

**THE UNIVERSITY OF MANITOBA**

**THE EDUCATION EXECUTIVE INFORMATION SYSTEM:  
A Manitoba Study of the Decision Making  
and Information Requirements  
of Community College Administrators**

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**by**

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A MANITOBA STUDY OF THE DECISION MAKING AND INFORMATION REQUIREMENTS  
OF COMMUNITY COLLEGE ADMINISTRATORS

BY

GREGORY M. ANDERSON

A thesis submitted to the Faculty of Graduate Studies of  
the University of Manitoba in partial fulfillment of the requirements  
of the degree of

MASTER OF EDUCATION

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## ABSTRACT

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It goes without saying that the educational enterprise requires information for administrative decision support purposes, and one could argue that the need in education is as great as it is in the private sector. One could also argue that there is a technological lag in terms of what educational information systems are providing the administrator, vis-a-vis what is possible, and what is currently being done within the private sector. This is not due to the inability, nor the desire, to have the information technology, but is often due to financial and human resource constraints. However, the technological aspect is not the only factor in the information gathering equation. There is another component in the dissemination of information that involves defining precisely what information is required and necessary for the educational administrator to make effective decisions. This study is about defining the information requirements of educational administrators, specifically the administrators of the Community Colleges within Manitoba.

The educational administrator faces challenges every day in making decisions that affects his or her employees, students, and the community at large. This study attempts to explore what information is necessary to help make these decisions in two Manitoba Community Colleges, and how specific information can be obtained to assist in the administrator's decision making process. This study was conducted due to the

observation that there was not a cohesive process which could provide effective information to the Community College administrator, information that sometimes was readily available, but was not in a useable form. This study also defines a model and a procedure that is effective in deciding what specific information, in form and substance, is required for the decision process to be effective for the administrator and, ultimately, the organization.

Thus, our problem statement was stated as: What are the information requirements of senior level management within selected Manitoba Community Colleges that will support and improve the quality of administrative decision and problem solving activities. The study also explored the types of decisions the selected administrators tended to make, what kind of information they can use, and what information solutions can be recognized.

The study surveyed, through an interview process, five senior Manitoba Community College administrators from two of the three Community Colleges in Manitoba, Assiniboine Community College and Red River Community College. The instrument was developed by the author and included three distinct parts: A survey of the administrators information sources, their current computer use, and a definition of the Critical Success Factors (CSF) within their respective departments and organizations. The latter portion of the study, the determination of the Critical Success Factors, was based on the research of John F. Rockart and others from the Center for Information Systems Research in the Massachusetts Institute of Technology. This CSF

methodology was used to study the Manitoba Community Colleges in terms of the administrative requirement for information to effectively accomplish their management objectives and goals, and in terms of the overall organization's mission.

The results of the study indicated a number of conclusions relevant to Manitoba Community College Administrators. The study concluded that computer use for Community College administrators was integral to the management process, that both computer and non-computer information is equally used, that Red River Community College administrators utilized computer-based information more than their Assiniboine Community College counterparts, that there was information lacking at both colleges to support administrative decisions (Assiniboine Community College had less adequate information than did Red River Community College), and that the three priority systems for improvement were the Student Record System, the Financial Information System, and the Personnel and Staffing Information System.

More importantly, however, the study indicated that the Critical Success Factor method was a viable process for determining specific information requirements for the Community College Administrators. From the study a model, the Integrated Management Information Systems model (IMIS), was also developed that integrated the CSF methodology into a management model that can be a practical method for not only determining management information requirements, but also for the ongoing evaluation of management objectives within the organization's mission.

A number of recommendations were outlined in the study and included: the IMIS model and the CSF process of information determination be implemented within the management of Manitoba Community Colleges, a distributed data processing model be considered, further computer and systems training be provided for Community College administrators, a decision support system for administrators be purchased or developed, a Chief Information Officer be designated to coordinate the information needs of each institution, and a long range information services plan be formulated for each college. These recommendations were summarized from the study and are intended to be a stepping stone towards the ultimate goal of providing a comprehensive information systems solution to the Manitoba Community Colleges.

The study indicated that information is essential to the Manitoba Community College administrator and, further, that the information required tends to be fluid, always changing according to the particular administrative problem and decisions that the administrator faces at that particular time. Thus, the study concludes that the administrator has to be provided with the ability to receive information and reports according to these changing requirements, and this can best be done through an interactive on-line information system with inquiry capabilities.

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## PREFACE AND ACKNOWLEDGEMENTS

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This study has been in the "process" for several years and has largely been inspired from approximately ten years of work as an Instructor and Department Head within the Manitoba Community College system. During this time I observed many instances where information was requested by my own administrators which was not readily available and had to be prepared through manual means. Needless to say, during some of the hours of information preparation and summarization I came to the conclusion that there must be a more efficient means of gathering this information.

Obviously, the computer was available and was providing information for administrative purposes, and had been doing so for some years. However, the reports (from my observation) never quite seemed to have the precise information required by administration for the decisions that were being made. I came to the conclusion after discussions with the various computer services personnel responsible that it was not necessarily a technical problem, or for that matter, a lack of technical expertise within the system. On the contrary, it appeared that a cohesive process was lacking which directly tied the administrative information needs to the information source. Thus, this study was born from observation of a very practical problem.

This study also takes on particular significance given the current change in the organizational structure of the Community College System within Manitoba. The three

Colleges in Manitoba will, within the next few years, be moving to an independent governance model of administration, as opposed to the current administrative structure, which has direct organizational lines to the Manitoba Department of Education, and eventually the Minister of Education. The administrative requirements within any given educational institution for accurate and timely information are ongoing and necessary during "normal times", however when broad administrative changes are occurring, this need tends to be even greater.

Thus, my goal in developing this study is to provide a blueprint for defining and obtaining useable information for Manitoba Community College administrators in the decision making process and, at the same time, contribute an information gathering and management model which may aid the Manitoba Community College system in the process of administrative change.

I have many people to thank for their help, assistance, and perseverance in this study. Dr. G. Porozny, who kindly gave me guidance and offered to act as my thesis advisor provided a guiding light for this study which sometimes appeared to have no end. The other members of my committee, Dr. A. D. Gregor and Dr. B. Levin, also provided many ideas and directions and, without their input, this study would not have been completed. Special thanks goes to Bob Goluch of the Department of Education, who reviewed the instrument, and Mr. Richard Mackie, former president, and Bill McCracken, former Vice-President, of Assiniboine Community College, both of whom sanctioned the study and encouraged its continuance. All of the study participants

were especially appreciated as it is the "guinea pigs" who really deserve the credit for any study. I appreciated their time and patience during our meetings.

Last, and not the least, I owe special gratitude towards all of my family members, who provided encouragement during the many hours of frustration at a project that to them seemed to last forever. They now can rest assured that this the study is complete, until the next one!

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## **I. BACKGROUND TO THE STUDY.**

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### **1.1 Introduction.**

Historically, the utilization of computer technology within educational institutions has followed a similar path to that of private industry. Although the precise application of the technology within educational institutions may be somewhat different than in private industry, the overall objective for using computer technology remains the same, i.e., to retrieve and use the generated information to support the particular mission of the organization.

The use of the computer within post-secondary educational institutions has usually been applied to three distinct services: financial, student records, and library. Within these applications the computer has primarily been utilized for record keeping and, as such, has usually been maintained within traditional data processing models.

Within the last decade private industry has been applying new technology to provide it with information for decision support, simulations, and to make predictions. Using artificial intelligence, analytical modelling, and sophisticated management information systems technology, together with state of the art hardware and software combinations, businesses now can have information which not only means the

difference between a profit or a non-profit situation today, but also may determine future survival.

Educational institutions, on the other hand have been somewhat slower to adopt sophisticated decision support tools, especially within the areas of higher level management. The reasons for this arise from inherent characteristics within the institution, together with the formidable task of administering these institutions, which are often characterized by authority and organizational problems. Other influential factors include the obvious cost and budget factors along with the lack of qualified personnel to implement these systems. Nevertheless, whether the goal is make a profit or to maintain educational services within financial constraints, the necessity for information in support of management decisions is no less important in either case.

This study examines this need for information within higher level management of post-secondary educational institutions, and in particular, within the Manitoba Community Colleges. The study also analyzes specific existing community college institutional administrative information requirements and proposes information solutions that will provide the support necessary for more effective management decisions.

## **1.2 Statement of the Problem.**

The problem of this study can be stated as follows:

What are the information requirements of senior level management within selected Manitoba Community Colleges that will support and improve the quality of administrative decision and problem solving activities?

Other more specific questions arise from this basic problem and can be

delineated as:

1. What kind of decisions and problem-solving activities do community college administrators usually perform?
2. What kind of information can community college administrators use that would improve the quality of these decisions and their resulting problem solutions?
3. What type of information processing solutions can therefore be recognized for the educational administrator that can be utilized within his/her daily decision processes?

The ensuing task of this study is therefore to answer the above questions. This can be accomplished through a research and interview process structured around the posed questions. The tasks may be outlined as follows:

- 1) To survey management literature and conduct personal interviews that will determine the educational administrator's decision making and problem solving activities;
- 2) To survey the information literature and conduct personal interviews that will determine the educational administrator's information requirements;
- 3) To survey the systems and educational literature in order to determine what others have done to provide timely and reliable information to

senior management in order to support their decision making and problems solving activities; and

- 4) To synthesize the research from the above three task performances into reasonable information processing solution recommendations.

The study will utilize several sources of information in surveying the literature including: traditional library sources of books and periodicals, published and unpublished documents in the libraries of organizations specializing in the study of information systems, ERIC and other electronic information sources, and computer company literature and documents. Personal interviews will be also conducted with senior level administrators (vice-presidents and presidents) at two community colleges in Manitoba in order to determine what decision making and problem solving activities are faced on a day-to-day basis, as well as to ascertain what information would be useful in these activities.

Once the data are gathered the final task will be to assess the information requirements of the educational administrator and to propose possible information processing solutions.

### **1.3 Purpose of the Study.**

The job of management, whether in private industry or in an educational institution is complicated. Management is a social activity which involves a high proportion of interaction and it is through these interactions that managers give and

receive information. The primary reason for the manager's existence is therefore to make decisions and solve problems for the organization based on this giving and receiving of information. The manager performs other duties, of course, within the various roles that the organization requires. However, it is within the context of the manager's information, decision, and problem solving activities that this study is conducted.

The purpose of information is to improve the quality of decisions and their resulting problem solutions. The purpose of this study is to investigate several questions relating to our problem statement in order to determine what information will improve the administrator's decision-making and problem solving activities:

What are the information sources, requirements, and gaps that can be identified by the educational administrator?

How often and when does the administrator require information in order to solve his/her on-going problems?

What problem solving and decision making activities can the administrator identify and which ones can be better resolved through improved information?

How should the data be processed and the information be presented to the administrator?

It is only through the process of analyzing the responses to the above questions using interviews of selected administrative candidates that meaningful information requirements can be determined. In the final analysis the unstated goal of this study is to attempt to see the world of information through the educational administrator's eyes and, in doing so, seek to provide a solution to his/her information requirements.

#### 1.4 Need for the Study.

The one main mandate of the educational institution is to provide knowledge to society through the education of its clientele. The institution has to accomplish this feat given financial constraints, along with the competing demand for financial resources from within. Although the mission of the educational institution is not to make a profit, as it is within private industry, it certainly has a requirement to maximize the utilization of existing funds and to minimize any necessary funding increases. This is evidenced by the fact that community college administrators cite effective management as one of the six top priorities of community colleges (Cross & Fideler 1989).

Within the context of increasing costs combined with constant resource demands, larger institutions with complex problems, and, at the same time, everything changing at a faster pace, the need for timely and reliable information becomes essential. The modern educational administrator has to solve problems often "by the seat of the pants" within this complex environment, while keeping the organization heading towards the overall mission goal.

Traditional information sources, such as meetings, departmental reports, and data processing reports have been and still are a necessary part of the information flow to the administrator. However, this information is often too late, or reflects the past, as opposed to predicting the future. This makes it difficult for the administrator to make

the most appropriate decision for the organization. The quest, therefore, is to provide the administrator with the proper information at the proper time to keep the organization on its mission path.

The need for further studies has been verified by other educational researchers who have also studied the impact and use of information technology in education. There has also been a number of recent writings on the various issues and concerns of information technology in relation to educational institutions and administration.

Within the Manitoba context, the community college environment is currently in a state of flux. In May of 1991 a legislative bill was introduced that would effectively make autonomous the governance of the community college system, moving decision making and responsibility centres from the current government system to a more decentralized board of governors system. Thus, this study can play an important role for current community college administrators who will be faced with the task of maintaining their own data base of information to support critical decisions they will soon be facing.

## 1.5 Definitions of Acronyms and Terms.

The following are some of the terms and acronyms used in this study.

Ad hoc inquiries

Unique, unscheduled, situation-specific information requests.

<u>Analytical Modelling</u>	Interactive use of computer-based mathematical models to explore decision alternative using what-if analysis, sensitivity analysis, goal-seeking analysis, and optimization analysis.
<u>Application Software</u>	Programs that specify the information processing activities required for the completion of specific tasks of computer users. Examples are electronic spreadsheet and word processing programs or inventory or payroll programs.
<u>Artificial Intelligence</u>	A science and technology whose goal is to develop computers that can think as well as see, hear, walk, talk, and feel. A major thrust is the development of computer functions normally associated with human intelligence, learning, and problem solving.
<u>Batch processing</u>	A category of data processing in which data are accumulated into "batches" and processed periodically. Contrast with Realtime processing.
<u>CEO</u>	Chief Executive Officer, or in the educational sense, the President or Provost.
<u>Critical Success Factors (CSFs)</u>	CSFs are the limited number of areas in which satisfactory results will ensure successful competitive performance for the individual, department or organization. CSFs are the few key areas where "things must go right" for the business to flourish and for the manager's goals to be attained.
<u>Data Processing</u>	The execution of a systematic sequence of operations performed upon data to transform them into information.
<u>Decision Making Process</u>	A process of intelligence, design, and choice activities which result in the selections of a particular course of action.
<u>Decision Support System (DSS)</u>	An information system that utilizes decision models, a database, and a decision maker's own insights in an ad hoc,

interactive analytical modelling process to reach a specific decision by a specific decision maker.

Executive Information Systems (EIS)

An information system that provides strategic information tailored to the needs of top management.

Goals

Specific targets which are intended to be reached at a given point in time. A goal is thus an operational transformation of one or more objective.

Hardware

Physical equipment, as opposed to computer programs or methods of use.

Information

Information is data placed in a meaningful and useful context for an end user.

Information System

A set of people, procedures, and resources that collects, transforms, and disseminates information in an organization; or, a system that accepts data resources as input and processes them into information products as output.

Information Technology (IT)

Hardware, software, telecommunications, database management, and other information processing technologies used in computer-based information systems.

Management Information System (MIS)

An information system that provides information to support managerial decision making. More specifically, an information reporting system, executive information system, or decision support system.

Measures

specific standards which allow the calibration of performance for each critical success factor, goal, or objective. Measures can be either "soft," that is subjective and qualitative, or "hard," that is objective and quantitative.

Objectives

General statements about the directions in which a firm intends to go, without stating specific targets to be reached at particular times.

<u>Problems</u>	Specific tasks rising to importance as a result of unsatisfactory performance or environmental changes. Problems can affect the achievement of goals or performance in a CSF area.
<u>Realtime Processing</u>	Data processing in which data are processed immediately rather than periodically. Also called online processing. Contrast with Batch Processing.
<u>Software</u>	Computer programs and procedures concerned with the operation of an information system. Contrast with hardware.
<u>Strategy</u>	Pattern of missions, objectives, policies, and significant resource utilization plans stated in such a way as to define what business the company is in (or is to be in) and the kind of company it is or is to be. A complete statement of strategy will define the product line, the markets and market segments for which products are to be designed, the channels through which these markets will be reached, the means by which the operation is to be financed, the profit objectives, the size of the organization, and the "image" which it will project to employees, suppliers and customers.

## **II. LITERATURE REVIEW.**

---

### **2.1 Introduction - Information Technology in Education**

Research that examines the actual effect of information technology is not conclusive; however, there is strong evidence to indicate, from individual institutional experiences, that administrative support systems do in fact aid the administrator in his/her daily tasks. Estes and Klier in their study of twenty-five United States educational institutions and educational programs in nine other countries conclude that the "New Information Technology has had a powerful impact on curriculum and institutional structures but the nature of the impact is inchoate and undefinable" and thus recommend further research (Estes and Klier 1985, 38). Regardless of how nebulous the impact is, many writers would agree that one must utilize the technology to narrow the gap between education and business. In fact, the importance of keeping abreast of technology is included as part of the mission and goal statements of many educational administration departments (Bratlien 1989).

However, the details of the precise effects of the introduction of New Information Technology are not of utmost importance to our inquiry, given that the numbers of institutions utilizing and installing the technology testify to its putative

validity. Educational institutions, however different from businesses, are no exception to the effect of the new information technologies and the need for timely information to manage them effectively.

Educational theorists, like their business management counterparts, have also recognized the need for information within the educational administrative process. These views range from one author's simplistic viewpoint: "what is needed is not another treatise on the complexities of the science of data management, but rather a simplistic look at basic information needs to support planning operations in small colleges" (Fame 1975, 32), to another's view of the sublime, in which he describes a day in the life of a College President as virtually living with a computer as an integral part of every daily activity (Powell 1988, 57-64).

Within the three major areas of educational computing, academic, administrative, and library, institutions vary in the extent of their integration and technological advancement. The design varies between separate installation of the respective information systems within the institution on one hand, and the combined systems installation on the other. The size and type of installation appears to depend on the complexity of the institution (Chandler, Devine, Gumm, Shope, and Steinmetz 1982). More recent literature appears to support the complete integration of all computing technologies on campus into a large computer network, supporting various operating systems and hardware environments, including all facets of the institutional

information system(s) (Beckham 1989; D'Archangelo 1988; Matzek, Moore and Nass 1988).

According to much of the literature concerning the process of design and implementation, there are broad general principles which can aid in the installation of information systems. A central theme throughout emphasizes serving the needs of the user with less dependence on the data processing staff.

For example, McGhee has developed four premises for a conceptual framework for a decision process which is based on a model that the administrator "seeks a satisfactory solution rather than the one best solution" (McGhee 1984, p. 24). Her four premises are: "the inevitability of imperfect communication" (between data processing personnel and administration), "the existence of uncertainty due to a rapidly changing environment", "the necessity of including management information needs with those of operations" (unlike traditional decisions which primarily focused on the needs of operations managers), and "the scarcity of data processing personnel" (in the sense that the educational environment cannot compete with private sector for competent personnel) (McGhee 1984, 24). These premises were developed by a special MIS office at Brandeis University which was specifically created to bridge the gap between data processing personnel and management, within an overall perceived requirement to provide top level management with "an information support structure that provides access to data sufficiently integrated and timely to support spontaneous questions in a world of changing requirements and objectives" (McGhee 1984, 26).

Similar premises were also expressed by Matzek, Moore, and Nass in their description of the structure and process they used to install information systems within a small college environment (the article is appropriately named "Small Colleges with Big Ideas"):

"Administrators should be able to make numerous unanticipated *ad hoc* inquiries into their data and see that data presented in a variety of ways, they should not have to allocate large portions of their time to providing requests for information to others - when those "others" are members of the college community, they should have direct access to the information themselves." (Matzek, Moore and Nass 1988, 85)

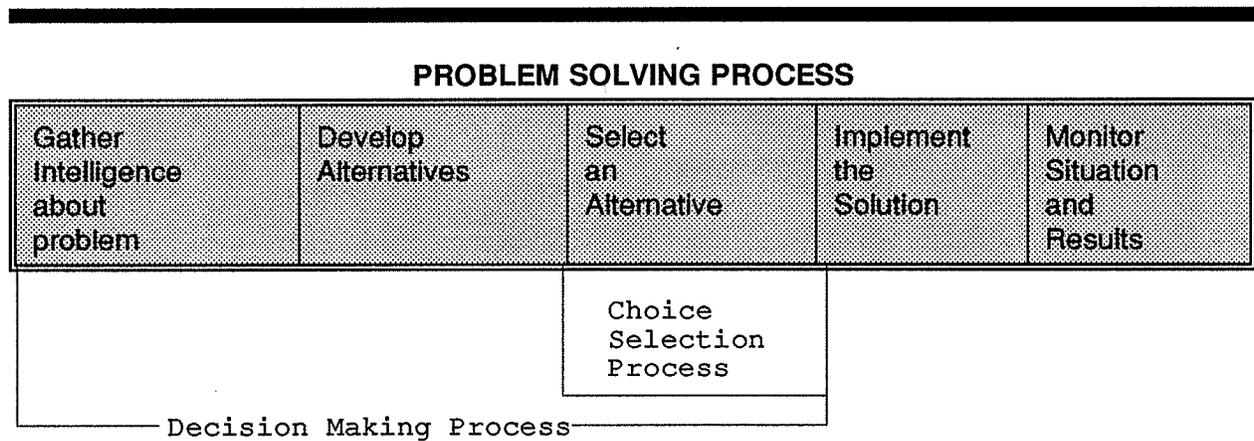
## **2.2 Information and the Decision making Process.**

This quest for information is not a new endeavour. Management theorists have studied the decision process for years and have also attempted to relate the information system, whether it be a manual or computerized system, to this process. In fact, in the sixties and during the early stages of computerization, theorists and practitioners suggested that: the "flow of information to decision authority centers is the lifeblood of the decision process" (Greenwood 1969, 7) and "computer-processed information could provide the means for more effective implementation of the decision-making function by more accurate and timely dissemination of information" (Rowe 1962, 741).

More recently, the combined study of information and management has become an integral concept. Although information is obviously not the only factor of the decision making process, it is often referred to as a central ingredient, with some

authors noting that the organization is rapidly becoming "a structure in which *information serves as the axis and as the central structural support* (Drucker 1986, 203) (author's emphasis) and where the new information technologies "serve major roles in the recognition and definition of managerial problems" (McCall and Kaplan 1985, 17).

Moreover, the type of decisions affected by information systems, and how they are affected, has to also be considered. Herbert A. Simon, a pioneer in decision theory, outlined three stages of decision making: *intelligence, design, and choice* (Simon, 1960). He suggests that these stages, the third being the act of making a decision, i.e., selecting one choice from a selection of alternatives (Hussain, 1973), are a subset of the overall problem solving process (see figure 2-1).



**FIGURE 2-1 Components of problem-solving activity (Kroenke, 1989).**

Simon further distinguishes between the types of decisions that are made as either *structured* (programmable decisions) or *unstructured* (nonprogrammable decisions), the former being a decision that can be programmed, or determined in advance, by decision rules, algorithms, or probability formulas, and thus ideal for computer programs. The later, on the other hand, involves decision situations where it is not desirable, or necessarily possible, to specify in advance most of the decision procedures to follow. Obviously, these unstructured decisions are not easily programmable into computer processes.

Within the educational milieu both types of decisions are obvious. The structured decisions involve clear-cut situations that "are well structured, conceptually simple, and that occur routinely and repetitively" (Hussain, 1973, p 345). For example, payroll, sectioning classes, student fee calculations, and student grade reporting could be classified as strictly programmable operational decisions. Nonstructured decisions, on the contrary, "are those that are ill-structured, typically complex in nature, and that occur once in a while and often involve major consequences" (Hussain, 1973, p 345). Examples of these would include the hiring and firing of personnel and the assignment of faculty.

Of course, the above distinction between structured and unstructured decisions is not always that clear cut. Decisions, in reality, lie in a continuum from one extreme to another, i.e. ranging from the purely structured decision to the totally unstructured decision. These decisions are termed *semistructured* and involve some decision

procedures that can be pre-specified, but not enough to lead to a definite recommended decision (O'Brien, 1990).

However, decisions are not necessarily made on such a rational basis. That is, the above assumes that a manager will obtain all the information about a problem and its alternatives, possess a complete specification of the objectives to be maximized, and then rationally select the best alternative.

Simon suggests, in the real world, decision makers will *satisfice* (the process of identifying an acceptable, workable solution to a minimum standard of sufficiency), rather than optimize to find the best possible solution (Simon, 1976, p 241).

Others, like O'Reilly, recognize that people make decisions under pressure in a complex environments and often make decisions by identifying one or a few outcomes that are acceptable and then constrain the decision process to fit those results (O'Reilly, 1983, p 108).

The former is termed *the bounded rationality model*, while the later, which is the decision process worked backwards, is coined *the results constrained model* of the decision process.

Further, most decisions are not made individually but are often made within groups. Although the above categories and models also apply to the group decision process, this fact adds another dimension to the process, which involves the characteristics and organizational context of the group itself.

The obvious function of the information system within the context of the decision making process is to provide managers and groups with summarized and organized information emphasizing the main points (e.g. major assumptions, resource requirements, and expected results) of each decision alternative. Thus, if we assume that Simon's bounded rationality decision making model is the ideal process for making rational decisions within the educational environment, then the role of the educational information system is to expand the boundaries and to increase the rationality of the decision process.

Information systems can facilitate activity within each of the five stages by providing information, simulations, and alternatives for decision evaluation. Information systems can also enhance the communications among group members who are engaged in the decision making process.

However, because this study is focusing on the decision making and information requirements of the educational executive in particular, the roles and functions of the executive must also be considered in relation to the process of decision making and management activity.

### **2.3 Information within the Functions and Roles of Management.**

Any given manager performs the acts of decision making and problem solving within the context of the particular role and/or function he/she is performing at any given moment. That is to say, regardless of the category of the type of decision that is

occurring, consideration has to be given to the circumstances surrounding the occurrence of that decision.

Mintzberg, a researcher who studied the activities of CEO's, identified ten major roles played by managers and are outlined as follows by Rockart and DeLong (1988, p 43-44)<sup>1</sup>:

### ■ **Interpersonal Roles**

- 1) **Figurehead.** Carries out a symbolic role as head of the organization, performing routine duties of a legal or social nature.
- 2) **Leader.** In the most widely recognized managerial duty, is responsible for motivation and "activation" of subordinates, as well as staffing, training, promoting.
- 3) **Liaison.** Develops and maintains a personal network of external contacts who provide information and favors.

### ■ **Informational Roles**

- 4) **Monitor.** Seeks and receives a wide variety of special information to develop a thorough understanding of the organization and the environment. In this role, the executive serves as the nerve center of internal and external information about the organization.
- 5) **Disseminator.** Transmits information received from outsiders or from subordinates to other members of the organization. Information ranges from factual information to value statements designed to guide subordinates in decision making.

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<sup>1</sup> Adapted from Rockart and DeLong's description of the roles of management, and the fundamental activities carried out by the executive in each, which was drawn on Mintzberg's model developed in the early 1970's in his book titled *The Nature of Managerial Work*.

- 6) **Spokesperson.** Communicates information to outsiders on the organization's plans, policies, actions, results, etc.

■ **Decision Roles**

- 7) **Entrepreneur.** Searches the organization and environment for opportunities and initiates "improvement projects" to bring about change; supervises design of certain projects as well.
- 8) **Disturbance handler.** Responsible for corrective action when the organization faces important, unexpected disturbances.
- 9) **Resource allocator.** Allocates organizational resources of all kinds.
- 10) **Negotiator.** Represents the organization in major negotiations.

Mintzberg's studies also indicated that top-level executives do not use computer based information systems, but instead rely on verbal information gathered from meetings, telephone calls, and personal contacts. This has implications for the current study since it is focused entirely on educational executives and proposes to provide an executive information system (EIS) as one solution to their problem solving dilemmas.

While one could argue that Mintzberg's findings indicate that automation has no place in the executive office, one could also argue that information technology could be used to support many of the executive functions, especially when one looks at the roles more carefully in relation to information that can be provided by information systems. For example, within the monitoring role there a definitive requirement for specific structured information that could be provided through an information system.

Rockart and DeLong go even further in Mintzberg's studies and relate his statement, "the effectiveness of the manager's decision is largely dependent on the quality of his models" (Mintzberg 1973, p 89-90), to "the potential of computer support in enriching these models" (Rockart and DeLong 1988, p 45). Therefore, one important component of the educational executive information (EEIS) system becomes the ability to model the organization and possible outcomes of potential decisions.

Managerial roles are an important consideration in any discussion involving information systems. However, special focus can be given to the monitoring role of the manager in relation to information systems. Although other roles receive and give information within which information systems can play a part, the quality of the monitoring role, which is the manager acting as the nerve center of the organization, has a direct relationship to the quality of the information the manager receives concerning the organization. The manager, within the other roles, to a large extent acts and decides on the basis of the information obtained within the monitoring role, (e.g., as the resource allocator). This is especially important to consider in conjunction with the management activities within an organization.

## **2.4 Information and Management Activities.**

Although the day-to-day operations of any organization occur within the confines of management, they are not part of a management activity per se. These operations are at the bottom of the organizational pyramid and, from a systems point of

view, reflect the transaction processing systems within the organization. Immediately above (see figure 2-2) is the pyramid of management levels of activities of planning and control. This pyramid of three management activities, which primarily focuses on the two roles of monitoring and resource allocation, can be summarized as follows

(Rockart and DeLong 1988, p 46)<sup>2</sup>:

**Strategic Planning.** The process of deciding on objectives of the organization, on changes in these objectives, on the resources used to attain these objectives, and on the policies that are to govern the acquisition, use, and disposition of these resources.

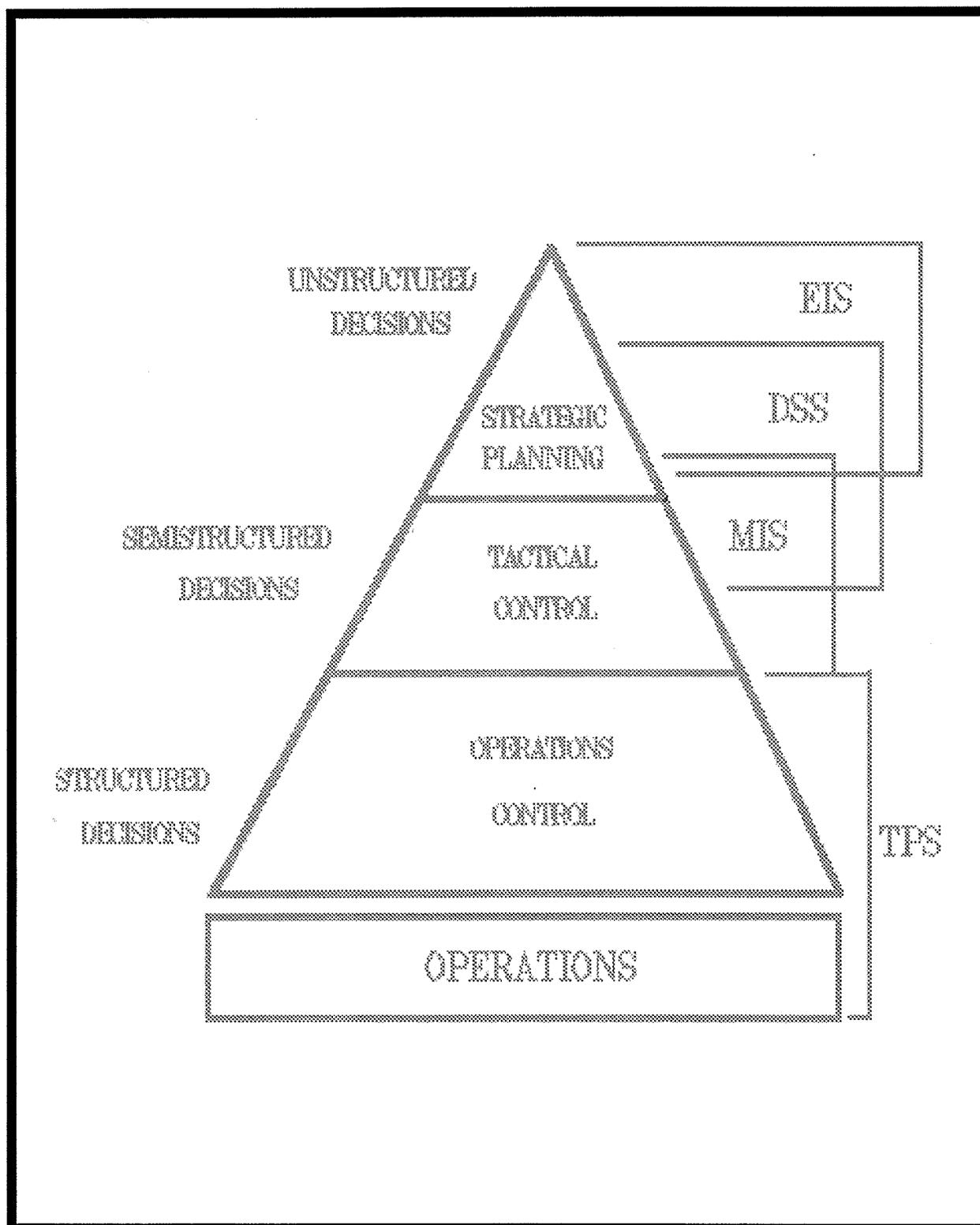
**Management Control.** The process by which managers assure that resources are obtained and used effectively and efficiently in the accomplishment of the organization's objectives.

**Operational Control.** The process of assuring that specific tasks are carried out effectively and efficiently.

The implications for an information system become quite distinct in terms of the information characteristics required for each level of management activity. Looking at the information systems acronyms to the right of the diagram in figure 2-2, and when considering the information requirements for each level (see table 2-1), it is obvious that requirements for each are quite different. On one hand, at the strategic management level, there exists an information requirement characterized by ad hoc, unscheduled, summarized, infrequent, forward looking, external, and wide in scope information, while on the other, at the operations management level, prespecified,

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<sup>2</sup> Based on the works of Robert N. Anthony, *Planning and Control Systems: A Framework for Analysis* (Boston, Mass.: Division of Research, Harvard Business School, 1965, pp 16-18.



**Figure 2-2** Information Systems Pyramid in Relation to Types of Decisions and Management Activities. (O'Brien, 1990, p 328 and Szymanski, 1990, p 279).

scheduled, detailed, frequent, historical, internal, and narrowly focused information is required.

However, the concern of this study is focused on the strategic management level and hence is primarily concerned with the information requirements of that level.

<u>Decision Types</u>	<u>Category of Information Systems</u>	<u>Characteristics</u>
Structured	Transaction Processing System (TIP)	Substitutes computer-based processing for manual procedures. Deals with well-structure routine processes. Includes record keeping applications.
Semi-structured	Management Information Systems (MIS)	Provides input to be used in the managerial decision process. Deals with supporting well-structured decision situations. Typical information requirements can be anticipated.
Unstructured	Decision Support Systems (DSS)	Provides information to managers who must make judgements about particular situations. Supports decision makers in situations that are not well-structured.
Unstructured	Executive Information or Support Systems (EIS) or (ESS)	Provides information to top level mangers who make strategic plans for, or monitor the strategic performance and the overall direction of the organization.

**Table 2.1. Characteristics of Information Systems in Relation to Decision Types**  
Adapted from the Categories of Management Users, James A. Senn, *Analysis & Design of Information Systems*, p.24.

## **2.5 Information, Education, and The Critical Success Factors Approach.**

There have been a number of studies investigating the effect of technology and computer information systems on education, although few have specifically

concentrated on the impact on the educational executive and administration specifically. Educational research on educational computer use has broadly ranged from: the quantitative results of surveys of microcomputer use in higher education (Peat Marwick Main & Co. 1987), the study of the role of the microcomputer in higher education administration through a sample of universities and colleges in California (Slovacek and Dolence, 1983), to the in-depth international case studies of higher educational institutions (Estes and Klier 1985).

Several other studies exist with specific reference to the public school system. In particular, two Canadian studies refer specifically to administrative use: one provides a basic manual of computer concepts for the public school administrator (Zajac 1990) and the other provides an in-depth analysis and evaluation of administrative computer systems in the British Columbia school system (Gibbens 1986).

One unique and rich source of information about computing and information technology in higher education can be found within the CAUSE organization library. It is within these papers, many of which are internal studies of MIS systems and RFP's, that provide solid material on what other post-secondary institutions are doing with their information systems.

However, of particular interest to this study is research within the MIS arena. Many theorists maintain that management principles within educational institutions are really no different than in business, except in terms of their respective missions and

goals. Therefore, it is appropriate to utilize MIS methods and research as a model for this particular study, especially considering that this study addresses specific management issues.

Although, according to MIS literature, there are several methods of studying executive information systems (Rockart, 1979), one method in particular stands out as being more appropriate for this study than any other. John F. Rockart, through the Center for Information Research at the Massachusetts Institute of Technology, has developed a particular methodology for studying the information requirements of senior management. His method, termed the Critical Success Factors approach, has demonstrated success in defining management information needs as a result of the focus approach his method uses. Critical success factors "are, for any business, the limited number of areas in which results, if they are satisfactory, will ensure successful competitive performance for the organization" (Rockart, 1979, p. 85).

Further, the critical success factors relate specifically to the missions of the organization and the particular goals of the managers involved. Therefore, this method can be adapted to any organization and has been demonstrated by Rockart to be useful in both for-profit and non-profit organizations (Rockart, 1979, p. 86).

Rockart also differentiates between the critical success factors of the organization (as seen by the CEO or top executive) and those of the layers of management below. Although lower level managers operate within the confines of the organizations missions, they also assume goals towards particular objectives within

these missions. Thus, the exercise of determining the CSF's of each level of management can provide significant benefits (Rockart, 1979, p. 88)<sup>3</sup>:

- The process helps the manager to determine those factors on which he or she should focus management attention. It also helps to ensure that those significant factors will receive careful and continuous management scrutiny.
- The process forces the manager to develop good measures for those factors and to seek reports on each of the measures.
- The identification of CSFs allows a clear definition of the amount of information that must be collected by the organization and limits the costly collection of more data than necessary.
- The identification of CSFs moves an organization away from the trap of building its reporting and information system primarily around data that are "easy to collect." Rather, it focuses attention on those data that might otherwise not be collected but are significant for the success of the particular management level involved.
- The process acknowledges that some factors are temporal and that CSFs are manager specific. This suggests that the information system should be in constant flux with new reports being developed as needed to accommodate changes in the organization's strategy, environment, or organization structure. Rather than changes in an information system being looked on as an indication of "inadequate design," they must be viewed as an inevitable and productive part of information systems development.
- The CSF concept itself is useful for more than information systems design. Current studies suggest several additional areas of assistance to the management process. For example, an area that can be improved through the use of CSFs is the planning process. CSFs can be arrayed hierarchically and used as an important vehicle of communication for management, either as an informal planning aid or as a part of the formal planning process.

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<sup>3</sup>For further discussions of CSFs please read Rockart's article, "Chief Executives Define Their Own Data Needs." Harvard Business Review. Vol. 57, no. 2, March-April 1979, pp. 81-93. The Center for Information Systems Research at the Massachusetts Institute of Technology, Sloan School of Management, also has a wealth of studies and further information on the CSF approach, some of which is cited in this study.

The important point, in Rockart's outline of benefits, is that the exercise is not solely computer orientated, and as such the process itself can have intrinsic value.

However, for the purposes of this study, the objective is to obtain the critical success factors of the executives within a community college environment. For example, according to Cross and Fideler, the primary organization goal of the community college is to provide General Education, which has four associated goal statements for the student: the "acquisition of general knowledge; achievement of some level of basic competencies; preparation of students for further, more advanced work; and the acquisition of skills and knowledge to live effectively in society" (Cross and Fideler, 1989). The critical success factor associated with this mission, therefore, is to insure that the institution graduates students with the competencies, skills, and knowledge to live, work, or study within society. If this CSF is not satisfactory then the institution has failed in its mission and must take corrective action.

The primary need, within information systems, is therefore to provide the necessary information to test the validity of the CSF involved. This is called the prime measure(s) of the CSF and, in this case, measures might include: average GPA of graduating students for each course of study, average exit test results (assuming the institution exit tests their students) for each course of study, and a ratio of the number originally enrolled to the number of graduating students for each course of study. The important aspect of the CSFs in relation to the measures is that they are to be determined by the manager involved during the discussions with the systems

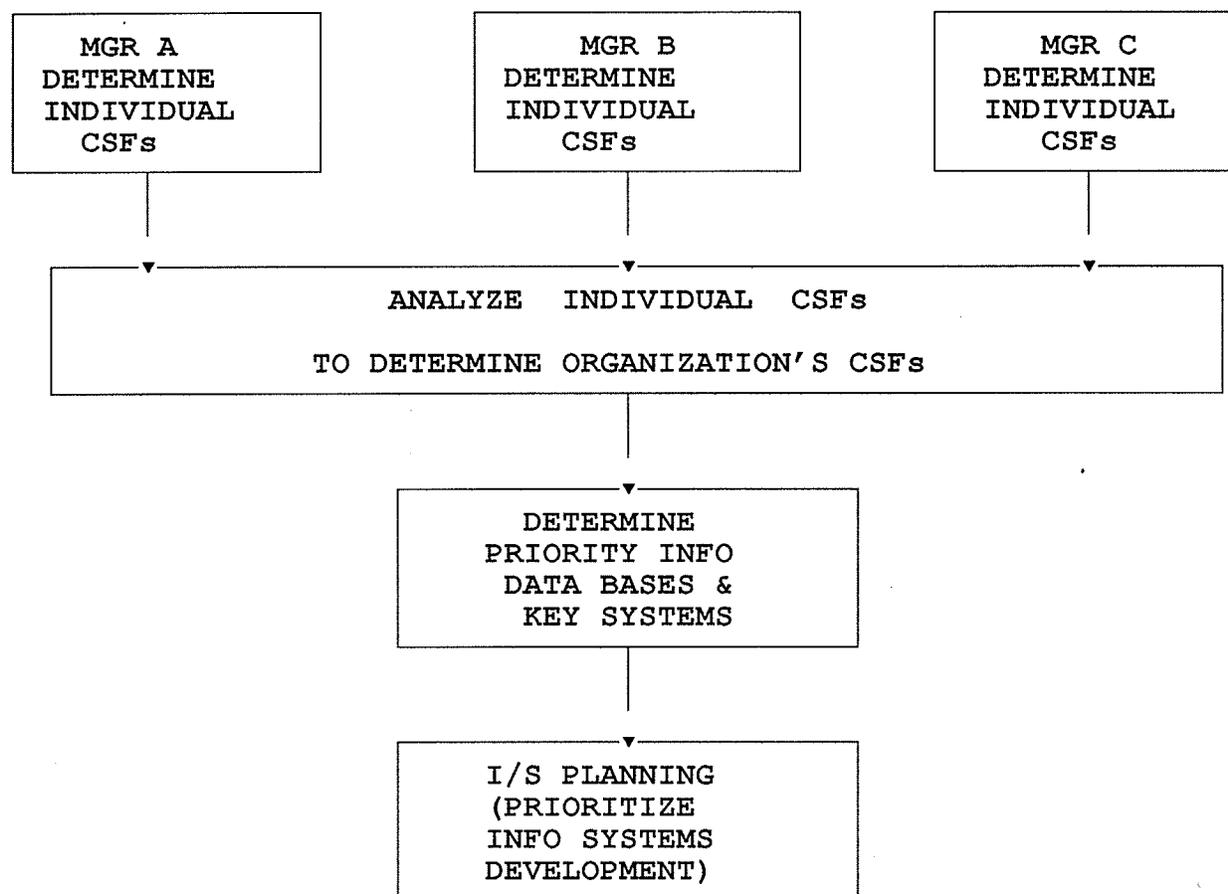
interviewer. It should also be noted that the CSFs and measures are not fixed entities, but can change as the missions and goals change with the particular executive and organization.

Further, when the CSFs are determined for each level within the organization the entire executive organizational information needs become quite apparent. This equips the analyst with the necessary guidelines to focus energy in providing the executives with the information services that *they need*, thus saving time and money in the process.

To continue with the previous example, the Vice-President of Academics would also be operating within the General Education Mission. However, his or her goals might also be more specific and include a commitment to quality instruction, along with the goal to graduate students with knowledge and competencies, which also has implications for the overall mission. Thus, his/her CSF for this goal would be to maintain quality instruction within all courses of study. He or she might also determine that the measures for this CSF would be: an evaluation index from the student evaluation summaries on the instructors, the average GPA per course by instructor, and a summary of the instructor's professional development activity.

Once the analyst has gathered the missions, CSFs, and measures from the various layers of the organization the task then becomes a process of information systems prioritize and systems development (see figure 2-3).

**Figure 2-3. CSF Procedure for I/S Planning (Bullen and Rockart, 1981).**



Within this step the analyst charts the various individual managers CSFs in order to determine the CSFs which have been identified by multiple managers. These provide an approximation of the organization's CSFs which, in turn, provide the analyst with one or more key information data bases or data processing systems.

Returning to our above example, the CEO identified a course results database by groups of students, and the VP identified a course results database by instructor.

Although, in reality, the VP's CSF is really a subset of the CEO's CSF, the exercise

identifies the need for course reporting, albeit in differing forms for each manager. Nevertheless, the analyst could identify the course database as a priority and begin to provide the information to the managers in a form according to the identified measures.

Thus, the information system then provides the managers with key information with which they can now make informed decisions. The crux of the critical success factors approach is therefore to identify the specific factors and measures that the organization depends on for success within the context of the manager's missions and goals. The information then becomes truly meaningful to the manager's roles and responsibilities and perhaps, more important, concisely presented for decision and managerial use.

The CSF procedure is not a one time event but is an on going process that the information analyst must constantly review. The information needs change as the events, priorities, and managerial objectives change. Thus, the CSF approach is a dynamic process that is conducted periodically, making the information relevant to the decision-maker.

## **2.6 Conclusion**

The activities, planning, and judgments that administrators make on a daily basis are usually a result of the "bubbling up" of problems that occur at lower organizational levels (Craft and Legere 1983). Educational administration is often characterized by poorly defined and dispersed decision-making authority and, organizational structures

and administrative functions that tolerate overlapping responsibilities and redundancies (Craft and Legere 1983, 19). Although strategies exist that can compensate for some of these administrative anomalies, the development of decision support systems can facilitate the move to clearer functioning roles and, as a result, a more efficient decision making process (Dunn & Glover, 1988). The assumption is that concise and accurate information provided within a structured environment at the input stage will have a positive effect on the actual day-to-day decision making process.

The Critical Success Factors approach to information analysis developed by Rockart has direct application to the study of information requirements within the educational environment and, in particular, to this study. Rockart has demonstrated that the CSF methodology has merit, thus it is the approach that this study will depend on in determining the primary information needs of the educational administrator. The CSF approach, which ties information needs to specific managerial objectives, has the possibility of offering education information systems managers a mechanism which that can offer the decision support that educational administrators require. Thus, this study will attempt to provide a potential information solution to the problem solving activities inherent within educational management and, in particular, at the executive level within the Manitoba Community College system.

## III. METHODOLOGY

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### 3.1 Research Design

This particular study was designed as a qualitative study of the executives of two Community Colleges within Manitoba, utilizing the critical success factor method as a principal means to obtain the information requirements of the organization. Main sources of data included interviews and questionnaires of the Presidential and Vice-presidential levels of the two colleges, as well as various documentation and researched publications. The resulting questionnaire data were compiled and tabulated and, together with the critical success factor's methods and researched material, conclusions and recommendations were drawn that answered the research questions.

Again, the central research question that we addressed was: what are the information requirements for an executive of a Manitoba Community College that can be gathered in a useable form for decision making and problem solving purposes? It was also the intended outcome of this study to provide general recommendations for possible information solutions.<sup>4</sup> Further, other recommendations emerged concerning

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<sup>4</sup>The suggested design is to be limited to suggested database systems for the managers of the colleges involved in the study. The actual technical aspects will obviously have to be determined by the computer specialists within the respective colleges, although this study may present overviews and possibilities.

the information flow within the two community college organizational structures, among the institutions, as well as to and from the MIS department.

Because of the small size of the population under study within Manitoba, the study involved all senior administrators, i.e., the Presidents and Vice-Presidents from two of the three colleges within Manitoba. Because of vacancies in both institutions the final numbers interviewed included: two Vice-Presidents and the President from Red River Community College, and one Acting Vice-President and one Acting President from Assiniboine Community College.

The interview was a personal one conducted according to the recommended critical success factor method, i.e., 1) the investigator provided an introductory letter and information package; 2) the investigator conducted the interviews beginning with the Vice-presidents to determine the missions, goals, and CSFs, and attempted to determine the measures and refine the CSF's within the same interview. A pilot interview/questionnaire was conducted with one former Community College administrator before conducting the full study to refine the questionnaire and test the interview method.

The recommendation phase of the analysis was based on: discussions surrounding the interviews and questionnaires, survey of relevant literature, examples of other institutional solutions to similar problems, informal discussions with personnel within the MIS department who are responsible for operations of the MIS system, and some opinions from the author of the current study. It was, however, important to

this study that any recommendations made be feasible, and every effort was made to bear in mind the actual situation when recommending solutions.

### **3.2 Research Methods & Procedures**

The research method was an interview and analysis of the information requirements of the presidents and vice-presidents of two Manitoba community colleges. To a large extent, the methodology was based on the Center for Information Systems Research paper "A Primer on Critical Success Factors" by Christine V. Bullen and John F. Rockart. This paper outlined very specifically the procedures, techniques, and methods of determining the critical success factors for executives. The procedures included all that were recommended and are summarized in the following (Bullen and Rockart, 1981, p 45-60):

- **Determining the objectives of the interview.** The interview questionnaire was designed in two parts, the first which consisted of several questions designed by the author to solicit general computing information, and the second which was to determine the critical success factors of the interviewee. Four concrete objectives were sought: 1) to understand the interviewee's organization and the mission and role of the interviewee within the context of his organization as the interviewee perceives them; 2) to understand the goals and objectives of the interviewee; 3) to elicit CSFs and measures from the

interviewee; and, 4) to assist the manager in better comprehending his/her own information needs (Bullen and Rockart, 1981, p 45).

- **Pre-interview Preparation.** The author of this study and interviewer completed several steps in the preparation of conducting the study: 1) complete familiarization with the methods and procedures of CSF interviews and concepts; 2) familiarization with the issues and trends within the community college system; and, 3) familiarization with the specific college organization and background to be studied. The investigator then contacted and initiated the interview process by contacting the President of each college to arrange permission and arrange an interview schedule. Letters of permission and the questionnaires were distributed ahead of time in order that the administrator could prepare for the interview.
- **Interview Procedure.** Once interview times were arranged the interviews were conducted according to a prescribed format and ranged from 1-1/2 to 3 hours in length. The general steps were: 1) opening the interview with a description of the purpose and use of the study; 2) responses to Part I & II of the questionnaire; 3) interviewee's description of his/her Mission and Role; 4) discussion of interviewee's goals; 5) developing the CSFs; 6) Prioritizing CSFs; and, 6) determining measures and concluding the interview.

Once the interviews were complete, the data were analyzed according to the following recommended critical success factor method of data analysis (Bullen and Rockart, 1981, p 61-63):

- **Review CSFs.** The interviewer reviewed the CSFs in terms of the managers' roles, missions, and goals. In some cases, written summaries were provided to the interviewer at the time of the interview; however, most often the CSFs were clarified during the interview.
- **Aggregate CSFs from the Individual Manager Interviews.** The interviewer compiled the CSFs for each organization utilizing a CSF chart (a matrix of personnel and CSFs in order to identify common information data bases.
- **Determine the Measures for the Priority Systems.** Once the priority CSFs were agreed upon through the chart measures were determined from information gathered at the interview. The data required were then established for each information data base that is recommended.

Conclusions were then drawn from the synopsis of responses to the question from parts I & II, as well as from the synthesis of data analysis from the CSF procedures. Altogether the questionnaire and interviews provided the study with much data from which to draw information for conclusions and recommendations for the study.

### 3.3 The Research Questionnaire.

The research questionnaire was divided into three distinct parts. The third part contained the actual critical success factors methodology of questions and was the primary source of study information. The interviewee received a letter of introduction concerning the interview along with a list of terminology, and a copy of the article *Chief Executives Define Their Own Data Needs* as an introduction to the critical success factors method.

The interviewee also received parts one and two of the questionnaire in order that he/she could think about the responses and most filled in as much of the questionnaire as possible prior to the interview. This also tended to save time for the critical success portion of the interview, which was the most important part of the study.

Part one was intended to get a feel for the executive's current information sources and needs in relation to specific business problems he/she has encountered. The results from this section were quantified to an extent and subsequently compared to the identified CSFs.

Part two was a survey of current computer use and was only intended to provide basic information for possible future training requirements, as well as to identify certain executives who utilized computers in their managerial role.

In total the questionnaire was designed to provide a comprehensive summary of the executive information needs of the Community Colleges in Manitoba and was to provide guidelines for future information systems implementation.

## **IV. RESULTS**

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### **4.1 Interviewee Profile and Organizational Structure**

There is a definite distinction between the two college interviewee groups in terms of their service, organization, and administrative profile. Therefore, it is appropriate to continue noting this distinction throughout the description of the survey results.

#### **Assiniboine Community College**

Firstly, the organizational structure of Assiniboine Community College is characterized by three top level positions, a President, a Vice-President in charge of academic affairs, and a Vice-President in charge of administration. The former two positions were, at the time of the interview, filled by administrators in acting status while the latter position was unfilled, although duties were assumed by the acting vice-president.

The Assiniboine respondents had only been in the acting positions for approximately six months at the time of interview, although they had 27 and 25 years respectively of post-secondary educational administrative experience.

Assiniboine Community College is located in Brandon, Manitoba, Canada which is a small rural city of approximately 35,000 people. The college services a wide area consisting of the agricultural communities of Southwestern Manitoba as well as the west central area to the north of Brandon. As such, Assiniboine College offers many agricultural and rural community programs extending from the Brandon Campus as well as from a satellite campus in Dauphin, Manitoba, which is located 100 miles to the north. The college, at its main and satellite campus, offers a flexible program of technical and occupational education to approximately 8000 full and part time students.

The computing facility at Assiniboine Community College consists of a number of terminals connected via a leased line which is connected to the central mainframe located at the University of Manitoba (see appendix G). The computer system, which is used on a time share basis, has student record, library, and financial system software which is developed and maintained by the computer services department located at Red River Community College. Assiniboine Community College also has a VAX mini computer which services the local administrative word processing needs of the organization.

### **Red River Community College**

The organizational structure of Red River Community College, being a larger institution, has one President, and four Vice-Presidents heading the departments of College Development and Extension Services, Student Affairs, Administration, and Academic. Two Vice-President positions were vacant at the time of the interview,

therefore the interview consisted of the President, and the two Vice-Presidents of Academic and Administration.

The two Vice-Presidents had been in their position for five and one-half and seven years respectively while the President had only recently been hired and had served only four months as President. The Red River administrators averaged approximately 15 years of administrative experience.

In contrast to Assiniboine Community College, Red River Community College is a large institution which services the city of Winnipeg with a population of 600,000 and the surrounding areas in the northeast and southeast sections of the province. Red River delivers a wide range of more than 85 one and two year certificate and diploma courses including trades, academic, and technology programs to approximately 25,000 full and part time students.

The computing system at Red River utilizes the same computer system (see appendix G) as does Assiniboine Community College, differing only in number of terminals. However, Red River Community College appears to have an advantage in computing ability in that they utilize a Hewlett Packard mini system for their administrative functions as well as word processing capabilities. At the time of the interviews the Red River administrators were utilizing the electronic mail and desktop abilities of the administrative system.

It therefore should be noted when surveying the results that the difference in size of the two institutions may be a factor in the differing responses of the

administrators. As well, due to the proximity of the Computer Services Department within Red River Community College, it would also appear that Red River administrators were more aware of the current system, as well as considerably more supportive of it.

Another caution when surveying the results of the study is to be aware that the Assiniboine Community College administrators were relatively new to the acting positions and they might have answered the questions in terms of their insecurities of the position, although both administrators were well versed in community college administration. This could be in contrast to the Red River administrators who would probably be more comfortable in knowing what information is necessary for the position, having been in the positions for longer periods (except in the case of the President). However, the Assiniboine group consisted of experienced community college administrators (as in the case of the Red River President) and thus, for the purposes of this study, one can assume that the knowledge gained from overall administrative experiences would outweigh the inexperience of the particular acting or new position that the individual happened to be in at the time of interview.

Although the critical success factors method is meant to determine the information needs of all departments which in turn are summarized to an organizational level, this study will assumed that the vacant departments would generally reflect the results of the departments that were studied. In most cases this is

accurate because the incumbents (at least in the case of Assiniboine Community College) were also minding some of the vacant position duties.

Most importantly, because the nature of the educational institution, common threads of information requirements appear throughout each department, regardless of its differing responsibilities. It would appear at the outset that the nature of the educational enterprise does not have greatly differing information requirements from department to department within the enterprise, in contrast to a private corporation where departments may have widely differing information needs.

The interviews were conducted for the most part in the respective administrator's offices or in a room within the educational institution, except one interview which was conducted outside of the institution. All interviewees appeared to be well prepared and were quite open to discuss their information needs. The interviews were one to two hours in length, which was adequate to conduct the interview. The interviews were taped and the discussion followed the order that the questions appeared in the questionnaire. The interviews were semi-formal, although often the administrators digressed into other areas (e.g. philosophy of education) which added credibility to the overall information they provided.

It appeared to the interviewer that the interviewees responded to the questions in terms of their knowledge of the impending administrative changes within the Manitoba Community College system. They not only responded to the questions in terms of

their past experience, but also in terms of what they thought what the future might hold when governance arrives.

#### **4.2 Part I Results - Information Sources and Information Needs.**

Most administrators who were interviewed saw themselves as ranging from semi-literate (N=2) to average (N=2) in the degree of computer ability, with only one being very literate. All would be able to manipulate a computer terminal and have the basics for training in the use the current Management Information System.

Question one<sup>5</sup> was intended to measure the reliance of computer versus non-computer sources of information according to common categories within an educational institution. The measure of computer to non-computer use on the scale of always, frequently, occasionally, seldom, and never, was meant to isolate high and low computer use areas in relation to the reliance on non-computer information sources.

Table 4.1 summarizes the results from question one and is broken down according to the average response from each college. The table clearly indicates several interesting points. Although there are similar trends in use of the computer versus non-computer sources of information between the two colleges, there are three areas where the distinctions are obvious. Assiniboine clearly relies on non-computer information sources in the E-mail, Administrative Functions, and Stats & Operations

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<sup>5</sup>From the following list of categories of information systems indicate whether you rely mainly on computer-based, non-computer, or a combination of information from computer and non-computer sources.

Research, as opposed to Red River where the reliance is more to both computer and non-computer sources.

It is interesting to note that both colleges frequently or always rely on the computer for student record and financial information, although at the same time still maintain non-computer sources which are frequently to occasionally depended upon.

Overall the chart does indicate that the computer is relied on as an information source at least on an occasional basis and is therefore utilized to a large extent within management activities. However, non-computer sources play an equal or greater role which would indicate that management activities are not yet at the point where the computer is playing the sole, or even the primary role, as the information source.

**Table 4.1 Summary of Information Source Average Responses from Each College for Computer vs. Non-computer use within Information System Categories (1-Never, 5-Always)**

INFO CATEGORY SOURCE-->	ASSINIBOINE		RED RIVER	
	COMPUTER	NON-COMP	COMPUTER	NON-COMP
STUDENT RECORDS	4	3.5	4.3	3.6
FINANCIAL INFO	5	3.5	4.3	3.6
COMMUNICATIVE CAP	2.5	4.5	2.6	3.6
E-MAIL	2	5	4	4
ADMIN FUNCTIONS	1	5	3.6	4
STATS & OP RESEARCH	2	4	2.3	2.6
PERSONNEL & STAFF	2.5	4.5	4	4
RESEARCH & LIBRARY	4	2	3	2.3

Question two<sup>6</sup> was intended to gather administrative opinions as to what the information category priorities should be, given limited resources. The results of this question tended to be somewhat ambiguous and essentially depended on how adequate the administrator thought the current system category was and, further, what situations the administrator encountered where information was not available.

If we summarize the results by looking at the top three choices of each administrator a frequency table can be obtained which indicates the priority information systems to be improved and/or installed. It is worthy of note that the Student and Financial Systems lead the way among the top three choices of the administrators with the Personnel System choice close behind. Another note of interest is that the last choice in priority was the Research and Library System in which four out of five administrators thought the current system was adequate and therefore limited resources should be directed elsewhere.

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<sup>6</sup>What type of information system from the above list would be your priority to have installed/improved within your office/department, and would be most important to you in your role as an educational administrator, from which to obtain timely and accurate computer-based information for managerial and decision making purposes?

**Table 4.2 Priority Information Systems  
Summarized as Number of Administrators Choosing  
Information System Category as One of the  
Top Three Priority Systems to Work on**

Information System Category	Frequency
Student Record System	4
Financial Information System	4
Personnel and Staffing Information System	3
Administrative Functions Support System	2
Electronic Mail Capabilities	2

Question three<sup>7</sup> was characterized by a description of a situation where information was lacking when required for decision making purposes. This proved to be a very revealing question in that it often related to and reinforced the results obtained during the critical success factors portion of the interview. Although the response appeared to reflect the particular bias (or departmental responsibility) of the interviewee, the results of this question begins to direct the study towards the specific information requirements of the administrator. Table 4.3 depicts the responses solicited from the interview and outlines the responses which portray the various roles and responsibilities of each administrator, each with a differing situation of information needs.

The diverse needs suggest to the systems analyst that the administrator does not need more rigidly defined reports, but needs to have some control over the range of

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<sup>7</sup>Can you describe a recent or current situation(s), in terms of your management decision making role, where you have found yourself making a decision or being part of a decision process where there was an obvious lack of information, information inappropriately presented, or information not available quickly enough?

information required to perform the administrative duties, and this fact would therefore point to a need for a relational data base system with query capabilities. In all of the cases noted the administrator was required to compile the reports manually, tasks sometimes taking hundreds of hours of work.

**Table 4.3 Situation Where There Was A Lack of Information and Whether it was a Recurring Problem, Information Source Used, and Which Information Source Could Have Played a Role. Administrator's Responses To Questions 3-a, b, & c**

A D M	SITUATION	RECURRING PROBLEM (3-a)	INFO SOURCE (3-b)	INFO SYSTEM PLAYED A ROLE (3-c)
1	Retention of student records required for rationalization of courses	Yes	Manually had to obtain report	Improved Student Record System
2	Staff planning - how many staff years remaining and how many can hire.	Yes	Manually Personnel record	Personnel Management System
3	Classroom scheduling and space allocation. What rooms are available.	Yes	Manually analyze timetable	Classroom Scheduling System
4	Cost per course, student required	Yes	Computer and Manual source	Combo of Financial Student & Personnel
5	Graduate follow up statistics	Yes	Manual from various sources	Survey & student record system

In any event, question four<sup>8</sup> summarizes the administrator's overall satisfaction with the current computer system and, interestingly enough, three administrators scored it an eight, one scored it a nine, and one administrator scored it a low one. All in all,

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<sup>8</sup>In general how satisfied are you with the current information flow and availability to your office in support of your managerial role and goals.

the high ranking reflects the administrator's general satisfaction with the MIS department, although the dissenting opinion was in relation to what is possible under other systems and he had a general feeling that the system was inadequate for information purposes. In fact, the dissenting opinion was quite vocal about the inadequacy of the information being provided, not in terms of the quantity of reports, but in terms of specific information that this particular administrator required to perform his tasks.

Question five<sup>9</sup> is attempting to find out if the lack of information is causing administrative time to be wasted. The interesting result indicates that all Red River administrators indicated no time was wasted, while Assiniboine administrators answered that there was time wasted. Whether this question reflects an inadequacy in the computer system, or whether there is a particular reporting or organizational problem at the Assiniboine institution, is not possible to tell from the study. However, from the discussions with Red River Administrators it was apparent that they had developed automated workgroup information systems that addressed some of the more direct information needs at that administrative level. This was in contrast to Assiniboine Community College where manual information gathering was the normal case, hence the sense of time being wasted. The main point here, however, is that the central MIS system did not address these information needs for either college.

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<sup>9</sup>Do you find you are wasting valuable time in searching out information to support your managerial roles and decisions?

I would surmise from the study that there may be a larger communication gap between the MIS department and Assiniboine than there is between MIS and Red River. This is further substantiated by the responses to question six<sup>10</sup> in that the Assiniboine administration responded that they were either sometimes or always searching for information at the last moment, while the Red River Administrators unanimously indicated that they were infrequently searching for information at the last moment.

Question seven<sup>11</sup> asks what information the administrator would want on his/her desk on a daily basis. Three responded by requesting their daily schedule and one responded by requesting an updated cash flow report. One did not respond at all to the question.

Question eight<sup>12</sup>, which has three parts to it, was responded to fairly consistently by all five administrators. Four indicated that they sometimes, and one indicated that he frequently, lacked adequate information in the strategic planning area. Four indicated that they infrequently lacked information within the tactical control area; while one indicated that he frequently lacked information within this area. All said they infrequently lacked information in the operations control area, although most

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<sup>10</sup>Do you find you are searching for information at the last moment before major decisions or problem-solving sessions have to occur?

<sup>11</sup>If you could have any piece of information on your desk daily as you arrive at work, what would that information be?

<sup>12</sup>In what areas of managerial planning and decision making do you find yourself lacking adequate information? Please indicate the degree that you lack adequate information from the following (make comments if you like):

of the administrators were not heavily involved in the operations area of management. Again, the dissenting administrator who indicated that he frequently lacked information in the two areas of strategic planning and tactical control reflected on his previous comments regarding time being wasted and the lack of specific information he required.

**Table 4.4 Areas of Managerial Planning and Decision Making  
Where Administrators Lacked Adequate Information**

DECISION AREA	ALWAYS	FRE- QUENTLY	SOME- TIMES	INFRE- QUENTLY	NEVER
STRATEGIC PLANNING	0	1	4	0	0
TACTICAL CONTROL	0	1	0	4	0
OPERATIONS CONTROL	0	0	0	5	0

### **4.3 Part II Computer Use Results**

Part II of the questionnaire surveys the administrators' use of the computer (as opposed to information), especially in terms of his/her management activities. The first portion of question one attempts to find out to what extent each administrator personally utilize the computer either in his or her home or in his or her office for management purposes.

Four out the five administrators indicated that they have access to a computer at home or at the office (or both) for management purposes. Worthy of note is that all Red River administrators indicated that they have computer access both at home and at

the office and either frequently (1) or always (2) use the computer to obtain information. In contrast, of the Assiniboine administrators only one indicated access to a computer at the office only and, further, both indicated that they never use the computer to obtain information. It would appear from this study that the Red River administration utilize and integrate the computer more into their daily management activities than do the Assiniboine administrators.

The results in table 4.5 indicate the use of the computer and various software for management purposes. No particular trend can be concluded from the results of the above questions except that the Red River administrators tend to use the computer more, and tend to utilize the electronic mail application, than their Assiniboine counterparts. Word processing is the primary application used for management activities and this would be no surprise to anyone involved in a educational institution.

Other applications seem to vary in use with no particular trend apparent except to note that the telecommunications and graphics applications are towards the low use end of the continuum. The Assiniboine administration group does not utilize a local area network for administrative purposes while Red River does. This may indicate why some applications and information are not being utilized at Assiniboine Community College for administrative purposes.

**Table 4.5 Administrator's Use of Computers  
In Home/Office/Department**

ADMINISTRATOR KEY: 1-NEVER, 2-SELDOM, 3-OCCASION, 4-FREQUENTLY, 5-ALWAYS	1 A C C	2 A C C	ACC AVG	3 R R C C	4 R R C C	5 R R C C	RR CC AVG	ACC & RR CC AVG
QUESTION								
2. Personally use computer	2	1	1.5	3	3	4	3.3	2.4
3. Office Staff use computer	4	4	4.0	4	4	5	4.3	4.2
4A. Word Processing	5	5	5.0	4	4	5	4.3	4.7
4B. Spreadsheet	4	1	2.5	3	4	3	3.3	2.9
4C. Database	3	1	2.0	1	4	1	2.0	2.0
4D. Graphics	1	3	2.0	3	3	1	2.3	2.2
4E. Telecommunications	1	1	1.0	1	1	1	1.0	1.0
4F. Integrated software	3	3	3.0	3	4	1	2.7	2.9
4G. Electronic Mail	3	3	3.0	3	4	5	4.0	3.5
4H. Other	1	1	1.0	1	1	1	1.0	1.0
<b>TOTAL AVERAGE</b>	<b>2.7</b>	<b>2.3</b>	<b>2.5</b>	<b>2.6</b>	<b>3.2</b>	<b>2.7</b>	<b>2.8</b>	<b>2.7</b>
5. Utilize Local Area Network	No	No		Yes	Yes	Yes		

#### 4.4 Part III Results: Missions, Goals, and CSFs.

The final portion of the questionnaire is the heart of the study and the purpose is to determine the administrator's and the organization's CSFs. Therefore, the majority

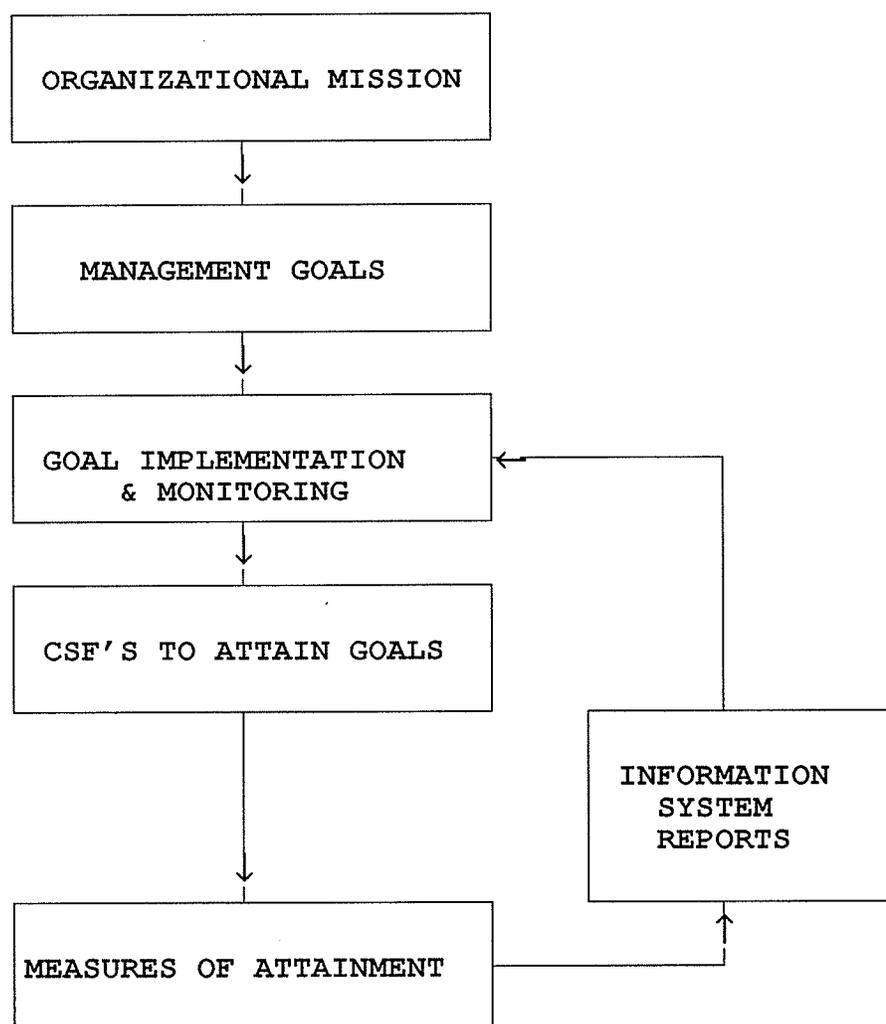
of the interview time with each administrator was spent discussing his or her respective missions, goals, and CSFs.

For proper analysis, according to Bullen and Rockart (1981), the study will analyze each administrator's individual CSFs in order to determine each college's CSFs (see figure 2-3). Once each college's CSFs are established the study will chart the respective CSFs to determine the entire organization's CSFs. For the purposes of our study, we are suggesting that each college is a department of one large organization known as the Manitoba Community College System. Given that all colleges utilize the same MIS department, offer the same or similar transferable programs, and are driven by corporate missions and goals through a central department (the Department of Education and Training as part of the Manitoba Government), the model is appropriate.

Some clarification of the process and purpose of CSF determination, in the context of the study, is appropriate at this point in order that the interview outlines have significance within the overall framework of educational management. CSF determination is an both an evolutionary and metamorphic process. The process logically begins at the top of the organization with its universal missions. From this point each administrator, from the perspective of his/her own department, determines departmental objectives and goals which support the organizational mission. As previously stated, the critical success factors are "the relatively small number of truly important matters on which a manager should focus her attention" (Bullen and Rockart,

1981, p. 12). Thus, throughout this portion of the interview I attempted to assist the administrator to outline his/her goals and objectives within his/her department that supported the organizational mission.

**Figure 4-1. CSF Process and Information Management Loop. An Interrelated Management and Information Systems Model. (Author)**



Once these were established the next step during the interview was to identify those factors which were critical to accomplish those goals. The measures therefore

become the information (computer or non-computer generated) necessary for the information systems personnel to provide as feedback to the administrator as to whether or not the implementation of the specific goal was working or not (see figure 4-1).

In reality, the CSF process is as much a management process as it is an information systems process. In fact, the intent of the CSF procedure, as developed by Rockart, is to be the bridge between the management of an organization and its information systems department. The resulting feedback from the information systems (CSF measures) therefore becomes the tool for managing the organization.

Although our stated purpose is to determine the information requirements of senior level management, we are, in reality, determining an interrelated management and information systems model for the Community Colleges.

For example, if a college were to determine one of its missions to be a better retention rate for students, then an administrative goal may be determined as the setting of a target retention rate (e.g. as a per cent) for each course that falls within departmental jurisdiction. The manager in charge of the department would then implement policies which would reflect this departmental goal. The CSF for this goal would therefore be whether the respective percent retention target for each course was reached, i.e. for the goal to be successful, the respective targets would have to be reached to the predetermined percent. The role of the information system would be to report the retention rates on a regular basis and would become the primary management tool

(within the feedback loop). This interaction between information reporting and management therefore becomes the mechanism for goal accomplishment, or at the very least, a means of goal monitoring and managing the goal implementation.

In respect to the study at hand it should be noted that we are studying five administrators at one moment in time and that our management and information systems model is, in reality, a fluid and dynamic process. Thus, the study concentrated on a few priority CSFs for each administrator as a sample method of determine CSFs for the respective department and organization, however did not purport to determine comprehensively all of the possible CSFs.

Therefore, the ensuing discussion will firstly concentrate on each college's CSFs and then proceed to an aggregate discussion of the organizational CSF chart. The discussion for each college will outline each administrator's perception of his/her<sup>13</sup> individual missions, roles, and goals within the organization and attempt to relate these to their particular CSFs. The study will, however, limit the final aggregate analysis to five sample priority CSFs for each administrator in order to keep the data manageable and results useable for IS planning. Finally, I will then discuss the implications for the MIS department and for IS future planning.

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<sup>13</sup>Throughout the interview descriptions we will refer to the administrator by using the male pronouns him, his, or he. This is to provide a degree of anonymity for the one female administrator who was interviewed.

## **Assiniboine Community College CSFs**

The mission and goal statement for Assiniboine Community College was currently under revision (see Appendix E) at the time of interview; however our interview discussions generally reflected each administrator's roles and goals within respective departmental responsibilities. For example, the Acting Vice-President of Academics/Community Programs viewed his missions as:

- To provide opportunities for students in the college to take the training they desire.
- To make the college accessible for all people who wish to take training.
- To react to student needs in terms of their self development and growth.
- To provide skills for students seeking future employment.
- To provide an environment for staff and administration to be able to deliver the training to students.

Further, this same administrator viewed his roles as:

- To obtain resources (human and fiscal) to accomplish his goals.
- To allocate and reallocate resources.
- To approve the expenditures necessary.
- To plan for future directions, recommend the discontinuation of programs, and plan for future staff development.
- To evaluate staff, programs, outcomes, student results, and follow-ups.
- To determine the cost factors for delivery of courses.

In terms of his prescribed missions and roles he also viewed his specific goals as:

- To determine information of staff years utilized and carry overs by June of 1991.
- To determine classroom space and availability for future programming by June of 1991.
- To know the remainder of the budget and financial shape of the college by August of 1991.
- To identify new programs, short and long term, before April 1991.
- To review a certain number of programs by June 1992.
- To develop an operational plan for the entire college.
- To meet informally with all staff and students.
- To develop a cost analysis system by June 1993.

Once we were able to establish a set of specific goals, the interview proceeded to establish a set of critical success factors which are necessary to accomplish these goals. Thus, we isolated several main CSFs for the above administrator (in priority order):

- To determine the human resources allocated and utilized within the college as of any given date.
- To determine what budget amount is available and what amount has been utilized for each budget centre as of any given date.

- To determine what classroom space is available at any given period of the day.
- To determine the daily cost of any given course and department.
- To determine college enrolment data for any given type of student and course.

The President of Assiniboine College had a similar set of missions, roles, and goals and are respectively outlined as follows:

- To provide the most appropriate education and training that will contribute to the wealth of the Province and to the social and economic well being of its citizens. Secondly, he also saw his mission to articulate the vision of the community college in a clear and compelling way and help move the college organizationally towards the accomplishment of the mission.

He further saw his roles in support of the mission as to:

- Reposition the college to meet emerging training needs.
- Identify tasks required in order to achieve this re-positioning.
- Restructure the college to provide effective and economic training.
- Provide a method communication of information and decision making mechanism for all managers.
- Insure that people are appropriately prepared to fulfil their role.
- Manage costs in a manner that's consistent with the budget.

He also defined his target goals as follows:

- To identify training needs.
- To identify tasks required and people required to perform the tasks.
- To identify space utilization and requirements.
- To determine enrolment trends.
- To insure that spending is consistent with budget allocations.
- To have an ongoing needs driven staff development program in place by September of 1991.

Thus, the President determined his critical success factors to support his goals as:

- To determine the financial health of the organization by ensuring that expenditures are consistent with historical expenditures and budgeted amounts.
- To determine the current global staff assignments and skill sets.
- To determine whether the current curricula and courses are relevant to the market place.
- To determine enrolment status and patterns within the community college.

From the above descriptions it is now possible to determine the critical success factors of the organization, these are summarized in table 4.5.

**Table 4.5 Assiniboine Community College CSFs  
Prioritized (top to bottom)**

Vice-President	President
determine human resources	determine financial health
determine budget available	determine staff assignments
determine classroom space	determine course relevance
determine course costs	determine enrolment status
determine enrolment data	

Although the similarities are obvious, the priorities are somewhat different and, in the author's opinion, generally reflect the perceived priorities of their respective positions. It is worthy to note that the top two priorities, financial and human resources, especially given the current economic state of the community colleges, are in all probability reflective of the current decision making demands on the administrators. The implications for the information system planners are equally obvious, however, prior to discussing this aspect of the factors, the critical success factors of Red River Community College should be analyzed.

### **Red River Community College CSFs.**

Three administrators were interviewed at Red River Community College and each interview is summarized into missions, roles, goals, and CSFs.

The Vice-President of Academics described his missions as follows:

- To provide quality education to Manitoba residents.

- To maintain access and opportunity for all people who wish to further their education to participate in community college programs.
- To provide support for students in order to retain them in the programs they have chosen.
- To meet the needs of the community as well as the students who attend the college.

The Vice-President also described his role as simply to coordinate, encourage, direct, and facilitate the people and organization towards the accomplishment of the missions and goals, which he outlined in his target goals as:

- To contribute to student success by providing strategies to improve retention.
- To evaluate programs (one per year).
- To revise academic procedures.
- To improve the quality of instruction and consult with the student association on program quality.
- To determine the cost of programs.
- To determine a classroom scheduling process.

Therefore, the resulting CSFs were determined from the above as follows:

- To determine human resources budgeted, expended, and required.
- To determine budget expended and costs associated with programs.
- To determine student enrolments and attrition rates.

- To determine program success and failures.
- To determine classroom usage and vacancies.

On the other hand, the Vice-President of Administration and Student Affairs described his missions as:

- To provide support services to programs.
- To provide sound accounting services and business practices.
- To provide support and environment which will allow students to move through the college successfully.

His role in support of these missions was described as to set the tone and attitudes of services that the college provides, to develop relationships with managers and to support lower level managers' objectives.

Some of his goals were outlined as follows:

- To develop a costing system and strengthen cost accounting methods and procedures.
- To improve the telephone system.
- To develop a student success model.
- To develop a physical space classroom system.
- To develop an office automation system.
- To review expenditures.

Within these goals the following CSFs were then identified:

- To determine accurately the financial cash flow for the organization.

- To determine whether physical resources were utilized effectively.
- To determine the success of the student process.
- To determine physical space usage and requirements.

The President saw his missions as identical to the missions included in the overall mission statement of Red River Community College (see appendix F) and, further, saw his role as facilitating the organization towards the accomplishment of those missions. However, he also saw his goals as follows:

- To realign programming in order to support economic growth and renewal.
- To maintain a successful conversion to governance.
- To increase the entry level enrolment of high school graduates.
- To increase course offerings and part time enrolment in extension and regional centres.
- To increase the co-op and work placement modes of delivery.
- To increase access for, and retention of, Native students.
- To improve graduation rates.
- To improve the organizational climate and culture.
- To improve the staff development process.

From the interview, the identified critical success factors were defined as follows:

- To determine whether the college can successfully move to college governance.
- To determine the financial status of the college.
- To determine student enrolment patterns.
- To determine human resource status and requirements.

Thus, the organizational CSFs can be summarized as in table 4.6.

The similarities are as equally striking as those within the Assiniboine Community College group. Again the emphasis appears to be on the financial health of the organization, which is not surprising given the changes which are occurring within the community college system in Manitoba. The stage is now set for a look at the combined CSF table for the two community colleges.

**Table 4.6 Red River Community College CSFs  
Prioritized (top to bottom)**

VP Academic	VP Admin & SA	President
determine Human Resources	determine financial cash flow	determine success of move to Governance
determine budget information	determine effective use of resources	determine financial status of organization
determine student enrolments	determine student success rates	determine student enrolment patterns
determine program success	determine physical space requirements	determine human resources
determine classroom scheduling		

#### **4.5 CSF Analysis of both Community Colleges**

According to Bullen and Rockart the analysis of the whole organization CSFs are to be charted to indicate "key information data bases or data processing systems which should receive priority in the information systems development process" (Bullen and Rockart, 1981, p. 39). Thus, table 4.7 indicates the combined CSF chart with the indicated key information systems. The numbers indicate the priority each administrator attached to a particular data base system; if all administrators chose a particular data base, then that system would be deemed to be a key system. Although a costing system is of low priority according to the chart, some of the administrators indicated that costing information should be provided as part of the financial system

and, as such, the measure chart will reflect costing information requests within the financial data base.

Although the chart indicates the general key database systems requested by the administrators, when they were asked to attach measures to the particular database system, the information required became more specific.

**Table 4.7 CSF Chart - Community Colleges of Manitoba  
(Bullen and Rockart, 1981)  
Assiniboine and Red River Community Colleges  
(Each Number Reflect the Respective Priority,  
Shaded Areas Refer to Priority Database Systems)**

EXEC/C SFs	FINANC IAL	HUMAN RESOURCE	CLASS ROOM SCHED	COSTING SYSTEM	STUDENT ENROLL	PROGRAM SUCCESS	M I S C
RRCC Pres	2	3			3		1
VP1	2	1	5		3	4	
VP2	1		4		3		2
ACC Pres							
VP1	1	2			4	3	
	2	1	3	4	5		

Table 4.8 summarizes some of the measures that administrators attached to the priority data bases. The study attempted to solicit specific information requests and these are reflected in the measures table. The classroom scheduling system, which is not noted on the chart was noted by several measures and report requests: room usage report,

vacancies by room, number of student in a classroom by hour, number classrooms utilized and their capacity, and general room booking system.

**Table 4.8 Data Base Measures Specific Information Requests**

<b>Financial</b>	<b>Student Enrolment</b>	<b>Human Resource</b>
% left of budget per department and division on monthly basis (operation & capital)	Student graduation rate by category, average GPA, % employed in field	dollar and staff year allocated to dollar and staff year expended by department
Operating Cost per student per program cost per full time equivalent student	Weekly application status compared to last two years, ration of application accepts, attrition vs successes on full time equivalent, age & gender analysis	skill analysis with 'tombstone data' and development data planned vs. actual staff years per department expended to data with variance on monthly basis.
One page report on revenue sources and expenditures by department	Student contact hours per instructor per year enrolment by category	# of vacant positions in full time # of staff years allocated per department
budget vs actual with variance by department on monthly basis.	current wait list status, current enrolments and attrition rate by program	
Cost analysis utilizing facility size, staff, capitalization, operating costs, and overhead.		

The CSF portion of the study reinforces the results of part I which also indicate that the three most important information systems were the financial, student enrolment, and human resource management systems.

However, the above information in Table 4.8 does not make practical sense unless there is differentiation of CSF measures according to each administrator. That is, the information systems personnel need to know specifically what information is required for administrators to accomplish particular goals, in order that the information system

can accommodate and facilitate the goal monitoring and implementation process.

Consider the following Tables for the specific requirements for each administrator:

**Table 4.9 Assiniboine Community College-President  
Administrative CSFs and Information Requirements**

Goal	CSF	Information Required
To insure spending is consistent with budget allocations	determine financial health of organization	1. Exception Report: Overspent areas (forecast) by program and department on a monthly basis. 2. Historical: Report to insure that expenditures are consistent with history (comparative). 3. Budget: Regular report on budget, expended, committed, uncommitted, and variance. 4. Costs: cost/program, cost/full time equivalent student.
Identify tasks required and people required to perform the tasks.	Determine staff assignments.	Work Load Reports: 1. Number of Students per Instructor 2. Contact Hrs/Instructor/week/year by program 3. Instructor summary report by subject. 4. Administrative services report. 5. Overtime Report. 6. Skills analysis report for each staff member.
Identify training needs	Determine course relevance to market place	1. cyclical review information 2. success rate report (% finished program) 3. Student job obtained, employer satisfaction, and starting salary report after completion of program 4. Cost/graduate

Goal	CSF	Information Required
Determine enrolment trends	Determine enrolment status	<ol style="list-style-type: none"> <li>1. Number of applications received per program compared to last two years on weekly basis.</li> <li>2. Ratio of applications to acceptances</li> <li>3. Attrition and success rates per full time equivalent student</li> <li>4. Age, ethnic, and gender analysis of student population graph reports</li> </ol>

**Table 4.10 Assiniboine Community College-Vice President  
Administrative CSFs and Information Requirements.**

Goal	CSF	Information Requirements
Determine staff years utilized and carry overs	Determine Human Resources - Days and weeks of staff time expended as of any given date	Dollars and Staff years allocated to dollars and staff years expended by department
To know remainder of the budget and financial shape of the college	Determine what budget is available, been utilized according to category as of any given date.	Summary report of budget vs expenditures according to department on daily basis.
Determine classroom space and availability	Determine free classrooms at any given period of day	Utilization report: number of students in classroom by hour. Classroom report: capacity, schedule, use, and availability
To develop a cost analysis system	Determine course costs	Summary report: Cost/day by department and course
To review Programs	Determine enrolment data	Student enrolment by course and status(age, gender, and ethnic group)

**Table 4.11 Red River Community College-President  
Administrative CSFs and Information Requirements.**

<b>Goal</b>	<b>CSF</b>	<b>Information Requirement</b>
Successful conversion to governance	Determine whether there has been a successful move to governance	Survey and performance review of Board of Governors
All Goals	Determine financial status of organization	1. Revenue sources to expenditures analysis, actual and projected by department (one page) 2. Budget allocated by department
Increase entry level enrolment, part-time enrolment, and Native enrolment (and retention)	Determine student enrolment and retention patterns	1. current and projected enrolment patterns by program 2. Graduation rates by program
Improve staff development, organization climate, and other goals.	Determine human resources	1. Demographic report-age by department 2. Contact hours by instructor 3. Staffing by number of chairpersons and coordinators

**Table 4.12 Red River Community College-Vice President Academic  
Administrative CSFs and Information Requirements.**

<b>Goal</b>	<b>CSF</b>	<b>Information Requirement</b>
All goals	Determine human resources	Number of planned vs actual Staff years per department and expended to date with variance (vacancies) on monthly basis

Goal	CSF	Information Requirement
Determine budget expended and costs	Determine budget and cost information	<ol style="list-style-type: none"> <li>1. (Operational budget) Percent left in budget per code, department, and division on bi-weekly basis</li> <li>2. (Capital budget) Percent left per department and division on bi-weekly basis</li> <li>3. (Operation Costs) Cost per student per program.</li> <li>4. Exception reports: overexpenditure, over commitments, over staff years, and low enrolment potentials.</li> </ol>
To improve student enrolments and retention rates	determine student enrolment and attrition	<ol style="list-style-type: none"> <li>1. Current enrolment and attrition by program</li> <li>2. Wait list information</li> <li>3. Percent graduation and employment rate</li> </ol>
To evaluate programs, improve quality of instruction	To determine program success	<ol style="list-style-type: none"> <li>1. Student employment rate in related jobs</li> <li>2. Summary report: evaluation from employers, students, graduates, advisory, and staff per program.</li> </ol>
To determine a classroom scheduling process	Determine classroom scheduling	<ol style="list-style-type: none"> <li>1. Room usage report</li> <li>2. Vacancy report</li> <li>3. Room booking system (e.g. motel)</li> </ol>

**Table 4.13 Red River Community College-Vice President Administration and Student Affairs Administrative CSFs and Information Requirements.**

Goal	CSF	Information Requirement
Review expenditures and develop costing system	Determine financial cash flow	<ol style="list-style-type: none"> <li>1. Cost/program, cost/student</li> <li>2. Budget vs actual with variance by department and division on monthly basis</li> </ol>
Provide support services	Determine effective use of resources	Number of projects per year completed, planned and unplanned

Goal	CSF	Information Requirement
To develop a student success model	Determine student success rates	Reports: Student by category (age, etc), average GPA vs history, percent graduation, percent employed in field.
To develop a physical space classroom system	Determine physical space requirements	Classrooms utilized and vacancies

The implications of this study for the MIS department, which is responsible for arranging for the information to get to the administrator, are important when considering which information system to work on and which reports are of most use to the administrator. The CSF method is essentially a planning tool which involves the procedures as discussed above and the generation of specific information data bases on which the administrator may begin to base his/her decisions. The information that this study provides to the information system planner can be outlined as follows:

- The financial health of the organization is of primary concern to the administrator and he/she requires to know budget information on a regular basis, program costs and expenditures, as well as revenue and expense information. This information must be timely, regular, and in a concise format in order to facilitate decision making activities.
- The student enrolment activities are of concern to the administrator also, and include course enrolment figures, attrition rates, success (graduation) rates, as well as gender and categorical information. Wait lists, application status reports, and other historical trends will also be of interest to the administrator who is

increasingly having to make decisions according to a customer (student) driven model.

- The human resource information is also important to the administrator since he/she is required to know what staff is available to deliver sometimes unscheduled courses requested by the community. Questions like: What staff development do we need?, What is the staff turnover rate?, What is the average age of the faculty?, are becoming increasingly important as administrators are faced with complicated human resource planning processes.
- Other information is also required of the administrator to complete his/her strategic decision processes. Decisions surrounding what programs to cut and what classroom space is available require accurate information.
- Specific information requirements were outlined which supported the specific goals of each administrator. The CSF process itself is a useful tool, not only to determine the information required, but also to refine the organizational and administrative missions and goals.

The picture that the community college administrator presented to the author of this study is that if the administrator can have accurate and up-to-date information on the financial health of the organization, student enrolment data, and human resource information, to support his/her particular goals the decisions facing the modern educational administrator become less subjective and more accurate. Rather than being a luxury, executive information systems are quickly becoming a necessity in order for the

organization to survive, or better, in order to maintain a degree of efficiency for quality educational programming.

Manual counts of information are rarely accurate and, given the time they take to complete, are no longer an efficient means to gather information. However, the information system planners must begin to look away from the traditional transaction based systems and plan their development with information decision making support questions in mind. This is not to say that computer systems are the answer to all information requirements in all cases. There is, and probably will always be, a need for non-computer generated information. In fact, within our proposed Management Feedback Model, we are not suggesting that all information be computer generated. What is necessary, however, is that the information be timely, accurate, and specifically address the critical success factors that are derived from the specific goals of management. Thus, the ideal system would encompass a variety of information generated from different sources, including formal computer reports, informal computer inquiries, and other non-computer information sources, including informal conversations.

This study presents the information system planner with support to develop such comprehensive feedback systems within the Manitoba Community College environment, and it is hoped that the information provided herein can provide an impetus for, at the very least, further administrative information system studies and research.

## **V. CONCLUSION.**

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### **5.1 Conclusions and Information Solution Recommendations.**

A few conclusions can be drawn from the data summarized from Part I of the questionnaire:

- The use of the computer is integral to the management process in the two community colleges, with most administrators indicating that they occasionally or frequently rely on computer-based information for management activities.
- Computer-based information is not totally relied on within management activities as administrators indicated non-computer sources being equal or more often relied on within their management activities.
- Red River Community College administrators rely on computer based information more heavily than do their counterparts at Assiniboine Community College in certain information source categories.
- There appears to be less adequate information at Assiniboine Community College than at Red River Community College.

- All administrators could outline situations where a lack of adequate information existed and, further, where improved information systems could have benefited their particular task.
- The administrator's top three priorities indicated that improvements could be made on the Student Record System, the Financial Information System, and the Personnel and Staffing Information System in that respective order. Through informal discussions there appeared to be a need for links and the ability to relate information among all three systems.

The essential conclusions that can be drawn from this study arise from the answers to the initial problem statement and questions that the study originally proposed. The study has determined the general areas of information requirements which are important to the community college administrator and were identified as: the financial system, the student enrolment system, the human resource management system, and to a lesser extent, classroom management and course evaluation systems. The administrators perceived these systems as being the most helpful in assisting in their decision-making processes.

However, these are relatively obvious conclusions that directly confirm what the literature has already told us and, further, due to their generality are not that useful in practice. Nevertheless, there is one key conclusion that can be drawn from this particular study. The process of CSF determination is in itself a worthwhile endeavour and, further, the Integrated Management Information Systems (IMIS) model that was developed as a

result of this study is a model that has direct application to the educational environment, especially to the Manitoba Community Colleges.

Although the administrators knew what they had to do in terms of their goals, and outlined these clearly during the interview process, they did not necessarily always fit into the prescribed overall organizational mission. That is, the Department of Education, through the Minister of Education, has a set of missions and goals that it sees as necessary for the overall public good. The college's missions and goals should be, in theory, a subset of the Department's goals and missions and, if accomplished, should support the realization of the Department's mission. Further, the respective college departments, through the associated vice presidents, would also have missions and goals which, in turn, support the achievement of the college mission and goals. It was apparent during the course of the study that the missions and goals were not necessarily clearly defined, especially at the vice-presidential level, and, in some cases, were in isolation from the main organizational mission and goals.

The CSF process and the IMIS model depend on clearly defined and integrated organizational missions and goals at all levels. The role of CSF identification, in terms of information systems, is to support management by identifying management performance, i.e. to see if organizational goals are achieved. The IMIS model is the framework and the CSF approach is the mechanism to use existing information systems to support the management process, specifically to monitor goal achievement.

If we reflect back on the initial problem statement from chapter one, i.e. to determine the information requirements of Community College administrators, it is apparent that the study has determined a sample of some of the priority information needs and were outlined in Tables 4.9 to 4.13. Thus, the initial inquiry has been satisfied and, more importantly, the CSF process has been successfully determined to be an ongoing method of systems analysis.

From the interviews and CSF procedure the study was also able to answer the questions which were posed from the initial problem statement.

**Question 1: What kind of decisions and problem-solving activities do educational administrators usually perform?** The study determined that the administrator is involved in problem solving and decision activities that could utilize all of the above information systems. The administrator, within his/her role as monitor, makes decisions concerning the continuance or non-continuance of courses and/or programs and, as such, requires student retention and success rates as well as costing information in order to determine the cost/benefit of any particular program. The administrator, as a monitor and resource allocator, requires information on staff planning, classroom scheduling, and financial status information in order to determine whether the human and physical resources are available to provide quality programs.

The study has determined that more information is required to support the administrators' activities in the areas of strategic planning and tactical control decision operations. This is reinforced throughout the study when the administrators consistently

referred to daily decision tasks when college wide program planning and budget allocation determinations were being made. Clearly the study has reinforced the necessity for information decision support for the administrators.

**Question 2: What kind of information can educational administrators use that would improve the quality of these decisions and their resulting problem solutions?** The administrators that were interviewed indicated three main areas of concern: financial, human resource management, and student enrolment. They further specified precise measures or reports that would improve the quality of their decisions (see table 4.8) and indicated what areas they currently utilize information systems for decision support activities (see table 4.1). Although the specific information required varies slightly from administrator to administrator, the common thread that binds them all is the fact they require specific information which is accurate and timely in order to fulfil their responsibilities and to perform their problem solving activities well.

**Question 3: What type of information processing solutions can therefore be recognized for the educational administrator that can be utilized within his/her daily decision processes?** The study did not directly answer the final question which was posed by the original problem statement. Instead, the study provided the background information from which several solutions can be contemplated. Therefore, the following recommendations can be determined from the results of the study:

- **That Computer Services implement the IMIS model and CSF process of information determination within the management of Manitoba Community Colleges.**

The study has concluded that the CSF process is a viable means of determining the information requirements for college administrators. Secondly, it has shown that it can also be integrated within management functions and processes as a method to ameliorate goal achievement and monitoring. This IMIS model, developed from the results of the study, has direct application to Community College management as a method of evaluating the management and reporting process.

- **A distributed data processing model is recommended for consideration in future IS planning.**

The study indicated that there were differing needs between the two community colleges participating in the study. This leads to one conclusion that a distributed data processing model could be an appropriate solution to meet the differing information requirements of each college. This is reinforced by other research which indicates that distributed computing "expands the role of other administrative departments in developing and managing the automation of their own operational processes" (Ryland, 1988, p. 32). Whether this takes the form of

centrally maintained data bases which are down loaded daily, or true distributed processing where portions of the data bases are maintained locally, is of no consequence to the administrator whose only concern is the information gleaned from the system.

The decentralization of computing is an issue which has attracted attention in recent literature and the trends and benefits appear to be obvious. Kissler suggests that "the decentralization of computing makes sense, because decisions should be made by someone who knows the academic programs and understands the computing needs in the departments" (Kissler, 1988, p. 49).

- **To provide further computer training for the administrators.** Although the administrators were computer users to varying degrees, and most were competent users, further training for administrators would be appropriate, especially in terms of the range of computer information possibilities available to them. During the study interviews it became evident to the author that if the administrators were to be more knowledgeable about what is possible in terms of the capability of computer information systems, then the responses could have been different and, as well, would help communication with the systems personnel. Ideally, the training would involve EES systems and other training that addresses management concerns. Training is a necessary ingredient, for managers and lower level staff alike, to the distributed data base model where the resulting enhanced

productivity can only be achieved when "an investment in the necessary training is made" (Ryland, 1988, p. 31).

- **To develop or purchase the necessary software in order to provide a decision support system and/or an executive support system.**

The administrators were unanimous in their use of computer based information for management activities. The results of the study indicated that specific management information requests were not available, or not available readily, which demonstrates that an information system that addresses management concerns is certainly needed. More than one administrator, during the interview, stated that there are reams of paper reports available, but they could not easily summarize and extract the information they required and, secondly, did not have the time to do it. This occurred in spite of constant requests from the government for specific management information.

Additionally, non-computer sources were still equally used where the computer could have performed the function more efficiently, which would indicate deficiencies in the computer based information system. Further, the described information currently being provided to the administrators was of an historical nature more than of a predictive nature. It was apparent from the study that the administrative decisions being made required more sophisticated modelling techniques, e.g. predicting student enrolments. Therefore a more formal Decision

Support System and Executive Support System would be appropriate in order to provide the modelling solutions for the relatively unstructured problems administrators face.

Current literature indicates that executive support systems can improve the administrative process. For example, Rockart and DeLong indicate six ways that executive support systems can improve organization planning and control:

1. Improvements in existing corporate or divisional reporting systems.
2. The redesign of management reporting systems to focus more strikingly on factors critical to managing the business.
3. Changes in planning and forecasting processes.
4. An ability to perform ad hoc analysis using customized information data bases.
5. The enhancement of personal communication links enabling executives to stay on top of critical activities in the organization.
6. Improved program management capabilities in project-orientated firms. (Rockart & DeLong, 1988, p. 95)

Within educational literature the uses of decision support systems have recently become a predominant component of the academic decision making processes. Jedamus suggests that decision support systems hold great promise for academic institutions, especially within the strategic and tactical planning areas, however he cautions that effective decision support management is also necessary (Jedamus, 1984). Dunn and Glover likewise suggest that tactical decisions can be

supported through decision support systems, although they recommend multi-campus collaboration (Dunn and Glover, 1988).

Commercial ESS and DSS systems are available which can be implemented into existing computer systems. One such system, the Policy Analysis and Simulation System (PASS), is a microcomputer-based modelling system which can be used by educational administrators, policy-makers, and planners to simulate and forecast under conditions of environmental uncertainty, the impact of strategic policies on the projected trends and goals of educational performance (Adams, 1989). Pilot software and Commander by Comshare are two examples of many commercial products which are more generic in nature, but could be applied to the educational enterprise.

The essence, however, of an ESS system is to provide operating data for management use. Existing corporate (or, in this case, educational) data can be simply tapped by knowing how to present the resulting information. The current reporting system at the community colleges utilizes paper reporting and it has been suggested by administrators in the study interviews that it is often difficult to extract the appropriate information from the reams of listings.

An ESS system typically uses electronic reporting (screens) and consists of three functions: drill down, which begins at a high level report and allows for the searching of greater detail at lower levels; trend analysis, which allows for

reporting of historical trends; and, exception reporting, which tracks those items which are out of line (Friend, 1987).

■ **To designate a Chief Information Officer to coordinate the information needs of the institution.**

Given the democratization and increased scope of computing and information technology, as well as the increasing information needs of management, there is a need for someone to coordinate, communicate, and jointly plan the institutional computing needs with administration and computing services. The study results reinforced this tenet and demonstrated that management information needs were comprehensive and specific, if management goals were to be achieved. Further, communication problems were apparent between computer services and management, especially with Assiniboine Community College. This is not unusual given the mind sets of the two separate divisions. Computer services tend to be technically orientated while management tends to be organizationally orientated. To bridge this gap requires a person who is a manager with information systems training or knowledge who can identify information needs and communicate these effectively to the systems personnel. Additionally, the constant monitoring of information is essential if the organization is to meet its missions and objectives.

Therefore, the appointment at a senior level of a CIO (Chief Information Officer), who is more likely to be a computer competent faculty member than a technological leader, would facilitate the information and computing needs of the institution (Hawkins, 1988). The CIO is an objective advisor, putting forth what is in the best interests of the organization, and focuses on working with the business units to learn their business operations and suggest ways to use information effectively (Gilmore, 1991).

The community colleges can therefore utilize such a person dedicated to managing information needs and coordinating the information flow to the administration. To further illustrate this point, during one of the interviews an administrator relayed the description of a recent information problem he had encountered. He required some past student enrolment information which could not be summarized and obtained from the current MIS system and therefore he had to have one staff member spend three months summarizing the information from original student registration forms. A CIO could have assisted in obtaining the information by working with the computer department in order to gather the reports from the current computer system.

- **To formulate a long range information services plan for the colleges (or each college).**

Many educational institutions have developed, or are in the process of developing, long range information systems plans. These plans usually include a mission statement and goals, a current situation summary including strengths and weaknesses, planning strategies and directions, and resource projections including costs and benefits. These plans are comprehensive blueprints for the provision of all computing services for the institution.

The results of this study indicate that there is no comprehensive blueprint for providing information to the two colleges. The current system appears to address information needs on a piecemeal basis through regular management reports which often do not address the specific information requirements of the administrator. Although most of our participants in the study indicated they were satisfied with the current system, they also indicated that they lacked information, especially within the strategic planning area. Secondly, the administrators responded to our study without really knowing what is possible within the ideal information system. Therefore, the study indicates that further long range studies and plans would help in determining not only the information needs of the Community Colleges, but would also provide a blueprint for implementation.

For example, Information Services Division for the Minnesota Community College system, which services 18 colleges throughout the state, has recently

developed a long range systems plan which includes a simple mission statement: to provide the Minnesota Community College System with data and information in an accurate and timely fashion. Although the system is driven by an IBM mainframe computer, their plans include moving processing and data storage to campus-based minicomputers, local area network connectivity, and a conversion to a relational data base management system. Five application software enhancements were identified as:

1. The Student Information System which will undergo a series of enhancements. The registration and admission modules will have new functions and data. A student receivables module will be developed. Interfaces with financial aid, enrolment management, assessment testing and degree auditing will be written.
2. A mainframe financial aid system will be implemented on February 1, 1991, in time for the 1991-92 processing year.
3. A series of new or enhanced systems will be made available for Fiscal Services. These will include, but are not limited to:
  - on-line Loan Management System
  - on-line Grant Management System
  - enhancements to the Allocation Accounting system
  - Student Receivables System.
4. A Human Resources Information System will be developed. This project began in January 1990, when a Project Team of expert clients was formed to define the overall requirements for this system. The Project Team appointed a Task Force to develop the detailed requirements for the system.
5. Many existing microcomputer reports use data from mainframe reports. These microcomputer functions will be moved to the mainframe in order to prepare them in a more timely and staff-efficient manner. (Minnesota Community College System Long-Range Plan, 1990, p. iv)

Other institutions have developed similar plans to the Minnesota plan as described above, although these differ in their approach and details. These plans are available

through the Professional Association for Computing and Information Technology in Higher Education, CAUSE exchange library, in Boulder, Colorado USA (see bibliography) and provide excellent information on what other institutions are planning.

This study indicates that the Community College System in Manitoba could benefit from a long range plan which includes system enhancements as described by the administrators which were interviewed. Although Manitoba Colleges are currently limited by resources and uncertainties in terms of governing structure, limiting planning can be accomplished and, in any case, would provide guidelines for future directions.

The above recommendations are only a beginning, a stepping stone, towards a comprehensive computing solution which can provide the colleges with precise, timely information. Although computing needs have been largely addressed for the ongoing transaction processing systems, this study indicates administration has been neglected. The administrator requires information to accomplish his daily problem solving tasks effectively and an effective computer information system provides infinite possibilities to provide this information to the administrator.

## **5.2 Summary.**

The results of the study are evident. The administrator of a Manitoba Community College needs more timely and concise information in order to perform his/her decision and problem solving activities. They indicated a dependence on computer based information, yet still utilized manual systems extensively. They also indicated that they

felt improvements could be made within the financial, human resource, and student record systems and indicated a continued reliance on those systems for decision making purposes. Specifically, they indicated information in measurable report forms that they required from the above systems. These applications can be summarized as in table 5.1.

## **TABLE 5.1 COMMUNITY COLLEGE ADMINISTRATORS SPECIFIC INFORMATION REQUESTS**

### **FINANCIAL DATA BASE**

#### **BUDGET:**

Budget summary reports including budget vs. actual, percentage left, and variance by department.

One page summary report on revenue sources and expenditures by department.

#### **COSTING:**

Operating cost per student per program per full time equivalent student.

Cost analysis including facility size, staff, capital required, operating costs, and overhead factors.

### **STUDENT ENROLMENT**

Student graduation rates by category report.

Student average GPA report by course.

Student employment rate in field of study.

Student application status reports compared to historical data.

Student attrition vs success report according to age and gender on full-time equivalent basis.

Student contact hours per instructor.

Student wait list and current enrolment report.

## **HUMAN RESOURCE**

The dollar and staff year allocated compared to the dollar and staff year expended by department with variances.

Staff analysis of 'tombstone data' (age, etc.) and skill development data.

Number of full time vacant staff positions and number of staff positions allocated per department.

The above information requests are directly related to each respective administrator's decision requirements. These information reports were solely based on what each administrator felt his/her immediate information needs were at the time of the interview. Thus, the study synthesized the administrator's information requirements and provided insights into his/her role as decision maker and strategist.

The main benefit provided by the study is a method for MIS personnel to gather more information for future IS planning. The critical success factor approach is an appropriate analysis method which proved to be efficient and accurate. Therefore, the final conclusion of the study is that MIS planners should continue to pursue administrative information needs and plan for their eventual implementation. Ideally, this would occur through the eventual capability for administrators to access

information on-line at their leisure, making inquiries to obtain the information they require when problems and the need for decisions arise. This can best be summarized by Charlotte McGhee of Brandeis University:

"University data processing has moved beyond the needs of operations to those of top level management. These needs cannot be prespecified. They require an information support structure that provides access to data sufficiently integrated and timely to support spontaneous questions in a world of changing requirements and objectives. This is best supported by an interactive on-line system with either a network or relational data base. (McGhee, 1984, p. 26)

## BIBLIOGRAPHY

- Adams, Charles F. "Computer Based Strategic Planning for Educational Organizations." Journal of Research on Computing in Education 21:3 (1989): 299-306.
- Albert, Louis S., and Theodore J. Marchese. "Office Implementation: A Case Study." Making Computers Work for Administrators. New Directions for Higher Education no.62, vol. XVI, no.2. San Francisco: Jossey-Bass, 1988. 65-70.
- Bank, Adrienne, and Elaine Craig. "Some Lessons for Educators from Management Information Systems Literature." Information Systems and School Improvement. Ed. Adrienne Bank and Richard C. Williams. New York: Teachers College, 1987. 22-34.
- Bazerman, Max H. Judgment in Managerial Decision Making. Toronto: John Wiley & Sons, 1986.
- Beaver College. RFP: Administrative Information System. Boulder: CAUSE, 1985.
- Beckham, Bonnie. "Networking Brown University." T.H.E. Journal. 16:8 (1989): 62-68.
- Bluhm, Harry P. Administrative Uses of Computers in the Schools. Englewood Cliffs: Prentice, 1987.
- Blunt, Charles R., and Kamal A. Hazboun. "Sharing Administrative Information Resources Through Office Systems Networks." CAUSE/EFFECT 6:2 (1983).
- Bork, Alfred. "Information Retrieval in Education." Technological Horizons in Education 8:2 (1981): 49-51. ERIC EJ 252822.
- Bratlien, Maynard J. "Computer Development in Educational Administration." T.H.E. Journal. 16:10 (1989): 46-49.
- Budden, Sandra Campbell. "Communications and Information Technologies in Community Colleges in Canada." Office of Development Research, TV Ontario. Ottawa: n.p., 1984.

- Bullen, Christine V. and John F. Rockart. A Primer On Critical Success Factors. Center for Information Systems Research, Massachusetts Institute of Technology. CISR Working paper no. 69, June 1981.
- Chandler, Devine, and Steinmetz Gumm. "An Investigation into Combined Versus Separate Academic/Administrative Information Systems." CAUSE National Conference Paper. (1982).
- Charp, Sylvia, and Duffy Hines. "A Primer on Campus Networks." Making Computers Work for Administrators. New Directions for Higher Education no. 62, vol. XVI, no.2. San Francisco: Jossey-Bass, 1988. 71-78.
- Committee of Enquiry. Review of Efficiency and Effectiveness in Higher Education. Canberra: Australian Government Pub. Services, 1986.
- Cross, K. Patricia and Elizabeth F. Fideler. "Community College Missions." Journal of Higher Education. Vol. 60, no. 2, March/April 1989.
- Craft, Larry N., and Jerry Legere. "Administrative Services from a Process Perspective." Cause/Effect March 1983. 18-21.
- D'Archangelo, Frank. "Keeping the Pieces Reconciled." CAUSE. CumRec paper 1988.
- Drucker, Peter F. The Frontiers of Management. New York: Truman Talley, 1986.
- Drucker, Peter F. "How to Make a Business Decision." Decision Theory and Information Systems. William T. Greenwood. Cincinnati: South-Western, 1969.
- Drucker, Peter F. The Practices of Management. New York: Harper & Row, 1954.
- Dunn, John A., Jr., and Robert H. Glover. "Using Campus Data for Decisions." Making Computers Work for Administrators. New Directions for Higher Education no. 62, vol. XVI, no. 2. San Francisco: Jossey-Bass, 1988. 35-45.
- Estes, Dr. Nolan, and Dr. Betje Klier. "An International Study of the Impact of New Information Technologies on Curriculum and Institutional Structures." Paper presented at the annual meeting of the American Educational Research Association. Chicago: n.p., 1985.

- Estes, Nolan. "Managing Technological in the Dallas Public Schools." Technology and Education (Proceedings of the National Conference on Technology and Education - January 26-28, 1981). Washington, D.C.: Institute for Educational Leadership, 1981. 139-144.
- Frame, Stanley M. "Information Needs in Support of Planning in Small Colleges." Information for Decisions in Postsecondary Education. Ed. Robert G. Cope. St. Louis: Ass. for Institutional Research, 1975. 32-34.
- Friend, David. "The Three Pillars of EIS." Information Center. August, 1987.
- Gibbens, Trevor P. The Administrative Impact of Computers on the British Columbia Public School System. Thesis, University of British Columbia, 1986.
- Gilmore, Ron V. "CIO Perils, Day Two and Later", Canadian Information Processing. April/May 1991.
- Goddard, Constance. Computer-Based Learning and Postsecondary Education: Some Experimental Projects and a Learning Model. 1983. ERIC ED 248841.
- Green, Kenneth C. "The New Administrative Computing." Making Computers Work for Administrators. New Directions for Higher Education no.62, vol. XVI, no.2. San Francisco: Jossey-Bass, 1988. 5-11.
- Greenwood, William T. Decision Theory and Information Systems. Cincinnati: South-Western, 1969.
- Harris, Albert L. "Improving the Impact of Administrative Support by Assessing the Environment and Delivery Systems." CUMREC. 1983.
- Hawkins, Brian L. "Administrative and Organizational Issues in Campus Computing." Making Computers Work for Administrators. New Directions for Higher Education no. 62, vol. XVI, no. 2. San Francisco: Jossey-Bass, 1988. 13-26.
- Hawkrige, David. New Information Technology in Education. Baltimore: Johns Hopkins U P, 1983.
- Heinlein, Albert C., ed. Decisions in Academic Administration. Kent: Kent State U P, 1974.

- Henderson, John C., John F. Rockart, and John G. Sifonis. "A Planning Methodology for Integrating Management Support Systems." The Rise of Managerial Computing. Homewood, Illinois: Dow Jones-Irwin, 1986.
- Hussain, Khateeb M. Development of Information Systems for Education. Englewood Cliffs: Prentice, 1973.
- Hussain, Donna, and K.M. Hussain. Managing Computer Resources. Homewood: Irwin, 1988.
- Information Services Division, Minnesota Community College System Long Range Plan, October, 1990.
- Jackowski, Edward M. "The Next Step in Educational Program Budgets and Information Resource Management: Integrated Data Structures." Journal of Research on Computing in Education 21:1 (1988): 1-14.
- Jedamus, Paul. "The Case for Decision Support Management." Using Microcomputers for Planning and Management Support. New Directions for Institutional Research no. 44, Vol. XI, no. 4. San Fansisco: Jossey-Bass, 1984.
- Kissler, Gerald R. "A New Role for Deans in Computing." Making Computers Work for Administrators. New Directions for Higher Education no. 62, vol. XVI, no.2. San Francisco: Jossey-Bass, 1988. 47-55.
- Kneifel, David R. and Steven B. Just. "Impact of Microcomputers on Educational Computer Networks." AEDS Journal 13:1 (1979): 41-49.
- Koehler, David. A System to Monitor the Status of a Request for Work. Boulder: CAUSE, n.d.
- Kroeber, Donald W., and Hugh J. Watson. Computer-Based Information Systems. New York: Macmillan, 1894.
- Kroenke, David. Management Information Systems. Santa Cruz: Mitchell, 1989.
- Lane, Michael S., and Thomas L. Blaskovics. "Microcomputer Education: An Integrated Approach to Curriculum Design." Journal of Education for Business May (1988): 358-362.

- University of Wisconsin/Madison. Teleprocessing Transaction Catalog: 3270 Applications. Boulder: CAUSE, 1988.
- Lapre, Kathryn. "Simplification Through Integration." CUMREC. 1985.
- Lapre, Kathryn. "An Integrated Approach to Meeting the Administrative Information Challenge." CUMREC. 1984.
- Leslie, Judith W. ed. Computers Serving Students: The Community College Way. Boulder: CAUSE, 1986.
- Levinson, Eliot. "The Implementation of Executive Support Systems." The Rise of Managerial Computing. Homewood, Illinois: Dow Jones-Irwin, 1986.
- Licker, Paul S. Fundamentals of Systems Analysis. Boston: Boyd & Fraser, 1987.
- Little, Elizabeth R. "Implementation of Administrative Computer Systems: The Swarthmore college Experience." CAUSE National Conference Paper. 1982.
- Loyola University of Chicago. Information System Policies. Boulder: CAUSE, 1987.
- Main, Jeremy. "At Last, Software CEOs Can Use." Fortune March 1989.
- Matzek, Moore, and Nass. "Computer in Small Colleges with Big Ideas." CAUSE Exchange Library. 1988.
- McCall, Morgan W., and Robert E. Kaplan. Whatever it Takes. New Jersey: Prentice, 1985.
- McGhee, Charlotte. "Fourth Generation of University Administrative Data Processing: The Brandeis Solution." CAUSE/EFFECT 7:1 (1984).
- McKenna, Christopher, K., Ph.D. Quantitative Methods for Public Decision Making. Toronto: McGraw, 1980.
- Memphis State Universtiy. RFP: Administrative Computing System. Boulder: CAUSE, 1985.

- Mintzberg, Henry. The Nature of Managerial Work. New York: Harper & Row, 1973.
- O'Brien, James A. Management Information Systems. Boston: Irwin, 1990.
- O'Daniel, Dale. "Microcomputer Applications for Community College Administrators." New Directions for Community Colleges 47. (1984).
- O'Reilly, Charles A., III, "The Use of Information in Organization Decision Making." Research in Organizational Behavior. Vol. 5, 1983
- Office of Technology Assessment Congressional Board. "Informational Technology and its Impact on American Education." 97th Cong. Computing Teacher 10:5 (1983): 18-29.
- Peat Marwick Main & Co. Microcomputer Use in Higher Education. n.p.: Peat Marwick, 1987.
- Percival, Fred, and Henry Ellington. A Handbook of Education Technology. Worcester: n.p., 1984.
- Powell, James L. "The Computers as Presidential Facotum." Making Computers Work for Administrators. New Directions for Higher Education no. 62, vol. XVI, no.2. San Francisco: Jossey-Bass, 1988. 57-64.
- Resnikoff, Howard L. "Implications of Advances in Information Science and Technology for Institutions of Higher Learning." EDUCOM Bulletin 16:1 (1981): 2-10. ERIC EJ 244321.
- Rockart, John. "Chief Executives Define Their Own Data Needs." Harvard Business Review. Vol. 57, no. 2, March-April 1979.
- Rockart, John F. and David W. DeLong. Executive Support Systems. Homewood, Illinois: Dow-Jones-Irwin, 1987.
- Rosen, Thelma. "Communications and Information Technologies in Canadian Universities." New Technologies in Canadian Education, Paper 4 Ontario Educational Communications Authority. 1984.

- Rowe, Alan J. "Management Decision Making and the Computer." Decision Theory and Information Systems. William T. Greenwood. Cincinnati: South-Western, 1969.
- Ryland, Jane N. "Distributed Computing." Making Computers Work for Administrators. New Directions for Higher Education no. 62, vol. XVI, no.2. San Francisco: Jossey-Bass, 1988. 27-33.
- Schmidtlein, Frank A. "An Analysis of Decision Strategies Employed in the Governance of Higher Education." Information for Decisions in Postsecondary Education. Ed. Robert G. Cope. St. Louis: Ass. for Institutional Research, 1975. 111-116.
- Schroder, M. "The Introduction of New Technology in Tertiary Institutions." Journal of Tertiary Education Administration 1:1 (1979).
- Schroeder, Roger G. "A Survey of Management Science in University Operations." Decisions in Academic Administration. Ed. Albert C. Heinlein. Kent: Kent State U P, 1974.
- Schroeder, Roger G. "Four Approaches for the Use of Management Science in University and College Administration: A Comparison." Decisions in Academic Administration. Ed. Albert C. Heinlein. Kent: Kent State U P, 1974.
- Senn, James A. Analysis & Design of Information Systems. Toronto: McGraw, 1989.
- Sharon, Donna, and Judith Tobin. "New Technologies in Education: Issues and Concerns." New Technologies in Canadian Education, TV Ontario, Paper 17. 1984.
- Sibley, William M. "The Transactional Frame of Information." Information for Decisions in Postsecondary Education. Ed. Robert G. Cope. St. Louis: Ass. for Institutional Research, 1975. 12-16.
- Simon, Herbert A. Administrative Behavior, 3rd edition. New York: Free Press, 1976.
- Simon, Herbert A. The New Science of Management Decision. New York: Harper & Row, 1960.

- Smith, Dwight C., Jr. "The Institutionalization of Information Systems: Or, What We Need to Learn Beyond Nchems." Information for Decisions in Postsecondary Education. Ed. Robert G. Cope. St. Louis: Ass. for Institutional Research, 1975. 361-364.
- Spuck, Dennis W. and Gene Atkinson. "Administrative Uses of the Microcomputer." AEDS Journal Fall/Winter (1983): 83-90.
- Spuck, Dennis W., and William C. Bozeman. "Training School Administrators in Computer Use." Journal of Research on Computing in Education 21:2 (1988): 229-239.
- State University & Community College System of Tennessee. Administrative Banchnark Plan. Boulder: CAUSE, 1988.
- Stevens, Orrin. "Distributed Database and Cooperative Processing: A Continuing Evolution." Technical Support. February 1990.
- Stonebraker, Michael, ed. Readings in Database Systems. San Mateo: Morgan Kaufmann, 1988.
- Tanner, Kenneth C., and C. Thomas Holmes. Microcomputer Applications in Educational Planning and Decision Making. New York: Teachers College Press, 1985.
- Tatlow, William L. "Conclusion: Using Microcomputers for Planning and Management Support." Using Microcomputers for Planning and Management Support. New Directions for Institutional Research no. 44, Vol. XI, no. 4. San Fansisco: Jossey-Bass, 1984.
- University of Nebraska. Administrative Computing and Systems Plan. Boulder: CAUSE, 1987.
- University of Puerto Rico. Master Plan for Communications, Computing, and Information Systems. Boulder, CAUSE, 1985.
- University of Miami. Long Range Information Systems Plan. Boulder: CAUSE, 1983.
- University of Miami. Long Range Information Systems Plan, Update 1984. Boulder: CAUSE, 1984.

- University of Nevada system. RFP for Consultation Services: Management Information Systems. Boulder: CAUSE, 1983.
- University of Maryland at Baltimore. Strategic Plan for Integrated Information Management Systems. Boulder: CAUSE, 1986.
- University of Wisconsin/Madison. Strategic Plan for Administrative Data Processing 1988-1993. Boulder: CAUSE, 1988.
- Vaino, Peter. "Impact of Technological Advance on Education." Proceedings of a Seminar held at the Chateau Laurier Hotel. Ottawa: Can. Teacher's Federation, 1984.
- Vidrine, J. P. "Making the Move to a Distributed Database." System Builder. February/March 1990.
- Vanderbilt University. Strategic Plan for Vanderbilt University Administrative Systems. Boulder: CAUSE, 1988.
- Virginia Commonwealth University. 1987 Strategic Long Range Plan: Administrative Information Systems. Boulder: CAUSE, 1987.
- Walling, Elizabeth. "Improving Administrative Support and Enjoying the Challenge." COMREC. 1983.
- Zajac, Bernard. Administrative Uses of Microcomputers in Schools. Master Thesis, University of Manitoba, 1990.
- Zuboff, Shoshana. "Short-Circuiting New Technology." Los Angeles Times. [Los Angeles] 5 June 1988, Part IV.

## INTERVIEW QUESTIONS-ADMINISTRATOR

COLLEGE: \_\_\_\_\_ POSITION: \_\_\_\_\_

DEPARTMENT: \_\_\_\_\_ DATE OF INTERVIEW: \_\_\_\_\_

HOW LONG IN PRESENT POSITION: \_\_\_\_\_

LENGTH OF SERVICE AS ADMINISTRATOR IN COLLEGE ENVIRONMENT: \_\_\_\_\_

## CURRENT DEGREE OF COMPUTER COMPETENCY

Illiterate	Semi-Literate	Average	Very Literate	Competent
■	■	■	■	■
■	■	■	■	■
1	2	3	4	5

## INTRODUCTION.

As you know, this study is attempting to determine the information requirements for you, as an senior manager of the organization, using a questionnaire and the Critical Success Factors method of systems analysis. From the article previously sent to you, and from the information which was outlined in the introductory letter, you would have noted that the method is based on your missions and goals within your position as a senior manager.

However, I would ask you to first answer Part I and Part II, which requests facts as to your current information sources and computer use, as completely as possible prior to the interview. I like you to also consider and think about the questions in Part III on the critical success factors. You don't have to answer them at this time as the responses will be clarified during the

interview. At your request a follow-up interview can be arranged which will provide you with the results of the survey.

#### **PART I. Information Sources and Information Needs.**

1. From the following list of categories of information systems indicate whether you rely mainly on computer-based, non-computer, or a combination of information from computer and non-computer sources. Insert a number on the line that most appropriately reflects the degree that you use the source of information, either computer or non-computer, for your usual decision making and management activities using the following guidelines. For example, if you utilize the computer frequently for obtaining student record information, but always utilize reports and other non-computer information for obtaining student information, then you would write a 4 on the computer line and a 5 on the non-computer line next to the Student Records category.

- 5 Always-totally depend on the information source for everything and most management activities
- 4 Frequently-usually depend on the information source for some decisions and some management activities
- 3 Occasionally-sometimes use the information source for decisions and management activities
- 2 Seldom-rarely use the information source for decisions and management activities
- 1 Never-the information source is not used for decision support or management activities

#### INFORMATION SOURCE

#### CATEGORY OF INFORMATION SYSTEMS

#### COMPUTER NON-COMPUTER

- |    |       |       |   |
|----|-------|-------|---|
| A. | _____ | _____ | STUDENT RECORDS<br>E.G., Enrolment past and projections                             |
| B. | _____ | _____ | FINANCIAL INFORMATION<br>E.G., Budget spent and projected need<br>with comparatives |
| C. | _____ | _____ | COMMUNICATIVE CAPABILITIES WITH OTHER DATA<br>BASES                                 |

E.G., To survey other institutional information

- C. \_\_\_\_\_ COMMUNICATIVE CAPABILITIES WITH OTHER PERSONS  
E.G., Electronic mail with other staff and associates

**COMPUTER NON-COMPUTER**

- D. \_\_\_\_\_ ADMINISTRATIVE FUNCTIONS  
E.G., Electronic scheduling, reminders, word processing, etc.

- E. \_\_\_\_\_ STATISTICAL AND OPERATIONS RESEARCH  
E.G. Analyze existing data using mathematical models to analyze performance against goals

- F. \_\_\_\_\_ PERSONNEL AND STAFFING INFORMATION  
E.G., Human resource management system information

- G. \_\_\_\_\_ RESEARCH AND LIBRARY FUNCTIONS  
E.G., Search and look-up books, periodicals, etc.

- H. \_\_\_\_\_ OTHER: \_\_\_\_\_

2. What type of information system from the above list would be your priority to have installed/improved within your office/department, and would be most important to you in your role as an educational administrator, from which to obtain timely and accurate computer-based information for managerial and decision making purposes? (please rank order them [A through H] from left to right and separate them with commas; low order and circle the systems already accessible and with adequate information within your office/department):

3. Can you describe a recent or current situation(s), in terms of your management decision making role, where you have found yourself making a decision or being part of a decision process where there was an obvious lack of information,

information inappropriately presented, or information not available quickly enough?

- a. Is this situation(s) an on going or a recurring business problem, a one time event, or a constant situation over many different business problems.
- b. Which information source(s) did you or your decision group rely on most in making the decision(s) in this situation(s).
- c. From the above list of types of information systems, which system(s) could have played a significant role in this situation(s) if precise and timely information were available.

4. In general how satisfied are you with the current information flow and availability to your office in support of your managerial role and goals. Rate your satisfaction on a scale of 1-10 with 10 being totally satisfied and 1 being totally unsatisfied (please circle).

1    2    3    4    5    6    7    8    9    10

5. Do you find you are wasting valuable time in searching out information to support your managerial roles and decisions?

\_\_\_ Yes                      \_\_\_ No

6. Do you find you are searching for information at the last moment before major decisions or problem-solving sessions have to occur?

\_\_\_ always    \_\_\_ frequently    \_\_\_ sometimes    \_\_\_ infrequently    \_\_\_ never

7. If you could have any piece of information on your desk daily as you arrive at work, what would that information be?

8. In what areas of managerial planning and decision making do you find yourself lacking adequate information? Please indicate the degree that you lack adequate information from the following (make comments if you like):

1. **Strategic planning** - Involving the setting of policies, the choice of objectives, the selection of resources, long-range forecasting, and the evaluation of plans of action.

always  frequently  sometimes  infrequently  never

2. **Tactical control** - Management control which includes short-range forecasting as well as the making of decisions to assure effectiveness in the acquisition and use of resources.

always  frequently  sometimes  infrequently  never

3. **Operations control** - Involves making decisions to assure effectiveness in the conduct of day to day operations.

always  frequently  sometimes  infrequently  never

## Part II. Computer use.

The following questions refer to your computer use in your home and/or office (or department).

**Decision Support**-is the use of sophisticated software (e.g. Spreadsheet data base, etc) that provides information which is targeted for use in strategic planning and management control (Dunn & Glover 1988).

1. Do you have a personal computer or terminal in your home/office/department with direct personal access to it?

Yes  No

If Yes, How many: home \_\_\_\_\_ office/department \_\_\_\_\_

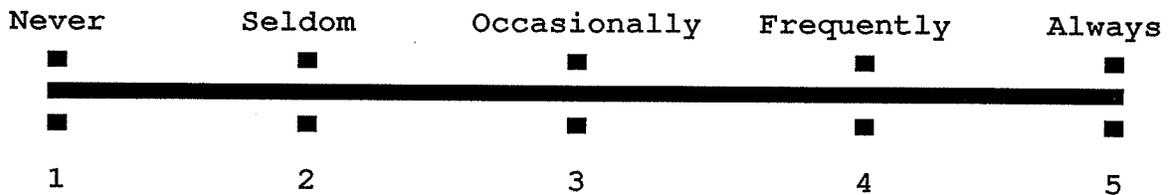
How often do you use it to obtain information \_\_\_\_\_

For questions 2-4 use the following to mark your response on the scale below each question.

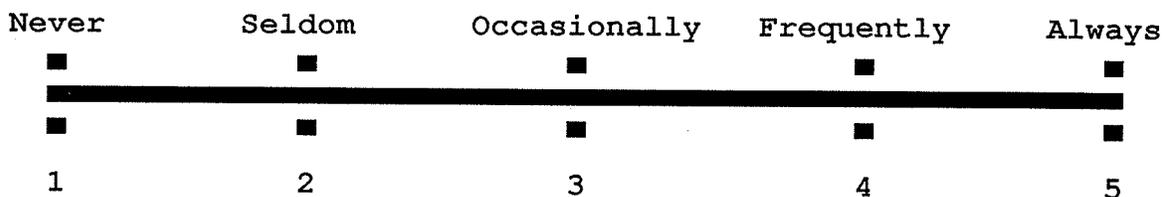
5 Always-totally depend on the computer information for everything and most management activities

- 4 Frequently-usually depend on the computer information for some decisions and some management activities
- 3 Occasionally-sometimes use the computer information for decisions and management activities
- 2 Seldom-rarely use the computer information for decisions and management activities
- 1 Never-the computer is not used for decision support or management activities

2. To what extent do you personally use the computer/terminal for direct decision information support within your normal duties?



3. To what extent do your direct office/department staff use the computer/terminal for direct decision information support for you and your office/department within the normal duties?



4. Please indicate the degree of use for each of the following software applications from your computers/terminals within your department/office that is used for decision and management support within your administrative area, and please name the predominate software package used for these decision support purposes:

ApplicationSoftware NameA. **Word Processing** \_\_\_\_\_

Never	Seldom	Occasionally	Frequently	Always
■	■	■	■	■
_____				
■	■	■	■	■
1	2	3	4	5

B. **Spreadsheet** \_\_\_\_\_

Never	Seldom	Occasionally	Frequently	Always
■	■	■	■	■
_____				
■	■	■	■	■
1	2	3	4	5

C. **Database** \_\_\_\_\_

Never	Seldom	Occasionally	Frequently	Always
■	■	■	■	■
_____				
■	■	■	■	■
1	2	3	4	5

D. **Graphics** \_\_\_\_\_

Never	Seldom	Occasionally	Frequently	Always
■	■	■	■	■
_____				
■	■	■	■	■
1	2	3	4	5

E. **Telecommunications** \_\_\_\_\_

Never	Seldom	Occasionally	Frequently	Always
■	■	■	■	■
_____				
■	■	■	■	■
1	2	3	4	5



**PART III. Missions, Goals, and CSF's.**

The following questions that I will be asking relate to the objectives, goals, and CSF's that you will determine from your own perspective as an executive.

1. Outline the major missions and objectives of your organization from the perspective of your own executive position and indicate what specific roles you play towards the on-going accomplishment of those missions and objectives.
  
2. What are your specific goals (specific targets which are intended to be reached at a given point in time, i.e. an operational transformation of one or more objectives) in relation to your mission objectives?
  
3. What are the identified Critical Success Factors in your job at this time?
  
4. Prioritize the Critical Success Factors. (can be generally stated).
  
5. Determine the measures for each Critical success factors outlined above. (this can be done in the follow-up interview).

**APPENDIX B. LETTER OF TRANSMITTAL TO EXECUTIVE.**

November 5, 1990

Dear Educational Administrator:

I am conducting a study, as a partial requirement towards a Masters degree with the University of Manitoba, of the information requirements of senior administrators within two Community Colleges in Manitoba (see enclosed letter of support from my employer, R. A. Mackie of Assiniboine Community College, as well as a letter of support from your local President). I would like to have your support as well in the conducting of this study and, in doing so, I would require approximately one to two hours of your time in order to conduct a personal interview.

I am also enclosing a consent form and a copy of the questionnaire which I will be using in the study in order that you will be prepared once the interview process begins. Parts one and two are obvious questions which only require some time on your part in order to respond. However, part three requires some understanding of the process involved and I am also enclosing an article by John F. Rockart, *Chief Executives Define Their Own Data Needs*, which describes the rationale and process of the critical success factors method of determining information requirements. I would suggest you read the article and review the questions from part three which I will be discussing with you at the time of the interview. You do not have to necessarily fill in the answers to part three at this point, however I would appreciate if you would think about the questions for the interview.

I am sure you will find the process interesting and not a waste of your time because as you will note on page 88 of the article there are some benefits to the manager who will take the time to determine your own critical success factors.

If you have any questions please phone me at 1-638-4908 and, in any case, I will be in touch with you by phone within the next two weeks to arrange a mutual convenient interview time.

Sincerely,

Greg Anderson

**APPENDIX C. LETTER OF REQUEST FOR SUPPORT FROM PRESIDENTS.**

November 5, 1990

Dear Mr. President:

I am writing to solicit your support in conducting a study of the information requirements of the executive managers (President and Vice-Presidents) of your institution, including yourself. I am enclosing a copy of the letter of transmittal which I will be sending to each VP, as well as a copy of the questionnaire, consent form, and an article on the critical success factors approach which I will be utilizing in the interview process.

I believe you will find the process useful and most likely also very enlightening. The results will provide benefits to the MIS staff as once they know what information to provide to managers, the technical problems tend to be manageable. I also believe you will find the critical success factor process rewarding in itself.

Could I therefore have your written support and have permission to transmit the enclosed information to your Vice-presidents along with your letter of support.

Please contact me at your convenience if you have any further questions at Assiniboine Community College, Parkland Campus, 1-638-4908. Thank you.

Sincerely yours,

Greg Anderson

**APPENDIX D. CONSENT FORM****NOTICE OF CONSENT**

**PROJECT TITLE:** The Educational Executive Information System: A Manitoba Study of the Decision Making and Information Requirements for Community College Administrators.

**INVESTIGATOR:** Gregory M. Anderson, Department Head, Assiniboine Community College, Parkland Campus, Dauphin, Manitoba.

**DESCRIPTION:** This study investigates the information requirements of the executive or manager of a post-secondary educational institution utilizing the critical success factors approach in determining information requirements. This study is in partial fulfilment of a Master of Education degree.

**CONDITIONS:**

1. My participation is voluntary.
2. I have the right to withdraw at any time and my withdrawal will not be prejudicial.
3. I may refuse to answer without penalty.
4. This interview is confidential.
5. My anonymity cannot be guaranteed, although my name will not be used within the study. References will only be made to title and/or department.
6. Duration of the interview will be approximately one to two hours with a follow-up interview at my discretion.
7. My inquiries concerning the research procedures will be answered by the investigator.
8. I have received a copy of the consent form including attachments.
9. This interview will be tape recorded with the provision that the tape will be kept in total confidentiality and will be only be used for the purposes of the study.
10. I will receive a copy of a summary of the results of the study.

I understand the conditions of the interview which have been explained to me and I hereby agree to the interview:

---

SIGNATURE

---

DATE

**APPENDIX E. MISSION AND GOALS FOR ASSINIBOINE COMMUNITY COLLEGE****MISSION**

**To provide an opportunity for individuals to acquire the skills and knowledge that will enhance their life-long economic security and personal development.**

**GOALS**

- **To enhance accessibility to college programs and facilities.**
- **To maximize the effective utilization of college resources.**
- **To extend the college's outreach capabilities.**
- **To establish and maintain an effective working partnership with agricultural, business, industrial and governmental sectors served by the college.**
- **To provide for the on-going evaluation and professional development of all college employees.**
- **To provide programs that are relevant to the work place and anticipate and accommodate labour market shifts.**
- **To articulate and cooperate with educational institutions and related agencies/associations.**
- **To create an environment which will allow and assist individuals to:**
  - a) **develop a sense of self-worth, self-confidence, and self-direction.**
  - b) **identify and achieve personal goals.**

## APPENDIX F. MISSION AND GOALS FOR RED RIVER COMMUNITY COLLEGE

DRAFT / JANUARY 1991



# Red River Community College

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## MISSION STATEMENT

The mission of Red River Community College is to provide high quality educational and training opportunities to assist with the economic, cultural and social development of Manitoba within the context of a global marketplace.

To achieve this mission, Red River Community College will work collaboratively with the appropriate sectors of government, education, business, industry and community organizations to accomplish the following strategic objectives:

- To enhance the quality of the learning experiences by fostering a culture of being a client based customer service organization;
- To expand the programming support to part time learners through partnership arrangements both within Winnipeg and with the regional communities;
- To enhance the support infrastructure and program access opportunities for all students with a particular emphasis on those with Aboriginal or Multicultural backgrounds;
- To expand the development of co-operative education as a major mechanism of delivering Red River Community College programs and creating stronger links with all sectors of the community;
- To respond to the training requirements of employers with effectiveness and flexibility;
- To continue to take an active role in supporting the general economic, social, cultural and environmental development of the community and the province;
- To explore new initiatives in International education.

These strategic objectives will be actively pursued within a framework that values academic and teaching excellence in an organization that encourages open communication, participative management, personal growth and innovative ideas.

# APPENDIX G. RED RIVER AND ASSINIBOINE COMMUNITY COLLEGES

## COMPUTER SYSTEM CONFIGURATION

