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THE DEVELOPMENT OF A MANAGEMENT INFORMATION SYSTEM FOR AREA VOCATIONAL EDUCATION CENTERS IN MICHIGAN AS DEMONSTRATED AT THE CALHOUN AREA VOCATIONAL CENTER

By

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ABSTRACT

THE DEVELOPMENT OF A MANAGEMENT INFORMATION SYSTEM
FOR AREA VOCATIONAL EDUCATION CENTERS IN MICHIGAN
AS DEMONSTRATED AT THE CALHOUN AREA VOCATIONAL CENTER

By

Clifford Owen Jump

A current issue in education concerns the degree of accountability of vocational education programs to the public. A local administrator must be able to make objective based decisions in order to be successful. Many administrators face a situation of limited and/or inadequate information usable in the decision-making process.

The purpose of this study was to develop a management information systems model for area vocational education centers in Michigan. Further, the model was to be demonstrated at the Calhoun Area Vocational Center.

The demands for educational accountability have prompted the educational enterprise to amass vast amounts of data; most of it unused in the decision-making process. The research in this study pointed up the fact that considerably more effort is needed in the search for a viable means of being accountable to the many publics.

Within the limits of this study, the following procedures seem reasonable:

1. A model for a management information system was developed for possible use in area vocational centers in Michigan.

2. The vocational education management information systems model has an accountability provision.
3. The vocational management information systems model was demonstrated at the Calhoun Area Vocational Center.

The development of the model for management information systems suggests the implication of needed in-service education for persons interested in the development and implementation of a management information system.

ACKNOWLEDGMENTS

This writer is deeply indebted to all of those who contributed to this thesis. It is impossible to list all of those who made both direct and indirect contributions.

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I am also grateful to all the staff members at the Calhoun Area Vocational Center that gave encouragement to continue my graduate work. Special recognition is given Ona Armstrong and Jo-Anne Boston for their assistance with the typing and proofreading.

Finally, my family must be recognized. I wish to express thanks to my parents for their continued encouragement and counsel. To my children, Greg, Sarita, Steve, and Don, for their patience and consideration in affording me the time necessary to carry out this project. To my wife, Jean, I am especially grateful for her understanding, encouragement and counsel. She served as a stabilizing influence in the final aspects of the study by managing the typing and production of the thesis.

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CHAPTER I

INTRODUCTION, PURPOSE, NEED, LIMITATIONS OF THE STUDY, DEFINITION OF TERMS, AND OVERVIEW

Introduction

Demand for greater accountability on the part of schools relative to the achievement of students are being heard from all segments of the population. Leon Lessinger, writing in one of the official organs for educators, said:

> Questioners in the past were content to listen to accounts of resources allocated. This has changed. Today the questions focus on results obtained for resources. The questions are pointed, insistent and abrasive. The public school system is being held accountable for results.[1]

As the public becomes increasingly aware of the fact that the outputs of the educational system are the ingredients which comprise the public welfare, the demand for more specific information as to educational outcomes will increase. The educational community has suggested that society's educational expenditures are, in fact, an investment in the well-being and stability of the present as well as the future. Parallel to this increased awareness on the part of the public along with its willingness to raise the level of funding,

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[1]Leon Lessinger, Engineering Accountability for Results in Public Education, Phi Delta Kappan, LII: December, 1970. p. 217.

educators are often frustrated by their inability to demonstrate what has been accomplished as a result of this increased effort.[2]

This lack of a means by which to communicate internally, as well as to the outside public, has an impact on the very basis of educational decision-making. The fact that vocational education lacks a system to respond to the variety of information requests has far reaching implications for the programmatic decisions which must be made.

Just given the economic decisions which an administrator must make, the lack of an adequate data base could be disastrous. At a time when there are large numbers of unmet needs and of competing demands for very scarce dollars, the necessity for very thoughtful planning for the distribution of resources is crucial. In fact, the process and function of economizing has become one of the focal points of responsible educational decision-making.

A director of an area vocational education center must decide whether he should add additional professional personnel to his teaching staff, whether he might be better off with larger numbers of less costly teacher aides, or whether the instructional outcomes of his vocational center might be best served by:

1. increases in the size of the center's media center,
2. expanded exploratory program offerings in vocational education, or
3. the initiation of a career development program available to all students.

At the state level, similar decisions must be made which determine priorities among competing resource needs, project future budgetary requirements, effectively allocate the very limited manpower resources

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[2]David J. Irvine, Meeting the Demands for Accountability, National Association of Secondary School Principals: November, 1971. pp. 80-86.

that are available to public agencies, and review the impact of allocatory decisions that have already been made.[3] At every governmental level in education--state, local and federal-- important and critical decisions in resource use are constantly at hand. As educational outlays rise, with their accompanying burdens upon taxpaying capacities, the role of each decision-maker as an economizer is assuming major significance.

As recent as May 1974, United States Representative Carl Perkins of Kentucky called for the development of more efficient and comprehensive data management systems when he introduced House of Representatives Bill 13991. In discussing the lack of adequate and timely data on which the Congress and other educational decision-makers could base their decisions he stated that "the collection and dissemination of educational statistics today is in a sorry state".[4]

Based on the personal communications of this researcher with other vocational administrators in Michigan there is a need for a comprehensive system to manage the data describing the state's vocational education effort. The impact of this situation has been significantly increased when the Michigan State Legislature began adding state resources to the federal vocational funds appropriated through the Vocational Education Amendments of 1968. In fact, the state's appropriation increased from $1.2 million to over $21 million between 1971 and 1975.[5] Not only were local administrators responding to the

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[3]Melvin L. Barlow, History of Industrial Education in the United States, Charles A. Bennet Company, Inc., Peoria, Illinois: 1967.

[4]Educational Daily: May 9, 1974.

[5]Michigan State Plan for Vocational Education: 1975.

traditional federal program area occupational enrollment and follow-up reports, there were not state enrollment reports by class and section, transportation reimbursement forms, local program facilities. The result of these new data requests was to multiply the number of information producing systems at the local level.

To further impact the situation, the Michigan State Board of Education approved an educational accountability model. The State Department of Education in the implementation of the accountability model has placed mandates on local vocational education personnel to meet program standards of quality. The mandates were in areas such as: performance objectives, advisory committees, placement and follow-up activities, use of facilities, and a maximum pupil/teacher ratio. Educational accountability has rapidly become a given for vocational education administrators if they desire to use state and federal funds.

Purpose of the Study

The purpose is to design a theoretical model using the systems approach that can be used in the management of an Area Vocational Education Center in Michigan. This model will assist the administration in carrying out the basic responsibilities of the job; e.g., management of people (personnel), management of dollars and maximum use of resources.

Proponents of management science and systems models hold to the idea that a systems model will make the individual accountable, for it indicates and evaluates what each person does.

It is crucial that a program of integrity and merit be developed explaining the philosophy, strategies and pitfalls of accountability as applied to an area-wide vocational education center program. Our increasing complicated educational system is demanding more managerial

sophistication, based on results oriented, cost effective decisions. Accountability is the key word in all of this for it implies goal-directed and performance-oriented educational leadership. It implies analysis of feedback and correction of the aim to more accurately focus on targets.

Need for the Study

In order to meet the wide range of vocational needs and expectations of the many publics served by a school system better support data for making decisions is necessary. Management systems which have proven successful in some industries and government are being instituted to provide educational leaders with workable models for making decisions.

A system is a set of elements whose relationships are designed to accomplish a desired goal. Among the elements in a system are problem identification, establishing of priorities, goals, objectives, input, outputs, environment, programs, decision-makers, measures of effectiveness and recycling. A model will be developed to show the interrelationships of these elements.

Determining what management science and/or a systems model should provide the users of these approaches in the administration of a vocational education program is a challenging task. An attempt was made to include information about management science and a systems model for an area-wide vocational education program which would have some relevancy to the following functions: Programs, finance, students, facilities, community and personnel.

Questions to be Answered

1. Is it possible to develop a management information systems model for area vocational education centers in Michigan?
2. Does the management information systems model, if developed, have an adequate provision for accountability in Michigan's area vocational education centers"

Limitations

No research has attempted to develop an information systems approach in the management of an area vocational education center; therefore, this thesis is a creative-library-materials study. Those limitations the researcher attributes to himself include (1) lack of knowledge of systems work, terminology, and use of systems models; (2) systems models; and (3) the emotional bias of an individual completing eight years of work as the Director of an Area Vocational Education Center.

The limitations stated above are common to a creative study or the development of a model that is going to deal with human behavior. There is no need to avoid this type of research because of limitations. Rather, there is a definite need to further apply and refine the methods used in this type of study to better understand and obviate the limitations and increase our knowledge of systems management applied to an area vocational education center.

Definition of Terms

In order to reduce the chance for misinterpretation, the following definitions of terms are presented.

Data Base: Data elements which constitute the basic file of statistical records needed for program review and administration.

Dictionary of Occupational Titles: A document prepared by the United States Department of Labor, Manpower Administration, Bureau of Employment Security which provides a classification structure under which most jobs in the American economy are arranged according to their interrelationships.

Evaluation: The worth, excellence, merit or value of a program or activity using an alphabetic, numeric, or percentage scale from highest to lowest.

Goal: A statement that proposes general levels of proficiency to be achieved. Goals are achieved through accomplishing objectives.

MIS: Management Information System - an organized method of providing past, present and projection information relating to internal operations and external intelligence.

Objective: An observable achievement accomplished under specified conditions.

System: A set of elements whose relationships are designed to accomplish a desired goal.

USOE: United States Office of Education

Vocational Education: Any form of activity conducted as part of a program designed to prepare individuals for gainful employment, or to prepare those who have already entered the labor market and who need training or re-training for stability or advancement in employment, as semiskilled or skilled workers or technicians or subprofessional in recognized occupations, except those which are designated as preparation for professional workers which require a baccalaureate or higher degree.

Other terms are defined within the text of the thesis.

Overview

Chapter II is a review of related literature. Herein are discussed the most widely accepted theories of management: (1) scientific management, a school of thought where the advocates seek order and stability in all matters; (2) administrative management, a school of thought where rules and principles are used to insure efficient and effective operation of an organization; and (3) humanistic management, a school of thought where advocates adhere to the belief that individuals bring to the organization: attitudes, values, and goals; and management must incorporate these concerns for effective operation.

Literature that is related to model theory is reviewed. The advantages and disadvantages of using models with respect to solving problems are discussed. Widespread attention is being given to the management team concept and its relationship to decision-making; therefore, literature which speaks of the management team concept is reviewed.

In Chapter III the researcher develops the concept of management and a management information system. The theory of a management information system is developed and the relationship of a management information system is made between business and industry and education.

In Chapter IV the philosophy of accountability is developed as well as the accountability in vocational education, industrial management and educational management.

The development of an area vocational center management information system model is the prime focus of Chapter V. Characteristics of a desirable systems model are noted and the steps for decision-making are listed. The model is implemented in theory and practice as a final aspect of the chapter.

Chapter VI specifically is related to the conclusion and recommendations.

CHAPTER II

RESEARCH RELATED TO THE MANAGEMENT SYSTEMS APPROACH IN THE ADMINISTRATION OF VOCATIONAL EDUCATION

As the literature was examined an effort was made to consider the following main topics for inclusion in the ensuing review of literature:

1. Philosophies of management systems
2. Literature related to model theory
3. Research related to the management team concept

The literature of education has numerous references to the various aspects of management systems which can be applied to an area vocational education center. In an effort to find new insights and understanding of the systems approach, an attempt was made to go beyond the tangles of charts and complex diagrams to provide the reader with explanations of the concepts and methodology permeating the writings of author's works which are reviewed in this section.

Philosophies of Management

There are at least three philosophies of management systems which are widely accepted by scholars and schools of management: (1) Scientific Management, (2) Administrative Management, and (3) Humanistic Management.

Scientific Management

The focal point of the Scientific Management school of thought is that man seeks order and structure in his environment. An attempt is made by advocates of this school of thought to seek order and stability in all matters. During the latter part of the nineteenth century, Frederick W. Taylor, the "Father of Scientific Management,"[6] and others analyzed the basic tasks of the individual worker. The purpose was to reduce each workman's task to the smallest, most specialized unit of work possible, thus eliminating any doubt about the expected outcomes. From this simple start Scientific Management has broadened its scope. Evaluative instruments have been designed to measure the intellectual potential of the individual in order to fit the "right person" for the right task on a predetermined basis. One of the chief criticisms of Scientific Management as it relates to school situations is that the environment and people are constantly changing, and it is difficult, if not impossible, to keep the predictiveness of the Scientific Management System intact.

Administrative Management

Rules and principles used to insure efficient and effective operation of an organization are the trademark of the Administrative Management System. The rules of management set forth are supposed to have "universal application." Basically, those people who believe

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[6]Frank B. Copley, Frederick W. Taylor, "Father of Scientific Management" (New York: Harper and Brothers Publishers, 1923).

in the Administrative Management concept would say that being friendly with one's subordinates is of no consequence. The boss or supervisor should just make the conditions of work favorable so that the worker can do his job effectively. Jobs have to be objective: that is, determined by task rather than by personality. To structure a job to a person is almost certain to result in the end in greater discrepancy between the demands of the job and the available talent.

The administrative philosophy of management is today practiced by some organizations, with the best example being the United States Government.[7] A manager, using the basic assumptions of Administrative Management System as a guide, tends to manage "by the book" and controls people by assuring that they will follow the rules.

Humanistic Management

Humanistic Management holds to the philosophy that individuals bring to their organizations: attitudes, values, and goals. Management must create an environment so that personnel can satisfy their needs and commit themselves to the goals of the organization at the same time. If management does not make allowances for the needs of personnel, this may result in disorganization and unhappy individuals. Douglas McGregor[8] promulgated the basic tenets of the Humanistic Management System:

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[7]U. S. Department of the Army, Army Command Policy and Procedure (Washington, D.C.: Government Printing Office, 1971).

[8]Douglas McGregor, The Human Side of Enterprise, (New York: McGraw-Hill Book Co., 1960).

1. The expenditure of physical and mental effort in work is as natural as play or rest. The average human being does not inherently dislike work. Depending upon controllable conditions, work may be a source of satisfaction (and will be voluntarily performed) or a source of punishment (and will be avoided if possible).

2. Man will exercise self-direction and self-control in the service of objectives to which he is committed.

3. Commitment to objectives is a function of rewards associated with their achievement. The most significant of such rewards, e.g., the satisfaction of ego and self-actualization needs, can be direct products of effort directed toward organizational objectives.

4. The average human being learns, under proper conditions, not only to accept but to seek responsibility.

5. The capacity to exercise a relatively high degree of imagination, ingenuity, and creativity in the solution of organizational problems is widely, not narrowly, distributed in the population.

6. The intellectual potentialities of the average human being are only partially utilized.

Model Theory

Several writers have explored and theorized about management systems and the development of models. These theorists have treated such topics as cybernetics, measurements, information retrieval, etc., with a great deal of specificity. In the review of the literature relative to model building, an effort is made to extrapolate those ideas and concepts which are relevant to the development of a model that will be useful for the area vocational education centers in Michigan.

Integrating and linking together some significant points relative to model building was Karl Deutsch.[9] Deutsch said that a model should

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[9]Karl W. Deutsch, "The Evaluation of Models," in Management Systems, ed. by Peter P. Schoderbek (New York: John Wiley and Sons, 1968), pp. 337-342.

perform at least four distinct functions: (1) organizing, (2) heuristic, (3) predictive, and (4) mensurative.

Organizing function means the model is structured so that disconnected data show relationships and these previously isolated parts form similarities which were not perceived. Stating it another way: The organizing function of a model helps one to transfer learned habits from a familiar to an unfamiliar situation for effective action.

Heuristic function helps one to discover new facts and new methods even though these novel facts and methods cannot be verified by the techniques which are available. Deutsch cautioned that the heuristic function of a model may be independent to a large extent from the organizing function, as well as from the predictive and mensurative function.

There are many predictive functions of a model; the most widely known and used one is verification by physical operation. Other predictive functions are: the simple yes-no prediction, qualitative predictions which possibly may yield answers to the questions of <u>when</u> and <u>how much</u>.

With respect to the mensurative function of a model, Deutsch raised these questions: (1) If the model is related to the things modeled by laws which are not clearly understood, the data it yields may serve as indicants; and (2) If the model is connected to the thing modeled by processes clearly understood, we may call the data obtained with its help a measure; and measures may range from simple rank orderings to ratio scales. Another aspect of evaluation is related to the performance of the model with respect to organizing, heuristic, prediction, and measurement.

Deutsch offered three aspects of a model which are crucial to success: (1) originality, (2) simplicity, and (3) realism. What, then, is meant by each of these important factors? Originality means the improbability of the model. Originality is a dichotomy of probability or obvious triteness. The simplicity of a model is synonymous with the economy of means. Simplicity is tantamount to economy, and it was compared to efficiency in economics by Deutsch when he declared: "Efficiency in economics denotes the attainment of a given result with the greatest economy in the employment of those means which are shortest in supply at each particular time, place or situation."[10] The final yardstick for evaluating a model is realism. Realism means the degree of reliance that may be placed on the model that represents some nearness to physical reality.

R. J. Chambers[11] offered some design principles which are applicable to the development of a model for an area vocational education center. The generalizations which follow are essential if one is to make decisions on the basis of the data obtained from his information system: (1) The language used by the model or the system must be identified by all members of the organization; (2) The system or model should be unquestionably reliable; that is, the users of the information will depend upon the system, rather than upon their own observations; (3) An abundance of information can impair sound judgment if the influence on the information or particular situation is not

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[10] Ibid., p. 339.

[11] R. J. Chambers, "The Role of Information in Decision Making," Management Technology, IV, 1 (1964).

clear to the users; (4) The information system is an abstracting system, and one is justified in reducing the flow of information to information that is relevant to action; (5) An information system must provide grounds for decisions as well as a feedback so that decisions may be reaffirmed or eliminated in favor of others; (6) An information system must keep formal records to protect against misinterpretation of past experiences; and (7) The information should be treated as a continuously developing instrument.

R. L. Martino[12] spoke of the functions of a total management system, and these functions have some relevancy for the development of a model for an area vocational education center. The functions of a total management system are (1) to predict, (2) to compare the prediction with actual results, and (3) to produce the deviations between the predicted and the actual. An elucidation of the aforementioned functions of a total management system reveals that the predictive function to which Martino addressed himself includes the determination and consideration of alternatives. The method used in the process of considering alternatives is called simulation, a technique wherein the multiplicity of factors involved in a given situation are assembled into a model and the user of the model weighs each alternative and its effects. This predictive function is based on historical data as well as on what Martino termed simulation. Operationally, predictions are continually compared with actual results to determine deviations. The deviations are used to refine or revise

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[12]R. L. Martino, "The Development and Installation of a Total Management System," in Systems Management, ed. by Peter P. Schoderbek (New York: John Wiley and Sons, 1968), pp. 121-122.

the initial set of predictions and strategies. Then, the whole system reiterates, producing new predictions, and so on.

Some wholesome advice about decision-making that is useful to any developer of a model for an area vocational education center was presented by John F. Burlingame.[13] The concept of decentralization is the key, for it was Burlingame's idea that decision-making responsibility should be assigned at the lowest point in the organization where the needed skills and competence, on the one hand, and the needed information, on the other hand, can reasonably be brought together. The decentralization of decision-making is thought of as creating an environment where the creative talents of responsible individuals are utilized. In this way individuals have responsibility, authority, and dignity, and an improved organization is the result.

A further amplification of Burlingame's ideas indicates that there are two types of decision-making one must notice: (1) those which involve subjective human values and the assessment of situations in which information needs cannot be adequately anticipated or adequately filled.

In making decisions which involve human values, Burlingame explained the difference between a centralized and a decentralized organization. In a centralized organization, the decision structure tends to be one where human and social considerations are made at the top echelon; decisions which are made at the lower levels are routine and insensitive to human values. In a decentralized organization all types of decisions

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[13]John F. Burlingame, "Information Technology and Decentralization," Harvard Business Review, XXXIX (November-December, 1961), pp. 121-126.

are made throughout the organization at all levels. The chief goal in a decentralized organization with respect to decision-making is to relate all decisions to the purpose of the work.

Having relevancy to the development of a model for an area vocational education center are the various ingredients involved in systems analysis which were presented by William G. Scott.[14] The ingredients are (1) the parts, (2) the interactions, (3) the processes, and (4) the goals of the system.

There are five parts which are strategically important, according to Scott: (1) The individual, his personality, motives, and attitudes have to be considered because they condition the range of expectations he hopes to fulfill by participating in the system; (2) The formal organization is the interrelated pattern of jobs which make up the structure of a system; (3) The informal organization involves mutual modification of expectancies on the part of the individual as well as on the part of the group; (4) The status and role patterns have to do with the kinds of behavior modifications individuals must make because of the roles demanded of them; and (5) The physical environment of work has to be so structured that the psychological, social, and physiological characteristics of the people are satisfied in the work environment.

Interaction appears to be automatic among the aforementioned parts of a system; however, Scott cautioned that it is important to analyze the process by which the interaction is achieved. The process for achieving interaction has three linking activities: (1) communication, (2) balance, and (3) decision-making. Communication takes many forms,

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[14]William G. Scott, "Organization Theory: An Overview and An Appraisal," Journal of the Academy of Management, IV, 1 (1961), 7-26.

i.e, formal-informat, vertical-horizontal, line-staff. Each part of the system communicates with the other, and communication takes place with the world outside the system. Balance means the various parts of the system are maintained in a harmoniously structured relationship to each other. Discussing decision-making, Scott made reference to the contributions made by March and Simon.[15] March and Simon promulgated two major classes of decisions which are (1) decisions to produce and (2) decisions to participate in the system. Decisions to produce are, for the most part, the results of interactions between individuals' attitudes and the demands of the organization. Decisions to participate reflect on the relationship between organizational rewards versus the demands made by the organization.

The goals of an organization are growth, stability, and interaction. These goals according to Scott are applicable to different forms of organizations at varying levels of complexity.

Some modeling considerations which are applicable to the development of a model for an area vocational educational center were presented by Joel M. Kibbee.[16] Simplicity is essential according to Kibbee, for it was his view there isn't reason to assume that complicated model. Flexibility for expansion is another crucial consideration for the development of a model. Using some basic time interval with respect to the questions under consideration is important, too.

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[15]James G. March and Herbert A. Simon, Organizations (New York: John Wiley and Sons, L958).

[16]Joel M. Kibbee, Management Control Simulation, in Management Systems, ed. by Peter P. Schoderbek (New York: John Wiley and Sons, 1968), pp. 353-354.

Promulgating the idea that a model can be an effective change agent, Robert Chin[17] constructed five questions he felt a model must answer:

1. Does the model account for the stability and continuity in the events studied at the same time that it accounts for changes in them? How do processes of change develop, given the interlocking factors in the situation that make for stability.

2. Where does the model locate the source of change? What place among these sources do the deliberate and conscious effort of the client-system and change-agent occupy?

3. What does the model assume about how goals and directions are determined? What or who sets the direction for movement of the processes of change?

4. Does the model provide the change agent with levers or handles for affecting the direction, tempo, and quality of these processes of change?

5. How does the model "place" the change-agent in the scheme of things? What is the shifting character of his relationship to the client-system, initially and at the termination of relationship, that affects his perceptions and actions? The question of relationship of change-agent to others needs to be part and parcel of the model since the existential relationship of the change-agent engaged in processes of planned change becomes "part of the problem" to be investigated.

The application of the aforementioned questions to the development of models crystallizes some of the formation of ingredients for a change-agent model for changing, and these questions have some relevancy to the developer of a model for an area vocational education center.

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[17]Robert Chin, "The Utility of Systems Models and Developmental Models for Practitioners," in Planning Change, ed. by William G. Bennis, Kenneth D. Benne and Robert Chin (New York: Holt Rinehart & Winston, Inc., pp. 201-214.

Advantages and Disadvantages of Models

Models, like most activities or situations of the real world, offer advantages as well as limitations. In searching the literature to ascertain what the advantages and disadvantages of models are, it was found that many of the theorists presented similar concerns and gratifications about models. Below is a summary of the expressions of satisfactions and dissatisfactions about models which, for the most part, are representative and inclusive.

Irving Bross[18] said models have various advantages, among which he listed their remarkable record of prediction in the past history of mankind, their use as a frame of reference on which to "hang the problem," their usefulness (even when a failure) for suggesting fruitful avenues of research, their simplification of the problem by employing only the significant attributes abstracted from the real world, their use of symbolic language for both manipulation of the model and for purposes of easy communication, and finally their economical approach to the costs of prediction.

Bross listed these disadvantages: the tendency toward over-simplification, the limitations of symbolic language used, the all-too-human tendency of model builders to reify their brain children, to look upon their models not as representatives of the real world but as being identified with it. He cautioned that when a model does not fit the real world, it is the model that must give way, and not the other way around.

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[18]Irwin D. J. Bross, Design for Decision (New York: Macmillan Company, 1953): pp. 161-182.

Indicating that the purpose of his paper was to present concepts relevant to, and benefits to be gained from using, a "system" model and a "developmental" model in thinking about human events, Robert Chin[19] indicated these advantages of a model:

1. The model provides "mind-holds" to the practitioner in diagnosis.

2. A model lessens the danger of overlooking the indirect effects of a change of relationship.

3. The identification of and analysis of how tension operates in a system are by all odds the major utility of system analysis for practitioners of change.

4. A model can be used for a diagnosis of persons, groups, organizations and communities for the purposes of change.

5. A model can provide directional focus for analysis, action and a temporal frame of reference.

Chin pointed out that the behavioral scientist by constructing a simplified model can analyze his thoughts and concepts, and in turn where the congruities and discrepancies occur between these and actual events. In this way, the behavioral scientist becomes at once the observer, analyzer, and modifier of the system of concepts that he is using.

In the article "Systems Can Too Be Practical," Allan Harvey[20] spoke of the things the systems approach accomplishes. First, it frees the corporation from the perils of its organizational straitjacket. Second, the systems approach makes it possible for management to make decisions with full knowledge of their impact on total costs. Third, the systems approach makes it possible to put to profitable use new

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[19]Chin, op. cit., pp. 201-214.

[20]Allan Harvey, Systems Can Too Be Practical, in Management Systems, ed. by Peter P. Schoderbek (New York: John Wiley and Sons, 1968), pp. 154-162.

techniques and new technology. Finally, the systems approach puts a firm foundation under the corporation information and control procedures.

Harvey felt that the proponents of the systems approach have led management astray by doing these things: (1) exaggerating its newness, (2) clothing it in unintelligible jargon and elaborate mathematics, and (3) permitting the impressions to persist that systems are only for giant complexes.

One of the strongest statements for model building was offered by Stafford Beer when he declared:

> I have often tentatively proposed that no operational research job has ever been done without the use of a model, and since this has never provoked a counter example I will now risk the statement that this is indeed a characteristic of the work. Should anyone seek to deny this, may I warn him in advance of my defense. He says of a given job: there was no model. I reply that a model of the situation must have existed to solve the problem. A model is no more than a description into which the real situation can be mapped. If the mapping can be done inside the skull, so much the better. But if the situation is too complicated, then the brain cannot hold the structure and its owner idea is the same, I contend.[21]

Extrolling and defining the virtues of the systems approach, its proponents have also indicated some concerns about its limitations; however, a judicious handling of the positive concepts and ideas they seem to be saying will obviate or reduce the limitations of a model.

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[21]Stafford Beer, What Has Cybernetics to do With Operational Reasearch? Operational Research Quarterly: March 1959.

Management Team Concept

A great amount of work and research have been done to establish the validity of the systems point of view and to promote its use, particularly in industry. The evidence drawn from successful experiences of some companies has served to stimulate educators to take a look at how the systems approach may be useful in the management of schools. As a result, the gap is narrowing between what educators have learned about complex systems and the use to which they are applying this knowledge. The ensuing review of literature about the management team concept is an affirmation that educators are proposing elements of the systems approach in an attempt to deal with problems encountered in school systems.

Conwell A. Anderson[22] viewed true leadership as involving total management in decision-making, not making edicts from the top down. An individual is given an opportunity to make decisions at the level where he is responsible for action and he, in turn, is accountable for those decisions. It is the belief of the advocates of the decentralization of decision-making philosophy that an individual can identify better with an organization and he is more responsive to it when he is trusted to make decisions at his level of competency and responsibility.

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[22]Conwell A. Anderson, ed., Administrative Team Leadership in Concept and Practice, Athens, Georgia: Institute of Higher Education, University of Georgia: t1966.

Recognizing that the systems approach is dealing with human beings, a consideration some forget, were Robert R. Blake and June S. Mouton.[23] These writers contended that concerns for people as well as concerns for production are the main ingredients of effective management. Blake and Mouton spoke of the following relationship in management: goals, boss-subordinate interactions, conflicts, creativity, commitment, management development, and personal behavior.

Focusing on how the central administrators in a school system are developed into a team were Edwin A. Fensch and Robert D. Wilson.[24] These authors discussed relationships and practices which are necessary for building the administrative team. The roles of the school leaders charged with operating the offices of instruction, certificated personnel, pupil personnel services, and business affairs were outlined. Significant concepts which permeated the thoughts of the writers relative to the roles of leaders in the various jobs of a school system are human relations skills and knowledge of the job where they have leadership responsibility.

Rensis Likert[25] described four types of management systems: (1) explorative authoritative, (2) benevolent authoritative, (3) consultative, and (4) participative group. It was the belief of this author that the participative group is more effective, for if individuals have some input their attitudes toward their jobs are

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[23]Robert R. Blake and June S. Mouton, The Managerial Grind (Houston: Gulf Publishing Co., 1964).

[24]Edwin A. Fensch and Robert D. Wilson, The Superintendency Team (Columbus, Ohio: Charles E. Merrill Books, 1964).

[25]Rensis Likert, New Patterns of Management (New York: McGraw-Hill Book Co., 1961).

better. Good communication at all levels is essential for the participative style of management to be effective. Likert observed that it is difficult for an organization to move toward a participative group style of management if the top echelon group operates in an authoritative manner. Administrators, in his view, should be involved in decisions that directly affect their responsibility.

William W. Savage[26] talked about the understandings and relationships which are required of school officials. The emphasis was placed on interpersonal and group relations of the administrators, teachers, students, parents, and community members who are interested in education. Savage said some individuals lack a basic sensitivity to other human beings. These individuals, in his view, are well-intentioned, pleasant people, but they are oblivious to the reactions and much of the behaviors of others with whom they have contact. They seem unaware of the evident attitudes and behavior of their colleagues, superiors, or subordinates. They may be oblivious to the obvious boredom or antagonism of the audiences to whom they speak. In interviews they learn nothing from the behavior of individuals with whom they talk, and as teachers in the classroom they are unaware of pupil boredom, frustration, or enthusiasm. The essential point that Savage made is that these insensitive people can be assisted to understand their behavior and that of others by developing skills in interpersonal and group relations.

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[26]William W. Savage, Interpersonal and Group Relations in in Educational Administration (Atlanta: Scott, Foresman and Company, 1968).

Lester W. Anderson[27] raised questions about the relevant issues and problems inherent in the management team concept. On the whole, management team revolves around two key questions: (1) do all parties really want a working relationship based on involvement in policy formation? and (2) is the organizational structure designed to keep communications open in the decision-making process? Amplifying the question of involvement, Anderson said that the management team concept requires a commitment to the viewpoint of involving people in the process of policy formation, especially when the policies are so directly related to their duties, especially as is the case in the relationship of collective bargaining. School policy is and should remain as the exclusive prerogative of the board of education. It is essential, in Mr. Anderson's view, that legislative responsibility be retained by the board; however, it is equally important that all administrators have the opportunity to influence legislative decisions. Participation in policy formation should be considered a right, not a concession to be granted. Organizing a structure for better communication is the other alternative that is essential for using the management team concept. Anderson suggested a structure that will have representative grouping; the main goal is to keep the channels of communication open from top to bottom.

Believing that the management team concept would increase the effectiveness and contribution of every administrator, Frank Heselton presented the concept of a management team from a board member's viewpoint when he stated:

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[27]Lester W. Anderson, "Management Team Concept," Michigan Journal of Secondary Education, X, 3 (1969).

> To me, from the board member's viewpoint, "Management Team Concept" means genuine delegation of managerial responsibilities to whatever administrative level is appropriate to best directly carry out those responsibilities, whether they be purchasing, transportation, public relations, curriculum, budget preparation, educational supervision, or you name it--there are more than enough responsibilities for all. In the reverse direction, "Management Team Concept" means to me a system for obtaining the maximum professional contribution from every administrator toward continually improving education and better management, and thus encouraging every administrator to enable himself to offer business, these bring improvements in education, these cultivate greater public understanding and support, these lead to closer working relations with the teaching staff and all other employees.[28]

Robert W. Walker and Eugene C. Hammel[29] were concerned about good management because it was their belief that such pressures as technology, finance, and negotiations are polarizing our public schools today. It was the belief of these writers that the management team concept should encompass not only involvement, but accountability. The starting points for accountability being woven into the management team concept rest with the school board. First, according to the writers, the board should provide their superintendent with broad immediate and long-range objectives for the school district. These objectives should: (a) fall within the framework of the school's written policies, (b) developed and agreed upon by the board and the superintendent as being realistic and tenable, and (c) be spelled out in such a fashion

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[28]Frank Heselton, Management Team Concept From Board Member's Viewpoint, Michigan School Board Journal, IV, 11: 1969. p. 6.

[29]Robert W. Walker and Eugene C. Hammel, Management by Design Using the Team Approach, Michigan School Board Journal, WVI, 12: 1969.

that they can serve as a formalized guide providing everyone involved with a sense of direction and a statement of expectations.

Defining and discussing the practical value of using the management team concept, Robert Walker[30] suggested ways of implementing the concept. By explanation, Walker said that the management team concept means the involvement, directly or by representations, of all levels of administrators in the decision-making process before the fact. This kind of involvement is essential in building a model for the management team concept. The practical value of using the management team concept is that it gives everyone an opportunity to state and defend his views before a decision is reached. Moreover, according to Walker, the management team concept should provide for two-way communication between administrators and staff in order that positive benefits and advantages derive from this kind of participation may be extended to all.

> One would indeed be naive not to recognize that some problems continue to occur in administrative relationships if prompted only by personality clashes and efforts to categorize functions. There will, no doubt, be problems and concerns in attempting to make this concept functional. Some give and take must be anticipated. Some disappointment will be experienced and perhaps some out and out failure. Some people will expect too much too soon and others will not be willing to give the idea a fair chance. Everyone will have to learn their new roles and altered roles involving responsibilities and accountability. Establishing and maintaining effective management methodology is both challenging and demanding. It involves a real sense of dedication and purposefulness. These are the ingredients which will insure success in the management team endeavor if we want to make the concept work.[31]

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[30]Robert Walker, The Management Team Concept, Michigan School Board Journal, XV. 11: 1969.

[31]Ibid. p. 9.

The authors that have been quoted in the review of literature have been affirmative that a systems approach is valuable. However, within the various levels of the educational community, there are those who would say that a systems approach has a limiting effect on the performance of various functions in education. Some authors suggest a very limited application of business-like ideas and methods to the administration of an educational program. For example, Raymond E. Callahan states, "that if educators had sought the finest product at the lowest cost - a dictum which is sometimes claimed to be a basic premise in American manufacturing - the results would not have been unfortunate. But, the record shows that the emphasis was not at all on producing the finest product but on the lowest cost."[32]

The influence of business ideology on the public school system has resulted in tragedy according to Callahan as he mentioned four points; (1) that education questions were subordinated to business considerations, (2) that administrators were produced who were not, in any sense, educators, (3) that a scientific label was put on some very unscientific and dubious methods and practices, and (4) that an anti-intellectual climate, already prevalent, was strengthened.[33]

In this study it must be recognized that the mandates of the State Board of Education regarding vocational education program standards of quality and the posture of the state legislature limits the opportunity for freedom if one wants to use state and federal funds.

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[32]Raymond E. Callahan, A Study of the Social Forces that have Shaped the Administration of the Public Schools, Education and the Cult of Efficiency, The University of Chicago Press: p. 244.

[33]Ibid. p. 246.

CHAPTER III

MANAGEMENT AND A MANAGEMENT INFORMATION SYSTEM

An important concept which underlies one's understanding and actual development of an educational management information system is that of management and its use of an MIS (management information system) as a support tool. A MIS which is not the result of a sound theory of organization and a well articulated concept of management is at best a misguided device which could result in unsound educational decisions. An individual must be able to relate the system design to the several levels of an organization as well as respond to each function or task which the administrator faces. In education the management information system addresses the potential needs of teachers as well as administrators and support personnel, and the understanding of the organizational patterns, responsibility relationships and authority roles becomes essential.

First, in terms of the organization, several aspects must be considered:

1. The individual,
2. The formal line and staff organizational structure,
3. The interpersonal relationships which evidence the informal organizational structures,

4. The status and role patterns which exist within the organization both formal and informal, and
5. The environment in which the organization functions.

Each of these factors influences the reponsiveness of the organization as well as its flexibility to cope with new ideas and methods. This is especially important when one considers that the development of a management information system is projecting the very basis of the educational enterprise, since the first prerequisite of any management system is an understanding of the system's objectives. Further, since a management system potentially can address the interrelations of the personnel in such configurations as faculty to faculty, faculty to student, administrator to faculty, etc., it is essential to have a grasp on the role and status definitions which are operational. The formal as well as informal organizational relationships which exist must also be known.

These concepts must be applied to the various organizational levels one is addressing. It is on the effectiveness with which this is accomplished that a great deal of the success in the implementation of a management information system lies. For example, when there exists differences between the secondary and post-secondary educational delivery systems, it would be most inappropriate to superimpose a secondary organizational model on a post-secondary operation in developing an analysis of a future management information system.

Just as it is important to understand the organizaton prior to attempting initial consideration of a system's requirements, it is equally important that one understand the various functions of management which it is the responsibility of a management information system

to facilitate. In 1937, Gulick identified the function of a manager. These functions are:[34]

1. Planning
2. Organizing
3. Staffing
4. Directing
5. Coordinating
6. Reporting
7. Budgeting

Although there are slight differences among writers as to the number and names given to these functions, the most common and useful method of classifying managerial functions is to group them around the activities of planning, organizing, staffing, directing, and controlling. The overall task of a manager is to create within the organization the environment which will facilitate the accomplishment of the objectives. In doing this, the manager plans the work of his subordinates by staffing his operation, organizes the work and task relationships, directs the work, and controls the system by measuring its performance against a predetermined plan. Even though Figure 1 does not show all the functions of management, Ross does depict the nature of planning and control and how these functions work together for the achievement of the organization's objectives.

It is from this perspective that the development of a management information system must be attempted. The management information system

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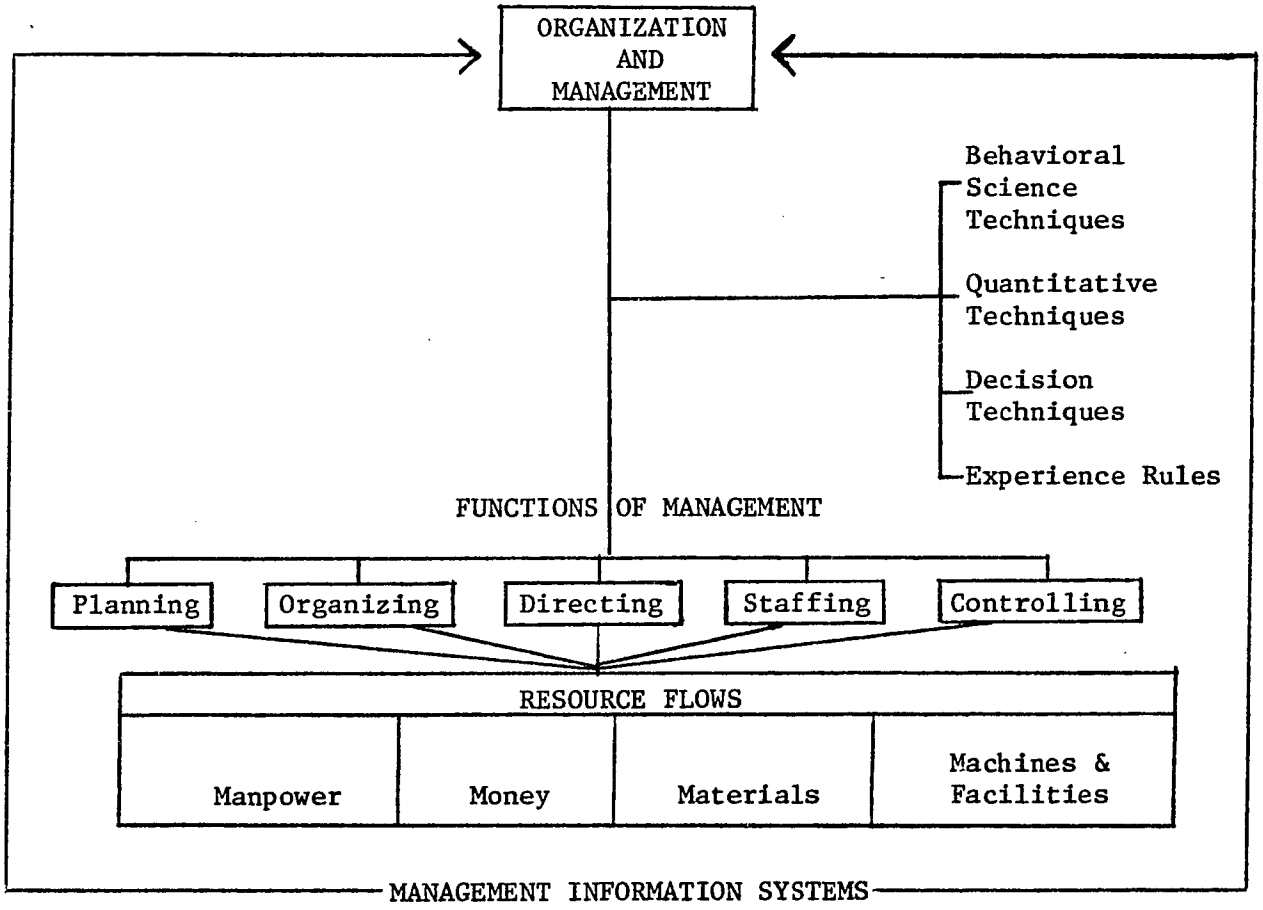
[34] Joel E. Ross, Management by Information Systems, Prentice-Hall, Inc., Englewood Cliffs, New Jersey, 1970: p.51.

must address the various components of an organization and thereby serve its users in accomplishing the specific functions of management. When this type of integration has been achieved, the system becomes an integral part of the organization. In fact, as shown the management information system serves as an envelop surrounding the manager's impact on the organization:35

FIGURE 1

ORGANIZATION AND MANAGEMENT - A SYSTEM



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35 Ibid. pp. 110.

Management Information Services

In considering the concept of services, a set of criteria was developed by Irvine providing the basis for the specific services. The criteria which an educational management information system should meet are:

1. It should measure program effectiveness.
2. It should report results on a multi-dimensional format to the interested public of the educational enterprise.
3. It should be a dynamic process that makes the educational system more responsive to the needs of society and its own clientele.
4. It should be related to comprehensive educational planning and show that programs generated are economical in terms of opportunity costs.
5. The system also be flexible enough to provide input to regenerate the system through constant evaluation and feedback which serves as a guide to program formulation, revision, or termination.
6. It should relate measurable educational goals to societal goals.[36]

Not only is it essential to consider the internal criteria in evaluating the need for an MIS, one must also consider the different publics to which he is expected to respond. As one develops this matrix of users, two factors become abundantly clear. First, the system which finally

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[36] Ibid. pp. 81.

emerges must be flexible in order to accommodate future demands as well as meet varied reporting requirements. Second, the system must have a broad enough data base to satisfy fundamental statistical reports as well as sophisticated simulation - what if - requirements. Again, Irvine has provided an excellent overview of the various audiences one must consider:[37]

> Information for Student and Parents. The system should provide every student and his parents with information about him and the alternatives open to him so that they can become better able to make decisions about his educational needs. For the student himself, many decisions grow out of the instructional process. As he develops, he will take on greater responsibility for instructional decisions.
>
> Information for Teachers. The system should provide teachers with information necessary to diagnose and prescribe for individual students. It should include pupil information, program information, and information about present and future alternatives the student has. It should also provide the means by which teachers can evaluate their effectiveness with individual students and with groups of students in order to improve their teaching performance.
>
> Information for Administrators. The system should provide administrators with information necessary to assess the effectiveness of programs under their jurisdiction in order to make decisions to strengthen those programs in ways which maximize the return on the resources invested. To assist the administrator, the system would assemble pupil and program information and relate it to information about the resources which are available to him.
>
> Information for State Officials. The system should provide the State Education Department with information needed to develop state policy, determine financial aid formulas, and allocate professional services to the schools.
>
> Information for Researchers. The system should provide individuals and agencies investigating educational problems with the data needed to answer questions about learning and the conditions which promote learning.

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[37]Ibid. pp. 82-83.

Information for Legislators and the Public. In the final analysis, the legislature and the public determine educational policy and level of support. Information should be available to give them a realistic view of the progress of each school system and of the state system of education.

Based on a consideration of the flexibility suggested by the above criteria as well as the need to be responsive to a wide range of audiences, Irvines' survey was centered around six major functions:

1. Forms Completion

   From the student through the administrator, each group is expected to complete innumerable types of forms. These forms are often not coordinated so that the individual must repeat data he's formerly reported but in a slightly different form. Any new information system which purports to manage must reduce, if not eliminate, this unnecessary waste.

2. Reporting Information

   A management information system assumes a two-way communication system. Often individuals are asked to respond to a questionnaire fully cognizant of the fact that they cannot expect any type of feedback. An operational management information system provides the capability for feedback minimally in a predetermined format and, if the system is based on individual or nongrouped data - on an interactive basis which responds directly to the question posed.

3. Educational Research

   In order for the educator to know the effects of the educational program, a management information system must provide a means whereby certain classroom management practices, types of instructional materials, or instructional qualifications can

be analyzed. Such options provide the teacher and the administrator opportunities to evaluate the effects of various input to the educational process as well as to determine what program adjustments are necessary. It is this aspect of a management information system that greatly assists the educator in coping with the accountability demands being made by the public.

4. Educational Decision-Making

The fourth major service of a management information system is to provide the educational decision-maker the means by which he can compare various factors which impinge upon a decision. This service recognizes the ramifications both in terms of human as well as fiscal resources which will result from the decisions made by the educators.

5. Educational Planning

As resources become more restricted and requirements placed upon the education decision-maker increase, information for analyzing various plans of action is essential. This function of a management information system provides the user with the capability of relating results which have been documented in the system with objectives which have been developed for future activities. Simulation of this sort can be one of the most significant benefits of a management information system; for the planner can pose the "what if" question, analyzing the potential effects of different delivery systems, personnel changes, changed classroom sizes, etc., prior to actually

effecting the changes and experiencing the costs which often accompany such changes.

6. Manpower Planning

This aspect of the management information system recognizes the necessity for the vocational educator to be able to relate his student output to an ever changing labor market. Based on analysis of the enrollment trends as well as the projection which can be developed within the system, the educational planner can bring valuable information to bear on new program decisions as well as existing program cancellations. Another important aspect of this service is the potential ability of the vocational education administrator to develop information which can be compared to specific job opening data developed by other agencies, such as the Bureau of Labor Statistics, state employment offices, private research companies, etc.

The need for data which is relevant to the collage of decisions faced by students, teachers, administrators, and parents and a system capable of turning these vast amounts of data into timely information is certainly evident. Thus, the concept of MIS services, and the publics to which the services are directed, form a major basis for the approach taken in the study.

Organizational Effectiveness and Educational Management Information Systems

Another concept which was basic to analyzing the perceived need of an educational MIS as well as developing an operational system is

that of organizational effectiveness. An effective organization is simply the combination of people who have the necessary technical and interpersonal skills with programs--systematic action strategies--designed to achieve the goals of the agency. It is the combination of these two ingredients, i.e., people and programs--the human side of the computer system--that makes a functional MIS possible. The recognition of the importance of the people side of the equation requires a consideration of the issue of maintenance or continuing support for the human component. Therefore, as an integral aspect of the concept of organizational effectiveness, one must consider the ongoing need for inservice education efforts.

As suggested above, in considering organizational effectiveness, the first factor to be taken into account is that of the people and the skills they possess. The system must be manned by effective people. Based on the research of Carkhuff and others, the effectiveness of an individual is primarily a function of two factors: the skills with which they relate to other people and the skills which they have in their particular area of responsibility.[38]

> Effectiveness in any role, then, is a function primarily of two factors: the skills with which the helpers relate to other people and the skills which they have in their specialty program area. The effective second grade teacher has the ability to relate to the children and the ability to devise reading methodologies to meet the students' unique needs. The effective counselor has both the ability to relate to the counselee and the ability to offer the counselee some skills in resolving his problem. The effective administrator has the ability to relate to his employees and superiors and the ability to translate his technical skills into operational tasks.

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[38]Robert Carkhuff, The Development of Systematic Human Resource Development Models, H.R.D. Press, Amherst, Massachusetts. (1972). pp. 4-5.

In addressing the question of the effectiveness of the personnel, one must know the present level of functioning--ability to perform the tasks related to information systems--of those who will be utilizing the services of the system as well as of those who will be maintaining the system. It is only after this analysis has been done that one can program to meet the initial training needs as well as develop an ongoing in-service education program. Again, as has been observed by Carkhuff:[39]

> Perhaps the best way to conceptualize skills in the specialty program area is also in terms of response repertoires. Just as we analyze personal effectiveness as quantity and quality of interpersonal responses in one's repertoire, so can we now analyze program effectiveness in terms of quantity and quality of specialty responses in one's repertoire. Just as Mrs. Reybolds drew from her repertoire of interpersonal responses to understand the students' needs and motivate them for learning, now she draws from her repertoire of teaching methodology responses, to match and individualize the program to the students' unique needs.

Once such an analysis has been made, specific instructional programs can be designed to prepare individuals both to use the system as well as to develop the necessary skills which would prepare one for the necessary adaptations. It is this latter factor which becomes quite a mistake to consider the task completed once the system is operational

Finally, the second factor impacting the achievement of a functional management information system is the effectiveness of the organization. Crucial to this is the cause and effect relationship which exists between the organization and the people who constitute it.[40]

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[39]Robert Carkhuff, People, Programs and Organizations: The Effective Ingredients of Human and Community Resource Development, H.R.D. Press, Amherst, Massachusetts. (1971). p. 9.

[40]Ibid. pp. 14-15.

> Effective organizations are simply ways of relating effective people to effective programs within an institution . . . specifically, they (effective organizations) relate effective people to effective people, effective people to effective programs, and effective programs to effective programs. People and programs are the essence of organization. Functional organizations cannot be defined independent of the calibre of the people and programs can be defined in terms of the quantity and quality of responses in the relevant repertoires.
>
> In its simplest form, organizations may be seen in the learning relationship. A learner (trainee) with a limited skills repertoire in a definable area, is related to a teacher (trainer), with an extensive skills repertoire in that area, though a program that moves the learner in a systematic, step-by-step procedure from where he is to where he wishes to go in skill acquisition.
>
> In more complex forms, the function of organization is to develop a hierarchy of effectiveness. Based upon criteria of functionality, the most effective people oversee the activities of those less effective; the most effective programs must subordinate and/or incorporate the systems of the less effective programs. Roles and responsibilities are defined by levels of functioning within the operations. The leaders have the responsibility for the development of the members of the organization who are functioning at different levels below them. The function of effective organizations, then, is to appoint the most effective persons to the leadership roles and equip them with the programs that will not only service the functions of the operation, but also develop additional effective leadership within the operation.

In this context, it becomes essential to isolate the specific objectives of the organization, evaluate the people in the organization, and prepare training programs specific to their needs. It is from this perspective that the development of a management information system is then approached. Not only does the isolation of the system's objectives determine the design and operation of the management information system, but it also provides an index by which to judge the ability of one's organization to maintain an information system once it is designed and operationalized.

As previously suggested, the achievement of an effective organization must be maintained by an ongoing in-service education program. To develop a system, train the personnel to use it, and then to fail to provide systematically continuing education opportunities is to assure a stagnant system which will do little more than deluge the organization in paper. The inservice training requirement is closely related to an ongoing method of evaluation.[41]

Such an evaluation should address at least the following:

1. System input
   - Needed modifications to the input documents
   - More efficient organizational structures to gather the data
   - More efficient means by which to determine error factors
2. System analysis:
   - Changes in the file structure to increase reporting flexibility
   - Data utilization analysis aimed at eliminating unnecessary data collection
3. System output:
   - Responsiveness to user demands
   - Relationship between the system's output and other information systems
   - Extent to which the system permits simulation activities in preparation for short and long range decisions

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[41]Philip K. Piel, Terry L. Eidell and Stuart C. Smith, ed., Social and Technological Change, Implications for Education, The Center for the Advanced Study of Educational Administration, University of Oregon; Eugene, Oregon: 1970.

The Definition and Characteristics of an Educational Management Information System

Essential to the full integration of the two questions which formed the basis for this study is an understanding of several sub-components which make up an educational MIS. Also, to be considered are the major characteristics ascribed to such a system according to various writers in the field. From those who discuss total information systems Sinclair[42] said to those who declare such systems as "mirages", Dearden[43] said from those who actively portray the unbelievable potentials of such systems, Barrett[44] said to those who call for the utilization of what now exists, Goodland, O'Toole, and Tyler[45] the writers on educational management information systems in particular or simply information systems in general, do not enjoy unanimity of understanding. In fact, the concept seems to be surrounded by confusion. A schema developed by John A. Evans, however, is most beneficial in developing an understanding of the composite meaning of the term educational management information system according to Piele and Eidell.[46]

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[42]John M. Sinclair, Basics of an Information System, The Office, February 1970: pp. 54-55.

[43]John Dearden and F. Warren McFarlan, Management Information Systems Texts and Cases, Richard D. Irwin, Inc., Homeland, Illoinois: 1966

[44]John H. Barrett, Information Systems: Breaking the Barrier, Journal of Systems Management, May 1969: pp. 8-10.

[45]John I Goodlad, John F. O'Toole, Jr., and Louise L. Tyler, Computers and Information Systems in Education, Harcourt, Brace and World, Inc., New York: 1964.

[46]Piele, Eidell, and Smith, op.cit.

Definitions

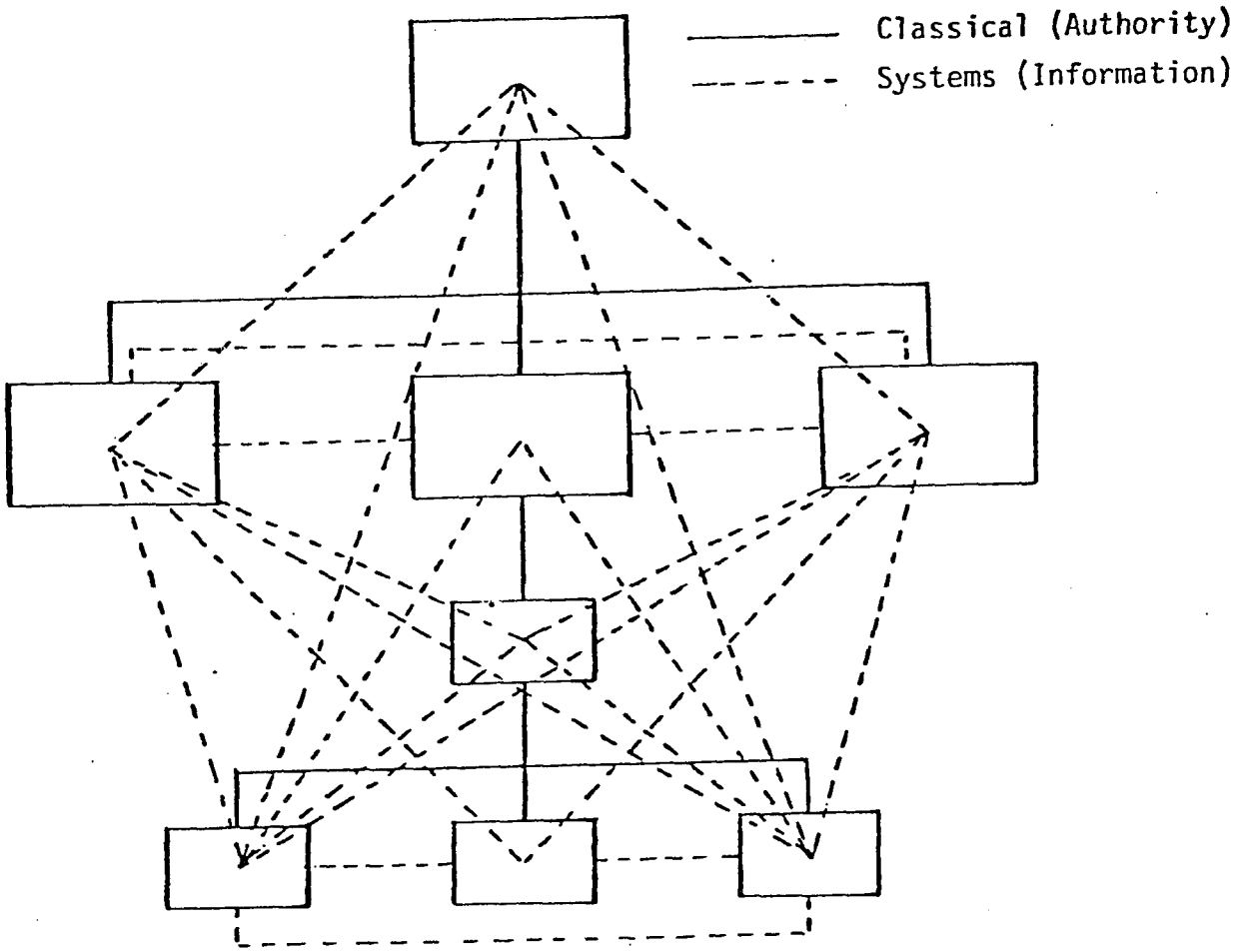
System

A system is a set of elements forming an activity or a processing procedure/scheme seeking a common goal or goals by operating on data and/or energy and/or matter in a time reference to yield information and/or energy and/or matter.[47]

In an effort to further explain the concept, Murdick and Ross developed the following schematic which is based on a hypothetical organization:

FIGURE 2

SYSTEM SCHEMATIC



[47] Robert Murdick and Joel E. Ross. Information Systems for Modern Management. Prentice-Hall, Inc., Englewood Cliffs, New Jersey. (1971).

From this diagram, one can see the highly complicated systems which emerge as the individuals in an organization attempt to make an organization functional. Additionally, this drawing highlights the necessity for any information system to be both flexible as well as based on input from all levels in the organization.

Management System

Another factor in the development of the meaning of an educational management information system is the definition of management system. The behavioralists, born of the Hawthorne experiments (Roethlisberger, 1968) and with an awakened interest in human relations during the 1930s and 1940s, saw management as a complex of interpersonal relationships and management theory as based on the tenets of the new and still not fully developed science of psychology. Still others, regarding decision-making as the central core of management, branched out in all directions from this core to encompass everything in organizational life. Many mathematicians thought of management primarily as an exercise in logical relationships that could be expressed in symbols and the ominpresent and everrelated mode. One can cut through these multifarious approaches by imposing the systems concept on the process of managing. From this perspective, management or administration can then be viewed as the process of converting information into action.[48]

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[48]Piele, Eidell and Smith, op. cit., p. 253.

> This process, in turn, is equivalent to a dynamic decision-making process, or system that cuts across formal organizational structures and that involves other organizations in the man and/or machine--aided acquisition, processing, and use of information--the lifeblood of the process--as the basis for making various decisions.

Decision-Making Process

Integral to the entire notion of developing an educational management information system is the premise that an operational system will make decision-making more effective. Given such a base, it is essential that a thorough understanding of another concept be gained; namely, decision-making.

As developed by Robert Anthony, decision-making can be viewed as a three-level hierarchically structured process. These three levels are defined as:[49]

1. Strategic Planning: the process of deciding on objectives of the organization, on changes in these objectives, on resources used to obtain these objectives, and on the policies that are to govern the acquisition, use, and disposition of these resources. In the educational system, this means policy planning primarily at the state department of education and board of education levels.

2. Management Control: the process by which managers assure that the resources are obtained and used effectively and efficiently in the accomplishment of the organization's objectives. In the educational system, this is carried out by superintendents, assistant superintendents, and principals.

3. Operational Control: the process of assuring that specific tasks are carried out effectively and efficiently. In the educational system, this type of activity is conducted primarily by teachers in the classroom or within specialized administrative support operations, for example, by personnel responsible for daily plant maintenance and for financial and transportation operations.

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[49]Robert N. Anthony, Planning and Control Systems, Framework for Analysis, Harvard University Press; Cambridge, Massachusetts: 1965.

These are the levels which an educational management information system must address both in terms of its input data as well as the types of output responses which it produces. Thus, one can conceive of decision-making as a process which is recurring, involving interaction between and among the various management levels in the organization. Schematically, Evans applies this schema to the educational enterprise.[50]

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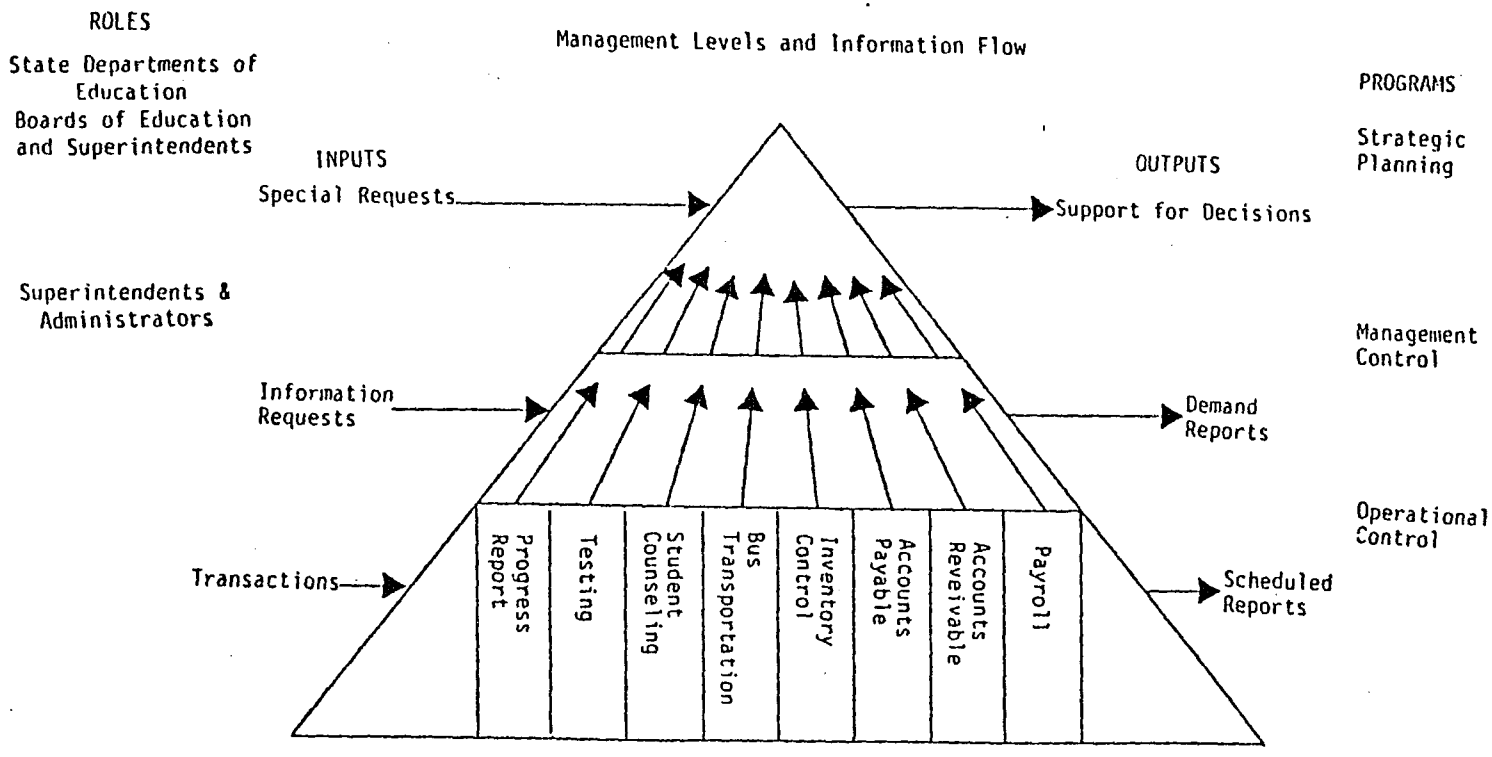
[50] Philip K. Piele, Terry L. Eidell and Stuart C. Smith, ed. Social and Technological Change, Implication for Education. The Center for the Advanced Study of Educational Administration, University of Oregon; Eugene, Oregon: 1970.



Philip K. Piele, Terry L. Ediella and Stuart C. Smith, eds. Social and Technological Change, Implications for Education, (Eugene Oregon: University of Oregon, 1970), p. 254.

FIGURE 3

Management Information

Management information is comprised of specific bits of data which have meaning to both specific individuals within the organization as well as the collective planning efforts of the total organization. Crucial to the development of management information for education is the development of measurable goals toward which the educational system is directed. Only if the goals are clearly defined can the necessary data be identified, and further, only then can the relationships be drawn on which to base educational decisions. Without substantial efforts in precisely defining the goals of the system, the results will be reporting systems which are unjustified, inefficiently structured data bases and inadequate management reports.

Information System

One of the concerns which often develops during the development of an educational management information system on the part of those in the organization is the fear that they are losing control of their piece of the organization. This is occasioned by the very function of an information system, for an information system is simply a network of communication channels that "acquires, processes, stores, retrieves, and redistributes--manages--data used in managing the educational plan and in supporting the individual and collective decision-making process. In short, an information system is a system for redistributing knowledge and power".[51]

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[51] Piele, Eidell, and Smith, op. cit., p. 257.

Educational System

Even though education extends far beyond the formal settings of secondary and post-secondary buildings and organizational structures, the concept of the educational system, as used in this study, addressed just these formal enterprises. Of course, each educational system has its uniquenesses and it is essential that as one develops an educational management information system these differences be clearly understood. Because the educational goals are not always clearly defined nor measurable, because there are numerous publics involved directly and indirectly in the policy making processes, and because the products of the system are so intangible, the necessity to be fully cognizant of the scope of the system under consideration is even more essential.

Educational Management Information System

For the purposes of this study, an educational management information system can only be understood as the above concepts are interrelated. An educational management information system acquires data from the educational system and the society, and manages these data in such a way as to make them useful. That is, it converts the data into information of use to managers at different levels, places, and times in the decision-making process based on the goals developed and agreed upon by and for the system.

Other definitions emphasize the same sequential development of an educational management information system:

> Management information system. A group of people, a set of manuals, and data processing equipment (a set of elements) select, store, process and retrieve data (operate on data and

matter) to reduce the uncertainty in decision-making (seek a common goal) by yielding information for managers at the time they can most efficiently use it (yield information in a time reference).[52]

A management information system is an organized method of providing past, present and projection information relating to internal operations and external intelligence. It supports the planning, control and operational function of an organization by furnishing uniform information in the proper timeframe to assist the decision-maker.[53]

Some writers make a distinction between data and information, whereby the former refers to a mass of unstructured facts and the latter to structured facts assembled in a meaningful fashion. Under this definition, a management information system would consist of collection, sorting and storage of data by means of electronic data processing devices, and the summarization and transmission of the resultant information. Any discussion of a total information system presupposes the use of computer.[54]

An information system is nothing more than a planned method of collecting necessary data and converting it to summaries and other reports that serve some vital purpose in the educational program. All of these systems are powered either by hand (manual systems) or by machine (automated systems).[55]

Management information systems are marked by an orientation toward management and the existence of a data base. The author proposes the following simple definition of such a system: A management information system is a management-oriented system characterized by information elements structured into a data base serving the information requirements of policy and operating management.[56]

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[52]Murdick and Ross, op. cit., pp.7-8.

[53]Dearden, op. cit., p. 91.

[54]Sinclair, op. cit., p. 54.

[55]Alvin Grossman and Robert Howe, Data Processing for Educators, Educational Methods, Inc., Chicago, Illinois: 1965.

[56]Norman L. Enger, Putting MIS to Work: Managing the Management Information System, American Management Association, Inc., New York: 1969.

An educational management information system, then, is one which is based on a set of definable and measurable goals, consists of independent data files which can interact in response to predetermined as well as spontaneous information requests for specific management decisions, and is automated and adaptable to an on-line communications environment.

Characteristics

Given the above definition of an educational management information system, the literature is quite explicit as to the characteristics such a system should evidence if it is to serve the organization effectively. Several authors have developed lists of appropriate characteristics, one of which is Joel E. Ross in his text, Management by Information System.[57]

Communication

A management information system must provide a means by which information can move vertically and horizontally within an organization to assist the managers in their functions. If such communications exist, a parallel objective is attained and that is system integration. By this is meant the interface of individual aspects, functions, or subsystems within the organization to achieve what many authors call a total organizational system.

Decision-Making

A management information system should provide the basis for two levels of decision-making. The function of information is to give the

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[57] Joel E. Ross, Management by Information System, Prentice-Hall, Inc., Englewood Cliffs, New Jersey (1970). p. 51.

decision-maker a foundation for the most accurate and effective decision he can make. An information system further enhances this understanding by permitting the manager to categorize his decision-making into those decisions which he programmed and therefore, made by the system, and those which he must make personally. In this latter category, the system inputs specific information relevant to the impending decision.

Structure

A third important characteristic is that the system be designed so as to provide for the ultimate development of a data processing system which is fully integrated into the organization. Due to the complexity of the task of developing a management information system, the observation contained in the literature that the development of a management information system should be achieved in segments with each successive segment interlocking with the former, is a most important development concept.[58]

In order to follow such an approach successfully, the developer must have a master plan whose development is the result of the combined effort of the entire organization. It is only when such interaction is achieved that there can be the type of commitment on the part of the organization for the development of a complete system whose various parts are fully integrated into the organizational structure.

Economy

The development and operationalization of a management information system is expensive initially, as well as in terms of the continuing

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[58] James M. McKeever, Building a Computer-Based MIS, Journal of Systems Management, (September, 1969), pp. 12-17.

costs of the professional personnel required to maintain an effective system. In the face of such costs educators are also faced with ever increasing per pupil costs, the projected system must be cost effective to the organization it is to serve. Of course, in considering initial costs, one must also consider the concept of marginal costs. At issue in considering marginal costs are the economic limits the developer places on the cost of the system in relationship to the other ongoing organizational costs. Based on this analysis, the administrator can establish a sequential program for the development of a management information system related to the immediacy of economic and organizational growth returns. In developing such a cost benefit analysis, an observation by Lancaster[59] is most important:

> The most effective system is likely to be one that sets out to satisfy the great majority of the demands placed upon it, but not all the demands. We will probably find, as Bourne has suggested, that we can design a system capable of satisfying, efficiently and economically, 90% of the user requirements, but that to satisfy the remaining 10% would require a disproportionate increase in costs and in effort.

Given such a cost analysis and a statement of priorities for development, the administrator can initiate the development of the proposed system. In this regard, a caution suggested by Evans is appropriate:[60]

> The evolving computer utilities (there will be more than one) will create pressures and opportunities to do the following:
>
> *improve the effectiveness and efficiency with which the educational system (K-12) is managed.
>
> *accelerate the degree to which education takes place out side the formal organizational system, e.g., in the

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[59]F.W.Lancaster, Information Retrieval System, John Wiley and Sons, Inc., New York: 1968.

[60]Piele, Eidell, op.cit., p. 288.

home, in the learning center, and on the job by group or individual in-service training.

*equalize educational opportunity regardless of the economic status of the community within which the school district resides.

In the face of these pressures, it is often tempting to address such a range of objectives that the project is doomed simply because of its complexity. That is not to preclude dealing with these and other objectives; it is to suggest that the objectives of any system development must be prioritized and approached in a sequential order.

Further, Evans observes that with the necessity to conduct an extensive system analysis in preparation for the development of a management information system, one must remember that in dealing with the educational system he is dealing with an extraordinarily complex institution, with a technology which is certainly not yet equal to the task. Not only is the institution complex in its structure, the fact that it lacks well articulated, measurable objectives simply adds to the difficulties of such an analysis. From this perspective, the application of cost effectiveness studies to determine the need for a management information system must be approached with candor and all deliberateness.

Human Orientation

One of the major concerns over the development of a management information systems in particular is the fear of the improper use of the data contained in the system. This concern is only heightened as one considers the possibility of utilizing a single unique individual identifier which could be assigned at birth.

At issue, as one considers this latter characteristic, is the relationship between the objectives of the system designer for system

flexibility and responsiveness to an online environment, and the desire to maintain complete anonymity. Additionally, as one considers the desire on the part of the schools and parents to evaluate the quality of output and student achievement with costs, the use of individualized data increases. Thus, the need for even more cautions is created. Basic to this entire issue is the position of West in that privacy has become an indispensable condition of freedom in the twentieth century.[61]

In addressing this issue, Lister summarized the major effects computerized management information systems have had and will have on the questions of privacy.[62]

> First, as storage and retrieval systems become steadily more efficient, it becomes less important to restrict the quantity of the data that are collected. Incentive to gather only essential data grow progressively less persuasive. As a consequence, more information than is immediately, or even prospectively, necessary is often collected. Second, data that might once have been discarded because of the inconvenience and expense of their storage may now be more easily retained. Although data-purging may be less difficult, it also may seem less urgent.
>
> Third, the new data systems permit more complete use of the information they include. Data may be more thoroughly and imaginatively correlated, thus revealing patterns of belief or behavior that, until recently, might have escaped notice. Very large data collections may be accurately searched even for relatively low priority purposes. Fourth, it is now possible to disseminate materials quickly to widely scattered groups of interested recipients. National systems for the exchange of data, linking thousands of remote terminals, will shortly become commonplace. As they do, information that might formerly have been seen only by local custodians will be made readily available to agencies across the country.
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> Fifth, information received through these systems may seem to its recipients enhanced in value or reliability simply

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[61] Charles Lister, Privacy and Large-Scale Personal Data System. Personnel and Guidance Journal, (November, 1970). p. 211.

[62] Ibid., pp. 209-210.

> because of its source. Unfortunately, large-scale computer and transmission facilities retain for many Americans a mysterious, nearly magical quality, that may distort their assessment of the information they receive. They may discount the likelihood of error or disregard the necessity of verification. Even if they do not, the computer may suggest an immediacy that altogether overcomes their sense of chronology. The oldest and most obsolescent data may, as a consequence, seem new with each computer printout.
>
> Finally, the improved performance of these data systems compounds the harm caused by inaccurate and incomplete information. So long as data circulated within a limited community, the subject often suffered relatively little harm, even if his criminal history, educational records, or other documents were mistaken or incomplete. The information's inaccuracy was balanced, at least roughly and in part, by the system's inefficiency. Although the new data systems, with their more sophisticated control devices, conceivably may lessen the overall probability of error, they must also be expected to magnify the injurious consequences where error occurs.
>
> These characteristics of large-scale personal information systems suggest quite significant new dangers for individual privacy. As an immediate matter, they lengthen and deepen institutional memories, thus reducing still further the likelihood that even isolated misconduct will be forgiven or forgotten. A counselor's informal assessment of a student's character and abilities may follow the student through a lifetime. Youthful wrongdoing may be brought out for explanation at each subsequent stage of the child's career. These systems threaten the creation of a society in which unorthodoxy is discouraged by its notoriety, and even the mildest eccentricities are catalogued for official evaluation. They lead unmistakably to a greater centralization of information, with its consequent political and social risks. All this may severely restrict the individual's control over the release to others of information concerning himself. There can be little doubt that privacy was until recently protected chiefly by the simple inefficiency of information systems; the important point is that this inefficiency is now substantially reduced.

In summarizing the basic characteristics of an educational management information system, it is essential that the information system is, in fact, a system which meets the information needs of the individual educational planners and institutional personnel at all levels

of the system. It must provide the administration and board of education with information needed to establish broad system plans and policies. Then, as the level of management decreases, the information supplied becomes much narrower in scope. Additionally, the system should be designed about the educational agency's activities such as evaluation, report preparation, and budgeting.

CHAPTER IV

PHILOSOPHY OF ACCOUNTABILITY

The process of educating the nation's citizens has been identified as one of man's most public enterprises; the educational administrator must have the means by which he can communicate with the public. This responsibility for ongoing communication includes information concerning new program directions, needed resources and cumulative accomplishments.

The lay public has summarized this multidimensioned set of responsibilities faced by educators as educational accountability. This concept has become, in the words of former United States Commissioner of Education James E. Allen, the "watchword of the Seventies."[63] In a pamphlet, published by the Michigan State Board of Education, John W. Porter, State Superintendent of Public Instruction, indicated that the educational accountability model highlighted the need for common goals of education, development of performance objectives rather than textbook completion, assessing needs, analyzing the ways in which teachers teach, and providing outside educational audits to determine if changes have indeed taken place, in addition to providing guaranteed in-service professional development.[64] As Robert Nash pointed out, the concept in an ideal sense

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[63] Donald B. Woodington, Accountability from the Viewpoint of a State Commissioner of Education, Phi Delta Kappan, October, 1972: pp. 85-97.

[64] John W. Porter, A Position Statement on Educational Accountability, Michigan Department of Education, 1972: p. 1.

is rooted deeply within the American value structure. From the view of the public, few can challenge the right of society, in general, to hold the agencies and their personnel responsible for what they purport to do. Americans believe that their institutions, especially educational institutions, exist for the benefit of the people whom they serve. Consequently, schools--their administrators and teachers--should be held responsible for what they produce in terms of student achievements.[65] The difficulty lies in the precise meaning given the term. Generally, the differences of opinion center around three distinct dimensions: accountability as a control over the educational process, accountability as an information and reporting system, and accountability viewed as a tool by which the aspects of control and information can be combined.

It is this latter application of the concept of accountability that gives rise to the type of data requirements and information management about which this study is concerned. If the educational system is to be responsible--accountable--for what it causes--learning--data relevant to the objectives of the learning environment must be identified and collected through a system which permits the development of meaningful information for the decision-makers.[66]

The educational accountability model that was approved by the Michigan State Board of Education has six steps: (1) Common Goals, (2) Performance Objectives, (3) Needs Assessment, (4) Delivery Systems Analysis, (5) Evaluation and Testing, and (6) Recommendations for Improvement.[67]

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[65] Robert J. Nash, Accountability--The Next Deadly Nostrum in Education? School and Society, December, 1971: pp. 501-504.

[66] David Bushnell and Dwight Allen, ed., Planned Change in Education. Harcourt, Brace, Jovanovich, Inc., New York: 1967

[67] John W. Porter, op. cit., p. 4.

The model serves as a guide for the administrator in the completion of the tasks relating to planning, organizing, staffing, directing, and controlling. Porter stated, "in a sense, use of the educational accountability model is analagous to program budgeting in the business world. It involves planning, acting and evaluating; it is a tool to be employed, or a road map to help lead the educator or citizen where he wants to go. As a process, the accountability model can help Michigan education along as it progresses in preparing children, youth and adults for life in the 21st century.[68]

Accountability is not new to education. Educators have always been accountable for the inputs into their system, particularly those responsible for vocational education because of mandates from the State Department of Education requiring local school districts to meet program standards of quality. This resulted in a need for local vocational education personnel to develop a state plan for which dollars were to be expended. This , in turn, was reflected in accountability measures from the local school districts by submitting annual reports to the U.S.O.E. Fiscal audits are just as common to education as they are to other institutions. The focus of accountability has changed and there is a demand for an accounting by the educator in terms of the outputs of his endeavors. Educators are divided in their opinions concerning accountability, some fearing that accountability is to be a vehicle to cut costs and to evaluate teachers solely by means of financial criteria. Other educators see the accountability movement as a necessary step to restore confidence in the public education system through more efficient educational management.

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[68]Ibid. p. 1.

An accountable instructional system is conceptually a fail-safe or zero-reject system. Its basic emphasis is upon the successful achievement of objectives. If the instructional system does not close the gap between the entry level of the learners and the desired end results, i.e., does not attain the objectives set for it--the system is redesigned and tested until it does. If the students do not learn, the immediate query centers on the system, its personnel, methods, materials and the like. The students, parents, teachers or environment are not blamed. It is the system's job to teach; the goal is learning; every effort is made to vary process until the system functions as it was intended to function.[69]

Not only must the vocational educator have the means by which he can report to the public and the agencies of the public, he must also have an information system which makes logical and meaningful decision-making possible in pursing organizational goals. As one considers the various studies concerning the data management capabilities of vocational education, it is evident that the state of the art falls far short of the need.

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[69]Creta D. Sabine, Accountability: Systems Planning in Education, Leon Lessinger & Associates; ETC Publications, 1973: p. 11.

Accountability in Vocational Education

As far back as 1963, the United States Congress has said that the planning and design of the multi-billion dollar space age enterprise called vocational education can no longer have as its basis intuition and the Pollyanna letters from local vocational education personnel.[70] As a prelude to the enactment of Vocational Education Act of 1963, a panel of consultants for the President of the United States developed a report which included the following excerpts:[71]

> A study of vocational education is severely handicapped by inadequate statistical reporting and lack of sufficient evidence to make an adequate evaluation of its methods of achievement. Evidence is lacking as to the number of youth who graduate from programs of vocational education. Information is generally not available concerning the number of vocational students who get jobs, and even less information is available regarding their success after employment.
>
> Very little research evidence or organized body of knowledge of the activities in vocational education is available to justify many of the practices in instruction or supervision. The task of vocational education will be more important in the years ahead. Every effort should be made to develop methods or accept changes to improve this educational service. To improve vocational education services, it is recommended that:
>
> The States and the Federal Government develop an adequate and standardized system of reporting.
>
> a. Information should be readily available to indicate enrollments by age, sex, year in school, year in training, occupation for which training is given, completions, placement by occupation, type of school, size of school, size of community, etc.
>
> b. Financial reports should make it possible to determine unit costs, source of funds, and classification of expenditures.

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[70] Bruce Reinhart, Lack of Data: Planning and Evaluation Bottleneck, American Vocational Journal, March 1971: pp. 38-41.

[71] Panel of Consultants on Vocational Education. Education for a Changing World of Work, U. S. Government Printing Office, Washington D.C. 1963.

c. Similar information should be available concerning teachers, supervision, instructional materials, and any research or experimental projects.

Additionally, the report continues:

Annual and periodic reports should be made by all states and local school districts to furnish information which makes it possible to determine the extent of these programs and the ways in which they are serving their communities and the nation. This information should be tabulated with related educational and population data to permit satisfactory analysis of these programs.

This report recommends an extension of vocational education to more people, in more locations, and in more occupations. This expansion cannot be done efficiently without considerable research and development. Pilot projects, experimental programs, basic and applied research, and analysis of operating programs should be extensively developed in order to provide the basis for improving these services. More and better information will be necessary to evaluate the progress of these changing programs.

Modern data-processing methods should be used in order to provide complete and up-to-date information. Information should be available by January for the school year ending the previous June. These data should include enrollments, completions, placements, and expenditures, and should be related to age, sex, type of school, size of school, type of other pertinent facts. Information should be available by administrative categories and the services to instruction and administration. Such information, which is now largely lacking, would permit annual evaluation of the services of vocational education to our nation. It would also make it possible to perform research studies and pilot projects to improve and expand these educational services.

Many recent achievements of industry can be largely attributed to the efforts which have been made in research and development. Relatively little has been done in research and development in vocational education; it could be the basis for improving the effective operation and use of vocational education services.

To make the role of the Federal Government in vocational and technical education more effective, it is recommended that:

1. A statistical reporting system be developed to provide current data concerning the various training programs. These data should indicate the people being served, the effective use of the skills developed, and the need for continuing programs and developing new programs.

2. The Federal Government assist the states in developing criteria to evaluate programs supported by federal funds.

3. A National committee be convened at least every five years to review and evaluate the services of vocational education to the nation and its people. This committee should consist of not more than 15 persons who have been appointed to represent federal departments, educational leaders, labor, management, and the public.

4. A special report be made to Congress each year by the U. S. Office of Education to indicate the activities, achievements, and limitations of the vocational training supported by Federal funds authorized by Congress.

The challenge made in the Report of Consultants in 1963 had resulted in very little improvement by 1968, according to an article by Bruce Reinhart, the National Advisory Council on Vocational Education charged that "reporting of vocational education is suffering from the lack of a fully developed data collection and reporting system".[72]

Almost as if the previous calls for an adequate data base and an effective management information system by which this data could be translated into meaningful information for planning had fallen on deaf ears, a White House report sounds strangely familiar.[73]

> The most serious constraint affecting planning and evaluation at the federal level, and at all levels as well, is the lack of any baseline data on vocational program operations. According to P & E Branch staff members, no funds have been made available within vocational education for the development of the 'benchmark' data that would be required for any kind of effective planning and evaluation.
>
> The general lack of baseline data useful for planning and evaluation is as much a problem at the state level as it is at other levels. For planning purposes, data is usually assembled

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[72]Reinhart, op. cit., p. 38.

[73]Health Education and Welfare Task Force, Special Report, Chapter 7, 1970: p. 2.

> from various different sources and is often not consistent or compatible in terms of time frame, definitions, or area of coverage.

Again, this warning did not result in the type of information the Congress had previously stated it needed. As a result of this apparent inactivity, the Congress, through the Senate Appropriations Committee, literally assumed the prerogative and directed "that $265,000 of 1972 vocational education research funds be used to support a national study of career education to be conducted by the National Advisory Council on Vocational Education".[74] The effort, known as Project Baseline, is a four-year study which will include findings on programs, students, costs and program results from all publicly supported vocational education and manpower training projects in the United States. From its beginning, the project was to establish a baseline of data and information "from which the effects of Federal as well as State and local funds, policies, and administrative actions may be observed and reported."[75]

Several excerpts from this report highlight the extent of the problem being dealt with by the study:

> Fifteen states are collecting individual student enrollment data at the present time, while 36 others are not. In those 15 states, which contain 27% of all vocational education students being reported, it is possible to know with considerable accuracy what kinds of students are enrolled in each occupational area, the neighborhoods from which they come, and what happens to them when they leave the program. In the other 36 states, containing 73% of reported vocational enrollments, classes are totaled as the only data being collected beyond the level of the local schools or, in some cases, regional reporting districts. All that is officially known in most of these states--and all the Federal Government knows--is that certain

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[74] Project Baseline, A Data Base for Vocational Educational and Manpower Training, 1972: p. 1.

[75] Ibid. p. 2.

numbers of students are enrolled in each program and that a certain number of them are male or female, disadvantaged or handicapped, of one ethnic identity or another, and classified as either secondary, post secondary, or adult. It is not known which students are in each of these categories, which are in more than one, what grade levels they have reached in school and therefore when they will be seeking employment, where they live, the occupational objective of each, which ones benefit most from their training, which benefit least, and anything else that might help to identify strengths and weaknesses in vocational education at the local and State levels...

It is not certain if any State has yet developed an adequate follow-up data system, and many apparently are little better than pure guesswork. At the very best, reliable follow-up data must come from the former student or members of the family whether on a sampling basis or in a follow-up of all students. Eleven states get their follow-up data in this way. In nine states, follow-up data are supplied by former teachers. Undoubtedly, many teachers do know what many of their previous year's students are doing, but it is totally unrealistic to assume that the percentage in either case is very high. The source of follow-up data in the remaining states is still in the process of being analyzed.

The U. S. Office of Education has required in its reporting system that the states follow-up all vocational education students. They must submit the numbers of students in each occupational program who have completed training, numbers who left before completion but with job entry skills, numbers employed full time in occupations for which they were trained or related occupations, numbers known to be not available for employment, numbers unemployed and numbers whose status is unknown. Even if these numbers could be reported on the basis of actual knowledge, which is probably not possible, they fall considerably short of measuring all of the results of the schools' training program.

Financial data reporting lags considerably behind student data, making reliable per-student costs by occupational program virtually impossible to compute in all but five states for which data are available at this time. In only one of these states have forms been obtained to show the itemization of expenditures on which per-student costs are figured. In the other four, information is still being sought which will show how the per-student costs received were obtained.

One aspect of financial data reporting of particular interest to both Congress and the U. S. Office of Education is the manner in which expenditures are identified for disadvantaged and handicapped students. Under the law, at least 15 percent of each state's allotment of Federal funds must be used for disadvantaged students "who have academic, socio-economic, or

other handicaps that prevent them from succeeding in the regular vocational education program without special educational assistance or who require a modified vocational education program". From information presently available, only seven states can be identified where these expenditures are related to specific programs or services for disadvantaged and handicapped students reported by the local schools. In the remaining 40 states, information is still being gathered.

During its first three years of operation, almost $900,000 has been expended on the project. Even though it has used existing data, two important facts emerge. First, several vocational education departments have begun to redesign their data systems. Secondly, the U. S. Congress is using Project Baseline's findings in considering the future direction of Federal vocational legislation.[76]

Accountability in Educational Management

As one considers the entire question of adequate information systems for educational decision-making, it is important to realize that even though this study considered the need for a management information system for vocational education, the problem is certainly not limited to secondary and post-secondary education. In discussing the Higher Education Amendments of 1972, Senator Harrison H. Williams lamented the absence of a single central repository of dependable information on higher education. In a report developed by Florida State University, the researchers made the following observation about the National Center for Higher Education (NCHE).[77]

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[76] Educational Daily, October 30, 1974.

[77] Louis W. Bender and Howard L. Simmons. One Dupont Circle: National Influence Center for Higher Education: Center for State and Regional Leadership. Florida State University/University of Florida, Tallahassee, Florida: 1973. p. 40.

> Congresswoman Edith Green was critical of the absence of objective information within the U.S.O.E. as well as the questionable practice of awarding contracts and grants without a viable data base. It might be observed that such criticism of U.S.O.E. has not fostered the most positive and open attitude of U.S.O.E. officials toward NCHE which has been the alternative information resource used by Congress, limited as it is.

As an example that even the National Center is suspect, the same report included a comment made by United States Representative Albert H. Quie as he posed the question as to how representative are the Washington based educators:[78]

> He added that one must not rely too extensively on these Washington-based associations. Principally, he had two reasons in mind when making this assertion: 1) these organizations do not have a sufficient data base, and 2) a disproportionate percentage of the data presented is a reflection of the ideas of college and university presidents. Furthermore, Congress is aware of the tendency of the associations to select institutional representatives "from the field" who mirror their positions.

An example of the efforts being made by the higher education community to overcome the criticism of a lack of information is the project being conducted by the Western Interstate Commission for Higher Education (WICHE) known as the National Center for Higher Education Management Systems (NCHEMS). It is the intent of this effort to develop a management information system which can be operationalized at the local institution. The system being developed contains enrollment and cost data at the course-section level. Provided such a system were operational within each state, a significant source of information would be available to potential users. In a document published by the Center, the following statement of purpose is found:[79]

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[78] Ibid. p. 42

[79] National Center for Higher Education. Management Systems, 1972: p. 6.

> Higher education is today the target of growing pressure for improved management. First, institutions of higher education are being faced with a "revenue crunch", they are being forced to make more effective use of the resources they have at their disposal. Second, more strings are now attached to the revenues that are made available to institutions. In short, accountability has been interpreted in a wider context as having an additional meaning: not only must stewardship obligations be met; the provider of funds is demanding an assurance that desirable benefits result from the resources invested in the educational enterprise.
>
> The National Center for Higher Education Management Systems at WICHE seeks to improve higher education institutional management, statewide coordination of higher education, and decision-making processes in higher education at national levels. NCHEMS (pronounced EN-chems) develops tools and procedures for deriving information relevant to higher education management at the institutional, state, and national levels and trains users and potential users in their implementation.

The fact that education generally and vocational education specifically, lacks a system by which it can manage the myriad bits of data and isolated packets of information is evident from the above. That educational administrators must plan and make decisions in this situation makes a statement by Peter Drucker most appropriate:

> If pressures, rather than the executives, are allowed to make the decisions, the important tasks will predictably be sacrifices.[80]

Without a comprehensive management information system which is responsive both to routine as well as spontaneous inquiries, the administrator will be forced, by the requirement for immediate data, to respond from incomplete and often unrelated data. When this situation occurs, pressures will take their toll on the important decisions expected of the administrator.

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[80]Peter Drucker, The Effective Executive. Harper and Row, Inc., New York: 1966. p. 36.

Accountability in Industrial Management

Studies of top management officials in private industry demonstrate that there exists a large discrepancy between a manager's professed leadership style and the one he uses. Nearly 95% of the managers in the studies emphasized the importance of openness, risk taking, and trust. The studies showed that risk taking, experimenting, openness, and trust were rarely observed in the actions of the managers.[81] The things one truly believes in, the values one holds, the general assumptions one makes about his activities and the people in his organization directly influence the way in which he manages. However, as the Argyris studies show, managers may not be aware of what their actual attitudes and assumptions really are. Verbal endorsement of management by objectives by the top manager followed by actions reflecting little utilization of major components of the management system will lead to a breakdown in the effort to implement management by objectives and will eventually completely discredit the concept.[82]

George Odiorne describes the management by objectives system as based upon assumptions that human beings are capable of becoming committed to their work and can become highly devoted to the activity in which they are engaged. There are, however, many managers who utilize management styles similar to that described by Douglas McGregor in his book,

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[81]Chris Argyris, Top Management Blindness, A Practical Approach to Organization Development Through Management by Objectives, ed. A.C.Beck, Jr., and E.D.Hillmar, Menlo Park, California: Addison-Wesley Publishing Co., 1972: pp. 279-281.

[82]Thomas Connellan and Robert E. Lahti, Managing Community Colleges by Objectives (speech delivered at Midwest Community College Leadership Council at Michigan State University, July 14, 1971), p. 14.

The Human Side of Enterprise,[83] as Theory X. Such a manager cannot successfully use management by objectives; he will be inclined to establish the objectives he deems suitable for his subordinates and impose them upon the individual. The style of management which Odiorne recommends as being more suitable to the concepts of Management by Objectives is Theory Y. A Theory Y manager assumes that people will work hard and be committed to their tasks; he will delegate authority and responsibility, will allocate resources to aid the subordinate in accomplishing his tasks.[84]

The active commitment of the top administrator of an organizational unit to the concepts of management by objectives must be accompanied by a commitment of support from the resource support systems within the organization if management by objectives is to be successfully implemented. Odiorne,[85] in explaining the importance of the environment in which a manager operates, states that, "the values and goals of the organization in which the manager works invariably shape his behavior and are often the underlying reason for his success or failure."

A study conducted at Texas Instruments Incorporated concerning motivation and management pointed out that effective management systems are those which the individual manages as opposed to systems that manage the individual. An effective management system is one in which effective

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[83] Douglas McGregor, The Human Side of Enterprise, New York: McGraw-Hill Book Company, Inc., 1960.

[84] George Odiorne, Management by Objectives Guidebook, instructional aid utilized in Management by Objectives implementation seminars., p. 7.

[85] George Odiorne, Management by Objectives, A System of Managerial Leadership, New York, Pitman Publishing Co., 1965: pp. 57-59.

programs, practices, and sub-systems make possible accomplishment of both job and personal objectives within an organizational setting.[86]

There is an essential management component in any organized enterprise. There can be well-managed enterprises, poorly-managed enterprises and unmanaged enterprises. Most educational enterprises tend to be unmanaged, i.e., they are administered rather than managed. The critical distinction between administration and management lies in the general absence of certain management functions in administration.

Accountability has become the "in" word in education and judging solely from the sheer volume of books, articles, editorials and speeches published since 1969, it seems safe to say that The Washington Post maybe correct in its designation of education as entering an "Age of Accountability."

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[86] Harold M. F. Rush, Behavioral Science Concepts and Management Application, New York: National Conference Board Studies in Personnel Policy, No. 216. 1969.

CHAPTER V

THE DEVELOPMENT OF AN AREA VOCATIONAL CENTER MANAGEMENT INFORMATION SYSTEM MODEL AND APPLICATION OF MODEL

Status of Management Information Systems in Vocational Education

Most states have designed and operated MIS's that were too inflexible to incorporate new and emerging data without requiring extensive redevelopment, were responsive only to meeting compliance reporting requirements, or had limited utility for broader management purposes. During the past few years a major thrust was initiated by a number of states to upgrade their MIS's capabilities through grants obtained from the United States Office of Education, Bureau of Adult and Occupational Education.

Efforts by states to upgrade existing MIS capabilities have focused primarily on development of information subsystem components and secondarily on upgrading data management capabilities. The major activities involved in these state efforts have included:

1. changing data bases and often in the direction of defining a minimal core of data support reporting or monitoring functions, redeveloping and field testing data collection instruments;
2. building a file of manpower demand and student supply information;
3. acquiring more sophisticated computer hardware and improving computer software capabilities, e.g., mini-computers, file management systems. These efforts seem directed toward improving efficiencies in data processing costs, data input and data retrieval.

Many of these upgrading efforts by the states have had merit. Yet, many states continue to operate with minimal vocational education information systems oriented around compliance data rather than management information systems that produce information for decision-making for all levels of management. The reason for this state of affairs seems to be that MIS upgrading efforts by the states have not adequately dealt with the problems of system design conceptualization required to produce responsive, viable and enduring management information systems.

MIS Model Development

In the development of the vocational education management information system model the following process was followed:

1. Identifying the MIS vocational education goals.
2. Identifying the MIS vocational education objectives for each goal.
3. Securing data that will identify each of the sub-systems in the model.
4. Establishing a data base for each of the sub-systems.

MIS Vocational Education Goals

1. Increase opportunities for vocational education instruction to all segments of the population by providing greater diversity of curriculum offerings and increased program availability and accessibility.
2. Increase the opportunities for successful training employment of program completors by adjusting vocational program offerings and enrollments so that they reflect a balance between current and anticipated manpower demands and the employment experiences of program completors.
3. Improve the quality of vocational education by promoting instructional program elements, ancillary services, personnel practices and activities, and school-community involvements which are assumed will produce desirable student educational and occupational outcomes.

4. Have available that management-useful information which will enable vocational education agencies to more effectively plan, allocate resources, monitor and redirect their programmatic efforts toward the achievement of specified objectives; and which will provide a basis for vocational education agencies to respond to the accountability requirements of external agencies and the public.

MIS Vocational Education Objective for Goal 1

To produce a data base whose interrelationship of elements are use indicators of opportunities for vocational education.

I. TARGET POPULATIONS CURRENTLY BEING SERVED

Data Base:

A. Enrollment data for students in vocational education programs, including sex, age, ethnic/racial affiliation, training objective, and whether special education assistance is needed.

II. VOCATIONAL PROGRAM DIVERSITY

Data Base:

A. Vocational education programs offered within each vocational discipline field.

III. VOCATIONAL PROGRAM AVAILABILITY

Data Base:

A. Program being planned that are not currently offered.

B. Programs currently offered that maybe discontinued or expanded.

C. Regular and special vocational programs which serve disadvantaged and/or handicapped students.

IV. VOCATIONAL PROGRAM ACCESSIBILITY

Data Base:

A. Regular vocational programs which modify equipment as a means of promoting program accessibility to the handicapped.

B. Vocational programs which modify facilities as a means of promoting program accessibility to the handicapped.

C. Vocational programs which use bi-lingually oriented instructional materials as a means of promoting program accessibility to those for whom English is a second language.

D. Vocational programs which have open-entry, open-exit policies or remove educational prerequisities for a admission.

MIS Vocational Education Objective for Goal 2

To produce a data base whose interrelationship of elements are useful indicators of balance between vocational education enrollments program offerings, and manpower needs.

I. EMPLOYMENT OPPORTUNITIES

Data Base:

A. Externally Generated Manpower Data (this requires that survey codes, e.g., D. O. T. (dictionary of occupational titles) are matched against occupational education program codes).

II. VOCATIONAL PROGRAM SUPPLY TO MANPOWER NEEDS

Data Base:

A. Identifying discrepancies between the supply of vocational education program completors and identified employer demands for these completors.

III. VOCATIONAL PROGRAM ADJUSTMENTS TO STUDENT DEMAND/AND MANPOWER NEEDS

Data Base:

A. Vocational education programs which are initiated as a result of specific business-industry requests.

B. Vocational programs that may be discontinued due to an inadequate demand for graduates.

C. Vocational programs that may be discontinued due to a lack of student interest.

MIS Vocational Education Objective for Goal 3

To identify a data base whose interrelationship of elements are useful indicators of the quality of vocational education instruction.

I. INSTRUCTIONAL PROGRAM ELEMENTS PRESUMED TO ENHANCE PROGRAM QUALITY

Data Base:

A. Vocational programs that organize the offerings in relation to program objectives.

B. Vocational programs which use written terminal performance objectives based on an analysis of required occupational competencies.

C. Vocational programs which have an inventory plan for all major equipment.

D. Vocational programs which have a replacement plan for all major equipment.

E. Vocational programs which have job placement services available to all students enrolled.

F. Vocational programs which have an occupational advisory committee providing advise and counsel.

II. ANCILLARY SERVICES PRESUMED TO ENHANCE PROGRAM QUALITY

Data Base:

A. Vocational programs enrolling special needs students which have provisions for obtaining educational testing and diagnosis for these students.

B. Vocational programs enrolling special needs students which have provisions for obtaining psychological and/or social work services to assist in the proper educational placement and/or counseling of these students.

III. EXTRA-CURRICULAR ACTIVITIES PRESUMED TO ENHANCE PROGRAM QUALITY

Data Base:

A. Vocational programs which provide students the opportunity to join nationally, state, or locally sponsored student vocational organizations.

IV. PERSONNEL PRACTICES PRESUMED TO ENHANCE PROGRAM QUALITY

Data Base:

A. Vocational programs which have at least one staff member involved in in-service teacher education activities, training programs required for credentialling or professional growth.

V. SCHOOL-COMMUNITY INVOLVEMENTS PRESUMED TO ENHANCE PROGRAM QUALITY

Data Base:

A. Vocational programs which have students involved in cooperative or other out-of-class work experiences.

B. Vocational programs which actively use an occupational advisory committee in evaluating their operations.

C. Vocational programs which plan field trips designed to acquaint students with the world of work.

MIS Vocational Education Objective for Goal 4

To produce a data base (which include data bases for Vocational System Goals 1-3) whose interrelationship of elements are useful for management decisions with regard to program planning (and evaluation) directed toward the achievement of specified objectives and for responding to accountability requirements.

I. STUDENTS' EDUCATIONAL EXPERIENCES

Data Base:

A. Student termination data including selected reasons for termination or completion, and involvement in specific educational experiences.

B. Students terminating their vocational instruction who leave program with marketable skills.

C. Students terminating their vocational instruction who complete the educational objectives for such programs.

II. VOCATIONAL EDUCATION FUNDING AND EXPENDITURES

Data Base:

A. Vocational education funds received from state/federal sources for operation of vocational programs.

B. Vocational education funds received from local sources.

C. Vocational education expenditure of funds for vocational programs.

D. Vocational education capital outlay funds for vocational education.

III. FACILITY UTILIZATION DATA

Data Base:

A. Number and locations of facilities offering vocational education and descriptive characteristics of those facilities, .e.g, type of facility, location, distribution of enrollments, space allocated for vocational and related instruction.

IV. PERSONNEL DATA

Data Base:

A. Number of vocational staff who are assigned to each vocational program.

B. Certification status of vocational education personnel.

Desired Management System Characteristics

A desired management information system must be responsive to its data consumers, viable with respect to being modified without losing its integrity as a system, and enduring so that it can be periodically assessed and improved over time.

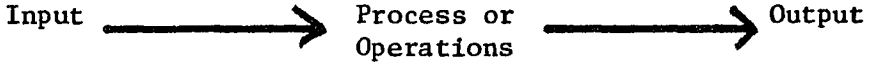
Two design requisites are needed for a desired management information system for vocational education:

1. The management information system must be comprehensive with respect to the completeness and integration of its information, data management, and operations and management subsystems:

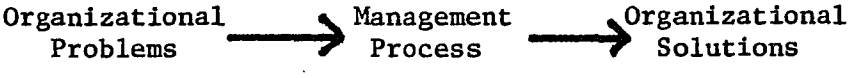
2. The system must be technologically adequate with respect to its intrinsic capabilities to deal with extensive changes in data input, informational output, and staff organization without requiring major system redevelopment activities.

A comprehensive MIS can be conceptualized as having three identifiable subsystems, and a management and organization subsystem; and each of these three subsystems is, in turn, composed of several components.

An information subsystem has two components. These are an input component and an output component. To oversimplify, the basic ingredients are:



In education if the input is the student, this student will be passed along a channel from human operator to human operator, and these operators represent the hardware of the system in performing the work or set of acts which has been assigned to them. The output is the educated student. Systems can be categorized in terms of their inputs, processes, outputs and components and since a management system is to provide solutions to organizational problems, the process can be as follows:



Organizational problems are the inputs into a problem solving process that produces organizational solutions as its output. The components that make up the process are usually human components, the sub-managers. After understanding the characteristics of a management

system, what general process should be employed in designing the system?

Figure 4 illustrates a process for a management information system. Special mention is made of the importance of goals and objectives in any management information system. The importance of specifying the mission must be a priority, otherwise the mass information assembled via a management information system is of little value. Reference is made to pages 76-77 for the goals that would be utilized for the initial step in the model. Specific objectives need to be written for each goal. The objectives for this vocational education management information system are noted on pages 77-80. Each objective provides the nucleus of the vocational education plan. To the administrator, the objective serves as a focal point for planning and evaluation.

Once goals and objectives are written for the area vocational center, it is possible to determine the input documents. For this model, seven data bases are used to form the basis of data collection. Specific statements are written for each objective with the data base further delineated to illustrate the type of information needed. The reader will note that the data bases are developed on pages 77-81. The input documents serve a purpose of providing the information for file building.

Several of the functions within the model serve somewhat of a similar purpose. File building, file index, and data retrieval as well as reporting are the ingredients of the core of a computer program. If the model were to be administered on a manual basis, the three functions provide little more than data storage.

The file building and updating functions simply provide for a systematic way of filing the information. A file index alternates between the file building and data retrieval functions serving as an efficient method of securing information. Without this step in a model,

the computer program would require an endless amount of time to sort the specific information requested. In essence, the function serves to deep separate the information in each of the data bases.

An administrator of a vocational education center may desire any number of type of reports. The data retrieval and reporting functions serve this purpose. Each of the final steps in the model are divided by the degree of difficulty in formulating the information requested in the report. As an example, a special request report normally is needed less frequently than a standard report, thus, the file building for this type of report requires less up-dating and change. In contrast, the turn around data function may require a more periodic examination for maintaining currency or accuracy.

The model is designed to enable the local vocational education administrator to utilize a computer to assist in the process of securing information. With simple modifications the model will serve equally well the administrator that is unable to use computer assistance. Regardless of whether mechanical assistance is utilized or not the ultimate result is the collection of desired data for analysis in decision-making.

The decision-maker in an area vocational education center in order to utilize the information gained from a MIS must carry the systems approach a step further. There are three main areas of concern in a management system or systems approach and these three are independent. The three areas are: 1) organizational goals and objectives, 2) problem raising, and 3) how to resolve problems in relation to determined goals and objectives. A management system can be visualized as a work process which manufactures or constructs solutions to resolve problems as well as determining the organizational goals.

In Figure 5, a schematic for a management system illustrates the systematic process of resolving a problem. This process is very important in the proper use of the MIS model.

FIGURE 4

EDUCATIONAL MANAGEMENT INFORMATION SYSTEM MODEL

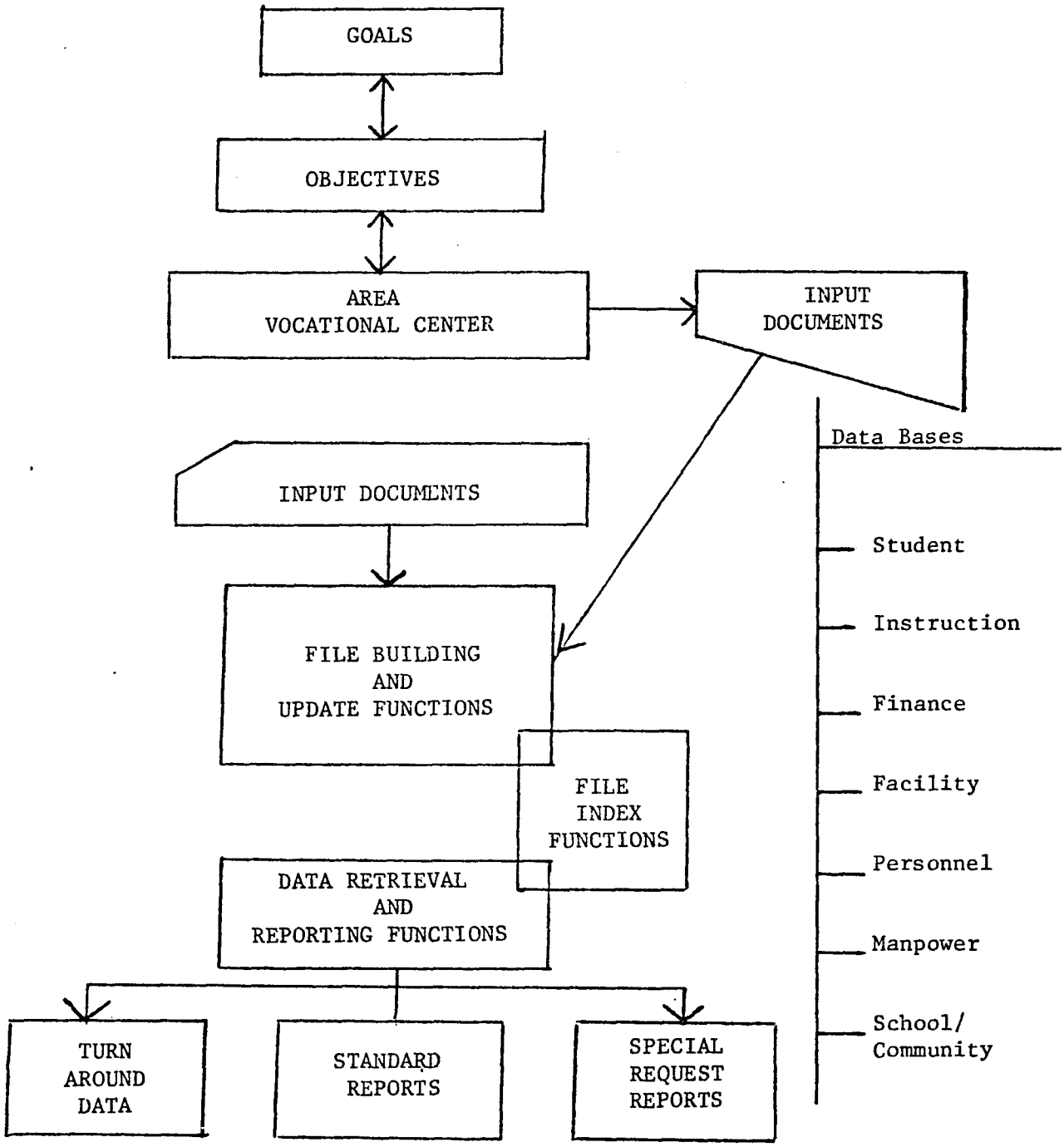
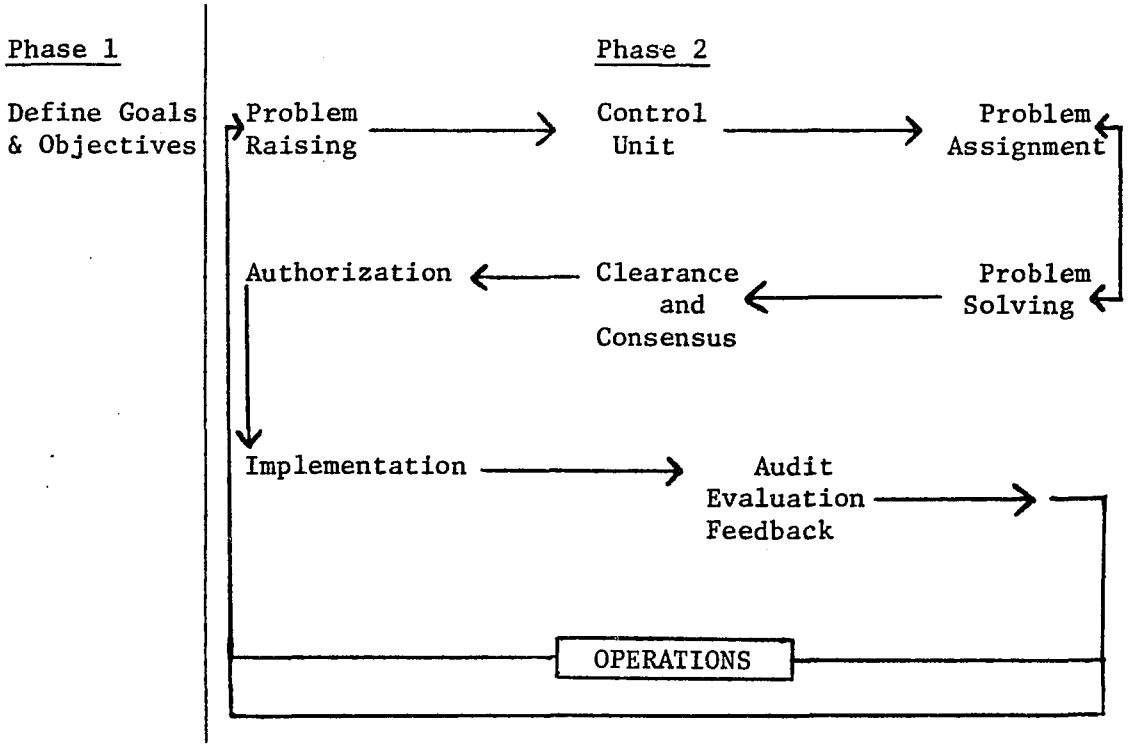


Figure 5

SCHEMATIC FOR MANAGEMENT SYSTEM

Phase 1 - Define organizational goals

Phase 2 - Design a system to resolve organizational problems



To resolve major problems and changes in an area vocational center the following steps are offered as an outlining procedure. Proposals for minor changes would not be submitted to this process, however, the same criteria may be used in part in arriving at a decision. These procedures will provide a systematic method of following through with proposals and will require target dates to be set for various steps as progress is made toward final solution of problems or changes.

The steps are as follows:

Step 1.0 - Problem Raising or Sensing

Step 2.0 - Problem Assignment

Step 3.0 - Problem Solving Teams

Step 4.0 - Consensus of Proposed Solution or Change

Step 5.0 - Authorization for Proposed Solution or Change

Step 6.0 - Implementation of Proposed Solution or Change

Step 7.0 - Audit - Evaluation - Feedback

This process is intended to be a start toward better utilization of staff and the thinking processes of staff members in resolving problems. The accountability steps to resolve problems are shown in Figure 6.

The current status of efforts with administrators in area vocational centers in Michigan is varied and possessive. The management styles of local vocational education administrators does not portray any specific type and there is a lack of consensus as to a common set of management decision requirements. Further there is a marked disagreement as to what is the basic core of data needed for a basis in decision-making.

FIGURE 6

ACCOUNTABILITY STEPS TO RESOLVE PROBLEMS

1.0 Problem-Raising or Sensing

External	Internal
Students-Graduated and Dropouts	Teachers
Accrediting Agencies	Other Employees
School Patrons	Administrators
Legal Constraints	Board of Education
Lay Groups	Students
	Budgets
	Grapevine

2.0 Problem Assignment - Administrative Team and/or Director

3.0 Problem Solving Teams

Educators Component	Administrative Support System
Staff Advisory Committee	Accrediting
Special Needs Consultants	Allocation - Budget
Program Managers or Instructors	Learning Resource Center
Other instructional staff	Negotiations
	Personnel
	Student support systems
	Testing, Counseling and Guidance

4.0 Consensus	Administrative Team Center Instructional Staff Student Council Policy Advisory Committee Occupational Advisory Committees
5.0 Authorization	Board of Education Superintendent Area Program Director Building Principal
6.0 Implementation	Administrators Personnel Space Material Delivery Operation

7.0 Audit - Evaluation - Feedback

Summary of Findings

The basic question in this study, "is it possible to develop a management information systems model for area vocational education centers in Michigan"?

Evidence within this chapter points to the fact that a management information systems model can be developed for vocational education. The model that has been developed for the area vocational education centers in Michigan has applicability to other institutions offering vocational education. To further prove that a management information systems model can be developed forms have been written to use in the collection of basic data. The forms represent the implementation phase of the management information system process.

Application of MIS Model

Demonstration Site

The Calhoun Area Vocational Center located in Battle Creek, Michigan was selected to demonstrate the implementation of the model. The Calhoun Area Vocational Center started serving the thirteen public schools and two parochial schools in the Calhoun Intermediate School district in September 1970. Enrollment for the 1975-76 school year exceeds 1400 secondary students. The Calhoun Area Vocational Center is one of twenty-five area vocational centers in Michigan.

Internal Reporting Forms

A basic necessity for the implementation of the management information systems model is a form that will assist the administrator in the collection of information. As stated in the review of the literature a manager lessens his chance to be accountable if the information used for planning

and decision-making is inadequate or missing.

Figure 7 is an internal reporting form. The form is designed to enable the administrator to have a wide range of information collected that can be used in the analysis stage of decision-making. Each data area on the form relates to the specific goals and objectives of the MIS vocational education model.

To illustrate in detail the implementation of this model the form is exhibited as Appendix A with specific information gathered from the records at the Calhoun Area Vocational Center. A review of this completed form gives the reader some idea of the many program comparisons that can be made from this data.

The data that has been assembled on this form can be used in several methods. One method would be to manually collect the data and make use of the information as time and desire dictates. Another method would be to have a computer program written to assist in the retrieval of the data. The method is not dictated and permits the administrator to make the decision within the limits of the local program.

The second instrument to be used in data collection is titled Program/Course Information and is shown in Figure 8. The purpose of this form is to provide a means of collecting data that is not readily comparable as information collected on the form in Figure 7. This form has been developed by using the goals and objectives as a basis for determining the priority information desired.

Each program or course would have a separate form. This enables the administrator to assemble specified information about each program. Much of the information is needed in the reporting process required by the State Department of Education. In Appendix B a completed form is exhibited.

Figure 7

VOCATIONAL EDUCATION MANAGEMENT INFORMATION SYSTEM

Internal Reporting Form

Name of Area Vocational Center _____

Date of Data Collection _____

(1) Program or Course Name	(2) O.E. Code	(3) Training Stations Available Per Session	(4) Enrollments Per Student Type			(5) Instructional Staff Costs	(6) Other Instructional Costs
			Reg.	Disad.	Hand.		

Figure 7 cont.

(7) Capital Outlay Costs	(8) Anticipated Reimbursement State/Federal	(9) Local Costs (5+6+7-8)	(10) Cumulative Local Costs	(11)-(12) Local Cost/Pupil / Program Cost/Pupil	(13) Pupil/ Teacher/ Teacher Assistant Ratio

Figure 8

Vocational Education Management Information System

Program/Course Information Form 2

Name of Area Vocational Center _____

Date of Data Collection _____

Program/Course Name _____

O. E. Code _____

1. Total amount of square footage in:

   Classroom _____

   Laboratory _____

   Average total square footage per student per session _____

2. Is there a written amortization plan for this program? Yes ___ No ____.

3. Do special or modified facilities exist for the handicapped students? Yes ____ No ____.

4. To what extent will groups in the private sector be contributing to this instructional program this year?

   $ _____ in direct funding, or in the value of donated or loaned equipment.

   _____ square feet of classroom or laboratory space provided without charge to the school district.

5. Number _____ and percent of the total _____ of students placed in related jobs in which they were trained.

6. Number _____ and percent of the total _____ of students placed in advanced training in the area of related training.

Figure 8 cont.

7. What evidence (if any) about local labor market demand has been obtained this year which supports the continuing need for this program?

   - a local area manpower survey conducted by: _____
     source

   - manpower data from other sources:

     _____
     source

     _____
     source

8. Is there an occupational education advisory committee for this program? Yes ____ No ____.
   Has contact been made with each member at least twice during the past school year? Yes ____ No ____.

9. Are up-to-date program objectives available for this program? Yes ____ No ____.
   Do terminal objectives exist for the learners? Yes ____ No ____.
   Do all students have the opportunity to be involved in a simulated work experience? Yes ____ No ____. If no, what percentage have the opportunity? _____%.

10. Do you have a written individual learner commitment form completed for each student in the program? Yes ____ No ____.

11. Do the students have an opportunity to join a vocational student organization? Yes ____ No ____. If yes, which one? _____

12. To what extent is data available regarding student termination in a program?

    - Written reasons by students for terminating a course Yes ____ No ____.

    - _____% of students terminating the program but have marketable skills.

    - _____% of students completing the program and have accomplished all the learner objectives.

Accountability of MIS Model

The secondary question answered in this study, "does the management information systems model, if developed, have an adequate provision for accountability in Michigan's area vocational education centers?" Reference was made to the accountability model now in use at the Calhoun Area Vocational Center. The accountability model shown in Figure 9 has been adopted from the model recommended by the State Department of Education portions of which are required in the program standards of quality.

The literature referred numerous times to the lack of information and limited procedures for administering a vocational education program. Each of the six steps in the model are necessary components for a vocational education administrator to be effective and efficient in the process of planning, organizing, directing and controlling the total vocational education program. The accountability model add to the quality of the MIS model in that another step in the process of administering and managing is put into writing with instructions for implementation.

Figure 9

CALHOUN AREA VOCATIONAL CENTER

ACCOUNTABILITY MODEL -- "LEARNER CENTERED"

SCHOOL MANAGEMENT INSTRUCTIONAL SYSTEM

STEPS		FUNCTION
I.	GOALS	What is to be achieved and for whom?
II.	PERFORMANCE OBJECTIVES	What goal achievers look like--specifically?
III.	NEEDS ASSESSMENT	The difference between where we are and where goals and objectives suggest we ought to be.
IV.	DELIVERY SYSTEMS	Ways and means for getting the jobs done--for individuals.
V.	EVALUATION AND TESTING	Feedback information--how well the systems are working
VI.	RECOMMENDATIONS FOR IMPROVEMENTS	System renewal--new inputs, maintenance of effective ones and discarding of ineffective elements.

Another management system model that adds further evidence of the accountability in the vocational management information system model is shown in Figure 10. This model affords the vocational administrator with the opportunity to make comparisons that are qualitative in nature as well as quantitative. Further the model is specific in requiring the user to identify what information is needed for each cell. Items listed in the cells are examples that could be used. The model serves the administrator that is serious in his desire to use information in decision-making by providing a means for planning. It is relatively easy to compare people information quantitatively, qualitatively or by desirable outcome. Other comparable combinations can be utilized in the process.

The use of the systems approach, efficiently instituted, will produce several tangible management benefits, among which the following are important:

1. The entire management decision process will be facilitated through the instituting of a system with discipline and improved information flow.

2. Administrators will be provided with total current and future resource implications of alternative courses of action.

3. The output of key personnel will be utilized more effectively by enabling them to focus on major objectives, policies, and resource decisions.

4. The likelihood of crisis management will be lessened through the early identification of potential problems.

5. The total management information needs will be defined and integrated.

6. Program justification to the public will be improved; legislators will be furnished more adequate information to justify requests in the competition for funds.

7. Public relationships will be facilitated by improving visibility of objectives and the resources available to accomplish the objectives.

8. The use of a systems approach will eliminate the piecemeal, fragmented, and last minute planning and evaluation which tends to occur under present practices.

9. Management will make more effective decisions because of the availability of concrete and relevant specific data.

FIGURE 10

MANAGEMENT SYSTEM MODEL

DECISION AREAS

TYPES OF INFORMATION	PEOPLE	DOLLARS	RESOURCES
Quantitative	Attendance	General Accounts	Inventory
Qualitative	Student Progress	Cost Accounting	Resource Allocations
Outcome	Follow up Information	Program Cost Benefits	Capital Inventory

CHAPTER VI

CONCLUSIONS AND RECOMMENDATIONS

This chapter presents the conclusions and recommendations based on the primary focus of the study to develop a management information systems model for area vocational education centers in Michigan.

The general public, the students, and the several policy making bodies are demanding that education be more accountable because of the amount of resources being provided it and to improve the methods of communication to assist the non-educator to more fully understand one of man's more complex systems. These demands have prompted the educational enterprise to amass vast amounts of data and design intricate decision-making systems which have not satisfied the criticism that education is still not responsive to the demands of the public to know more about what's happening in education. In fact the observations that education must have a management information system which will permit the interrelation of these vast amounts of data in order that the evaluative decisions can be made have come from all levels of government and the public.

In addressing the issue, this study provided a review of previous efforts to highlight this need and the relationship to accountability in education. In addition, a management information system was developed relating the people and program dimensions of organizational decision-making. The function of the management information systems model was related to the effectiveness of the model.

The study served a twofold purpose: (1) the development of a management information systems model for area vocational centers in Michigan and (2) to demonstrate the model at the Calhoun Area Vocational Center.

Conclusions

Two questions were developed to provide direction to the study. In addition, the model as developed was implemented at the Calhoun Area Vocational Center. Based on the development of the study, several important conclusions were drawn:

1. An educational management information systems model was developed for area vocational education centers in Michigan.

2. The vocational management information systems model meets criteria for providing the provision of accountability in area vocational education centers in Michigan.

3. The vocational management information systems model was implemented at the Calhoun Area Vocational Center by demonstrating the collection of data per the model.

Recommendations

During a time when funds for vocational education are becoming more restricted, when vocational education is becoming increasingly more important as greater numbers of youth and adults seek to acquire job entry skills or retraining because of job obsolescence, and when individuals and groups are demanding that vocational education be more accountable, a management information system which provides the basis for a response to these concerns is essential. The results of this study indicate several implications and the following recommendations are offered:

1. It is suggested that further study be made in the re-refinement of a vocational education management information systems model.

2. The State Department of Education through the Vocational-Technical Education Service should give further consideration to providing in-service training for local vocational education administrators in the development of management systems.

3. A follow-up study of local vocational education administrators to determine the level of understanding and commitment to management information systems.

4. The Michigan Vocational-Technical Education Service should consider establishing program development as a priority and seek an increased emphasis for program quality.

5. Increased attention should be given to providing computer assistance as an important support mechanism to an educational management information system.

APPENDIX A

VOCATIONAL EDUCATION MANAGEMENT INFORMATION SYSTEM INTERNAL REPORTING FORM

APPENDIX A

VOCATIONAL EDUCATION MANAGEMENT INFORMATION SYSTEM

Internal Reporting Form

Name of Area Vocational Center Calhoun Area Vocational Center

Date of Data Collection June 15, 1976

(1) Program or Course Name	(2) O.E. Code	(3) Training Stations Available Per Session	(4) Enrollments Per Student Type			(5) Instructional Staff Costs	(6) Other Instructional Costs
			Reg.	Disad.	Hand.		
Accounting	14.0100	15	27	1	2	11,500	2,200
Data Processing	14.0200	25	43	8	1	21,800	3,400
Industrial Machines	17.2302	30	39	7	1	23,900	6,500
Health Occupations	07.0206	50	83	12	7	54,100	5,200
Secretarial	14.9800	50	100	7	3	56,432	11,748
Welding	17.2306	20	32	6	1	25,510	2,700

(7) Capital Outlay Costs	(8) Anticipated Reimbursement State/Federal	(9) Local Costs (5+6+7-8)	(10) Cumulative Local Costs	(11)-(12) Local Cost/Pupil / Program Cost/Pupil	(13) Pupil/ Teacher/ Teacher Assistant Ratio
800	6,912	7,588	7,588	253 / 457	15.0
24,500	29,025	20,675	28,263	398 / 485	8.6
5,500	33,000	2,900	31,163	62 / 647	11.8
300	16,728	42,872	74,035	420 / 581	14.5
6,600	18,348	56,432	130,467	513 / 620	11.0
1,800	19,494	10,516	140,983	270 / 723	9.8

APPENDIX B

VOCATIONAL EDUCATION MANAGEMENT INFORMATION SYSTEM PROGRAM/COURSE INFORMATION FORM 2

APPENDIX B

Vocational Education Management Information System

Program/Course Information Form 2

Name of Area Vocational Center Calhoun Area Vocational Center

Date of Data Collection June 15, 1976

Program/Course Name Health Occupations

O. E. Code 07.0206

1. Total amount of square footage in:

   Classroom combined facility

   Laboratory 3632

   Average total square footage per student per session 70

2. Is there a written amortization plan for this program? Yes X No ____.

3. Do special or modified facilities exist for the handicapped students? Yes X No ____.

4. To what extent will groups in the private sector be contributing to this instructional program this year?

   $ 350 in direct funding, or in the value of donated or loaned equipment.

   - square feet of classroom or laboratory space provided without charge to the school district.

5. Number 29 and percent of the total 28 of students placed in related jobs in which they were trained.

6. Number 15 and percent of the total 14 of students placed in advanced training in the area of related training.

7. What evidence (if any) about local labor market demand has been Obtained this year which supports the continuing need for this program?

   - a local area manpower survey conducted by: CAVC Placement Personnel
     source

   - manpower data from other sources:

     M.E.S.C.
     source

     _____
     source

8. Is there an occupational education advisory committee for this program? Yes X No ____.
   Has contact been made with each member at least twice during the past school year? Yes X No ____.

9. Are up-to-date program objectives available for this program? Yes X No ____.
   Do terminal objectives exist for the learners? Yes X No ____.
   Do all students have the opportunity to be involved in a simulated work experience? Yes X No ____. If no, what percentage have the opportunity? _____%.

10. Do you have a written individual learner commitment form completed for each student in the program? Yes X No ____.

11. Do the students have an opportunity to join a vocational student organization? Yes ____ No X. If yes, which one? _____

12. To what extent is data available regarding student termination in a program?

    - Written reasons by students for terminating a course Yes X No ___.

    - 3 % of students terminating the program but have marketable skills.

    - 86 % of students completing the program and have accomplished all the learner objectives.

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