotated matrices shows that there are two stable clusters of items in the instrument. Items 1 to

Table 7

Varimax Solutions for the Three Administrations of the Satisfaction Instrument

| Item | Factor Matrices | | | | | |
|---|---|---|---|---|---|---|
| | First Matrix | | Second Matrix | | Third Matrix | |
| 1 | .758 | | .785 | | | .815 |
| 2 | | | .646 | | .600 | .555 |
| 3 | .715 | | .866 | | | .510 |
| 4 | .807 | | .848 | | | .893 |
| 5 | .649 | | .546 | | | .749 |
| 6 | | .797 | | .685 | .685 | |
| 7 | | | | .796 | .653 | |
| 8 | | .755 | | .875 | .800 | |
| 9 | | | | .626 | .524 | |
| 10 | .563 | | | .737 | .853 | |
| 11 | .739 | | .562 | | | |
| Sums of Squares | 3.41 | 1.66 | 3.48 | 3.25 | 3.20 | 3.17 |

5 and 11 tend to load highly on one factor, and items 6 to 10 tend to load highly on the other factor.

Although the structure of the item loadings remained quite invariant over the three administrations of the test, the interpretation of the factors is by no means clear-cut. Two different interpretations of the results are possible.

The first interpretation points to two components of the satisfaction measure--one related to satisfaction with the processes by which decisions are made, and the other related to satisfaction with the decision itself. Items 1 to 5 fall in the first category; items 7, 8, and 10 fall into the second. Items 6, 9, and 11 were deleted because they did not seem to be meaningfully related to the other items in the cluster and because an inspection of the original correlation matrices showed that these items tended to have lower correlations with the other items of the test than did the remaining eight items. Further support for the deletion of these items was obtained from a varimax rotation of the three factor solution for each administration of the test. These three items tended to load highly on the third factor; that is, they tended to fall outside of the space defined by the other two factors.

Table 8 shows the items and their orientation to either satisfaction with decision procedures or to satisfaction with the decision itself.

Table 8

The Eight Items of the Satisfaction Instrument which were Retained and their Satisfaction Orientation

| Item | Statement | Satisfaction Orientation |
|---|---|---|
| 1 | I wish I had more information on which to base my decisions. | Procedures: the amount of information accumulated. |
| 2 | If I had an opportunity to make the decisions again, I would change them. | Procedures: the opportunity to back-track through the simulation. |
| 3 | I would have liked to consult with other people before making decisions like these. | Procedures: consultation before making a decision. |
| 4 | I wish I could have had more time to make the decisions. | Procedures: the amount of time available. |
| 5 | I don't really like the decisions I made, but they were the best ones possible under the circumstances. | Procedures: the circumstances (the simulation) in which the decision was made. |
| 7 | It is not likely that I could have made a better decision under the circumstances. | Decision: its value in the situation. |
| 8 | If I was faced with a similar situation again, I would make the same kind of decision. | Decision: its repeatability. |
| 10 | I am satisfied with the decisions I made. | Decision: personal satisfaction. |

The alternative interpretation of the results of the factor analytic procedures suggests that the participants responded to positively phrased items in the instrument in a different way than they responded to negatively phrased items. Even after the negative items had been reflected, they formed a cluster which tended to be distinct from the positive items.

Since the mid-1940's psychologists have assembled a considerable amount of evidence which shows that response bias in replying to test items has a significant influence on scores on self-evaluation and self-description instruments (for a review of this research and a discussion of the main types of response styles see Damarin and Messick, 1965). Three main types of response set have been identified: acquiescence, "defined as a tendency to agree (or disagree) with items regardless of their content [Couch and Keniston, 1960, p. 151]"; desirable responding, the tendency to respond to items in a way that is felt to be socially desirable; and extreme responding, the tendency to respond only at the extremes of multi-point scales. In this study, the last two types of response set may have influenced the way in which the participants completed the satisfaction instrument.

In spite of the fact that the participants were told at the beginning of the simulation that their performance would not be evaluated in any way, it seems likely that some of them would feel social pressures during the course of the exercise. And, if this was the case, it could be expected that the positively phrased items would elicit a greater number of extreme responses than would the negatively phrased items.

Table 9 indicates that this is what occurred when the participants responded to the satisfaction instrument. On the average, the participants responded more extremely to the positive items than to the negative items. This would reduce the correlations between the positive and negative items and would account for the fact that the positive and negative items of the satisfaction measure tended to fall into separate clusters.

Table 9

Frequency of Extreme Responses to the Items of the Satisfaction Instrument for Each Administration of the Test

| Item | Frequency of Extreme Responses | | |
|---|---|---|---|
| | First Administration of the Test | Second Administration of the Test | Third Administration of the Test |
| 1 | 9 | 9 | 11 |
| 2 | 21 | 13 | 15 |
| 3 | 9 | 12 | 14 |
| 4 | 13 | 15 | 14 |
| 5 | 16 | 12 | 12 |
| 6 | 16 | 9 | 14 |
| 7 | 14 | 13 | 17 |
| 8 | 23 | 14 | 16 |
| 9 | 27 | 24 | 22 |
| 10 | 20 | 16 | 16 |
| 11 | 14 | 14 | 13 |
| Mean | 15.6 | 13.7 | 14.9 |

Scoring the satisfaction instrument. The satisfaction instrument was scored in two ways. In both cases, the negative items were reflected, and the responses to each item were summed to obtain a total value.

First, two scores, one relating to satisfaction with decision procedures and the other to satisfaction with the decision itself were computed. Second, a total satisfaction score was obtained by summing all eleven items in the satisfaction instrument. All three scores were used in the analysis of the results which appears in Chapter Five.

Summary. The satisfaction instrument constructed for this study was administered three times to the same persons, and the items for each administration of the test were correlated. The factorial composition of the measure was found to be constant. Because the interpretation of the factors was not clearcut it was suggested that the instrument could be used best by scoring it in two different ways.

Limitations of the instrument. The instrument described above should be regarded as only a first effort in the development of an adequate measure of satisfaction with decision making. In further studies, a broader range of possible items should be explored, and the scales attached to the items should be increased to seven points. Finally, although the factor analytic procedures produced theoretically meaningful results, it is possible that these results can be attributed to chance because of the small number of persons tested.

The Paragraph Completion Instruments

Paragraph completion measures of the participants' abilities to rationalize their decisions, to anticipate the possible consequences of the decisions, and their tendency to attach qualifying statements to their decisions were used for three main reasons. First, it seemed that the domains of items related to these variables were task specific and that a separate instrument for each segment of the simulation would be required to obtain a more objective measure of these variables. Second, a series of paragraph completion instruments seemed to be the most useful way of obtaining insights into the extent of the participants' involvement in the simulation. Finally, it was anticipated that responses to this form of instrument would provide useful suggestions for improving the design of the simulation.

To quantify responses to these instruments, the number of reasons, consequences, and qualifying statements written by the participants were counted. Although this frequency oriented approach to measuring the performance of the participants was probably inadequate (but not entirely unsatisfactory as will be seen later), a rigorous content analysis of their responses was beyond the limits set for this study.

Although there is again some evidence that the participants did not respond carefully to these tests in the later stages of the simulation, on the whole these instruments tended to yield consistent results (see Tables 12, 13, and 14 in Chapter Five).

Limitations of the instruments. The major limitations of the paragraph completion form of instrument are that it is difficult to quantify the results with an assurance of objectivity and that, according to Nunnally (1967), the validity and reliability of such measures are generally unsatisfactory. However, because of interest in the impressions that participants held of the simulation and because of the difficulties that would have been encountered in developing a structured measure of these variables, a paragraph completion form of test seemed to be the most useful in this study. Needless to say, much more attention should be given to the development of these instruments and to an appropriate scoring procedure in a further study.

## Participants

Twenty-seven persons enrolled in a graduate level evening credit course in Educational Administration at the University of Alberta worked through the simulation. All had some training in educational administration; sixteen were practicing administrators. Two of the remainder were full-time students; the rest were classroom teachers. None had taken part in a simulation before, but all were familiar with the computer facilities on which the simulation was conducted.

## Data Collection

All of the twenty-seven participants worked through the simulation in one evening during a five hour period. Three separate runs of the simulation were conducted. Ten persons took part in the first run. Because of film trouble, the number who participated in the

second run was reduced to eight. The repair of one film permitted nine persons to take part in the third and final run.

During the evening two persons were required to change instructional stations and thus interrupt their run because of still unexplained technical problems. In spite of this they were able to complete the entire simulation; none of the data on their performance were lost.

## Data Analysis

Three main techniques were used to analyse the data obtained in this study--correlation, factor analysis, and the analysis of cross-breaks. These procedures were used because of their suitability to an exploratory study of this kind.

## Concluding Statement

This Chapter has described the instruments used in this study and the research procedures followed. Its recurring themes have been the exploratory nature of the study and the limitations of the instruments themselves. It is from these two vantage points that the findings to be reported in the following Chapter should be viewed.

# Chapter Five

## Findings of the Study

The questions which provided the research focus of this project dealt with the simulation, Jarac, and with the decision responses of the persons who took part in the simulation. The information which this study has brought to bear on these questions is presented in this Chapter. Because the study was exploratory, relationships which were found but which were not within the domain of the initial questions will also be discussed.

Although statistical techniques were used to describe the relationships among variables, these techniques were not used to test experimental hypotheses. Rather, they were used to help discover what relationships were present, to suggest conclusions about the simulation, and to point out questions which could be examined fruitfully in other research.

### The Simulation and Simulation Procedures

Two findings about the simulation have already been reported in Chapter Three. They can be summarized briefly.

1. Jarac was an effective and valid tool for discovering individual differences among the information gathering behaviors of the participants in the simulation.

2. The three segments of Jarac tended to yield similar results.

The other findings of this study concerning the simulation follow.

3. Because the simulation was run at three different times in one evening, it seemed possible that the behavior of those persons who took part in the exercise later in the evening would be adversely affected. However, Table 10 shows that:

(a) the time at which the simulation was run had no appreciable effect on the average amount of information requested by the participants in the three separate runs. However, the fact that there were three persons in the final run who requested no information at all in the third segment of the simulation suggests that the participants in the final run may have reacted to Jarac in a different way than those in the first two groups.

(b) the average amount of time taken to work through the simulation was not affected by the time at which the people participated. The average times taken by the participants in the three runs were 79, 92, and 80 minutes respectively. The average time for all of the participants was 87 minutes.

Table 10

The Performance of the Participants in the Three Runs of the Simulation

| Run | Number of Participants | Average Amount of Information | Average Length of Time in Minutes |
|---|---|---|---|
| 1 | 10 | 71 | 79 |
| 2 | 8 | 71 | 92 |
| 3 | 9 | 66 | 80 |
| Total | 27 | 69 | 87 |

4. Table 11 shows that there was a substantial positive correlation (.45) between the type of school in which the participants were employed (school type was scored as follows: elementary school, 1; junior high school, 2; junior-senior high school, 3; and senior high school, 4) and their average satisfaction scores. This suggests that the more nearly the simulation describes an environment with which the participant is familiar, the more satisfied he will be with making decisions in the simulation. This inference is supported by a statement of one of the participants: "Elementary situations are more meaningful to me." On the other hand, there was no consistent relationship between the amounts of information requested by the participants and the type of school in which they were employed.

5. It can be inferred from the content of the responses to the paragraph completion instruments (refer to Chapter Three for illustrations) that knowledge of the background information contributed to the participants' feelings of involvement in the simulation. However, Table 11 shows that the scores of the participants on the forty item test on the background information were not related to any of the decision variables examined in this study with the exception of the length of time taken to complete the simulation.

6. There were features of the design of the simulation which were related to the amounts of information accumulated by the participants. On the average, the participants requested a much higher proportion of the total information available for the teacher selection segment than for the other two segments--72 per cent as compared to 38 per cent and 49 per cent for the last two segments.

Table 11

Product-Moment Correlations of the Demographic Variables and the Simulation Performance Variables

| | A | TE | AE | P | ST | TS | TT | DE | TS |
|---|---|---|---|---|---|---|---|---|---|
| Age | 1.00 | .665 | .403 | .146 | .273 | .212 | .161 | .063 | .226 |
| Teaching Experience | | 1.00 | .587 | .498 | .115 | .359 | .459 | .222 | .369 |
| Administrative Experience | | | 1.00 | .694 | .131 | .674 | .482 | .422 | .268 |
| Position | | | | 1.00 | -.107 | .550 | .600 | .397 | .205 |
| School Type | | | | | 1.00 | .128 | .104 | -.051 | .223 |
| Teacher Selection Experience | | | | | | 1.00 | .208 | .319 | .202 |
| Teacher Scheduling Experience | | | | | | | 1.00 | .542 | .217 |
| Discipline Experience | | | | | | | | 1.00 | .091 |
| Test Score | | | | | | | | | 1.00 |
| Amount of Information--Segment 1 | | | | | | | | | |
| Amount of Information--Segment 2 | | | | | | | | | |
| Amount of Information--Segment 3 | | | | | | | | | |
| Total Amount of Information | | | | | | | | | |
| Simulation Time | | | | | | | | | |
| Simulation Run | | | | | | | | | |
| Average Satisfaction Score | | | | | | | | | |

Table 11 (continued)

Product-Moment Correlations of the Demographic Variables and the Simulation Performance Variables

| | 1-1 | 1-2 | 1-3 | 1-T | ST | SR | AS |
|---|---|---|---|---|---|---|---|
| Age | .031 | .257 | .226 | .200 | .392 | .203 | .160 |
| Teaching Experience | .091 | .239 | .195 | .207 | .488 | .007 | .020 |
| Administrative Experience | .274 | .096 | .433 | .272 | .442 | .096 | .063 |
| Position | .023 | .131 | .197 | .015 | .230 | .085 | .231 |
| School Type | .184 | .156 | .367 | .246 | .059 | .000 | .450 |
| Teacher Selection Experience | .235 | .101 | .510 | .286 | .177 | .185 | .098 |
| Teacher Scheduling Experience | .311 | .129 | .143 | .218 | .263 | .000 | -.157 |
| Discipline Experience | .274 | .121 | .255 | .244 | .286 | -.104 | -.143 |
| Test Score | .326 | .206 | .054 | .228 | .411 | .292 | .238 |
| Amount of Information--Segment 1 | 1.00 | .664 | .512 | .807 | .512 | .134 | .075 |
| Amount of Information--Segment 2 | | 1.00 | .640 | .927 | .378 | -.111 | -.061 |
| Amount of Information--Segment 3 | | | 1.00 | .817 | .182 | -.060 | .089 |
| Total Amount of Information | | | | 1.00 | .393 | -.073 | .007 |
| Simulation Time | | | | | 1.00 | .253 | -.099 |
| Simulation Run | | | | | | 1.00 | .334 |
| Average Satisfaction Score | | | | | | | 1.00 |

(a) It seems likely that the high proportion of information requested in the first segment can be at least in part attributed to the ambiguity of the teacher selection task (thirteen participants chose one teacher, fourteen chose the other). Support for such a conclusion can be found in the work of Seiber and Lanzetta (1962) and Kogan and Wallach (1967); their research has shown that as problem uncertainty and ambiguity increases, the amount of information required to make a decision increases.

(b) The low proportion of information requested in the second segment was probably related to the format in which the information was presented. In the simulation, the students to which the teachers were to be assigned were grouped homogeneously. Because the first group of students in a grade was always superior to the second, and the second group always superior to the third, and so on, it could be expected that the participants would discover this pattern. Once this pattern was determined, further information gathering would be redundant.

7. Features of the design of the simulation also had an effect on the order in which the information was requested by the participants. In the first two segments of the simulation, the information was tabulated in a comparative manner: information about one teacher was placed opposite the same information about the other teacher (see Figure 2); information about one group of students was juxtaposed to the same information about the other student groups (see Figure 3). In these two sequences, the great majority of the participants requested information in a comparative order. In the third sequence, information was presented in a random order. Analysis of the information

accumulated by the participants revealed no recurring pattern of requests.

8. As could be expected, there was a consistent, very strong relationship between the amounts of information requested by the participants in the three segments of the simulation and the amounts of time they took to work through the three segments. Tables 15, 16, and 17 show that, over the three segments of the simulation, the correlations between these two variables were .784, .756, and .874 respectively. Table 11 shows that the correlation between the total amount of information requested in the simulation and the total length of time taken to work through the exercise was somewhat smaller, .393. The reduced correlation can be attributed to the fact that, when computing the total time taken to work through the simulation, the times spent by the participants in completing the true-false test and in responding to the off-line instruments were included. Neither of these were included in calculating the time taken by the participants to work through the three segments of Jarac.

## The Decision Responses of the Participants

1. Table 2 has shown that the participants tended to request consistent amounts of information in the three segments of the simulation. This consistency of behavior has been reported by most studies on individual decision making (Kogan and Wallach, 1967) and human information processing (Schroder, Driver, and Streufert, 1967). This consistency does not imply an absolute level of response which the participant always achieves, but rather that the individual tends to

respond at a consistent level relative to the other participants.

2. Tables 12, 13, and 14 show that the participants also tended to respond in a consistent way to measures of (a) their ability to rationalize their decisions, (b) their ability to anticipate the consequences of their decisions, and (c) their tendency to attach qualifying statements to their decisions. It should be noted that the respondents responded most fully to each of the instruments after the first segment of the simulation.

Table 12

Product-Moment Correlations of the Number of Reasons Given for a Decision in Each Segment

| | One | Two | Three |
|---|---|---|---|
| Segment One | 1.00 | .522 | .483 |
| Segment Two | | 1.00 | .585 |
| Segment Three | | | 1.00 |
| Mean Number of Responses | 6.0 | 3.4 | 3.9 |

Table 13

Product-Moment Correlations of the Number of Consequences Given for a Decision in Each Segment

| | One | Two | Three |
|---|---|---|---|
| Segment One | 1.00 | .526 | .194 |
| Segment Two | | 1.00 | .389 |
| Segment Three | | | 1.00 |
| Mean Number of Responses | 2.9 | 2.4 | 2.8 |

Table 14

Product-Moment Correlations of the Number of Qualifying Statements Given with a Decision in Each Segment

| | One | Two | Three |
|---|---|---|---|
| Segment One | 1.00 | .505 | .338 |
| Segment Two | | 1.00 | .677 |
| Segment Three | | | 1.00 |
| Mean number of Responses | 2.1 | 2.0 | 1.6 |

3. Table 11 shows that, in general, the demographic variables studied were significantly related among themselves but they were not related to the decision responses of the participants. This finding is not surprising in view of some of the studies reported in Duncan (1959) and Kogan and Wallach (1967). Nevertheless, it had been expected that there would be some relationship between the participants' experiences in teacher selection, teacher scheduling, and dealing with discipline problems on the one hand, and their decision responses in the three segments on the other. Such relationships were not found, although there were weak tendencies in a positive direction.

4. The amount of time taken to complete the simulation was found to be related to the age, teaching experience, and administrative experience of the participants. While these correlations shown in Table 11 might be attributed to chance or sampling error, it is also possible that they replicate findings reported in Kogan and Wallach (1967) and Duncan (1959). In those studies it was found that older subjects tend to be more conservative than younger subjects, and that one indicator of this conservatism is the amount of time taken to make a decision.

The remainder of the findings to be reported here deal with the performance of the participants in the three segments of the simulation. Tables 15, 16, and 17 show the correlations among the decision variables for each of the three segments of Jarac. All correlations significant at the .10 level or better are marked with an asterisk.

Table 15

Product-Moment Correlations of the Decision Variables:
Segment One

| | I | R | C | Q | TS | T | PS | DS |
|---|---|---|---|---|---|---|---|---|
| Amount of Information | 1.00 | .429* | -.144 | .196 | .039 | .784* | -.092 | .400* |
| Number of Reasons | | 1.00 | .248 | .472* | -.033 | .649* | -.146 | .322* |
| Number of Consequences | | | 1.00 | .653* | -.257 | .035 | -.256 | -.069 |
| Number of Qualifications | | | | 1.00 | -.252 | .400* | -.390* | .288 |
| Total Satisfaction | | | | | 1.00 | -.072 | .929* | .209 |
| Sequence Time | | | | | | 1.00 | .217 | .448* |
| Procedural Satisfaction | | | | | | | 1.00 | -.159 |
| Decision Satisfaction | | | | | | | | 1.00 |
| Mean Response | 22.8 | 6.0 | 2.9 | 2.1 | 36.0 | 13.1 | 14.8 | 10.7 |

*Significant at the .10 level or better

Table 16

Product-Moment Correlations of the Decision Variables:
Segment Two

| | I | R | C | Q | TS | T | PS | DS |
|---|---|---|---|---|---|---|---|---|
| Amount of Information | 1.00 | .078 | -.163 | .015 | .013 | .756* | -.161 | .286 |
| Number of Reasons | | 1.00 | .377* | .056 | .303* | -.025 | .292 | .255 |
| Number of Consequences | | | 1.00 | .522* | .177 | -.222 | .208 | .061 |
| Number of Qualifications | | | | 1.00 | -.165 | -.096 | -.273 | .085 |
| Total Satisfaction | | | | | 1.00 | .029 | .934* | .770* |
| Sequence Time | | | | | | 1.00 | -.126 | .243 |
| Procedural Satisfaction | | | | | | | 1.00 | .499 |
| Decision Satisfaction | | | | | | | | 1.00 |
| Mean Response | 26.7 | 3.4 | 2.4 | 2.0 | 37.6 | 20.3 | 13.2 | 10.0 |

*Significant at the .10 level or better

Table 17

Product-Moment Correlations of the Decision Variables:
Segment Three

| | I | R | C | Q | TS | T | PS | DS |
|---|---|---|---|---|---|---|---|---|
| Amount of Information | 1.00 | .337* | .104 | -.021 | .145 | .874* | .102 | .181 |
| Number of Reasons | | 1.00 | .595* | .317* | .026 | .229 | -.043 | .063 |
| Number of Consequences | | | 1.00 | .520* | .114 | .182 | .091 | .072 |
| Number of Qualifications | | | | 1.00 | -.039 | -.019 | .011 | -.156 |
| Total Satisfaction | | | | | 1.00 | .117 | .965* | .808* |
| Sequence Time | | | | | | 1.00 | .082 | .185 |
| Procedural Satisfaction | | | | | | | 1.00 | .639* |
| Decision Satisfaction | | | | | | | | 1.00 |
| Mean Response | 19.4 | 3.9 | 2.8 | 1.6 | 39.4 | 9.3 | 15.7 | 10.5 |

*Significant at the .10 level or better

It had been expected that the decision variables, if they were successfully operationalized and if the participants did not become bored with the testing procedures, would be significantly and consistently interrelated. The results did not meet this expectation fully but, since they partially replicate the findings of other studies, they lend some support to the procedures and instruments used in this study.

The findings which are listed below are those which were achieved with some consistency over the three segments of the simulation.

5. Tables 15, 16, and 17 show that there was a strong relationship between the number of consequences that the participants were able to anticipate for their decisions and the number of qualifying statements that they attached to their decisions in each of the segments of the simulation. Such a relationship could be expected because of the partial overlapping of the two variables and because of the similar ways in which they were operationalized. The number of consequences identified by an individual is one measure of his ability to anticipate the repercussions of his decision. The tendency of an individual to attach qualifying statements to his decisions is also partially an indicator of his ability to anticipate the future, particularly if the qualification suggests some event in the future upon which the success of a present decision is dependent.

6. Tables 15 and 17 show that in the first and third segments of the simulation there were significant positive correlations between the amounts of information requested by the participants and the number of reasons they gave for having made their decisions. It appears that the broader the information base of a participant before he made a

decision the more fully he could rationalize his decision.

7. As could be expected because of the nature of the procedures for scoring the satisfaction instrument, the summated scores of the participants on the two components of the satisfaction instrument tended to be significantly related between themselves and to the total satisfaction score.

8. The number of reasons that the participants gave for having made their decisions tended to be positively related to both the number of consequences which they anticipated for their decisions and to the number of qualifying statements they attached to their decisions. On the one hand it could be argued that these positive relationships are an artifact of a common method of measurement--the paragraph completion instrument. On the other hand, research by Seiber and Lanzetta (1962), Festinger (1964), and Schroder, Driver, and Streufert (1967) has shown that there are consistent individual differences in the amount of information given with a decision and that the relationships observed in this study are theoretically meaningful. Because of the divergence of these two interpretations, it is unwarranted to draw any conclusions about these relationships on the basis of present evidence. Further research into these relationships is clearly needed, and refinements of the three instruments and of scoring procedures for them are first priorities.

## Discussion of the Results

According to the theoretical point of view taken in this study, decisions cannot be effectively understood if they are looked upon only

as single, dramatic choices between alternatives. Because most decisions are made in a complex environment, it is more useful to consider them as a sequence of activities which enable the decision maker to respond to his task and environment in an appropriate way. This sequence probably includes selecting information about the alternatives, determining the implications of the information, and making some judgements about a suitable preference order to place on the alternative courses of action.

This study, and also many of the related studies reported in Chapter Two, paid particular attention to three dimensions of this broadly sketched theory:

(a) the implications of the model for the design of the research setting;

(b) the relationship between the decision maker and his environment;

(c) the relationship between information acquisition and decision response.

Each of these will be discussed in turn.

## The Information Processing Model of Decision Making

The information processing approach to decision making is concerned with the ways in which information is acquired and processed in coming to a decision. The model isolates the information gathering aspects of decision making and, in so doing, provides useful insights into the design of simulated information systems.

In this study, the information model directed attention to some

of the features of the interface between the participants and the computer and to the information bearing nature of this interface. The interface was described in terms of two main activities, giving information and receiving information. When the computer was giving information, the participants were receiving it, and vice-versa.

The model also suggested that the research setting had to be designed in such a way that different persons using different ways of processing information could reach different decisions under the same conditions. That is, the simulation had to be programmed in such a way that the paths taken through it by the participants would be a reflection of individual differences in decision making.

Finally, the model indicated the relevance of examining the responses which follow the acquisition of information and the making of a decision.

## Interaction between Individual and Environment

Some of the preceding discussions in this Chapter have shown that even though different people responded to the simulation in different ways, the format of the simulation did influence their actions in common ways. That is, certain characteristics of the simulation produced similar effects in different people.

The following properties of the environment influenced the actions of the participants in this study:

(a) the amount of information available;

(b) the procedures to be followed for gathering information;

(c) the form and content of the information;

(d) the order in which the information alternatives were presented;

(e) the degree of ambiguity of the decision alternatives;

(f) the realism of the simulation to the participants and the extent to which the simulation held the interest of the participants.

Other properties of the environment appear to have had some effects, although they were not studied directly:

(g) the combination of on-line and off-line activities in the simulation;

(h) the stress-free, non-competitive nature of the simulation;

(i) the social content of the simulation;

(j) the reliance on subjective as opposed to "real" pay-offs to increase participant involvement in the simulation.

Similar findings have been reported in many other studies. The findings show that the decision maker must adapt to his environment and that he must adjust to the movement and distribution of information within it. They also indicate that, in a study of this kind, the term information must be conceived in its broadest sense--that information relates to the structural properties of the environment as well as to the actual contents of the environment. Finally, the findings of this study suggest that, as long as the structural properties of the environment do not place too many unreal constraints on their behavior, the participants can become involved in the simulation and act in an individual way within it.

## The Relationships Between Information Acquisition and Decision Response

In part, the findings of this study suggest that what was already known about how people respond to their decisions is also an effective way of describing how educational administrators respond to their decisions in a simulated task environment. In common with other research on individual decision making, this study found:

(a) a strong, direct relationship between the amount of information accumulated and the length of time taken to make a decision;

(b) that the participants tended to behave consistently relative to other people;

(c) that there was a relationship between the ability of the participants to anticipate the consequences of their decisions and their tendencies to attach qualifying statements to their decisions;

(d) that there was a relationship between the amount of information acquired by the participants and their ability to rationalize their decisions.

Contrary to expectations, no relationships between the amount of information accumulated by the participants and (a) their satisfaction with their decisions, (b) their ability to anticipate the consequences which their decisions might have, and (c) their tendency to attach qualifications to their decisions were found. Because such relationships have been found frequently in other studies, it is probable that their absence here can be attributed to shortcomings of the instruments used to measure the latter three variables.

## Concluding Statement

The findings reported in this Chapter show that Jarac is a promising instrument for gathering information about administrator decision making in education. They show that, even though the structural properties of the simulation influenced different people in similar ways, the participants were able to act in an individual way in the simulation. Since the present findings partially replicate the results of other studies, they show that the general body of knowledge about human information processing and individual decision making is a useful way of describing the behavior of educational administrators in a simulated task and information environment.

# Chapter Six

## Summary and Conclusions

### Summary

#### The Problem

The central concern of this study was the development of a man-computer simulation of the task-information environment of the Alberta high school administrator. The simulation was to serve as a tool for gathering data about how administrators make decisions.

A related purpose of the study was to conduct some exploratory research into administrator decision making in education. The findings in this regard were also to be used to assess the effectiveness of the simulation as a research tool.

#### Theoretical Analysis of the Problem

The information processing model of decision making was followed in matters relating to simulation design and was also used to suggest the research questions of this study. A review of the research on human information processing filled out the model and provided more concrete indications of what comprised an effective simulation and what specific research questions could be fruitfully asked.

Particular attention was given to materials dealing with the interaction between the decision maker and the task-information environment and to the relationship between information acquisition and the ways in which people respond to their decisions.

## Research Questions

The questions which provided the research focus of this study dealt with the simulation developed for this study and with the decision responses of school administrators. Because the study was exploratory, these questions were phrased in such a way as to suggest as great a number of relationships to examine as possible. In addition, relationships which were observed but which were not within the domains of the initial questions were also described and analysed.

## Methodology and Instrumentation

After the simulation Jarac was fully operational, twenty-seven persons worked through the simulation. Of the twenty-seven, approximately one-half were practicing educational administrators; all of them had had some training in educational administration. As well as working through the simulation proper, the participants completed a number of off-line instruments which were used to describe their decision responses. Each of these instruments was completed three times by all of the participants.

Data provided by the participants performance were analysed using correlation, factor analysis, and the analysis of cross-breaks. Only those relationships which occurred with some consistency throughout the simulation were reported.

# Findings

## The Simulation

It was shown that the simulation was an effective tool for

discriminating among the decision responses of the participants in this study.

The time at which the simulation was run had no quantifiable effect on the performance of the participants.

It was found that the more closely the simulation described the kind of environment with which the participants had had experience, the more satisfied they tended to be with their decisions in the simulation.

The amount of information that was requested by the participants in the simulation was apparently related to the total amount of information available, the content of the information, and the format by which the information alternatives were presented.

## The Decision Making of the Participants

In general, the demographic variables studied were highly interrelated among themselves, but they were not related to any of the decision responses of the participants.

The participants tended to behave consistently as information gatherers and responded consistently to measures of their satisfaction, of their ability to rationalize their decisions, of their ability to anticipate the possible consequences of their decisions, and of their tendency to attach qualifying statements to their decisions.

Those participants who requested an above average amount of information in the three segments of the simulation also tended to give an above average number of reasons for having made their particular decisions.

The participants who gave an above average number of consequences anticipated for their decisions also tended to attach an above average number of qualifying statements to their decisions.

## Conclusions

### In Relation to the Simulation

The simulation developed for this study was an effective tool for the purposes for which it was devised. However, it was a special purpose instrument. For this reason, and because it became apparent that the simulation could be put to many uses with a few changes, the simulation was revised. In its present form, Jarac can be used for a variety of research and training purposes. Minor modifications to the program can be made easily if the objectives of later research and training projects require them.

### In Relation to the Instruments

In general terms, the instruments developed for this study also served the purposes for which they were constructed. Before they could be used in other studies, however, they would have to be revised.

The satisfaction instrument, even though it was reliable and showed validity, did not permit enough discrimination among the responses of the participants. For this reason, the instrument should be lengthened and the four point rating scales attached to each item should be increased to six or seven points.

The three paragraph completion instruments should be given more attention. The results indicate that a content analysis of the responses to these instruments might be more useful than the frequency-

oriented approach used here. Alternatively, if the responses to these instruments are to be quantified, other methods of scoring the instruments should be devised.

### In Relation to the Decision Making of the Participants

In one sense, this study has not contributed any significant new findings to the general body of knowledge about human information processing and individual decision making. However, it has shown that this general body of knowledge is, at least in part, a useful way of describing the decision making behavior of school administrators in a simulated environment. By extension, it might be argued that this same body of knowledge can be used to describe administrator decision making in a real educational environment.

This study has also shown that the participants in this study tended to respond consistently to different tasks, and that there were substantial individual differences in decision making among them when the tasks and the environment were held constant.

## Concluding Statement

Further research is needed to follow this introductory study of administrator decision making in education. The findings of this study and of additional research in this area should provide a basis for an improved understanding of how educational administrators make decisions.

# Chapter Seven

## Suggestions for Further Research

In the preceding Chapters of this report the exploratory nature of this study has been repeatedly emphasized. On the following pages a number of further studies are suggested. These suggestions deal with the use of the simulation technique in educational research, and they cover both studies of simulation procedures and studies of administrator decision making.

Broadly speaking, these suggestions form a coherent group of studies. They are a reflection of the writer's own interests, however, and do not in any way represent an exhaustive catalogue of the possibilities.

### The Expansion of Jarac

When the participants in this study were asked for suggestions for improving the simulation, a number replied that they should have more decisions to make. This recommendation has a greal deal of merit: a much more broadly representative set of tasks would provide a truer picture of the job of the educational administrator, the simulation of the passage of time could be made more effective, and the participants might develop feelings of greater control over the hypothetical situation.

In its present form, participants in the simulation are asked to complete three tasks: select a teacher, set up timetables for two teachers, and deal with a discipline incident. Some of the more

obvious ways in which the simulation could be expanded are listed below; there are many other possibilities.

1. The program could be modified so that one or both of the teachers would object to the teaching assignments given to her by a participant in the simulation.

2. There could be a follow-up to the discipline incident.

3. In the present simulation, both of the hypothetical teachers are new to the staff of Bellevue Senior High. A sequence in which the participants would be asked to recommend one or both of them for permanent appointment could be included.

4. The number of teachers dealt with in the selection and timetabling sequences could be increased.

When making such revisions, attention should be given to the following points:

1. The passage of time should be simulated adequately.

2. The process of accumulating information should be as life-like as possible.

3. The participants should be given the opportunity to retrace their steps through parts or all of the simulation.

4. Above all, the simulation should be designed so that the objectives of the researcher can be met.

In such an expanded form the simulation would be an improved vehicle for studying the research problems which are suggested below.

## Research into a More Effective Use of the Simulation Technique

One of the most frequently recurring problems when designing programs for instructional and research purposes can be expressed in the following way: "How can computer programs be constructed to more adequately take account of individual differences in learning and response styles?" This general statement encompasses a wide variety of related questions. "How should program time be controlled?" "How many alternative paths should be available to users to move through the program?" "In what form and with what content should feedback be given to the participants in the exercise?" "Should some attempt be made to individualize feedback?" In the interests of increasing user involvement in the program and of increasing the realism of the program, these questions and others like them must be dealt with.

The following topics are illustrative of the kind of studies that could be carried out in an effort to come to grips with these problems.

1. Can the passing of time be better simulated by dividing the simulation into segments to be run at different times? Will this segmentation increase or decrease subject involvement in, and satisfaction with, the simulation?

2. How can the information be presented most effectively? What other media can be used to enhance this effectiveness and increase the realism of the simulation?

3. Can greater individualization be achieved by a content analysis of free decision responses rather than by an analysis of user

responses to predetermined alternatives?

4. Should the role-playing aspect of the simulation be eliminated altogether? Would it be more effective if the participants were able to use their own names during the simulation?

## The Development of Simulated Environments

In this study it was shown that the structural properties of the simulated environment had an impact on the performance of the participants in the simulation and that the background material prepared for Jarac contributed to the users' feelings of involvement in the simulation. Researchable questions related to the first of these findings can be inferred easily from a preceding discussion in Chapter Five. Research problems related to the second finding are suggested below. If there is interest in determining the effect of factors in the hypothetical background information on performance in the simulation, it is not sufficient merely to identify those factors. Several other questions must be dealt with, and each of them points to the possible manipulation of a number of situational factors in further studies.

1. In what specific way does the background situation influence behavior in the simulation?

2. Which situational factors influence the behavior of the participants? Which factors have no influence? Are there some factors which influence certain tasks and not others?

3. Which situational factors can be manipulated most fruitfully as independent variables in other studies?

## Information Systems for Schools

Over the past decade interest in educational information systems has become widespread. In many ways, the enthusiasm for such systems has become faddish, and all sorts of claims are made about the gains to be had when information systems are established. To date, however, accomplishments are far outstripped by the claims made.

A number of questions must be carefully researched before these systems can live up to their promise. A simulation such as the one used in this study can play a role in that research.

1. Do administrators suffer more from a lack of information or from an excess of irrelevant information? A study of what information administrators find valuable in solving school problems could make significant contributions to efforts to reduce the information load of administrators.

2. Because educational systems deal with people, research into the confidentiality of information should be carried out. Using the simulation technique, insights into how confidential information is treated could be obtained. Similarly, the pieces of confidential information regarded as essential by administrators for making decisions could be determined.

3. Research into the design of information systems for education should be conducted. Who should have access to the information? How is information best presented? Is it possible to make a self-correcting information system? How is information best classified? What impact will a rationalized information system have on the social structure of the school?

## Administrator Decision Making

The findings reported in Chapter Five are suggestive of many studies that could add much to the body of knowledge about how educational administrators make decisions. Some suggestions for further research were made in that Chapter; other useful studies could including the following:

1. Will improving the quality of information available to administrators necessarily lead to improved decision making? A prior study would involve determining the worth of given decisions; that is, what constitutes a good decision should be examined.

2. What are the effects of training and experience on the performance of skill tasks such as teacher selection and teacher timetabling?

3. What biases and value standards influence the decisions of school administrators? In what way do they have an influence?

## Studies in the Training of Administrators

Because of the complexity of the information environment of the school administrator, it seems desirable that administrators be given some training in making more effective use of information. It is likely that training could provide administrators with some guidelines for evaluating information and for determining when they have enough information to make a decision. It is also probable that this training could help administrators to develop the ability to evaluate their personal decision habits with some degree of objectivity.

In this area, a number of studies come to mind immediately.

1. Training in skill tasks such as teacher selection and teacher scheduling.

2. Training in information evaluation.

3. Training administrators to be more able to anticipate the consequences of their decisions and to be more able to cope with the effects of negative feedback.

## Concluding Statment

In this Chapter a number of studies that could be conducted profitably and that would contribute in important ways to our understandings of the simulation method and of how educational administrators make decisions have been suggested. All of these studies are feasible; each of them could be completed within a reasonable period of time using present resources. As research capability is enhanced by the development of technological hardware and software and by increased understandings of the problems themselves, these studies will become still more feasible.

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# Appendix A

ADMINISTRATOR RESPONSE BOOKLET

PARTICIPANT NUMBER _____

Please provide the following information about yourself:

1. Age _____

2. Years of experience as a classroom teacher _____

3. Years of experience as an administration _____

4. What is (was your last) your position? Check one.

   Principal _____ Department Head _____

   Vice-Principal _____ Classroom Teacher _____

5. In what type of school are you (were your) employed? Check one.

   Elementary school _____

   Junior High _____

   Senior High _____

   Jr. High-Sr. High _____

6. Do you hold an advanced degree in educational administration? If so, please specify. _____

   _____

7. How many university courses have you completed in the following areas?

   Educational administration _____

   Social sciences _____

8. Have you ever participated in a simulated exercise? If so, name the simulation. _____

9. As part of your experience in education have you:

   [a] been involved in the selection of teachers? _____

   [b] been involved in setting up of teachers' timetables? _____

   [c] been involved in resolving a problem in teacher-student relations? _____

## SECTION ONE

On the following pages you will be asked to describe some of your feelings about your decisions. Do not evaluate any of the items in terms of "good" or "bad" behavior, but read each item carefully and respond in terms of how closely the items describe your feelings.

Complete all of SECTION ONE at this time. DO NOT GO ON TO SECTION TWO UNTIL YOU ARE INSTRUCTED TO DO SO.

Decide whether each of the following items describes your feelings very closely, to some extent, not very closely, or not at all. Draw a circle around one of the four letters following the item to show the answer you have selected. Please respond to every item here.

A -- Very closely
B -- To some extent
C -- Not very closely
D -- Not at all

---

| | | |
|---|---|---|
| 1. | I wish I had more information on which to base my decisions. | A B C D |
| 2. | If I had an opportunity to make the decisions again, I would change them. | A B C D |
| 3. | I would have liked to consult with other people before making decisions like these. | A B C D |
| 4. | I wish I could have had more time to make the decisions. | A B C D |
| 5. | I don't really like the decisions I made, but they were the best ones possible under the circumstances. | A B C D |
| 6. | I made my decisions after examining all the necessary information. | A B C D |
| 7. | It is not likely that I could have made a better decision under the circumstances. | A B C D |
| 8. | If I was faced with a similar situation again, I would make the same kind of decision. | A B C D |
| 9. | I made an honest effort to deal with the problem. | A B C D |
| 10. | I am satisfied with the decisions I made. | A B C D |
| 11. | I have some lingering doubts about the decisions that I made. | A B C D |

Using the sentence leads which appear below, and on the next two pages, write 3 paragraphs describing your feelings about the decision which you just made. Put down anything that comes to mind -- nothing that you write will be criticized in any way.

I made this decision because _____

The consequences of my decision will be _____

When I made this decision I was worried that _____

## SECTION TWO

On the following pages you will be asked to describe some of your feelings about your decisions. Do not evaluate any of the items in terms of "good" or "bad" behavior, but read each item carefully and respond in terms of how closely the items describe your feelings.

Complete all of SECTION TWO at this time. DO NOT GO ON TO SECTION THREE UNTIL YOU ARE INSTRUCTED TO DO SO.

Decide whether each of the following items describes your feelings very closely, to some extent, not very closely, or not at all. Draw a circle around one of the four letters following the item to show the answer you have selected. Please respond to every item here.

A -- Very closely
B -- To some extent
C -- Not very closely
D -- Not at all

---

| | | |
|---|---|---|
| 1. | I wish I had more information on which to base my decisions. | A B C D |
| 2. | If I had an opportunity to make the decisions again, I would change them. | A B C D |
| 3. | I would have liked to consult with other people before making decisions like these. | A B C D |
| 4. | I wish I could have had more time to make the decisions. | A B C D |
| 5. | I don't really like the decisions I made, but they were the best ones possible under the circumstances. | A B C D |
| 6. | I made my decisions after examining all the necessary information. | A B C D |
| 7. | It is not likely that I could have made a better decision under the circumstances. | A B C D |
| 8. | If I was faced with a similar situation again, I would make the same kind of decision. | A B C D |
| 9. | I made an honest effort to deal with the problem. | A B C D |
| 10. | I am satisfied with the decisions I made. | A B C D |
| 11. | I have some lingering doubts about the decisions that I made. | A B C D |

Using the sentence leads which appear below, and on the next two pages, write 3 paragraphs describing your feelings about the decision which you just made. Put down anything that comes to mind -- nothing that you write will be criticized in any way.

I made this decision because _____

The consequences of my decision will be

When I made this decision I was worried that

## SECTION THREE

On the following pages you will be asked to describe some of your feelings about your decisions. Do not evaluate any of the items in terms of "good" or "bad" behavior, but read each item carefully and respond in terms of how closely the item describes your feelings.

Complete all of SECTION THREE at this time. DO NOT GO ON TO SECTION FOUR UNTIL YOU ARE INSTRUCTED TO DO SO.

## DECISION FOR DISCIPLINE SEQUENCE

You have indicated that you are ready to make a decision about how you would handle this discipline incident. Please outline below any actions you would take. Devise a solution which you think would really be effective in a situation such as the one described to you. Describe your solution in some detail. Your response here will not be criticized or evaluated in any way.

Decide whether each of the following items describes your feelings very closely, to some extent, not very closely, or not at all. Draw a circle around one of the four letters following the item to show the answer you have selected. Please respond to every item here.

A -- Very closely
B -- To some extent
C -- Not very closely
D -- Not at all

---

| | | |
|---|---|---|
| 1. | I wish I had more information on which to base my decisions. | A B C D |
| 2. | If I had an opportunity to make the decisions again, I would change them. | A B C D |
| 3. | I would have liked to consult with other people before making decisions like these. | A B C D |
| 4. | I wish I could have had more time to make the decisions. | A B C D |
| 5. | I don't really like the decisions I made, but they were the best ones possible under the circumstances. | A B C D |
| 6. | I made my decisions after examining all the necessary information. | A B C D |
| 7. | It is not likely that I could have made a better decision under the circumstances. | A B C D |
| 8. | If I was faced with a similar situation again, I would make the same kind of decision. | A B C D |
| 9. | I made an honest effort to deal with the problem. | A B C D |
| 10. | I am satisfied with the decisions I made. | A B C D |
| 11. | I have some lingering doubts about the decisions that I made. | A B C D |

Using the sentence leads which appear below, and on the next two pages, write 3 paragraphs describing your feelings about the decision which you must made. Put down anything that comes to mind -- nothing that you write will be criticized in any way.

I made this decision because_____

The consequences of my decision will be

When I made this decision I was worried that

## SECTION FOUR

Now that you have completed the simulation we would like to have your general reactions to it. These reactions will be helpful to us in improving the simulation so that it can be put to other uses. Please be specific -- refer to definite parts of the simulation. Please be frank -- without your frank opinions we will not be able to make the needed changes. Some questions to guide you in giving your reactions appear on the following pages.

Thank you for your participation and cooperation in this research project.

1. Is the simulation as a whole well organized?

2. Are the assignments you were given clear and easy to understand?

3. Is there too much material in this simulation to work through in a convenient period of time?

4. Were the decision sequences realistic and true-to-life?

5. Were you asked to do things that you would not do in real life?

6. Did the information presented to you assist you in making decisions?

7. Do you think this simulation could be used for instructional purposes? What changes would be needed to make it more suitable for these purposes?

8. How involved did you become in the simulation? How could it be made more involving?

9. If you have any general comments about the simulation and the way in which it was conducted, please note them here.

# Appendix B

Bellevue is a hypothetical city located in the province of Alberta. The description that follows is not of any certain community, but rather represents a composite of various cities and schools. This material was prepared so that you may gain impressions and develop ideas about this community and its schools. This information will be important to you when you are asked to make decisions in the simulated situation.

In the simulation you will be given the name, James Jackson, Principal of Bellevue Senior High School. This is for convenience in computer programming only; try to act as naturally as you can. Remember that your actions in this simulation will not be evaluated in any way.

## THE COMMUNITY OF BELLEVUE

Bellevue, a city containing approximately 75,000 persons, is Alberta's third largest urban center. It was founded by immigrant farmers and temperance colonists in the late nineteenth century. Wheat farming and associated service industries were the major activities of Bellevue until late in the 1940's. As the population grew, commerce and activities changed to meet the needs of the new citizens.

Around 1950, certain fundamental shifts began to take place in the social and economic nature of the city. As agriculture was mechanized and as more effective use was made of rural labor, the population of the surrounding rural areas declined. At the same time, employment opportunities within the city of Bellevue increased. The

city, which once served in a supportive role to the surrounding agricultural region, has become an economically independent unit. It seems certain that it will continue to grow at a rapid rate for some time to come.

Much of the recent expansion has been prompted by the ready availability of natural gas to be used in the generation of electricity. A number of large companies surveyed the Bellevue area and found it favorable for relocation. Announcements of their new location by these companies brought other related industries and manufacturing concerns to the region. Most of this development occurred in the southern part of the city; while some of the older sections of the city were revitalized, most of incoming businesses and industries located in this newer area.

As in other major cities of Alberta, the shift toward decentralized shopping conveniences and the lack of adequate downtown parking have led to the construction of a number of shopping centers in Bellevue, particularly in the southern subdivisions of the city. This trend has become a matter of local concern, particularly to members of the "downtown" business community.

A number of changes are occurring in the older downtown area. A number of new buildings have been erected recently on sites formerly occupied by run-down facilities. Among the new buildings are a large city hall and a new professional office building.

Several civic associations have joined together to develop a downtown center for community, social and cultural events. When

completed, the museum, library, and sports and recreational facilities are expected to be the focus of activities in Bellevue. The steering committee for the project consists of most of the influential leaders of the community. The leadership of this committee extends beyond this project and additional planning is being made for the rapid growth of the community.

The citizens of Bellevue are typical Albertans. They are organized into service, professional and women's clubs, along with many other special interest groups such as political and religious associations. Most of these clubs and groups are sensitive to recent changes in the city and a number of them cooperate with municipal and school officials in working on common problems.

Although many of the women have jobs by which they supplement the family income, others are active members in community service clubs. One of these, the Home and School Association, receives fairly good support. Its recommendations are frequently recognized in political circles as worthy of consideration. Most recently, it played an active role in assuring that school and recreational lands above the amount required by law would be made available in developing residential areas of the city.

An interesting feature of the community is its ability to absorb new residents without a continual conflict between "old" and "new" citizenry. Community leaders have always stressed the importance of integrating new citizens into the town's social structure. The leaders themselves have not formed a closed political clique.

Bellevue has become a medium-sized city and has problems

associated with the recent growth. Although the city relies heavily upon its new industrial growth, diversified activities and successful farming in the surrounding rural regions have eliminated any threat of economic instability. While the great majority of the residents are middle-class citizens, their concerns for the community coincide with those of the elected officials and unofficial leaders of the city in planning for future needs and providing for the education of their children.

## BELLEVUE CITY SCHOOL DISTRICT

The Bellevue City School District was formed in 1905, the same year that Alberta became a province. From that time until about 1950, enrolments were small and the annual rate of growth was only 1 1/2 per cent. After 1950, however, school enrolments rose even more rapidly than the city population increased. This rapid expansion was accentuated by the attendance of rural young people in the city schools. Problems associated with this rapid growth have been reduced because of the school board's sensitivity to the city's problems.

The local school board isn't considered a self-perpetuating group, not because of unstable community-school relationships, but rather because of the rapid growth of the city and the retirement of some board members. Although the election of board members has been instigated occasionally by various groups, small group or factional interests have not been able to control the board.

Regular school board meetings are held monthly. Members of the

public and the teaching body are encouraged to attend, and over the years attendance has fluctuated as issues of general interest or controversy have arisen. Usually the school principals attend so that they may acquaint themselves with the issues.

Like many other facilities in Bellevue, the school district's administrative center, although relatively new, is inadequate to serve the central administrative staff. Portable structures have been added for additional office and conference space.

The superintendent, Mr. Lane Holmes, is the key figure in the system's administration. He is regarded by the school board as its chief executive officer in educational matters. Mr. Holmes keeps close contact with the schools of the system. He calls meetings every second week for the school principals and outlines his policies pertaining to what he considers the important and pressing educational issues. He always makes himself available to his principals, regarding them as the key to the effective operation of individual schools. He allows his principals much leeway in the operation of their respective schools, but also encourages some degree of system-wide coordination through certain specified operating procedures.

The organizational structure of the central administration seems typical for a district with a school population of nearly 17,000 pupils. In addition to the administrative staff, many supportive personnel, such as school-psychologists, curriculum specialists, and health consultants, are available to assist the classroom teachers.

The student population has changed as the community has changed from one with a rural atmosphere to one with more typical urban

characteristics and expectations. Middle-class values predominate, both in the community and in its schools.

Comprehensive programs are available in the secondary schools. Approximately 15 to 20 per cent of the graduating students attend college, and the problems of keeping a balanced curriculum are continually being examined by the staff in district meetings and workshops. Several new programs such as team teaching, independent study, and new specialized courses have been introduced to achieve a balance in the curriculum.

Concerns at the elementary level are somewhat similar to the secondary schools -- meeting the changing needs of the school population. A major concern is the attempt to assure the continuity of the child's experiences in school.

The open communications between the community and the schools, including the school board, have resulted in excellent financial support from the community. This support has allowed the district to construct new facilities, upgrade and change various programs, and attract and maintain an excellent educational staff.

Planning is a major concern in Bellevue's schools, much of it in the area of building requirements. At the present time one senior-high school, one junior-high school, and three elementary schools are in various stages of planning and/or construction.

Currently there is a great deal of interest in higher education, especially with the possibility of a community college being constructed in this region.

## BELLEVUE SENIOR HIGH SCHOOL

Bellevue Senior High School, built six years ago, is located in the southeastern section of Bellevue. The attendance area encompasses a neighborhood which is made up of both newer and older parts of the city.

The homes within the older parts of the city are generally from twenty to forty years old and appear to be in good repair despite their age. Home owners in this area have been permanent residents; few have left the neighborhood after their children entered secondary school or college. Many of these residents have little or no connection with Bellevue Senior High.

Another portion of the Bellevue Senior High attendance area consists of newer homes. Most of these are owned by new residents of the community. Many members of Bellevue's professional community reside in this area. The boundaries of this part of the attendance area have been changed frequently because of the rapid growth of the city.

The number of rural students enrolled in the school has increased moderately in the past three or four years. However, because of the depopulation of the surrounding rural area, the number of these students is expected to decline steadily in the future.

Bellevue's present enrollment is 750 pupils, which is close to the intended capacity of the building. Fortunately, the planning and construction of new facilities has kept pace with the pupil population growth. It is planned that a new wing will be added to the school

within a year, and that the enrollment will reach 900.

The building itself is designed so that the administrative offices, the library-learning resource center, the cafeteria, and the auditorium-gymnasium can be reached easily from the classroom wings. The various science labs and the limited shop facilities are well equipped. All teachers have the use of small lesson preparation and student-conference areas close to the classrooms in which they do most of their teaching.

Most of the students coming into the high school enter the general or matriculation programs. Because of the limited technical facilities, there are no students enrolled in a full vocational program. Those students wishing to enter a vocational track are transported to the school system's technical collegiate in another part of the city. Of the students who enter the matriculation program in grade ten, approximately 50 per cent are successful in obtaining university entrance requirements. Many of the remaining matriculation and general program students enter the city's post-secondary vocational school. In all, the record of graduates from Bellevue Senior High has been very good.

The instructional staff consists of forty-one full time teachers, a full-time librarian, a full-time guidance counsellor, and two assistant principals who spend half time in the classroom. The principal spends all of his time in administrative work. Since the school has a business manager, little of the principal's time is taken up with routine administrative matters.

The Bellevue staff is well-balanced. The staffs' ages range from

23 to 55 years. Their experience ranges from 1 to 23 years. Six of the staff are beginning teachers and eight have less than three years of experience. Of the forty-seven professional staff members, twenty-nine are male. All of the staff have bachelor's degrees, four are working toward advanced degrees, and two hold master's degrees.

In assessing the characteristics of the staff, the high esprit de corps is mos evident. The teachers work well together and don't seem overburdened by non-teaching activities. Staff turnover at Bellevue is one of the lowest in the city. The few disagreements which have arisen have been resolved either in consultation with the principal or, if not personal, at the regular staff meetings.

These staff meetings serve at least three purposes. Any staff member can have an item included on the agenda simply by notifying the principal. This is a frequent procedure where such items as sports events, visitors, etc., are discussed. A second function of the staff meeting is that the principal can make announcements and bring up matters that he considers necessary. Thirdly, the staff meetings sometimes serve an in-service function with various staff members accepting responsibility for leading discussions on such matters as discipline in the school, new teaching techniques, and the like.

This cooperative atmosphere among the faculty members is reflected in the pupils and their organization, the Students' Council. Discipline is not a great problem in the school. There is only an occasional serious breach of school regulations: such incidents are usually dealt with by the principal himself, or by the faculty at a staff meeting. The Students' Council is encouraged and expected to

deal with many of the minor infractions such as running in corridors, defacing walls or desks, and so on. They do this by excluding offenders from social and athletic events. The offenders always have the right of appeal to the faculty. This device is seldom used but it is considered necessary.

At present, every effort to make the groups of students more homogeneous for instructional purposes is being made. Before homogeneous grouping was introduced, the entire faculty participated in discussions concerning the proposed plan. In these discussions it was agreed that homogeneous grouping was a worthwhile innovation.

Special attention has been given to the problem of student scheduling. It was decided that before teacher, time, or room assignments were made, the students would have to be placed into appropriate groups. Professional assignments could be made after the students were grouped.

The staff, with the assistance of outside resource persons, are continually evaluating the program, trying to determine if the program is meeting the pupil's needs better than the former ungrouped method of instruction. Other secondary schools in Bellevue are observing the program in operation before deciding whether to adopt the scheme themselves.

Although the staff is encouraged by the results of the homogeneous grouping, most staff members have some reservations. They are concerned particularly about the adequacy of the criteria on which grouping decisions are based. Other concerns include the adequacy of the present curriculum and an interest in the balanced social

development of the students.

## THE VACANCY

On the staff of Bellevue High there are two teachers who spend full time in French instruction. The vacancy for near year will be in one of these positions. The teacher assigned to fill the vacancy will work with the returning teacher in developing the school's French program.

This year at Bellevue, oral French is being taught in Grade 10 only. Traditional programs are being offered in Grades 11 and 12. Next year the oral French will be extended to Grade 11; it will be taught in Grade 12 in the following year. Student response to the oral French has been very enthusiastic.

At Bellevue there are very few non-matriculation students taking French. Because University entrance requirements are changing, a number of matriculation students are not taking the language. In general, however, the better students in the school are enrolled in French.

Mrs. Johnson, the teacher who is staying on staff, is completing her second year in this school. She is 25 years old, creative, outgoing, and is becoming a very effective teacher. The students respond well to her oral French program. She has been active in the French Subject Council of the Alberta Teachers' Association, and has strongly advocated the use of oral methods in the teaching of French. Her plans include the completion of an advanced degree in Secondary Education.

The teacher who is being replaced worked well with Mrs. Johnson. The vacancy is occurring because the teacher's husband is being transferred to another city. Because she was a superior teacher her resignation was accepted with regret by the administration.

The applicant who is selected will be expected to work well with the staff and to create a learning atmosphere in her classes in which the students' learning can be maximized.

## CONCLUSION

You should now begin to become identified with Bellevue and its schools, particularly with Bellevue Senior High School. When you enter into the simulated situation, you will be asked to make a number of decisions which will affect Bellevue Senior High School.

# Appendix C

## The Information Available in the Teacher Selection Segment

### MISS BLAKE

1. Fluency in French

   Miss Blake speaks French fairly well. She has taken the Berlitz French program and has made an effort to spend her vacations in Quebec.

2. Academic Awards Received

   In 1957 Miss Blake received a government of Alberta University Entrance Scholarship.

3. School Activities Willing to Direct

   Miss Blake has expressed an interest in forming a French Club in the school.

4. Professional Activities

   Miss Blake is a member of the French subject council of the ATA. She is also an associate member of an American French teachers' association.

5. Teaching Experience

   Miss Blake has taught two years in an Edmonton high school.

6. Teaching Certificate

   Miss Blake holds an Alberta Interim Professional Teaching Certificate.

7. University Coursework in French

   In addition to a methods course, Miss Blake has taken 6 full courses in French. Her average grade as 7.0.

8. Personal Appearance

   Miss Blake appears healthy and possesses good habits of grooming and dress.

9. Interest in Students

   During the course of the interview, Miss Blake expressed an interest in innovations for individualizing instruction.

10. Breadth of General Knowledge

Miss Blake has broad interests in the arts and cultural affairs.

11. Aptitude for Teaching

Miss Blake is an above average teacher. She has the potential to become a master teacher in subject matter and methods.

12. Students' Reaction to Teacher

Students reacted favorably to Miss Blake. They appreciated the interest she expressed in them and her ability to speak their language.

13. Staff's Reaction to Teacher

No mention was made of this in any of the correspondence with her former principal.

14. Cooperation with Administration

Miss Blake did her part in contributing to the success of school functions. Her help was timely and valuable.

15. Classroom Management

Miss Blake conducted a fairly orderly classroom. She had few discipline problems.

16. Techniques of Instruction

By effectively using the oral French method, Miss Blake was able to maintain a high level of motivation among her students. She also spent much time in individual conferences with students.

MISS MOORE

1. Fluency in French

Miss Moore speaks French fluently. She comes from a bilingual family.

2. Academic Awards Received

In 1958 Miss Moore received a Red Deer School District Bursary for Teachers. In the same year she won a government University Entrance Scholarship.

3. School Activities Willing to Direct

Miss Moore is willing to take part in most school projects. She has particular interests in intramural athletics.

4. Professional Activities

Miss Moore is an executive member of the ATA's French subject council.

5. Teaching Experience

Miss Moore has had three years of teaching experience, all in the Red Deer Senior High School.

6. Teaching Certificate

Miss Moore holds a permanent professional certificate.

7. University Coursework in French

In addition to a methods course, Miss Moore has taken 6 full courses in French. Her average grade was 7.0.

8. Personal Appearance

Miss Moore appears healthy and possesses superior habits of grooming and dress.

9. Interest in Students

During the interview Miss Moore expressed interest in the extracurricular activities of the students.

10. Breadth of General Knowledge

While she was a student Miss Moore was active in school and University politics. She has kept her interest in politics.

11. Aptitude for Teaching

Miss Moore is a competent teacher. She shows much promise.

12. Students' Reaction to Teacher

Students reacted favorably to Miss Moore. She developed good rapport with them in extracurricular events.

13. Staff's Reaction to Teacher

Miss Moore got along well with the staff. Her enthusiasm for projects was contagious.

14. Cooperation with the Administration

No mention was made of this in any of the correspondence with her former principal.

15. Classroom Management

Miss Moore conducted a noisy classroom, but a classroom that seemed to provide a good climate for learning.

16. Techniques of Instruction

Miss Moore has been able to achieve a high level of student interest in French. Her teaching sometimes shows much ingenuity.

## The Information Available in the Teacher Scheduling Segment

### STUDENT GROUP 1

1. Age

Average age 15 years; age range 13 to 16 years.

2. Intelligence Level

Average I.Q., 118; i.Q. range 118 to 142.

3. Reading Level

Average ability of 8 on a 9 point scale; range from 7 to 9.

4. Home Background

Many of the students come from homes that are middle class. Their parents are concerned with their progress in school and are able to provide them with some help in their studies.

5. Previous French Record

On the Grade 9 Departmental examinations the average stanine of these students was 8. Their marks ranged from 6 to 9.

6. Likely Response to a Teacher

Student records transferred from junior high schools to Bellevue indicate that these students are an enthusiastic and lively group. Anecdotal records show they work well for most teachers.

7. Exceptional Students in the Group

In this group there are two students with I.Q.'s over 130.

STUDENT GROUP 2

1. Age

Average age 15 years; age range 13 to 16 years.

2. Intelligence Level

Average I.Q., 111; I.Q. range 104 to 122.

3. Reading Level

Reading ability of 7.5 on a 9 point scale; range from 6 to 8.

4. Home Background

Most of these students come from ordinary middle-class homes. A few have parents in the professions. Most of the parents' are concerned with their childrens' performance and some of them can help their children with their work.

5. Previous French Record

On the Grade 9 Departmental examinations the average mark of these students was 6.7. Their scores ranged between 6 and 8.

6. Likely Response to a Teacher

On the whole, this is a good group of students, quite enthusiastic and interested in their work.

7. Exceptional Students in the Group

One student in this group has a rather serious speech defect. It is often a source of embarrassment to him.

STUDENT GROUP 3

1. Age

Average age 15 years; age range 14 to 16 years.

2. Intelligence Level

Average I.Q., 107; I.Q. range 98 to 100.

3. Reading Level

Reading ability of 6.5 on a 9 point scale; range from 5 to 7.

4. Home Background

The home backgrounds of this group of students are very diverse. Only a few of the students have parents who are able to help them with their school work. The parents of many of them are not concerned about their progress.

5. Previous French Record

On the Grade 9 Departmental examinations these students averaged a stanine of 5.6. Their scores ranged between 5 and 7. There is one student in this group who is repeating French 10.

6. Likely Response to a Teacher

They would not respond enthusiastically to most teachers. However, there are no problem students in the group.

7. Exceptional Students in the Group

There are no exceptional students in this group. The student who is repeating French 10 probably merits some special attention.

STUDENT GROUP 4

1. Age

Average age 15 years; age range 14 to 17 years.

2. Intelligence Level

Average I.Q., 103; range 93 to 104.

3. Reading Level

Average reading ability of 5.3 on a 9 point scale; range from 4 to 6.5.

4. Home Background

Most of the students in this group come from lower-middle class backgrounds. Most of the parents are not very concerned with their childrens' progress. Few, if any, could help their children with homework.

5. Previous French Record

Most of these students scored poorly on the Grade 9 Departmental examinations in French. There are five students in the group who are taking French 10 for the second time.

6. Likely Response to a Teacher

This group is likely to pose a number of problems for an average teacher.

7. Exceptional Students in the Group

In this group there are no students who would be classified as exceptional. The five repeaters should be given some special attention by the teacher.

STUDENT GROUP 5

1. Age

Average age 16 years; age range 14 to 17 years.

2. Intelligence Level

Average I.Q., 115; I.Q. range 108 to 133.

3. Reading Level

Average reading ability of 7.8 on a 9 point scale; range from 7 to 9.

4. Home Background

Most of these students come from upper-middle class backgrounds. Most of their parents are concerned about their progress in courses and most of them are able to provide some help.

5. Previous French Record

All of these students did well in French 10. Nearly all of them obtained marks above 70%.

6. Likely Response to a Teacher

The records of this groups' performance in Grade 10 show that the students in it are enthusiastic and interested in learning a second language.

7. Exceptional Students in the Group

There is one student with an I.Q. above 130.

STUDENT GROUP 6

1. Age

Average age 16 years; age range 15 to 17.

2. Intelligence Level

Average I.Q., 110; I.Q. range 103 to 119.

3. Reading Level

Average reading ability of 7.1 on a 9 point scale; range from 6.3 yo 7.8.

4. Home Background

The home backgrounds of these students are very mixed. Most of the parents are quite interested in their children's performance and some of them are able to give their children help with their school work.

5. Previous French Record

Most of these students did fairly well in French 10. There are two students taking French 20 for the second time.

6. Likely Response to a Teacher

There are no students in this class who can be expected to give a teacher trouble. A few are enthusiastic about taking the class. Most of the students, however, are taking it because they have to.

7. Exceptional Students in the Group

There are no exceptional students in this group. One of the students speaks French fluently (she is a Grade 10 student who has been given permission to take French 20). There are two students in the class who are taking French 20 for the second time.

## STUDENT GROUP 7

1. Age

   Average age 16 years; age range 15 to 18 years.

2. Intelligence Level

   Average I.Q., 100; I.Q. range 95 to 111.

3. Reading Level

   Average reading ability of 5.8 on a 9 point scale; range from 4.7 to 6.9.

4. Home Background

   The majority of these students come from lower-middle class homes. A few of the parents are interested in the progress of their children, but only a couple are able to help with school work.

5. Previous French Record

   None of these students did very well in their French 10 classes. Two are taking French 20 for the second time.

6. Likely Response to a Teacher

   None of these students are interested in taking French. There are three or four who are likely to be difficult to deal with.

7. Exceptional Students in the Group

   There are no exceptional students in this group although the repeaters may require some special attention.

## STUDENT GROUP 8

1. Age

   Average age 17 years; age range 15 to 18 years.

2. Intelligence Level

   Average I.Q., 115; range 107 to 135.

3. Reading Level

Average reading ability of 7.8 on a 9 point scale; range from 6.5 to 9.

4. Home Background

About half of these students come from homes that are middle class in character. The parents of all of these students are concerned with their progress, particularly because this is graduating year.

5. Previous French Record

All of these students have done rather well in their previous French classes. Many of them have scored in the high 80's and 90's on examinations.

6. Likely Response to a Teacher

In the past, this group of students has been interested in learning a second language. This year, because of the Departmental examinations facing them at the end, they are likely to be even more attentive.

7. Exceptional Students in the Group

There are two students in this group with I.Q.'s over 130.

STUDENT GROUP 9

1. Age

Average age 17 years; age range 16 to 18 years.

2. Intelligence Level

Average I.Q., 107; range 102 to 115.

3. Reading Level

Average reading ability of 6.8 on a 9 point scale; range from 6 to 8.

4. Home Background

The backgrounds of these students are very heterogeneous. Their parents are very concerned about their progress in this, their graduation year.

5. Previous French Record

All of these students have successfully completed their previous French classes. As a group, their average on the French 20 final was 60%.

6. Likely Response to a Teacher

In the past, many of these students have not been very interested in French. Because they face Departmental examinations this year, most of them can be expected to try harder.

7. Exceptional Students in the Group

There is one student in this group with a speech impediment.

STUDENT GROUP 10

1. Age

Average age 17 years; age range 16 to 19.

2. Intelligence Level

Average I.Q., 104; I.Q. range 96 to 109.

3. Reading Level

Average reading ability of 5.6 on a 9 point scale; range from 4.8 to 7.6.

4. Home Background

Most of these students come from lower-middle class homes. Many of their parents are interested in their progress for the first time.

5. Previous French Record

While most of these students have not failed their previous French courses, their marks have not been very high. There are two students in the group taking French 30 for the second time.

6. Likely Response to a Teacher

A number of the students in this group have caused problems for their teachers in other years. Some of them can be expected to improve their conduct, but others will remain unchanged.

7. Exceptional Students in the Group

There are no exceptional Students in this group. The repeaters will need special help if they are to graduate this year.

## The Information Available in the Discipline Segment

### INFORMATION ON THE STUDENT

1. Age

Garry is 17, which is slightly older than the average age of his classmates.

2. Intelligence

In the past three years, Garry's scores on intelligence tests have ranged between 104 and 109. This is close to the average of his classmates.

3. Family Background

Garry's background could be described as lower-middle class. His father works in a pipe plant in Bellevue. Because he has a number of younger brothers and sisters, his mother does not work. Both his parents are deeply religious. His father has been active in the Employee's Union at the pipe plant. His mother does not belong to any clubs or associations in the city.

4. Previous Record in French

Before this year, Garry had taken French in Grades 9 and 10. On the Grade 9 Departmental examination he received a 6. Last year, in French 10, he obtained a final mark of 58%.

5. Criminal Record

Garry has no criminal record.

6. His Report on the Incident

Garry was concerned about the incident. On the day it happened he was moody and preoccupied with everything but school. He was also very embarrassed by the teacher's words and resented them deeply. In his words, "She didn't have any right to say those things to me!"

7. Record of his Interview with the Guidance Counsellor

At registration time early in September Garry had a short interview with the guidance counsellor of the school. In that interview he expressed concern about the courses he would take and how those courses might affect his future. At the same time he seemed to have no pressing personal problems that were bothering him.

8. Personal Qualities

Garry is a nice boy. As a general rule he is interested in his work. He does most things willingly.

9. Emotional Stability

Garry has shown no unusual tendency to be emotionally unstable.

10. Motivation

In general, Garry seems to be motivated to do his school work. At present, however, he is concerned about his future and the effects his work will have on it.

11. Courtesy

With the exception of the very infrequent outburst, Garry has always been very courteous in school.

12. Attentiveness in Class

Garry has been a willing student during his time at Bellevue. He has, of course, been more enthusiastic about some of his classes than others. French has not been one of his strong subjects.

13. Exceptional Characteristics

Garry has no exceptional or unusual characteristics which set him off from his classmates.

14. Reading Ability

At the beginning of the year Garry was given the Gates Reading Ability Test. He scored at the average of his age and grade group.

15. His Friends

Garry's friends are very much like him. They all seem to be typical boys. None of them has ever been in serious trouble.

16. Participation in Student Activities

Garry has not been an active participant in student activities. Last year he tried out for the football team but wasn't able to make the squad. He has taken no interest in the Student's Council.

17. Response to Other Teachers

Garry has responded very well to some of the teachers at Bellevue, particularly those who are teaching subjects that interest him. He seems to take quite a while to get to know his teachers--he is reserved with most of them for a fairly long time.

18. General Record in School

Garry's record on examinations has been good for his ability. His average grade is between 65 and 70%. Until this time he has not been a serious problem to any of his teachers.

19. Previous Discipline Problems

In the past, Garry's activities in the school have not been a cause for concern. He has generally been a well-behaved student.

20. Attendance

Garry's attendance this year has been good--he has missed only one out of 28 school days.

## INFORMATION ON THE TEACHER

1. Empathy with Students

   She seems to have established a good rapport with her students and appears to be able to "talk their language."

2. Report on the Incident

   The incident bothered her. In her opinion Garry was being deliberately rude. Because the class had been disrupted on two or three occasions in the past, she decided it was time to "lay down the law."

3. Emotional Stability

   She has shown no tendency toward emotional instability.

4. Interest in Students

   She seems interested in her students and their general well-being. At the only staff meeting of the year she voiced concern about the effects of homogeneous grouping on the social development of students.

5. General Control of Students

   This is the first discipline case which she has referred to you. In the staff room she has occasionally mentioned the name of one student who had given her trouble, but this problem apparently has been taken care of.

6. Cooperation with the Administration of the School

   She has cooperated well with the administration. She has questioned the need for filling in reports and attendance forms; nonetheless, she completes them and hands them in when they are due.

7. General Attitude

   She is regarded by her colleagues as an asset to the school. She is cheerful and almost always enthusiastic about her work and about participation in out-of-class activities.

8. Adaptability to New Situations

   She seems to be able to cope with any situation that might confront her. On occasion she appears to over-react. She is aware of this tendency and attempts to offset it.

9. Motivation for Teaching

She is very interested in teaching and intends to pursue it as a career. She is very interested in students and takes a great deal of pride in their progress.

10. Idiosyncracies

She has no unusual habits which could interfere with her work.

11. Sense of Humor

She has a good sense of humor and it has been a help to her in the management and control of her classes.

12. Teaching Methods

She tends to rely on lecture methods for presenting her course material. She frequently takes her students into the school's language laboratory to practice speaking French.

13. Techniques of Discipline

When disciplining students she always explains the reasons for her actions and emphasizes the importance of order in the classroom. She uses her sense of humor to good advantage, disciplining students in such a way that they do not become angry at her.

14. Participation in Student Activities

She has helped the students with some of their extra-curricular activities but she has never dominated them. The students seem to enjoy her help in these matters.

15. Feelings about the Student Involved

She is concerned that her actions will affect her relations with the student involved. She feels that her actions were warranted in the situation, and hopes that Garry will improve his behavior because of her actions.

16. Relations with other Students

She has tried to maintain good relations with all of her students and has been largely successful. Only a couple of minor incidents have arisen in her classes.

17. View of the Problem

She feels that Garry is unsure of himself and his future and that this uncertainty was probably at the root of much of his embarrassment.

18. Previous Discipline Problems

She has had no serious discipline problems before this incident. She has had to clear up a few minor problems and has done so successfully.

19. Report of her Interview with the Student's Parents

Early in the Fall she had a short interview with Garry's mother who was concerned about his attitude toward school. At the time she assured Mrs. Murphy that she would do what she could to improve matters.

20. Willingness to Compromise

Although she holds many of her opinions strongly, she does not seem to be unwilling to compromise if she feels it will gain something.