AN INFORMATION SYSTEM AND ITS USERS: A DESCRIPTIVE STUDY

Thesis for the Degree of Ph. D.
MICHIGAN STATE UNIVERSITY
THOMAS W. MERCER
1971

LIBRARY
Michigan State
University

This is to certify that the

thesis entitled

An Information System and Its Users:
A Descriptive Study

presented by

Thomas W. Mercer

has been accepted towards fulfillment
of the requirements for

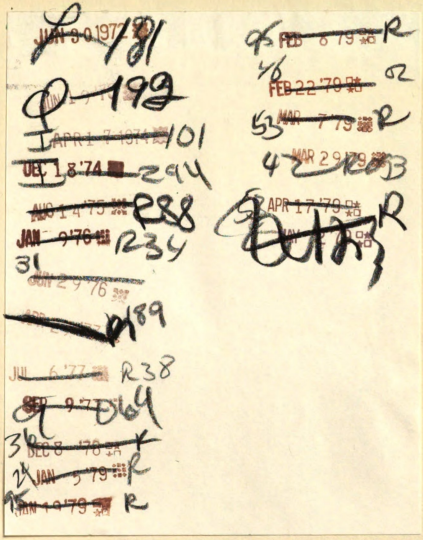
Ph.D. degree in Curriculum

Ted W. Ward

Major professor

Date August 11, 1971

O-7639



671627

ABSTRACT

AN INFORMATION SYSTEM AND ITS USERS: A DESCRIPTIVE STUDY

By

Thomas W. Mercer

Introduction

Knowledge about the world around us is accumulating at a phenomenal rate. This is true in the field of education as well as in all other areas of life. Technology is now available to provide educators with rapid and accurate knowledge about their field.

Purpose

This study is designed to describe the effects of the introduction of a new information retrieval system on decision-making. In addition, a description of the impact of a training manual on the utilization of the product of the new information service system.

Procedure

Ninety educators in Michigan Public Schools [illegible] made up the population. The instrument in the study was a (1) Directory of Descriptions (DD)--a computer-generated composite of the "Section I" responses for the 1968-69

ABSTRACT

AN INFORMATION SYSTEM AND ITS USERS:
A DESCRIPTIVE STUDY

By

Thomas W. Mercer

Introduction

Knowledge about the world around us is accumulating at a phenomenal rate. This is true in the field of education as well as in all other areas of life. Technology is now available to provide educators with rapid and accurate knowledge about their field.

Purpose

This study is designed to determine the effect of the introduction of a new information service product on decision-making. In addition, a determination of the impact of a training manual on the utilization of the product of the new information service system.

Procedure

Ninety educators in Michigan Public School Systems made up the population. The treatment in the study was a (1) Directory of Descriptions (DD)--a computer-generated composite of the "Section 3" proposals for the 1969-70

school year plus other educational developments and (2) Training Manual (TM)--an artifact which consists of (a) procedural steps to take to effectively use the DD, (b) a description of the DD content, and (c) suggestions on how the content of the DD can be helpful to the user in his curriculum leadership role.

The population was randomly split into three sub-populations and the three permutations of the treatment: (a) DD+TM, (b) DD only, and (c) base-line--no information were randomly assigned.

After a ninety-day exposure to the treatment, a structured telephone interview procedure was used to collect the data on the acceptance and use of the DD and TM.

Major Findings

An overall analysis of the data shows that the presence or intervention of the DD or DD+TM had no observable impact on the behavior of the population as a whole. Impact is operationally defined here as those changes of behavior hypothesized.

Some specific findings are:

1. Many of the building principals do not see themselves in the process of needing information about other school districts' programs.

2. The central office administrators were found to need information about other school districts' programs.

3. School districts represented by the population generally rely on within-district sources for information.

4. Printed materials was not mentioned as a source of information on school programs in Michigan.

5. The results were not productive in terms of the testing of hypotheses in the study.

Conclusion

This study accomplished the following:

1. Ascertained the reaction and response of a clientele to a new, previously untested information service system and,

2. Developed understandings and interpretations of the communication and information-gathering patterns of a, heretofore, unresearched group in the area of user studies.

Hypotheses and questions for further research are suggested, some of which are fundamental and should be answered before this study is replicated. Assumptions found to be faulty in this study are apt to be faulty

in other studies of this sort; therefore, subsequent research should more carefully examine assumptions of the nature used in this study.

AN INFORMATION SYSTEM AND ITS USERS:

A DESCRIPTIVE STUDY

By

Thomas W. Mercer

A THESIS

Submitted to
Michigan State University
in partial fulfillment of the requirements
for the degree of

DOCTOR OF PHILOSOPHY

Department of Secondary Education and
Curriculum

1971

ACKNOWLEDGMENTS

The writer wishes to sincerely thank Professor Ted W. Ward, chairman of his doctoral committee, for his interest in the study, his aid in identifying and delimiting the problem, his suggestions during the development of the training materials, and his assistance and consultation in the completion of the dissertation.

A special thanks to Louis Kocsis and Clarence Wills, administrators, State Department of Education, Compensatory Education Division, for their cooperation and advice in the compilation of public school program information.

The writer is appreciative to the other members of his committee, Professors Dale Alam, Norman Bell, and J. Ed Green, for their cooperation throughout the duration of the study.

The writer is also grateful to Joseph Coughlin, graduate assistant in the Learning Systems Institute, for his efforts in the compilation of abstracts and for his assistance in designing and preparing the information products used in the study.

In addition, the writer wishes to express thanks to the public school administrators, who constituted the population for this study, and whose cooperation was indispensable for the completion of the study.

Finally, sincere appreciation is extended to his wife, Janet, for her aid, cooperation, and encouragement, despite many trying circumstances.

TABLE OF CONTENTS

CHAPTER I

DEFINITION OF THE PROBLEM

Introduction

Knowledge about the world around us is accumulating at a phenomenal rate. This is true in the field of education as well as all other areas of life. Technology is now available for establishing dissemination services to provide educators with rapid and accurate knowledge about their field.

In order to fulfill its purpose, an information service system performs these operations:

1. Determines the information using habits of its users.
2. Procures units of information occurring in the environment that correspond to needs of the user population.
3. From these units extracts elements of information to be processed.
4. Processes these elements into a predetermined order or format.

5. Maintains cumulative storage of these elements.

6. Provides and distributes information services and products based on these elements to the user population according to their using habits.

In an analysis of the acceptability and effectiveness of an information service system, one of the main factors to be considered is frequency of usage. Even more than many communication models, an information service system is largely receiver-controlled communication in that the user determines utilization of the system and, consequently, its success. That is, the success of an information service system is contingent on the achievement of the system's objectives. One of the objectives is frequency and extent of utilization. Other principal success indicators, in terms of benefits to users are timeliness, degree of relevancy, usefulness (implied by information quality), and value of information (applications of information to decision-making).

Rationale

The assessment of success of an information service system, then, will benefit the design of others. More specifically, additional understandings (information) of user behavior in the educational arena will benefit further development, utilization, and evaluation of educational service systems.

Assumptions

The following assumptions constitute the basis of the rationale for the study:

1. Information about instructional ideas, strategies, and programs can be useful in curricular decision-making.

2. A computer-based information system provides a curriculum leader a selective yet extensive confrontation with educational development activities external to his immediate environment. The flexibility, selectivity, and accessibility of a computer-based storage-retrieval system provides an additional and effective basis for curricular decisions.

3. Easy access to such a system will attract curriculum leaders to use it.

4. The current situation in public schools is that each school system tends to operate as a pioneer in its curricular endeavors. Understandings are usually built to the exclusion of utilization of relevant outside information.

5. The curriculum leader is a change agent.

6. The curriculum leader in his role as potential change agent needs information.

7. The curriculum leader tends to have only a general cognizance of pertinent experiences of others who have dealt with the particular development problems in other places.

8. The building principal is a curriculum leader.

9. The Directory of Descriptions (DD) and the Training Manual (TM) will motivate the recipients to desire more specialized information about programs of interest through inter-population communications.

Research

Purpose of the Study

1. To determine the effect that the availability of an information service has upon Michigan public school curriculum leaders' decisions on "Section 3"* school proposals.

2. To determine the effect of the availability of a training procedure to the use of an information service.

Hypotheses to be Tested

1. The Directory of Descriptions (DD) will be perceived as valuable to the curriculum leader.

---

*"Section 3" refers to the Michigan School Aid Act, Section 3.

2. The availability of the DD will increase the number of planned changes in the next "Section 3" proposal.

3. The DD will be a medium of interpopulation communication concerning "Section 3" programs.

4. The presence of the DD will increase the number of interpopulation communications concerning "Section 3" programs.

5. The Training Manual (TM) will be perceived as valuable in using the DD.

6. The TM will increase the number of persons who perceive the DD as valuable.

7. The TM will increase the number of planned changes in the next "Section 3" proposal.

8. The availability of the DD and TM together will increase the number of interpopulation communications concerning "Section 3" programs.

Theory Related to the Study

There is a lot less information on users of information systems in education than one would like, but there are two bodies of literature which are useful. First, there is the literature on diffusion of innovations, which is concerned with adoption of new practices and inventions; second, there is the literature on information science.

Rogers describes the process of adopting innovations as a special kind of decision-making.[1] He says that when a person makes a rational decision to adopt something new or different, he goes through a number of stages. One rarely finds any of these stages skipped if a decision to change is made. The initial stage is awareness that some alternative to current practice exists. Next, a motivated person will try to get more specialized information. Having had his interest answered with more information, he then engages in an evaluation of whether this new idea relates to him, whether it promises higher rewards than his current practice, the problem he lives with, and so forth. If the product of his evaluation effort is favorable, he will, undoubtedly, go through a time period in which he tests out the innovation on a limited scale to see whether the innovation does indeed work for him. This trial period also allows time to adapt the innovation to the local setting. Finally if the trial is successful, the rational innovator will accept and perhaps expand the innovation on a continuing basis until it is replaced by something better.

This adoption process, particularly and primarily, relates to the study. As a person progresses through the adoption process, he uses different information sources

[1] Everett M. Rogers, Diffusion of Innovations (New York: The Free Press of Glencoe, 1962).

at each stage. Awareness comes from mass-media--from technical reports or abstracts perhaps, and from the kinds of testimonials about new practices that characterize much writing about education in newspapers and magazines. If sufficiently motivated, the potential adopter is now not satisfied with the kind of superficial information found in such testimonials. He wants materials which interpret what the innovation is about in some detail and the situations in which it has been tried. A personal two-way communication with an earlier adopter is most likely to provide the most relevant response to his interest.

When the adopter gets to the evaluation stage, he relies heavily on interpersonal communication; he will go to the people who have tried it, who have lived with the problem. As Rogers puts it, during the pre-trial evaluation adopters are more likely to believe people than documents. The result is that in medical, agricultural, and particularly educational settings, there is a heavy reliance on interpersonal communication during the pre-trial evaluation stage. During the trial and adoption stages, we find ever-increasing emphasis on interpersonal contacts and communication.

Relating this adoption process to the study, awareness is provided by the DD, sufficient motivation to investigate further is stimulated by the TM, and

valuation and program changes (adoption) through inter-population communication is expected to follow.

Information scientists provide evidence on how science-oriented practitioners and scientists themselves seek out information. Menzel[1] identifies a variety of different approaches to decision-making, or to information gathering, by both scientists and technologists. This is similar to what was said earlier about how educators seek out information. The first pattern is what Menzel calls the current approach, in which the information seeker attempts to stay up to date in a field in which he is already competent. The information systems' developments, techniques, and products which are responsive to this current approach are called current awareness searches such as SDI (selective dissemination of information). Second, Menzel describes what he calls the everyday approach. An example is the physics teacher who does not clutter up his mind trying to remember chemical or physical properties of materials under certain conditions of temperature and pressure, but uses a handbook for this. Another example is the school principal who draws on many sources of information--the school counselor, anecdotal records, cumulative academic records, and teachers when making a decision about how to

---

[1]Herbert Menzel, "Types of Information Seeking," Library Quarterly, XXXIV (1964).

deal with a "problem" child. Again, this process requires a different kind of information from simply the current awareness where you are trying to tap everything coming out as it comes out. Third, there is what Menzel calls the exhaustive approach. Here again, a person is competent in a given area, before starting some new and presumably major project, attempts to find out everything he can that relates to this particular problem in his field. An example in the field of education, is somebody writing a proposal for special Federal or State project funding. The fourth approach is what he calls the brush-up approach. This is where the individual attempts to collect information in an area where he is not highly knowledgeable. If, for example, a school attorney is reviewing a legal contract that involves educational jargon, he must learn very quickly and very efficiently about that particular phase of education in that school district. Again, the inference is that the brush-up approach leads to a need for different kinds of information and information products than those required for other purposes. Finally, Menzel describes the browsing approach in which, on a more or less random basis, one skims through catalogues or indexes or journals, or other sources outside one's predetermined field of interest.

Studies of users of information systems have repeatedly shown that the first information source used and the most frequently used information source is the one which is closest at hand to the user; even when the user does not think it is very good. Also, interpersonal communication permits incorporation of the message with the user's prior knowledge and needs in a way that simply scanning documents does not. And finally, there is a phenomenon that some people call user apathy. Paisley[1] calls it "user nonchalance" meaning that most people simply are not going to try to use information sources unless they are readily accessible.

The degree to which Menzel's "exhaustive approach" is operating within the population described in Chapter III was analyzed. Interpersonal communication and Paisley's "user nonchalance" are also examined. This is one of the ways in which the study is expected to contribute to the building of theory, inasmuch as the theories of Menzel and Paisley are being applied; the theories are being tested for their adequacy in explaining the behavior of the test population.

---

[1]William J. Paisley, "Information Needs and Uses," in Annual Review of Information Science and Technology, ed. by Carlos Cuadra, III (Chicago: Encyclopaedia Britannica, 1968), 1-30.

Definitions of Terms and Artifacts

Section 3.--The Michigan School Aid Act, Section 3;

Information Units.--Journal articles, technical reports, preprints, drafts, and limited distribution papers;

Information Elements.--Abstracts (documents or summaries of documents), and descriptions (classification of documents including key terms);

MERA/EDIC.--An acronym for the Educational Developments Information Center sponsored by the Metropolitan Education Research Association and the Michigan State University Learning Systems Institute;

Directory of Descriptions.--The computer generated composite of the "Section 3" proposals for the 1969-70 school year plus other educational developments;

Training Manual.--Consists of three sections, (a) procedural steps to take to effectively use a MERA/EDIC Directory of Descriptions, (b) a description of the DD content, and (c) suggestions on how the content of the DD can be helpful to the user in his curriculum leadership role.

Organization of the Study

Chapter I presented an introduction to the study: the rationale and purpose for the study, assumptions within which the study was carried out, the hypotheses, related theory, and definitions of terms and acronyms.

Chapter II reviews the literature on information science and systems. A neophyte in this highly technical, relatively new area, especially in the educational environment, will find this chapter crucial to the understanding of the study, the conceptual framework within which it was carried out, and very importantly, the relevance of the contribution it makes to this body of knowledge appropriately called Information Science and Systems. Nine sections constitute this chapter, starting with a basic discourse on decision-making and the information problem, proceeding into rudimentary information system components and user study categories, and finally arriving at information centers in education. Chapter II is written in such a way that an educational practitioner can gain an overview of information systems regardless of the lack of previous background in this literature.

The writer found two studies which were related to the investigative procedure of this study; these two are reviewed in the section Studies of Users, category seven.

Chapter III describes the population, the information deprivation schedule, the testable hypotheses, nature of the interview follow-up process, and the design and analysis of the data/information collected. It concludes with the procedure which pulls all of the elements into a logical sequence of events.

Chapter IV presents the analyses, statistically and descriptively, of the treatment. The treatment was the DD and TM. The population was randomly split into three subpopulations and the three permutations of the treatment: (a) DD+TM, (b) DD only, and (c) baseline--no information, were randomly assigned.

Chapter V reviews the assumptions of the study in retrospect, suggests hypotheses and questions for further research, and concludes with a statement on the value of the study to the field of research on information service systems and users.

CHAPTER II

REVIEW OF LITERATURE AND RESEARCH

Information is a composite of facts so organized (or datum so utilized) as to be knowledge or intelligence.[1] It is meaningful data. It is a basic ingredient of decision-making. Decision-making behavior may be thought of as a succession of individual choices. Given that it is accurate and is interpreted accurately, information strengthens rational choice decisions.[2]

Decision-Making and the Information Problem

Every administrative decision is predicted on a belief in the existence of a causal relationship between some educational objective and a particular means selected to achieve that objective.[3] Decisions of high quality

---

[1]P. E. Rosove, Developing Computer Based Information Systems (New York: Wiley, 1967), p. 3.

[2]Vincent E. Cangelosi, D. M. Robinson, and L. L. Schkade, "Information and Rational Choice," The Journal of Communication, XVIII (June, 1968), 131-43.

[3]Robert J. Panos and Alexander W. Astin, "On Using Systematic Information in Making Educational Decisions," Education Record, XXXXVIII (Spring, 1967), 172-78.

require a careful evaluation of possible consequences, awareness of a school's research and personnel, and insight into the availability of appropriate action leading to a favorable response.[1] In short, the decision-maker believes that of all means available, the one selected is most likely to result in the desired outcome. Decisions are always made on the basis of incomplete information. The extent to which it is possible to anticipate the consequence of alternative decisions, however, is a function of the availability of relevant information. Information-gathering activities, if relevant to the decision-making process, are important because they help to extend the knowledge available for future decisions.

The fields of business, science, technology, government, and education are all concerned with the growing complexity of interrelationships of information. In education, new curriculums, evaluation methods, instructional aids, and other innovations are being developed and applied in classrooms and laboratories across the country. It is increasingly recognized that soundly based decision-making processes are dependent upon the analysis of information from numerous sources and diverse fields. The need is obvious--to provide the

---

[1] L. T. Bishop, et al., "Supervisor and Curriculum Director at Work; Bases for Priorities and the Improvement of Decision-Making," ASCD YEARBOOK (1965), 127-30.

decision-maker with more information. Yet, as the amount of relevant information increases, the processes of obtaining, examining, and selecting information required for decisions becomes very difficult. In addition, more information is available than there is time to read, much less digest, understand, and retain.[1,2] The information problem is best characterized as a problem of abundance.[3] This urgency demands special techniques for handling information and the increased usage of machine support.

Information Systems

Man communicates not only by means of gestures and sounds, but also by means of intelligible information in such forms as handwriting, printing, photographs, drawings, sound recordings, and instrument traces. These clusters of information can be collectively called records. Information systems exist for the purpose of furnishing these records which contain the record of knowledge, that is, the information itself. An information system can be

---

[1]William F. Williams, Principles of Automated Information Retrieval (Elmhurst, Illinois: Business Press, 1965), p. 5.

[2]Philip K. Piele and Terry L. Eidell, "How to Plug into School Information Systems," Nation's Schools, LXXXIV, No. 4 (October, 1969), 68-69.

[3]"The National Information Problem," SDC Magazine, IX (February, 1966).

described as the means of collecting, analyzing, storing, retrieving, and disseminating records of knowledge, defined as information.[1]

It is essential to differentiate between an information system and the particular technology which is utilized as one feature of the system. A system is an integration of men, materials, and equipment.[2] It is more than an automatic data-processing system. Rosove suggests that an information system is the formal or rationally planned means whereby people record and transmit information.[3] In this sense, an information system may include automatic data-processing as one aspect of the information-handling apparatus, but it may also include oral or written expression. For this presentation, the concept of information system is delimited to one which involves recorded information and is concerned with information storage and retrieval.[4] A system involving both human and machine elements in its organization.

---

[1]Paul W. Howerton, ed., Information Handling: First Principles, Spartan Books (Washington, D.C.: Information for Industry, Inc., 1963), p. 61.

[2]George Schecter, ed., Information Retrieval: A Critical View, Based on the Third Annual Colloquium on Information Retrieval, May 12-13, 1966, Philadelphia, Penn. (Washington, D.C.: Thompson Book Co., 1967), p. 4.

[3]Rosove, Computer Based Systems, p. 4.

[4]In a sociological sense, retrieval attempts to predict the needs of one group of people for the products

The various literary products tend to use information system, information storage and retrieval system, document retrieval system, and machine literature searching system as synonymous for the information process under discussion. In fact, the entire field of ISAR (Information Storage and Retrieval) seems to be voluminous and complex until one realizes the repetition and redundancy occurring from one source to another.

Vickery[1] outlined the elements which make up an ISAR system. A diagram of these elements was produced by Wilson and Stephenson[2] and by Hayes and Becker.[3,4] The following diagram is a simplified version of the one by Hayes and Becker:

---

of another group. Robert A. Fairthorne, Towards Information Retrieval (London: Butterworths, 1961), p. 13. The products are various types of recorded information which may have different meaning to different users.

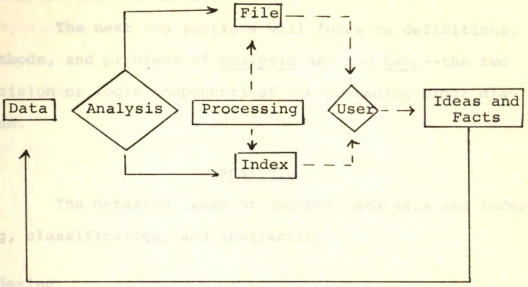
[1]Brian C. Vickery, On Retrieval System Theory (Washington, D.C.: Butterworths, 1965).

[2]Thomas D. Wilson and James Stephenson, Dissemination of Information (New York: Philosophical Library, 1965), p. 58.

[3]Harold Borko, "The Storage and Retrieval of Educational Information," J. Teacher Education, XV (December, 1964), 450.

[4]Joseph Becker and Robert M. Hayes, Information Storage and Retrieval: Tools, Elements, Theories (New York: Wiley, 1963), p. 70.

A General Information System



Recorded data are received and analyzed for indexing, abstracting, classification, and perhaps foreign language translation. Several paths of physical organization are possible--filing the documents (File) or using other modes of referencing (Index). Salton[1] and Becker and Hayes[2] offer discussions of possible modes. The user interacts with the index and/or the file for relevant information. Ideas and Facts complete the cycle and enable recycling. That is, what "fresh" material enters the system is very often dependent on the writers (users)

---

[1]Gerald Salton, Automatic Information Organization and Retrieval (New York: McGraw-Hill, 1968), Chapter nine.

[2]Becker and Hayes, Information Storage and Retrieval, Chapter seven.

having retrieved and assimilated the information and generated new documents.[1]

The next two sections will focus on definitions, methods, and problems of analysis and the user--the two decision or logic components of the preceding block diagram.

Analysis

The detailed tasks of document analysis are indexing, classification, and abstracting.

Indexing

One of the most important operations in an information system is indexing. The word "index" refers to indicating, pointing out, guiding, denoting, or some listing that allows for referencing.

Indexing, as it pertains to information systems, consists of establishing some bridge between documents which are stored in the information file, and a means of finding those documents which are desired without reading the sources, abstracts, and/or extracts of every article contained in the file. There are two main types of

---

[1]For an elucidation of each of the unit operations see Allen Kent, Textbook on Mechanized Information Retrieval (New York: Wiley, 1962), Chapter eight; Allen Kent, Information Retrieval in Action (Cleveland, Ohio: Press of Western Reserve University, 1963), Chapter eight; Allen Kent and John Canter, Specialized Information Centers (Washington, D.C.: Spartan Books, 1965), pp. 25-29.

indexing: word and controlled. Kent[1,2] provides a thorough discussion of each. Word indexing is usually performed by a non-technical person. The method consists of selecting "keywords" from source documents which appear to be important. "KWIC"[3,4,5,6], "KWOC"[7], and "UNITERM"[8,9,10,11] are examples. The inadequacy of these approaches lies in the fact that the indexer is free to select or ignore words

---

[1]Kent and Canter, Information Centers, pp. 85-90.

[2]Kent, Mechanized Retrieval, p. 105.

[3]Howerton, Information Handling, p. 102.

[4]Salton, Organization and Retrieval, p. 86-88.

[5]Benjamin F. Cheydleur, ed., Colloquium on Technical Preconditions for Retrieval Center Operations (Washington, D.C.: Spartan Books, 1965), p. 66.

[6]H. P. Luhn, (KWIC Index) Keyword-in-Context Index for Technical Literature (Yorktown Heights, New York: IBM Corporation, Advanced Systems Development Division, 1959).

[7]Kenneth Janda, Information Retrieval: Applications to Political Science (New York: The Bobbs-Merrill Co., 1968), p. 47.

[8]Williams, Automated Retrieval, p. 125-26.

[9]Becker and Hayes, Tools, Elements, Theories, pp. 46-48.

[10]M. Taube, et al., "The Uniterm Coordinate Indexing of Reports," in The Technical Report, ed. by B. H. Weil (New York: Reinhold Publishing Corporation, 1954), p. 319.

[11]F. W. Lancaster, Information Retrieval Systems: Characteristics, Testing, and Evaluation (New York: Wiley, 1968), p. 32.

and/or concepts which he feels are not relevant to the document. Thus, duplication of terminology and lack of consistency of approach often result. The user must provide the missing links between the source document, the selection of words and terms by the analyst, and the manner in which the user views the information which he wishes to retrieve.

An approach which attempts to resolve this problem is called controlled indexing. This method implies a selection of input into the indices in order to prevent, as far as possible, the scattering of related topics under unrelated headings.[1] One of the main reasons to use controlled indexing is to maximize the recall factor, which is the percentage of relevant documents in the file that are actually retrieved. A very thorough treatment of indexing theory, the problems of terminology, and the growth of specialized vocabularies is given by Jonker.[2]

Classification

Classification is the process of arranging information into similar categories by comparing similar and dissimilar attributes. The object of classification is economy and increase in efficiency in the use of documents.

---

[1]Kent, Mechanized Retrieval, p. 90.

[2]Frederick Jonker, Indexing Theory, Indexing Methods, and Search Devices (New York: The Scarecrow Press, 1964).

A "universal or logical" classification of things does not exist.[1]

The analyst, as he scans the document, will select the topic that he feels is most nearly representative of the entire body of information. This is often called a pigeonhole or rigid classification. The alternative, diametrically opposite, method in use is called multi-dimensional. Each document appears under as many class headings as there are bodies of information contained in the source document. The main problem is that the classification decisions made by the analyst are difficult to communicate to the retriever (user).

Abstracting

Abstracting, as it relates to an information system, is primarily a summary of a publication accompanied by a bibliographical description to enable the publication to be traced. It is possible to identify three types of abstracts from library and document literature: (1) conventional, (2) extracts, and (3) telegraphic.

A conventional abstract may be distinguished as descriptive--a general statement of the nature and scope of a document, or informative--a concise but comprehensive summary of the significant contributions to the fund of knowledge contained in the document. The function of a

---

[1]Kent, Mechanized Retrieval, p. 98.

descriptive abstract is to alert possible readers to the article and provide sufficient information so that he can decide whether to retrieve the original article. The function of an informative abstract is to present a brief but complete coverage of the article, especially noting all high points.

The function of abstracting in information systems is rather poorly defined, both in method and result. There are divergent opinions on the benefits of descriptive and informative abstracts, and as to which method should be used with each type of information.[1]

One real problem is that the analyst may interject his personality too deeply into the abstract procedure, and thus remove the intent of the author's thoughts one additional step from that of the receiver (user).

Extracting is a process of selecting sentences, phrases, words, and/or paragraphs from the original document. These selections should embody the basic theme. This method reduces personal interpretation but there still is the subjective decision of what fragments are significant and the difficulty of reading items out of context. Extracts are convenient forms to produce by machine. Frequency and distribution of key words in the textual material are used as the basis for determining the relative significance of each sentence in the document.

---

[1]Kent and Canter, Information Centers, p. 97.

This method is often called "auto-abstracting." The problem here is that there is no idea of how much meaning that was implied in the original document will survive the transfer to the auto-abstract. The procedure can be practical if a sufficient part of the meaning is retained in enough cases.

A telegraphic abstract is a detailed index to a record. It is composed of (1) significant words selected from the document, (2) code symbols called roll indicators which supply a context for the chosen words, and (3) punctuation symbols which separate and group words and role indicators into units not unlike the traditional role of conventional punctuation. This method is used in connection with machine information retrieval systems. The abstract provides input to the machine in a consistent and predictable form so that the machine can be programmed to search for certain predictable forms of information within this input. The main problem with this method is that thoroughly trained analysts must do the abstracting.

User

Retrieval obtains responses from storage based on predetermined criteria. Indexing and retrieval are input and output responses respectively. Storage is the transfer function. Information retrieval means two things. One, document retrieval, the finding of documents having certain indexed descriptors and two, content retrieval or "fact

retrieval" which is used with a document-free system. This type of system contains integrated knowledge to which the user may address questions. A unified treatment of the two types is given by Licklider.[1]

Two major retrieval problems are envisioned in the literature. The first is devising a searching strategy appropriate to the organization of the file. Vickery points out that retrieval is not simply a matching process of question codes against descriptor codes but must include more inclusive terms, included terms, and related terms.[2] The other problem is decay of categories and indices.[3] Retrieval assumes that all information in the system is consistent and true and has no gaps. In reality, beliefs are constantly changing; "knowledge" in the system has to be frequently readjusted or rearranged.

Dissemination is distribution of information for use. The major objective of an information system is to bring relevant data in usable form to the right user at the right time so that the data can be of help in decision-making and problem-solving procedures.

---

[1] J. C. R. Licklider, Libraries of the Future (Cambridge, Mass.: MIT Press, 1965).

[2] Vickery, Retrieval System Theory, p. 40.

[3] Schecter, Retrieval: A Critical View, p. 194.

The means of dissemination can be divided into two groups: (1) those directed toward all users (present and potential)--abstract lists, accession lists, and (2) those directed toward groups of users or individuals. SDI (Selective Dissemination of Information) is a common practice. Veal and Clague provide a comprehensive discussion of SDI.[1] SDI was first proposed by Luhn.[2]

Mechanization of Information Systems

In the preceding paragraphs a number of information analysis and dissemination methods were described. Many of these analysis, search, and retrieval procedures are being incorporated into fully automatic text processing and retrieval systems. SMART is a good example.[3] Vickery has broken down the unit operations of an information system and discussed the requirements for its complete mechanization.[4] The main reason for developing

---

[1]D. C. Veal, "An Experiment in the Selective Dissemination of Chemical Information," and P. Clague, "The Selective Dissemination of Information in Electronics," in Computer-Based Information Retrieval Systems, ed. by Bernard Houghton (Hamden, Conn.: Archon Books, 1969).

[2]H. P. Luhn, "Selective Dissemination of New Scientific Information With the Aid of Electronic Processing Equipment" (Yorktown Heights, N.Y.: IBM Advanced Systems Development Division, 1959).

[3]Salton, Organization and Retrieval, Appendix A.

[4]Vickery, Retrieval System Theory.

totally mechanized systems is two-fold: (1) the amount of documentary information produced is increasing exponentially each year and (2) manpower available to store and select from this growing mass of information is limited.

Studies of Users

Studies of users are relevant to the determination of information needs by yielding data on communication gathering behavior together with data on the aims, success, and effect of that behavior and on the utilization of the information yielded.

Forms of Studies of Users

Studies of users tend to fall into one of seven categories as indicated:[1]

1. Preference and Evaluation Studies.--These studies attempt to obtain preferences, evaluations, and facilities that do not refer to specific information-receiving events. This type of study can be an aid in planning a new information center. Respondents react to subject matter, information channels, and service possibilities.

---

[1]Herbert Menzel, "Information Needs and Uses," in Annual Review of Information Science and Technology, ed. by Carlos A. Cuadra, American Society for Information Science (Chicago: Encyclopaedia Britannica, Inc., 1966), pp. 41-69.

2. Demand Studies.--Requests for information or documents that were actually made by persons in the course of their activities, form the data for this type of study. Data may be in the form of written orders or requests, and telephone calls. The researcher typically classifies the requests and orders for analysis.

3. Channel Studies.--This type of study concentrates intensively on one communication channel, using a multitude of methods to investigate usage.

4. Critical Incident Studies.--These studies seek to sample information-receiving episodes from a selected group's experiences, and to associate with each episode detailed descriptions of how it came about, the communication function it served, the person's satisfaction with the information obtained, or other matters.

5. Dissemination Studies.--An attempt is made in these studies to look at the communication process from the point of view of the author of documents as a disseminator of information (rather than as a receiver). Authors are queried concerning feedback they receive from speaking engagements at conventions and the possible effects of the feedback on their subsequent work and dissemination efforts. Some of the questions to be answered are: What are the dissemination channels that you use? In what forms are the documents conveyed--orally, preprints,

articles? What kinds of feedback were experienced? What action or change in behavior did you take as a result of the feedback?

6. User Feedback Studies.--These studies are used with quality control aspects of SDI systems. Here members of the system audience are sent notification presumed to be pertinent to their activities and interests, and are asked to indicate which of the items sent were actually of use to them.

7. Diaries and User Records.--The researcher asks the cooperation of a designated group of users to follow a record-keeping procedure of their information activities. The participants set aside documents selected via consultation of an index. A telephone call or personal contract is used to query each participant in order to ascertain how the index was used to track down each document.

Paisley points out the complexity of the user's environment and consequent difficulty in studying his information-processing behavior.[1] He suggests that an investigation of user behavior should focus on the various systems affecting him. These systems, by controlling and

---

[1]William J. Paisley, "Information Needs and Uses," in Annual Review of Information Science and Technology, ed. by Carlos A. Cuadra, American Society for Information Science (Chicago: Encyclopaedia Britannica, 1968).

filtering processes, determine the availability of information. Paisley views each user within a set of concentric circles (systems). These systems are culture, politics, professional membership, reference group, invisible college, (friends with mutual interests), formal organization, work team, "his own self," legal/economic, and formal information-retrieval.

Related Studies

Two studies relate to the methodological problem of the research plan presented in Chapter III. Both studies fall into the Diaries and User Records category (seven, above). Jahoda, Hutchins, and Miller[1] as well as Werner[2] attempted to investigate the use of personal indexes--to investigate information-related activities. Jahoda's information users were twelve science and engineering researchers and Werner's sample was constituted by four medical researchers. Both used dictation via telephone to record information-related activities instead of log-keeping.

---

[1]G. Jahoda, Ronald D. Hutchins, and D. M. Miller, "Analysis of Case Histories of Personal Index Use," in Progress in Information and Technology, ed. by Donald V. Black, Proceedings of the American Documentation Institute, 1966 Annual Meeting, October 3-7, 1966, Santa Monica, California (Woodland Hills, Calif.: Adrianne Press), pp. 245-54.

[2]David J. Werner, "A Study of the Information-Seeking Behavior of Medical Researchers" (unpublished Masters Thesis, Dept. of Industrial Engineering and Management Sciences, Northwestern University, Evanston, Illinois, December, 1965), p. 102.

The dictation via telephone by both Jahoda and Werner was determined as a failure because of poor response. The subjects were either unable or unwilling to dictate records. It was reported to be "bothersome" and "time-consuming."

Jahoda, to stimulate cooperation, substituted a procedure in which the participants set aside documents selected via consultation of their personal indexes. Jahoda's assistants then telephoned the participants weekly to find out whether they had used their personal index. In addition, they visited each participant in an attempt to reconstruct how his index was used to track down a document.

Jahoda points out that this technique relies heavily on participants' memories and produces no records of null searches. Another shortcoming indicated is the lack of representativeness of use patterns that it produces.

Werner augmented the telephone-recording technique by distributing information activity cards which amounted to a check list of search types. Any search that could not be described on a card was to be reported by telephone dictation. It is not clear to what extent this complementary technique was actually followed.

User studies in the diary category generally demonstrate that the very act of examining an individual's

information-gathering patterns, with his knowledge, has the effect of altering them.

Information Center Activities

There are about twelve thousand special libraries and information centers in the United States and Canada.[1] The following list illustrates their activities; the degree of each activity will, of course, vary from one center to another:

1. Acquisition
2. Storage
3. Reference Searchings
4. Retrieval
5. Hard-copy Dissemination
6. Micro-copy Dissemination
7. Preparation and Dissemination of Abstracts
8. Preparation and Dissemination of Indexes
9. Accessation Lists
10. Preparation of Bibliographies
11. Technical Question Answering Service
12. Preparation and Dissemination of Analytical Studies
13. Referral Service

Information Centers in Education

Although a few leaders have been aware of the duplication of effort going throughout the country in education and have foreseen the problem of exchanging information, we still find many people struggling to "rediscover the wheel."[2] Much of the development in education (school)

---

[1]Anthony T. Kruzas, Directory of Special Libraries and Information Centers (2nd ed.; Detroit, Mich.: Gale Research Co., The Book Tower, 1968).

[2]Don D. Bushnell and Dwight W. Allen, eds., The Computer in American Education (New York: Wiley, 1967).

systems has been accomplished in isolated centers by individuals or small groups. These individuals proceed with their immediate problems without documenting their findings. As a result very little of the information is disseminated to those who need it. Hughes (Director of the Division of Compensatory Education, Title I, ESEA) supports these comments in School Management.[1] "What we are asking for is really something new and untried," Hughes says. "We are asking state and local people to put aside a portion of Title I funds strictly for information dissemination. . . . We are most eager that dissemination be a continuous program, conducted by people who can give their full time and attention to it." Polley (former State Superintendent of Public Instruction in Michigan) has said "progress in education, as in virtually every other field, often is delayed simply because we too seldom know about the achievements of others. If an administrator or teacher only had brief information about a program being conducted in another part of the state (or country), he often would be able to save invaluable time and effort in revising a program which he might be planning."[2]

---

[1]John F. Hughes, "Spreading the Word About Successful Projects," School Management, XI (May, 1967), 25.

[2]Ira Polley, PACE In Michigan, ESEA Title III Programs (Wayne, Michigan: Statewide Dissemination Service, November, 1968).

One of the few information networks actively operating in the field of education is the Educational Research Information Center (ERIC). ERIC was created in May, 1964, to "facilitate and coordinate information storage and retrieval efforts in all areas of educational research.[1] To insure widespread distribution of educational research results, $1.7 million was allocated for the creation of this national network of clearing-houses, or document centers.[2,3] ERIC acquires, abstracts, indexes, stores, retrieves, and disseminates the most significant research documents. Subject specialists at the clearing houses screen the documents for quality and usefulness.[4] Those documents selected are summarized, then indexed using ERIC's thesaurus terms, and copied on microfiche. The microfiche is stored at ERIC Central in Washington, D.C.

---

[1]Lee G. Burchinal and Harold Haswell, "The Story of ERIC," Education Digest, XXXII (September, 1966), 44-47.

[2]Office of Education, "ERIC, Educational Research Information Center--A National Information System Dedicated to the Progress of Education Through the Dissemination of Educational Research Results and Research Related Materials," Brochure (Washington, D.C.: Government Printing Office, 1966), 6p.

[3]H. Marron and L. G. Burchinal, "ERIC--A Novel Concept in Information Management," in Proceedings of the 30th Annual Meeting of the American Documentation Institute (New York: Thompson Book Co., 1967), pp. 268-72.

[4]Kruzas, Special Libraries and Information Centers, Appendix twelve.

and upon request, retrieved and replicated on hard copy or microfiche. ERIC Central also publishes indexes and annals of new acquisitions. In regards to the future of ERIC, Burchinal and Haswell state, "we believe the day is not far distant when the ERIC network will link universities, professional organizations, school systems, boards of education--the entire education community--to speed all research results to places where they are needed and when they are needed."[1]

Smith and Dickson note that the U.S. Office of Education has installed an on-line, remote inquiry system that allows the personnel of a number of federal, state, and local agencies throughout the United States to communicate directly with the central computer, located in Washington.[2] The data cover surveys, applications of congressional acts, socio-economic school data, and abstracts and some educational research projects. New

---

[1]Lee G. Burchinal and Harold A. Haswell, "How to Put 2 1/2 Tons of Research Into One Handy Little Box," American Education, II (February, 1966), 23-25.

[2]Jack W. Smith and William C. Dickson, "An On-line Nationwide Remote Inquiry System for the Dissemination of Educational Data," AEDS Journal (September, 1967), 5-14.

York State,[1] Oregon,[2] and Wisconsin[3] have similar state plans. California has a regionally oriented plan in which information is stored on drop-outs, education buildings, attendance, and other administrative matters.[4] "RISE" (Research and Information Services for Education), is a research-oriented information center in Montgomery County, Pa.[5]

Educational Products Information Exchange (EPIE), an independent nonprofit organization created in 1967, is the first major effort for the exchange of information on educational products.[6] The National Science Foundation operates a referral center (NRC). It directs people who seek information to organizations or individuals with specialized knowledge of that subject. Phi Delta Kappa

---

[1]"An Overview of Educational Data Processing in New York State," AEDS Monitor, VI (September, 1967), 6-7.

[2]Lowry M. Bennett, "Oregon Begins Implementation of Project OTIS--An Advanced, State-wide, School Information System," AEDS Monitor, VI (November, 1967), 3-5.

[3]William G. Katzenmeyer, "The Wisconsin Information System," AEDS Monitor, V (March, 1967), 3-5.

[4]Alvin Grossman, "The California Education Information System," Datamation, XIII (March, 1967), 3-7.

[5]"A One-Stop Information Center," American Education, IV (July, 1968), 26.

[6]Piele and Eidell, "How to Plug Into School System."

began SRIS (School Research Information Service) in 1967. The purpose of the service is to communicate educational information gained through research and innovative practices. EDUNET is a proposed information network at the university level, an outgrowth of the organization of EDUCOM in July, 1966.[1] The last chapter of the book EDUNET is an open proposal to develop, in three phases, a countrywide information network for educational use.

Summary

This chapter presented an overview of the components of information systems in general preceded by a rationale for their existence--the information problem. Studies of users of information system products were discussed via categorization. Two studies by Jahoda[2] and Werner[3] were delineated in terms of their methodology. The writer appropriately points out here that this study differs from Jahoda's and Werner's in the following ways:

1. The participants were practitioners in education, not researchers.

---

[1]George W. Brown, James G. Miller, and Thomas A. Keenan, eds., EDUNET, Report of the Summer Study on Information Networks (New York: Wiley, 1967).

[2]Jahoda and Others, "Case Histories of Index Use."

[3]Werner, "Study of Behavior of Medical Researchers."

2. The participants were only questioned once, after at least a ninety-day exposure period to the DD and TM; that is, the participants were not "prodded on to act or change" by weekly telephone calls.

3. The participants were not asked to record information-gathering activities but their responses were based entirely on recall, a possible weakness of this study. It was decided to sacrifice accuracy of recall in favor of a lengthy exposure time.

The chapter concludes with a "state of the art" discourse on information centers in education.

Chapter III will map out in detail the design of the study, population characteristics, statistical choice for treatment of the data, development of artifacts, and nature of the structured telephone follow-up interview for each investigative level.

CHAPTER III

METHOD OF RESEARCH

This study is designed to determine the effect of the introduction of a new information service product on decision-making. In addition, a determination of the impact of a training manual on the utilization of the product of the new information system.

Description of the Population

Ninety educators in Michigan Public School Systems made up the population. Part of the population consisted of principals of elementary school buildings in which "Section 3" programs were operative. The other portion were primarily federal and state project coordinators who were responsible for writing and submitting "Section 3" proposals to the State Department of Education.

Design

The treatment in the study was the DD and TM. The population was randomly split into three subpopulations

and the three permutations of the treatment: (a) DD+TM, (b) DD only, and (c) base-line--no information, were randomly assigned.

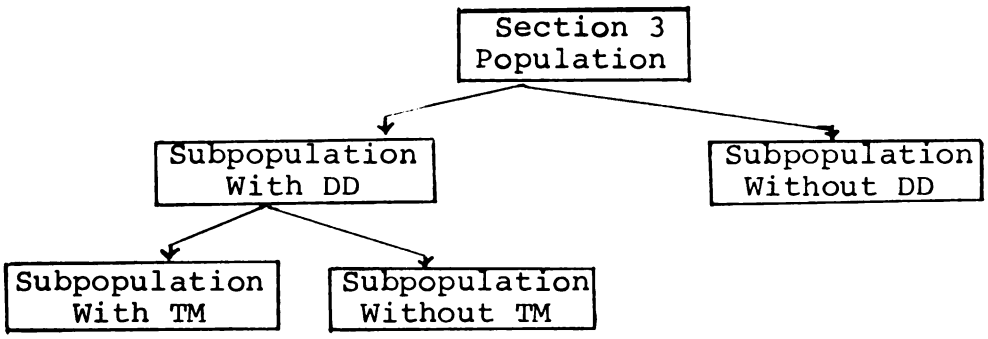
The results of this randomization process are tabulated by school district as follows:

DISTRIBUTION SCHEDULE

School District	DD+TM	DD	No Information
Baldwin	2		
Battle Creek	1	2	
Beecher		1	
Benton Harbor	1	1	1
Detroit	4	4	6
Ecorse	2		1
Ferndale	1	1	1
Flint	4	3	3
Grand Rapids	3	3	4
Inkster	2		1
Kalamazoo			2
Lansing	1	1	1
Muskegon	1		1
Muskegon Hts.		2	
Oak Park		1	
Pontiac	1	2	
Port Huron		1	1
River Rouge	2	1	
Romulus	1		1
Saginaw	4	3	3
Westwood		2	
Ypsilanti			2
Highland Park		1	1
Jackson		1	1
Totals	30	30	30

The graphic model on the next page describes the procedure that was followed:

Information Dissemination Design



Testable Hypotheses

The hypotheses are restated from Chapter I. Each hypothesis is also presented in parenthesis in a quantitative statement or symbolically.

1. The Directory of Descriptions (DD) will be perceived as valuable to the curriculum leader.

   (75% of the subpopulation in possession of the DD will state it a valuable source of information.)

2. The availability of the DD will increase the number of planned changes in the next "Section 3" proposal.

   ($H_1 : M_1, M_2 > M_3$)

3. The DD will be a medium of interpopulation communication concerning "Section 3" programs.

   (25% of the group in possession of the DD will state that it was an enabling agent to interpopulation communication concerning "Section 3" programs.)

4. The presence of the DD will increase the number of interpopulation communications concerning "Section 3" programs.

   (H_1 : M_1, M_2 > M_3)

5. The Training Manual (TM) will be perceived as valuable in using the DD.

   (80% of the group in possession of the TM will state it of value in using the DD)

6. The TM will increase the number of persons who perceive the DD as valuable.

   (H_1 : M_1 > M_2)

7. The TM will increase the number of planned changes in the next "Section 3" proposal.

   (H_1 : M_1 > M_2)

8. The availability of the DD and the TM together will increase the number of interpopulation communications concerning "Section 3" programs.

   (H_1 : M_1 > M_2)

Symbols: M_1 = mean of group with DD+TM

M_2 = mean of group with only DD

M_3 = mean of group without DD and TM

H_1 = alternative to the null hypothesis

Analysis

There are two types of responses from the structured telephone interviews: (1) verbal and (2) numerical. The verbal responses are listed by subpopulation and analyzed.

For the numerical analysis, the writer treated the "Section 3" population as a sample from an unspecified, hypothetical or real, larger population which has similar characteristics. Cornfield and Tukey discuss this choice of statistical model for a population study of this nature.[1] The statistic is Two-Way ANOVA, Mixed Model. The treatments (availability of information) are randomly assigned and the geographical characteristic (metropolitan or nonmetropolitan) is fixed.

This choice of statistical model not only strengthens the study in a credibility sense, but also allows for a greater extension for the conclusions, implicit or explicit, to a larger population.

The statistical treatment is able to establish the statistical significance of the numerical frequency differences between columns (treatments) and the interaction effect (a determination of whether there exists a frequency response pattern because of geography).

---

[1]Jerome Cornfield and John Tukey, "Average Values of Mean Squares," Annals of Mathematical Statistics, XXVII (Baltimore, Maryland: Waverly Press, Inc., 1956), 913.

Procedure

The major tasks of artifacts development, distribution, and follow-up interviews were completed in a time span of one and a half years.

Artifacts Development

Particulars of the development of the DD and TM are as follows:

Directory of Documents.--On December 8, 1969, an EDIC Project Information Sheet,[1] with an explanatory cover letter,[2] was sent to sixty-six elementary schools in twenty-four school districts who were recipients of "Section 3" funds. The elementary building principals were asked to verify the information given on the project information sheets. The writer had completed the project information sheets beforehand by taking the pertinent information from the "Section 3" proposals that were submitted to the State Department of Education.

It was asked that the form with any necessary changes made be returned by December 19, 1969. Twenty-five per cent of the forms were returned by December 24, 1969; 80 per cent return by January 5, 1970, and

---

[1]See Appendix A.

[2]See Appendix B.

98 per cent return soon after follow-up telephone calls during the week of January 12, 1970.

On January 13, 1970, the forms were deposited with the EDIC project staff. The information was transferred to IBM cards; a computer print-out of the information in the EDIC abstract format was prepared, and the printing of the DD with its abstracts and indices was accomplished.

Training Manual.--The key document of the study is the training manual. The writer (and others) felt that EDIC-type abstract document composites are not fully appreciated nor used as a source of information. A training manual with the following characteristics was assumed to be needed to increase the knowledgable use of the DD:

(1) Procedural steps in effectively using the DD;

(2) description of the DD content, and

(3) suggestions on how the DD can be useful in a decision-making process.

Ten different trial versions of the manual were developed before a decision was made. It was felt that the style should:

(1) Differ from the usual pamphlet that goes across the desk of an administrator;

(2) be "eye-catching";

(3) be easy to follow;

(4) list educational topics upon which decisions are made each year, and

(5) contain a sample abstract that can be found in the DD, rather than a fabricated one.

Distribution and Follow-up

The materials were distributed during the third week of November, 1970, according to the random-selection schedule indicated in the design.[1] The materials were distributed in November in order to be timely. The Michigan Legislature approved the distribution of "Section 3" funds in December, 1970, for the 1970-71 school year. The DD and TM, being distributed one month earlier, could have an impact on local decisions that were made concerning the use of these funds.

The timetable called for at least a ninety-day exposure to the DD and TM. The follow-up, therefore, was scheduled for March, 1971. The data were collected by a structured telephone interview. Each interview consisted of queries generated to ascertain at the first investigative level:

Subpopulation Having Access to the DD

1. In what ways, if any, was the DD valuable?

---

[1]See p. 38.

2. In what ways, if any, was the DD of help in planning the 1970-71 "Section 3" proposal?

3. How many changes were made in this proposal from last years?

4. How many changes were planned as a result of having access to the DD?

5. How many communications were made with other "Section 3" schools concerning their proposal or program? Name them.

6. How many of the communications were a result of having access to the DD?

7. How many "Section 3" programs in other schools can they describe?

Subpopulation Not Given the DD

1. How many changes were made in this proposal from last years?

2. How many communications were made with other "Section 3" schools concerning their proposal or program?

3. How many "Section 3" programs in other schools can they describe?

4. How many are aware of a DD?

5. If aware, how did they find out?

The persons in this subpopulation that come, by other means, to have access to a DD were asked to respond to the questions for the subpopulation in possession of the DD. They were treated separately, as a subgroup, however.

At the second investigative level questions were asked to ascertain:

Subpopulation Having Acess to the TM

1. How many can understand and use the DD? (A series of questions were formulated from the contents of the DD and TM to determine this.)

Subpopulation Not Given the TM

1. How many can understand and use the DD? (A series of questions were formulated from the content of the DD to determine this.)
2. How many are aware of a TM?
3. If aware, how did they find out?

The persons in this subpopulation that came, by other means, to have access to a TM were asked to respond to the questions for the subpopulation that were in possession of the TM. They were treated separately, as a subgroup, however.

Summary

The schedule of tasks in this study is as follows:

Work Task	Actual Time Period
1. Build the information file: abstract, verify, and enter the "Section 3" projects.	December, 1969 to February, 1970
2. Construct the DD and develop the TM.	March, 1970, to September, 1970
3. Distribute the DD and TM.	November, 1970
4. Collect the data/information via telephone interviews.	April, 1971
5. Analyze the data/information.	May, 1971

Conclusion

The design is experimental. Feasibility of experimentation with a not-yet-adopted innovation is dependent on the validity of all assumptions underlying the design of the innovation. The information service under study is new and untested in the field. Before the experimental question can be answered, the issue of acceptance of the system by the users, must be determined. The information service (EDIC) is, in itself, an innovation and subject to all of the processes of diffusion of innovation as set forth in the theory section of Chapter I.

CHAPTER IV

ANALYSIS OF RESULTS

As was previously stated, the data were obtained through structured telephone interviews. A flowchart of the order in which the questions were asked and the complement of questions follows.

Complement of Questions

Mainline Questions

Introduction: This is Tom Mercer. In November of last year I sent you some information--a directory of abstracts of educational projects in Michigan, primarily "Section 3" projects and a User Manual which can be used as a guide to the use of the directory of abstracts.

Q_1 : Did you receive these?

Q_0 : Would you like copies sent?

Explanation : These documents were part of a communication effort to distribute information on Federal and State projects under a foundation grant.

Q_2 : Would you answer a few questions?

Q_3 : Basically, I would like to know in what ways, if any, were these materials used in planning programs this year. What can you recall about the directory?

Q_4 : In what ways, if any, was the directory of use?

Q_5 : In what ways, if any, was the directory of help in planning this year's "Section 3" programs?

Q_6 : What changes were made in this year's "Section 3" program?

Q_7 : How many of these changes can be attributed in any way to having the directory?

Q_8 : Did you use the directory to call any other school districts on their "Section 3" program? Name them.

Q_9 : Are you acquainted with any other "Section 3" programs in other school districts? Describe them.

Q_{10} : What can you recall about the User Manual?

Q_{11} : Was the User Manual helpful in any way? How?

Q_{21} Series

Q_{21} : Who is the person most likely in need of information about other school districts?

Q_{22} : Are you really in that process at all?

Q_{23} : To what degree?

Q_{24} : Are you involved in writing program proposals or submitting ideas for proposals?

Q_{25} : Do you need information about other programs in your role?

Q_{26} : Did you realize that the directory contained information about other programs in Michigan?

Q_{27} : Did you have any occasion to use it this year?

Q^{28} : In what ways?

Q_{29} : In what ways, if any, do you have contact with other school districts in terms of their academic program? In other words, are there any sorts of schools or programs that you systematically or regularly inquire or read about?

Q_{30} : How many personal contacts have you made with other school districts this school year in order to inquire about programs?

Q_{31} : Are you satisfied with the amount and quality of information that you receive about programs in other Michigan schools?

Q_{41} Series

Q_{41} : How many changes were made in your "Section 3" program this year from last year?

Q_{42} : Did you call any other school districts on their "Section 3" programs this year? Name them.

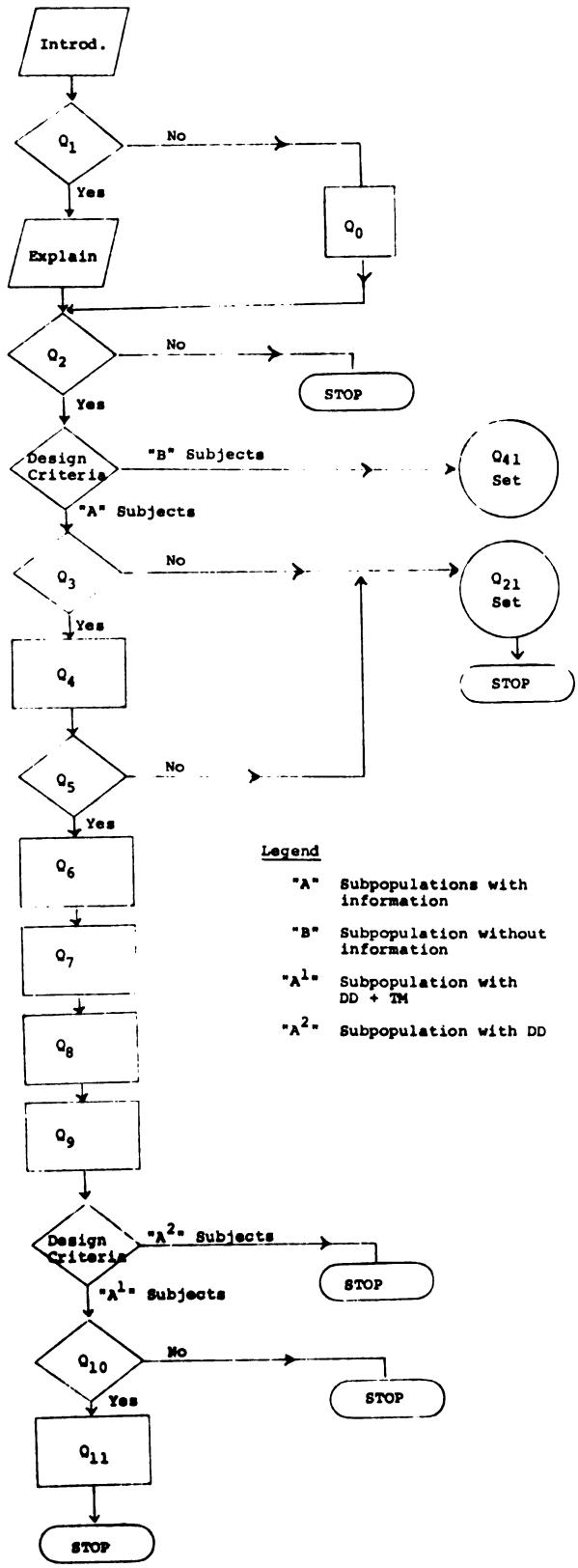
Q_{43} : Are you acquainted with any other "Section 3" programs in other school districts? Name them.

The Flowchart of the Structured Telephone Interview appears on pages 54 and 55.

Discussion of the Data

Commentary and analysis of the data are presented by order of figures. Each question is stated to assist immediate association of the discussion with the data.

Flowchart of Structured Telephone Interview



Flowchart (Cont.)

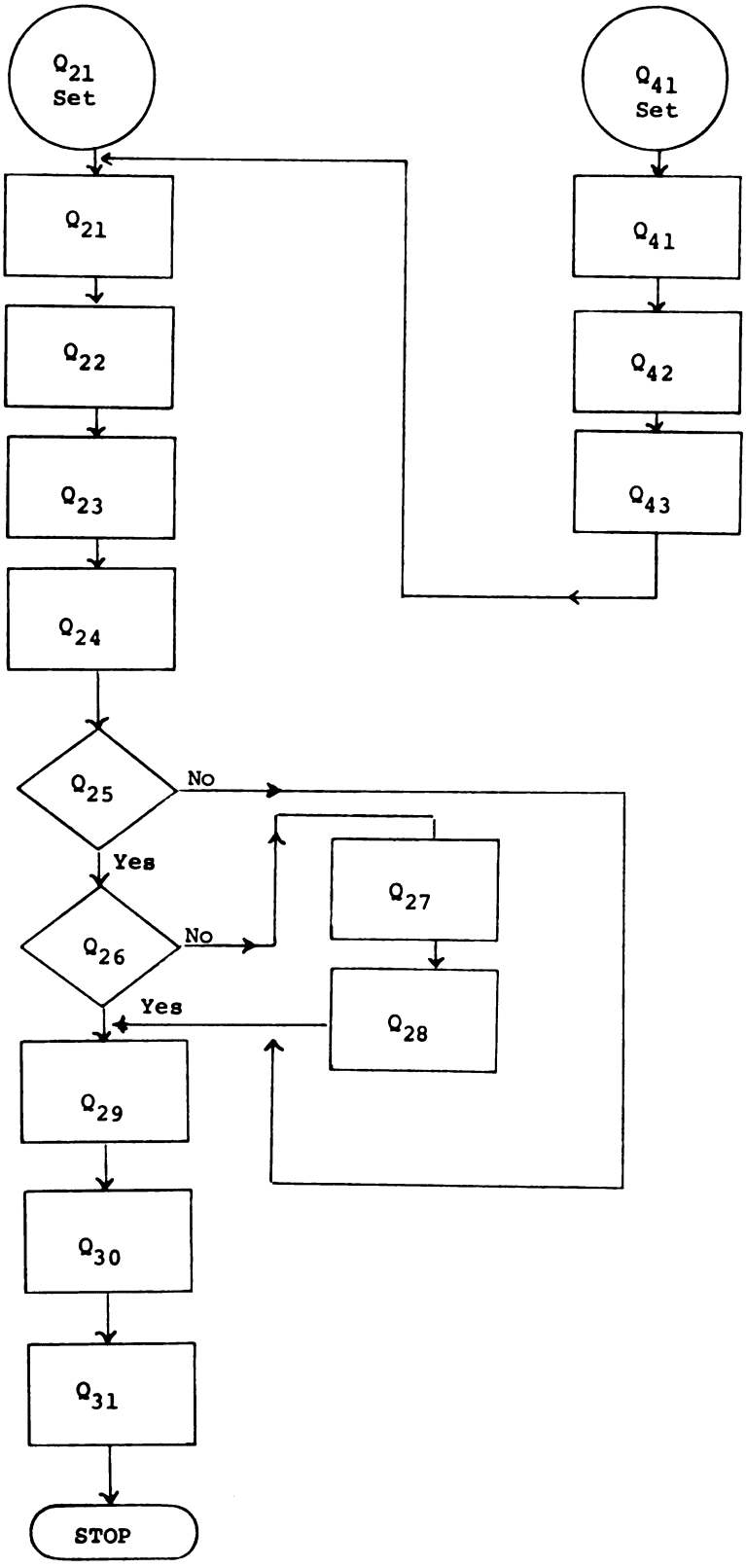


Figure 4.1

Q_1: Did You Receive These? n: 58

1. Half of the building principals and a half of the central office administrators recall receiving the information, DD or DD+TM (over 90 per cent of this group have the information readily available in their office).

2. Recall rate was considerably higher for the medium and small school districts than it was for the large school districts.

Figure 4.2

Q_{21}: Who Is The Person Most Likely In Need of Information About Other School Districts? n: 86

1. Every central office administrator indicated that he needed information about other school districts' programs.

2. One-third of the building principals felt that they were in need of information.

3. There is an inverse relationship between the number of principals who felt that they need information and the size of the school district in which they function.

4. There is no observable difference of response among the three subpopulations.

Figure 4.3

Q_{22}: Are You Really In That Process At All? n: 86

1. Every central office administrator indicated that he was definitely in the process.

2. Twenty-six out of the sixty-four building principals felt that they are in the process.

3. There is an inverse relationship between the number of building principals who felt that they are in that process and the size of the school district in which they function.

4. There is no observable difference of response among the three subpopulations.

Figure 4.4

Q_{23}: To What Degree? n: 48

1. The central office administrators apparently are more involved in the process than building principals.

2. There is an inverse relationship between the degree of involvement and school district size.

3. There is no observable difference of response among subpopulations.

Figure 4.5

Q_{24}: Are You Involved In Writing Program Proposals Or Submitting Ideas For Proposals? n: 48

1. Of the twenty-six building principals who felt that they were in that process, twenty were involved in submitting ideas for proposals.

2. The central office administrators were involved in writing proposals or in supervising the writing of proposals.

3. The number of building principals who assisted in the writing of proposals was larger in the small and medium size school districts than in the large school districts.

Figure 4.6

Q_{25}: Do You Need Information About Other Programs In Your Role? n: 86

1. Every central office administrator indicated that he needed information in his role.

2. Thirty-one out of the sixty-four principals felt that they need information.

3. There is an inverse relationship between the number of building principals who felt that they need information and the size of the school district.

4. There is no observable difference of response among the three subpopulations.

Figure 4.7

Q_{26}: Did You Realize That The Directory Contained Information About Other Programs in Michigan? n: 29

Q_{27}: Did You Have Any Occasion To Use It This Year? n: 29

Q_{28}: In What Ways? n: 29

1. Five out of twenty-nine respondents did not realize what the DD contained.

2. Seven out of twenty-nine persons had an occasion to use the DD. Three of these made contacts.

3. Of the twenty-nine respondents, twenty-four gave the DD some degree of attention.

4. There is no observable difference of response between the two subpopulations who were in this group.

Figure 4.8

Q_{29}: In What Ways, If Any, Do You Have Contact With Other School Districts In Terms of Their Academic Program? n: 86

1. Fifty-four out of eighty-six respondents indicated that their primary (and for most of them, their only) source of information about other school districts' programs is another person or persons within the district in which they function.

2. Fourteen respondents indicated regional or professional organizations.

3. Thirteen respondents indicated personal contacts as their primary source.

4. Printed materials, as a vehicle of information about other programs, was not mentioned.

5. Fifty-one out of the sixty-four building principals indicated that they rely on with-in district sources.

6. Three out of the twenty-two administrators rely on with-in district sources.

Figure 4.9

Q_{30}: How Many Personal Contacts Have You Made With Other School Districts This School Year In Order To Inquire About Programs? n: 86

1. Sixty-five respondents have not contacted other school districts this year.

2. Thirteen building principals and eight central office administrators indicated that they have made personal contacts.

Figure 4.10

Q_{31}: Are You Satisfied With The Amount And Quality Of Information That You Receive About Programs In Other Michigan Schools? n: 86

1. Thirty-six respondents are satisfied. The proportion is the same for building principals as for central office administrators.

2. Seven respondents indicated that they do not receive information about other Michigan schools.

Presentation of the Data

In this account each figure is headed by the question which elicited the data. The data are collated and tabulated along several axes within each figure.

Q_1: Did Receive These? n: 58

(1)

	Yes	No/ Don't Recall
P	21	21
A	8	8

Response Classified
By Role of Respondent

(2)

	Yes	No/ Don't Recall
Lg.	10	18
Med.	7	3
Sm.	12	8

Response Classified
By Size of School Dist.

(3)

		Yes	No/ Don't Recall
Lg.	P	9	15
	A	1	3
Med.	P	5	3
	A	2	0
Sm.	P	7	3
	A	5	5

Comprehensive Array
of Data

Legend:

P Building Principal
A Central Office Administrator

Lg. School District With $\geq$ 20,000 Pupils
Med. School District With 10,000 < Pupils < 20,000
Sm. School District With $\leq$ 10,000

Figure 4.1

Q_{21}: Who Is The Person Most Likely In Need Of Information Of Other School Districts? n: 86

(1)

	I	A
P	21	43
A	22	

Response Classified by Role of Respondent

Legend:

I I am.

A Central Office Administrators

(2)

		Groups as Assigned by Design: Info.		No Info.	
		I	A	I	A
Lg.	P	5	19	4	12
	A	4		1	
Med.	P	2	6	2	
	A	2		4	
Sm.	P	7	3	1	3
	A	10		1	

Response Classified by Presence/Absence of Info.

(3)

		Groups as Assigned by Design: DD+TM		DD		No Info.	
		I	A	I	A	I	A
Lg.	P	4	8	1	11	4	12
	A	2		2		1	
Med.	P		3	2	3	2	
	A	1		1		4	
Sm.	P	4	1	3	2	1	3
	A	5		5		1	

Comprehensive Array of Data

Figure 4.2

Q_{22}: Are You Really In That Process At All? n: 86

(1)

	Yes	No
P	26	38
A	22	

Response Classified By Role of Respondent

(2)

		Yes	No
	Lg.	11	29
P	Med.	5	5
	Sm.	10	4

Response Classified By Size of School Dist.

(3) Groups As Assigned by Design

		Info.		No Info.	
		Yes	No	Yes	No
	P	6	18	5	11
Lg.	A	4		1	
	P	3	5	2	
Med.	A	2		4	
	P	8	2	2	2
Sm.	A	10		1	

Response Classified By Presence/Absence of Info.

(4) Groups As Assigned by Design

		DD+TM		DD		No Info.	
		Yes	No	Yes	No	Yes	No
	P	4	8	2	10	5	11
Lg.	A	2		2		1	
	P		3	3	2	2	
Med.	A	1		1		4	
	P	5		3	2	2	2
Sm.	A	5		5		1	

Comprehensive Array of Data

Figure 4.3

Q_{23}: To What Degree? n: 48

		Groups As Assigned by Design								
		DD+TM			DD			No Info.		
		Some	Mod.	Fully	Some	Mod.	Fully	Some	Mod.	Fully
Lg.	P	1	3		1	1		4	1	
	A			2			2			1
Med.	P				1	2			2	
	A			1			1			4
Sm.	P		5		1	2		2		
	A			5			5			

Comprehensive Array of Data

Figure 4.4

Q_{24}: Are You Involved In Writing Program Proposals or Submitting Ideas for Proposals? n: 48

(1)

	Groups As Assigned by Design					
	Info.			No Info.		
	S	A	W	S	A	W
Lg. P	5	1		5		
Lg. A		1	3		1	
Med. P		3		1	1	
Med. A		1	1			4
Sm. P	7	1		2		
Sm. A			10			1

Response Classified by Presence/Absence of Info.

(2)

	Groups As Assigned by Design								
	DD+TM			DD			No Info.		
	S	A	W	S	A	W	S	A	W
Lg. P	3	1		2			5		
Lg. A			2		1	1		1	
Med. P					3		1	1	
Med. A			1		1				4
Sm. P	5			2	1		2		
Sm. A			5			5			1

Comprehensive Array Of Data

Legend: S = Submits Ideas
A = Assists in Writing Proposals
W = Writes Proposals or Supervises the Writing

Figure 4.5

Q_{25}: Do You Need Information About Other Programs In Your Role? n: 86

(1)

		Yes	No
P	Lg.	14	26
	Med.	6	4
	Sm.	11	3

Response Classified By Role of Respondent

(2)

Groups Assigned by Design

		Info.		No Info.	
		Yes	No	Yes	No
Lg.	P	9	15	5	11
	A	4		1	
Med.	P	4	4	2	
	A	2		4	
Sm.	P	9	1	2	2
	A	10		1	

Response Classified By Presence/Absence of Info.

(3)

Groups Assigned by Design

		DD+TM		DD		No Info.	
		Yes	No	Yes	No	Yes	No
Lg.	P	5	7	4	8	5	11
	A	2		2		1	
Med.	P	1	2	3	2	2	
	A	1		1		4	
Sm.	P	5		4	1	2	2
	A	5		5		1	

Comprehensive Array of Data

Figure 4.6

Q_{27}: Did You Have Any Occasion to Use It This Year? n: 29

Q_{28}: In What Ways? n: 29

(1)

		Groups As Assigned by Design					
		DD+TM			DD		
		No	Ref.	Cont.	No	Ref.	Cont.
Lg.	P	6			3		
	A	1					
Med.	P	2			2		1[a]
	A	1					1[a]
Sm.	P	3	2			2	
	A	1		1[b]	3		

Response Classified By Degree of Information and Usage

(2)

		Groups As Assigned By Design											
		DD+TM						DD					
		No	Scan	Lib.	Comp.	Ref.	Cont.	No	Scan	Lib.	Comp.	Ref.	Cont.
Lg.	P	2	4						3				
	A	1											
Med.	P		1	1					2				1
	A			1									1
Sm.	P		2		2	1				1		1	
	A		1				1	2	1				

Response Classified by Degree of Information and Degree of Attention Given to the DD.

Notes:

The Respondents in the No Column in Table (1) did not realize that the DD contained information about other programs in Michigan (Q_{26}).

Q_{27} and Q_{28} elicited information on the degree of attention given to the DD, as well as usage, if any.

[a] Two contacts made

[b] Many contacts made

Legend:

Scan Looked the DD over briefly.
Lib. Gave brief attention to the DD; placed it in the professional library for others to use.
Comp. Compared programs found in the DD; spent considerable time reviewing it for ideas.
Ref. Used the DD as a reference in modifying programs.
Cont. Used the DD to contact other school districts.

Figure 4.7

Q_{29}: In What Ways, If Any, Do You Have Contact With Other School Districts In Terms of Their Academic Program? n: 86

(1)

	Pr. Mat.	Wk. Shop	Org.	Contact	In-Dist.
P		3	3	7	51
A			13	6	3

Response Classified by Role of Respondent

(2)

		Pr. Mat.	Wk. Shop	Org.	Contact	In-Dist.
Lg.	P		2	1	2	35
	A			3	1	1
Med.	P			1	2	7
	A			3	2	1
Sm.	P		1	1	3	9
	A			7	3	1

Response Classified by Size of School District

Legend: Pr. Mat. = Printed Materials; Wk. Shop = Workshops and formal college classes; Org. = State level professional organizations and/or regional groups; Contact = Personal contacts by phone or visit; In-Dist. = In-District sources.

Notes: In most cases, the respondents mentioned one primary source of information. Only the primary sources are therefore recorded. In-Dist. means that the respondent receives most or all of his information from other persons within the school district.

Figure 4.8

(3)

Groups As Assigned by Design

	DD+TM					DD					No Info.				
	Pr. Mat.	Wk. Shop	Org.	Con-tact	In-Dist.	Pr. Mat.	Wk. Shop	Org.	Con-tact	In-Dist.	Pr. Mat.	Wk. Shop	Org.	Con-tact	In-Dist.
Lg. P		1	1	1	9		1			11				1	15
Lg. A			1	1				2							1
Med. P					3			1	1	3				1	1
Med. A					1				1				3	1	
Sm. P				1	4			1	2	2		1			3
Sm. A			3	2				3	1	1			1		

Comprehensive Array of Data

Figure 4.8 (cont.)

Q_{30}: How Many Personal Contacts Have You Made With Other School Districts This School Year In Order to Inquire About Programs? n: 86

(1)

	Number of Contacts				
	0	1-2	3-4	5-6	over 6
Lg. P	32	7	1		
Lg. A	2			1	2
Med. P	7	2	1		
Med. A	3	1	1	1	
Sm. P	12		1	1	
Sm. A	9		1		1

Response by Size of School District

(2)

	Number of Contacts				
	0	1-2	3-4	5-6	over 6
DD+TM	20	4	1		3
(A) DD	24	1	2	3	
(A) P	51	9	3	1	
(B) A	14	1	2	2	3
Info.	44	5	3	3	3
No Info. (C)	21	5	2		

Response By:
- (A) Degree of Information by Design
- (B) Role of Respondent
- (C) Presence/Absence of Information by Design

Figure 4.9

Number of Contacts

Groups As Assigned by Design

		DD+TM					DD					No Info.				
		0	1-2	3-4	5-6	over 6	0	1-2	3-4	5-6	over 6	0	1-2	3-4	5-6	over 6
Lg.	P	7	4	1			12					13	3			
	A					2	1			1		1				
Med.	P	3					4						1	1		
	A	1								1		2	1	1		
Sm.	P	5					3		1	1		4				
	A	4					4		1			1				

Comprehensive Array of Data

Figure 4.9 (cont.)

Q_{31}: Are You Satisfied With the Amount and Quality of Information That You Receive? n: 86
About Programs in Other Michigan Schools?

(1)

	No	None	Sat.
P	32	5	27[a]
A	12	1	9[b]

Response Classified by Role of Respondent

(2)

	No	None	Sat.
Lg.	20	3	22
Med.	8	1	7
Sm.	16	2	7

Response Classified by Size of School Dist.

(3)

		Groups As Assigned by Design								
		DD+TM			DD			No Info.		
		No	None	Sat.	No	None	Sat.	No	None	Sat.
Lg.	P	6		6	1	3	8	11		5
	A	1		1			2	1		
Med.	P			3	3		2	2		
	A			1	1			2	1	1
Sm.	P	4		1	3	1	1	2	1	1
	A	5			2		3			1

Comprehensive Array of Data

Notes:

[a]The building principals are primarily satisfied because they are not involved in program determinations.

[b]The central office administrators are primarily satisfied because they obtain information through contacts.

Legend:

No	No, need more
None	No, don't have information on other school dist.
Sat.	Satisfied with information

Figure 4.10

Summary

No reference has been made from the data to the hypotheses postulated and enumerated in Chapters I and III. An overall analysis of the data shows that the presence or intervention of the DD or DD+TM had no observable impact on the behavior of the population as a whole. Impact is operationally defined here as those changes of behavior previously hypothesized. Some degree of attention was given to the DD and TM by most of the persons who recall receiving it. In fact, seven persons had an occasion to use the DD.

In an attempt to determine the real need for information, if any, it was found that many of the building principals do not see themselves in that process. The principals who do see themselves in that process are generally involved in determining building programs to the degree of submitting ideas when asked. The central office administrators were found to need information about other school districts' programs.

School districts represented by the population generally were found to operate in isolation. Few personal contacts were made this year with other school districts on their programs and most of the population relies primarily on with-in district sources for information.

Many of the building principals were satisfied with the amount and quality of information that they presently receive, primarily because they are not involved in program determinations or are involved to a limited degree. Some central office administrators were satisfied because they have developed personal channels of information.

Printed materials was not mentioned as a source of information on school programs in Michigan. This result has implication for the information system under study.

These results were not productive in terms of the testing of hypotheses in this study. They were productive, however, in gaining a better understanding of the population within which the information system under study must operate.

Conclusion

Generally speaking, the larger the school system, the more restrictive, inflexible, and isolated is the role of the building principal in terms of program input and determinations. Through conversations with the respondents it was found that their role as defined by the Central Office does not require them to seek out information and information sources. Principals generally

operate their building curriculum on an accept/reject basis. Tentative programs that have State or Federal funding commitments are presented to each principal. The principal has the prerogative of acceptance or rejection.

CHAPTER V

SUMMARY AND CONCLUSIONS

As a formal experiment this study was not as productive as it was intended to be. In effect, the study is an unfulfilled experiment which has been converted to a descriptive study in order to learn from the circumstances of the study. The reason for this lesser productivity lies primarily in faulty assumptions that were made in the design of the experiment. The assumptions are reviewed in light of the experience of the research.

Assumptions of the Study in Retrospect

Nine assumptions were given as the basis of the rationale for the study in Chapter I. The assumptions are as follows:

1. Information about instructional ideas, strategies, and programs can be useful in curricular decision-making.

   COMMENT: The research identified no basis for discounting this assumption.

2. A computer-based information system provides a curriculum leader a selective yet extensive confrontation with educational development activities external to his immediate environment. The flexibility, selectivity, and accessibility of a computer-based storage-retrieval system provides an additional and effective basis for curricular decisions.

   COMMENT: The research identified no basis for discounting this assumption.

3. Easy access to such a system will attract curriculum leaders to use it.

   COMMENT: Although this assumption still stands, the research revealed that the "easy access" factor alone is inadequate to stimulate use on a widespread basis.

4. The current situation in public schools is that each school system tends to operate as a pioneer in its curricular endeavors. Understandings are usually built to the exclusion of utilization of relevant outside information.

   COMMENT: The research identified no basis for discounting this assumption.

5. The curriculum leader is a change agent.

   COMMENT: The research identified no basis for discounting this assumption.

6. The curriculum leader in his role as potential change agent needs information.

COMMENT: The research identified no basis for discounting this assumption.

7. The curriculum leader tends to have only a general cognizance of pertinent experiences of others who have dealt with the particular development problem in other places.

   COMMENT: The research identified no basis for discounting this assumption.

8. The building principal is a curriculum leader.

   COMMENT: According to the criteria used in this study, namely:

   (1) Felt need for information about other school district programs,

   (2) Belief on the part of the principals that are involved in the process and the degree of involvement, and

   (3) Contact with educators in other school districts concerning programs,

   the majority of building principals cannot be classified as curriculum leaders although they may be such according to other criteria.

9. The Directory of Descriptions (DD) and the Training Manual (TM) will motivate the recipients to desire more specialized information about programs of interest through interpopulation communications.

   COMMENT: This assumption is faulty. It was crucial to the study. Three out of twenty-nine persons who recalled receiving the materials made personal contacts requesting more specialized information.

Since some of the basic assumptions of the study seem to be faulty, the study should be seen, in retrospect, as a descriptive study rather than an experiment. Since descriptive research has as its primary purpose the building of hypotheses, the next part of this chapter will be devoted to specifying hypotheses which would allow subsequent testing of relationships observed in the present study.

Hypotheses for Further Research

The following hypotheses are suggested by review of the data gathered through the structured interviews:

1. Given that the operators of an information system understand the role of the recipients (Users) as the recipients understand it, then the information system can function in filling perceived needs in curriculum development.

2. The information system can assist users and operators to perceive needs which they would not have perceived without the broad base of information provided by the system.

3. Given the fact that professional person-to-person contacts outside the school system are rare among the users, and their scope of information thereby restricted, the system can be useful in allowing haphazard communication to be carried out more systematically.

4. A higher degree of interaction among potential users will correlate positively with the use of an information system.

5. Contacts of a salesmanship and training sort will correlate positively with the use of an information system.

6. Giving priority to a smoothly functioning bureaucracy over effective curriculum building does not encourage the use of information systems.

7. The information system will affect decision-making when the information it provides is perceived as pertinent by the decision-makers.

8. The information system can help raise the educational attainment level of students indirectly by providing information which assists educators to make effective decisions.

9. If the principal is involved in decision-making about the curriculum, then access to and use of information systems relating to curriculum development will be perceived by the principal as being of value.

Through the conversations engaged in and data collected, certain questions can be raised which do not relate to information systems and users per se, but

which are noteworthy and would require further research in order to understand. These questions are recorded following:

Questions for Further Research

1. The role of the building principal in large school systems is narrowly defined either because the system limits the principal's flexibility or because the principal himself defines his role narrowly or there may be other causes. Does the role definition of a building principal limit his effectiveness as a curriculum leader?
2. Does the reliance of within-district sources of information make for smooth operation of the system but inhibit the development of new ideas?
3. Is printed information not perceived as a useful source of information for making decisions in the development of curriculum?
4. Why do building principals sometimes not see themselves to be involved in curriculum development?
5. What do central school administrations believe about the building principal and his role in curriculum development?

6. Is information perceived to be pertinent actually used in making decisions?

7. Does the use of information perceived to be pertinent result in effective decisions?

8. What other services must be provided along with the information system in order that educators use the information system that they desire?

9. What factors must pertain in order for educators to perceive that they have time to use available services?

Value of the Study

This study accomplished the following:

(1) Ascertained the reaction and response of a clientele to a new, previously untested information service system;

(2) Developed understandings and interpretations of the communication and information-gathering patterns of a, heretofore, unresearched group in the area of user studies.

The value, if any, of the Training Manual (TM) developed and distributed as an aid to the understanding and use of the information system product--the Directory of Descriptions (DD), was not revealed in the study. It

behooves further research efforts to accept, reject, or modify the Training Manual dependent on the results incurred.

Conclusion

In closing it should be again noted that this study was not as productive of theory-building data as it was intended to be primarily because faulty assumptions were made. These assumptions proved to be crucial to the productivity of the study. Hypotheses and questions for further research have been suggested, some of which are fundamental and should be answered before this study is replicated. Assumptions found to be faulty are apt to be faulty in other studies of this sort; therefore, subsequent research should more carefully examine assumptions of this nature.

BIBLIOGRAPHY

BIBLIOGRAPHY

Works Cited

"A One-Stop Information Center." American Education, IV (July, 1968), 26.

"An Overview of Educational Data Processing in New York State." AEDS Monitor, VI (November, 1967), 3-5.

Becker, Joseph, and Hayes, Robert M. Information Storage and Retrieval: Tools, Elements, Theories. New York: Wiley, 1963.

Bennett, Lowry, M. "Oregon Begins Implementation of Project OTIS--An Advanced, State-Wide, School Information System." AEDS Monitor, VI (November, 1967), 3-5.

Bishop, L. T., et al. "Supervisor and Curriculum Director at Work; Bases for Priorities and the Improvement of Decision-Making." ASCD Yearbook (1965), 127-30.

Borko, Harold. "The Storage and Retrieval of Educational Information." J. Teacher Education, XV (December, 1964), 450.

Brown, George W.; Miller, James G.; and Keenan, Thomas A., eds. EDUNET, Report of the Summer Study on Information Networks. New York: Wiley, 1967.

Burchinal, Lee G., and Haswell, Harold. "The Story of ERIC." Education Digest, XXXII (September, 1966), 44-47.

_____, and _____. "How to Put 2 1/2 Tons of Research Into One Handy Little Box." American Education, II (February, 1966), 23-25.

Bushnell, Don D., and Allen, Dwight W., eds. The Computer in American Education. New York: Wiley, 1967.

Cangelosi, Vincent E.; Robinson, D. M.; and Schkade, L. L. "Information and Rational Choice." The Journal of Communication, XVIII (June, 1968), 131-43.

Cheydleur, Benjamin F., ed. Colloquium on Technical Preconditions for Retrieval Center Operations. Washington, D.C.: Spartan Books, 1965.

Cornfield, Jerome and Tukey, John. "Average Values of Mean Squares." Annals of Mathematical Statistics, XXVII (1956), 913.

Fairthorne, Robert A. Towards Information Retrieval. London: Butterworths, 1961.

Grossman, Alvin. "The California Education Information System." Datamation, XIII (March, 1967), 33-37.

Howerton, Paul W., ed. Information Handling: First Principles. Spartan Books. Washington, D.C.: Information for Industry, Inc., 1963.

Hughes, John F. "Spreading the Word About Successful Projects." School Management, XI (May, 1967), 25.

Jahoda, G.; Hutchins, Ronald D.; and Miller, D. M. "Analysis of Case Histories of Personal Index Use." Progress in Information and Technology. Edited by Donald V. Black, Proceedings of the American Documentation Institute; 1966 Annual Meeting, October 3-7, 1966, Santa Monica, California. Woodland Hills, Calif.: Adrianne Press, 245-54.

Janda, Kenneth. Information Retrieval: Applications Political Science. New York: The Bobbs-Merrill Co., 1968.

Jonker, Frederick. Indexing Theory, Indexing Methods, and Search Devices. New York: The Scarecrow Press, 1964.

Kent, Allen. Textbook on Mechanized Information Retrieval. New York: Wiley, 1962.

_____. Information Retrieval in Action. Cleveland, Ohio: Press of Western Reserve University, 1963.

Kruzas, Anthony T. Directory of Special Libraries and Information Centers. 2nd ed. Detroit, Mich.: Gale Research Co., The Book Tower, 1968.

Katzenmeyer, William G. "The Wisconsin Information System." AEDS Monitor, V (March, 1967), 3-5.

Lancaster, F. W. Information Retrieval Systems: Characteristics, Testing, and Evaluation. New York: Wiley, 1968.

Licklider, J. C. R. Libraries of the Future. Cambridge, Mass.: MIT Press, 1965.

Luhn, H. P. (KWIC) Index) Keyword-In-Context Index for Technical Literature. Yorktown Heights, N.Y.: IBM Corporation, Advanced Systems Development Division, 1959.

_____. "Selective Dissemination of New Scientific Information With the Aid of Electronic Processing Equipment." Yorktown Heights, N.Y.: IBM Advanced Systems Development Division, 1959.

Marron, H., and Burchinal, L. G. "ERIC--A Novel Concept in Information Management." Proceedings of the 30th Annual Meeting of the American Documentation Institute. New York: Thompson Book Co., 1967.

Menzel, Herbert. "Information Needs and Uses." Annual Review of Information Science and Technology. Edited by Carlos A. Cuadra, American Society for Information Science. Chicago: Encyclopaedia Britannica, Inc., 1966.

_____. "Types of Information Seeking." Library Quarterly, XXXIV (1964).

Office of Education. "ERIC, Educational Research Information Center--A National Information Center Dedicated to the Progress of Education Through the Dissemination of Educational Research Results and Research Related Materials." Brochure. Washington, D.C.: Government Printing Office, 1966.

Paisley, William J. "Information Needs and Uses." Annual Review of Information Science and Technology. Edited by Carlos Cuadra, III. Chicago: Encyclopaedia Britannica, 1968.

Panos, Robert J., and Astin, Alexander W. "On Using Systematic Information in Making Educational Decisions." Education Record, XXXXVIII (Spring, 1967), 172-78.

Piele, Philip, D., and Eidell, Terry L. "How to Plug into School Information Systems." Nation's Schools, LXXXIV, No. 4 (October, 1969), 8-9.

Polley, Ira. PACE in Michigan, ESEA Title III Programs. Wayne, Mich.: Statewide Dissemination Service, 1968.

Rogers, Everett M. Diffusion of Innovations. New York: The Free Press of Glencoe, 1962.

Rosove, P. E. Developing Computer Based Information Systems. New York: Wiley, 1967.

Salton, Gerald. Automatic Information Organization and Retrieval. New York: McGraw-Hill, 1968.

Schecter, George, ed. Information Retrieval: A Critical View. Based on the Third Annual Colloquium on Information Retrieval, May 12-13, 1966, Philadelphia, Penn. Washington, D.C.: Thompson Book Co., 1967.

Smith, Jack W., and Dickson, William C. "An On-Line Nationwide Remote Inquiry System for the Dissemination of Educational Data." AEDS Journal (September, 1967), 5-14.

Taube, M., et al. "The Uniterm Coordinate Indexing of Reports." The Technical Report. Edited by B. H. Weil. New York: The Reinhold Publishing Corporation, 1954.

"The National Information Problem." SDC Magazine, IX (February, 1966).

Clague, P. "The Selective Dissemination of Information in Electronics." Computer-Based Information Retrieval Systems. Edited by Bernard Houghton. Hamden, Conn.: Archon Books, 1969.

Veal, D. C. "An Experiment in the Selective Dissemination of Chemical Information." Computer-Based Information Retrieval Systems. Edited by Bernard Houghton. Hamden, Conn.: Archon Books, 1969.

Vickery, Brian C. On Retrieval System Theory. Washington, D.C.: Butterworths, 1965.

Werner, David J. "A Study of the Information-Seeking Behavior of Medical Researchers." Unpublished Masters Thesis, Dept. of Industrial Engineering and Management Sciences, Northwestern University, Evanston, Illinois, December, 1965.

Williams, Williams F. Principles of Automated Information Retrieval. Elmhurst, Illinois: Business Press, 1965.

Wilson, Thomas D., and Stephenson, James. Dissemination of Information. New York: Philosophical Library, 1965.

General References

Abramson, Norman. Information Theory and Coding. New York: McGraw-Hill, 1963.

Ash, Robert B. Information Theory. New York: Interscience Publishers, 1965.

Baly, Charles F., and Stanwood, Richard H. Literature on Information Retrieval and Machine Translation. Wt. Plains, N.Y.: IBM Corporation, 1966.

Barhydt, Gordon C. "Information Retrieval in Education." Data Processing Education, IV (October, 1965), 1-3.

_____, et al. "Educational Media Research Information Center (EMRIC): A Progress Report." AV Communication Review, XIII (Fall, 1965), 296-302.

Borko, Harold. Automated Language Processing. New York: Wiley, 1967.

Bourne, Charles P. Methods of Information Handling. New York: Wiley, 1963.

_____. Bibliography on the Mechanization of Information Retrieval. Menlo Pk., Calif.: Stanford Research Institute, 1958.

Connor, Judith Holt. "Selective Dissemination of Information: A Review of the Literature and the Issues." Library Journal, LXXXXII (August, 1967), 373-90.

Frank, Otto, ed. Modern Documentation and Information Practices: A Basic Manual. The Hague, International Federation for Documentation, 1961.

Gardin, J. C. SYNTOL-VOL. II. New Brunswick, N.J.: The Rutgers University Press, 1965.

Giuliano, Vincent E., and Jones, Paul E. "Study and Test of Methodology for Laboratory Evaluation of Message Retrieval Systems, Interim Report." Air Force Systems Command: Tech. Report ESD-TR. Cambridge, Mass.: Arthur D. Little, Inc., 1966.

Holzbauer, H., comp. Mechanized Bibliography of Documents and Information Sciences. Rev. ed., Jan., 1967. Washington, D.C.: U.S. Dept. of Interior Library, 1967.

Howe, R. L. "Information System for the Schools; California Total Educational Information System (CTEIS)." CTAJ, LXIV (March, 1968), 18-21.

Kent, Allen, and Taube, Orrin E., eds. Electronic Information Handling. Washington, D.C.: Spartan Books, 1965.

_____, et al. Electronic Handling of Information; Testing and Evaluation. Washington, D.C.: Thompson Book Co., 1967.

_____, and Perry, James W. Centralized Information Services: Opportunities and Problems. New York: The Press of Western Reserve University, 1958.

Kochen, Manfred. Some Problems in Information Science. New York: Scarecrow Press, 1965.

_____. The Growth of Knowledge; Readings on Organization and Retrieval of Information. New York: Wiley, 1967.

Machol, Robert Engel, ed. Information and Decision Processes. New York: McGraw-Hill, 1960.

Meister, David, and Sullivan, Dennis J. "Evaluation of User Reactions to a Prototype On-Line Information Retrieval System." NASA Contractor Report CR-918. Canoga Pk., Calif.: Bunker-Ramo Corp., October, 1967.

Overhage, Carl F. J., and Harman, Joyce R. Intrex: A Report of a Planning Conference on Information Transfer Experiments, Sept. 3, 1965. Cambridge, Mass.: MIT Press, 1965.

Packer, Rod E. "Computers, Education, and the Government." Computer Automation, XIV (March, 1965), 14-17.

Perry, James W.; Kent, Allen; and Berry, Madeline M. Machine Literature Searching. Cleveland, Ohio: The Press of Western Reserve University, 1956.

Rubinoff, Morris, ed. Toward a National Information System. Second National Colloquium on Information Retrieval, April 23-24, 1965, Philadelphia, Penn. Washington, D.C.: Spartan Books, 1965.

Scientific American. "Information." San Francisco: W. H. Freeman, 1966.

Sharp, Harold. Reading in Information Retrieval. New York: The Scarecrow Press, Inc., 1964.

Slamecka, Vladimir, ed. The Coming Age of Information Technology. Bethesda: Documentation Inc., 1965.

Spangler, Marshall R. General Bibliography of Information and Retrieval. Phoenix, Arizona: General Electric, 1962.

Taube, Mortimer, and Wooster, Harold, eds. Information Storage and Retrieval Theory, Systems, and Devices. New York: Columbia University Press, 1958.

APPENDICES

APPENDIX A

EDIC PROJECT INFORMATION SHEET

APPENDIX A

EDIC Project Information Sheet #568/1169

Use a separate form for each project. If project not previously entered in EDIC, please check. ☐
If updating previously entered project, please check. ☐

1. TITLE _____

2. DISTRICT
☐ BATTLE CREEK ☐ HIGHLAND PARK ☐ ROYAL OAK
☐ DETROIT ☐ LANSING ☐ SOUTHFIELD
☐ FLINT ☐ OAKLAND INTERMED ☐ _____
☐ GRAND RAPIDS ☐ PONTIAC

3. CONTACT person for this project _____ PHONE _____
last, first name area code, telephone number

* * Project involves _____ building(s) Principal: _____ Phone _____

4. START Indicate starting date of project.
☐ PRE-1965 ☐ 1966 ☐ 1968 ☐ 1970
☐ 1965 ☐ 1967 ☐ 1969 ☐ 1971

5. END Project is expected to END 19____
give year

6. Source of FUNDS? Check major sources of support.
☐ LOCAL ☐ FEDERAL ☐ FOUNDATION
☐ STATE ☐ INDUSTRIAL

* * Exact source of funds _____
if federal, give bill title, number or name

7. Grade LEVEL involved? Check all appropriate boxes.

* *
☐ PRE-KINDERGARTEN
☐ KINDERGARTEN
☐ ELEM-UNGRADED
☐ 1st grade
☐ 2nd grade
☐ 3rd grade
} ELEM-EARLY

☐ 4th grade
☐ 5th grade
☐ 6th grade
} ELEM-LATE
☐ INTERM-UNGRADED
☐ 7th grade
☐ 8th grade
} INTERMEDIATE

☐ HGH-SCH-UNGRADED
☐ 9th grade
☐ 10th grade
☐ 11th grade
☐ 12th grade
} HIGH-SCHOOL
☐ DROP-OUTS
☐ ADULT

8. Number of STUDENTS involved?
☐ VERY-SM-ENROLLMENT (less than 31)
☐ SMALL ENROLLMENT (31-100)
☐ MED-SM-ENROLLMENT (101-200)
☐ MED-ENROLLMENT (201-500)
☐ MED-LG-ENROLLMENT (501-1000)
☐ LRGE-ENROLLMENT (1001-2000)
☐ VRY-LG-ENROLLMENT (over 2000)

* * Give exact number of _____ students participating in project

9. Number of instructional STAFF involved?

☐ SMALL (1-5) ☐ MEDIUM (16-25) ☐ LARGE (51-100)
☐ MED-SMALL (6-15) ☐ MED-LARGE (26-50) ☐ VERY-LARGE (over 100)

** Specify exact number of professional staff members involved in project,
** " " " " para-professional persons involved

10. RESULTS Check as many boxes as needed.

☐ NEW MATERIALS DEVELOPED for or through the project
☐ REPORT AVAILABLE
☐ OTHER (specify) _____

11. List one-word terms which should be used to index this project or to SEARCH for similar projects. Use as many boxes as needed. Please print. The examples given are a guide and not intended to be restrictive.

		Examples
,	,	Mathematics
,	,	Grouping
,	,	Disadvantaged
,	,	Scheduling
,	,	Evaluation
,	,	Audio-visual
,	,	Community
,	,	Drop-out
,	,	Curriculum
,	,	Rural

12. SUMMARY * *

Subject or topical area(s) given attention in the project _____

Purpose of the project _____

Steps taken to accomplish project _____

Future plans for the project _____

_____
School District

Thomas W. Mercer
State of Michigan
Department of Education
P. O. Box 420
Lansing, Michigan 48902

APPENDIX B

COVER LETTER FOR A

STATE OF MICHIGAN

DEPARTMENT OF EDUCATION

Lansing, Michigan 48902

IRA POLLEY
Superintendent of Public Instruction

STATE BOARD OF EDUCATION
PETER OPPEWALL
President
THOMAS J. BRENNAN
Vice President
MICHAEL J. DEEB
Secretary
JAMES F. O'NEIL
Treasurer
LEROY G. AUGENSTEIN
MARILYN JEAN KELLY
CHARLES E. MORTON
EDWIN L. NOVAK, O.D.
GOV. WILLIAM G. MILLIKEN
Ex-Officio

December 8, 1969

There is a need for a composite review of the Section 3 proposals. This office is producing an abstract of each proposed project for summary purposes. Mr. Thomas Mercer will be responsible for carrying out this dissemination project.

Enclosed is the project summary for Elementary School. In order to verify the accuracy of our abstract for your project, your help, or that of the person who is responsible for the project, is needed. We will appreciate your additions, changes, deletions, and comments on the enclosed abstract. The abstract form, before being entered into the information retrieval system, should truly represent your project. Please take special note of the circled sections, and, if necessary, submit your comments on a separate sheet.

The compiled information will be of considerable value to the Department of Education. In addition, when the review is completed, a composite book of all Section 3 project summaries will be available to you upon request.

I would appreciate the return of the summary sheet with your comments by December 19, 1969.

Thank you for your cooperation in this matter.

Sincerely,

Clarence Wills

Clarence Wills
Coordinator, Section 3

CW:cv

Enclosure

APPENDIX C

CRITERIA FOR "SECTION 3" FUNDING

APPENDIX C

CRITERIA FOR "SECTION 3" FUNDING*

The State Board of Education shall use the following criteria in determining the degree of cultural, economic, and educational deprivation of children living within attendance areas of individual schools within a school district. Terms used in these criteria shall be defined by the State Board of Education.

(a) Criterion--There is enrolled a high percentage of students with socio-economic deprivation (SED).

Percentage of SED Score	Points Allowable
1-3	10
4-6	9
7-9	8
10-12	7
13-15	6
16-18	5
19-21	4
22-24	3
25-27	2
28-30	1

*State Aid Act 1970-71 (Act No. 312 of the Public Acts of 1957, Section 3, as amended).

(b) Criterion--There is enrolled a high percentage of students with low achievement levels.

Percentile	Points Allowable
1	25
2	24
3	23
4	22
5	21
10	16
15	11
20	6
25	1

Percentile ratings between 1 and 25 not listed shall be allowed proportionate points. Points for each of the criteria shall be added together for each school. School districts which receive at least 13 points under criterion (b) or a total of 18 points under criteria (a) and (b) shall be eligible for funding.

APPENDIX D

SAMPLE PAGES FROM THE DIRECTORY OF DESCRIPTIONS (DD)

APPENDIX D

SAMPLE PAGES FROM THE DIRECTORY

OF DESCRIPTIONS (DD)

E D I C D I R E C T O R Y

CONTENTS

ABSTRACT

*TITLE SPECIALIZED COUNSELING
*DISTRICT BATTLE CREEK
*CONTACT MC COY, EUGENE PHONE 616 962-5581 EXT 249
*START 1965
*END 1970
*FUNDS FEDERAL
*LEVEL INTERMEDIATE, HIGH-SCHOOL
*STUDENTS MED-SM-ENROLLMENT
*STAFF SMALL
*RESULTS OTHER REDUCING DROP-OUTS BY COUNSELING
*SEARCH DROP-OUTS, DISADVANTAGED, COUNSELING

*SUMMARY INVOLVES 6 BUILDINGS, SOURCE OF FUNDS PUBLIC LAW 89-10 TITLE I, 7TH-12TH GRADE, 120 STUDENTS PARTICIPATION, 2 STAFF MEMBERS, PLUS TWO PARA-PROFESSIONALS INVOLVED IN PROJECT,
SUBJECT AREA COUNSELING,
PURPOSE TO REDUCE THE DROP-OUT RATIO OF STUDENTS FROM DISADVANTAGED HOMES,
STEPS TAKEN INDIVIDUAL COUNSELING BY A COUNSELOR RELEASED FULL TIME TO HELP THE STUDENT SOLVE HIS PROBLEMS,
FUTURE PLANS TO INCREASE THE STAFF IN ORDER TO WORK WITH MORE STUDENTS THAT ARE POTENTIAL DROP-OUTS
BATTLE CREEK,

ABSTRACT 2

*TITLE TRAVELING MUSEUM
*DISTRICT BATTLE CREEK
*CONTACT MCKOWN, LARRY PHONE 616-962-5581 EXT 226
*START PRE-1965
*END 1970
*FUNDS FEDERAL
*LEVEL ELEM-EARLY, ELEM-LATE
*STUDENTS MED-LG-ENROLLMENT
*STAFF SMALL
*RESULTS NEW MATERIALS DEVELOPED, REPORT AVAILABLE
*SEARCH DISADVANTAGED, MOTIVATION, AUDIO-VISUAL, SCIENCE, MUSEUM, MOBILE
*SUMMARY INVOLVES 8 BUILDING, SOURCE OF FUNDS PUBLIC LAW 89-10 TITLE I, 1ST-6TH GRADE, 587 STUDENTS PARTICIPATING, 2 STAFF MEMBERS INVOLVED IN PROJECT,
SUBJECT AREA SCIENCE IN THE ELEMENTARY GRADES,
PURPOSE TO MOTIVATE CHILDREN TO LEARN BY CREATING A LEARNING SITUATION THAT PRODUCES CURIOSITY AROUT THE WORLD AROUND THEM,
STEPS TAKEN A LARGE TRAILER EQUIPPED TO TRAVEL FROM SCHOOL TO SCHOOL WITH CAREFULLY DESIGNED LESSONS TO MOTIVATE CHILDREN,
FUTURE PLANS TO BRING THIS MOTIVATION THROUGH SCIENCE TO HIGHER LEVELS BY CREATING NEW MATERIALS,
BATTLE CREEK,

SEARCH INDEX

APPENDIX E

EXCERPTS FROM THE TRAINING MANUAL (TM)

APPENDIX E

EXCERPTS FROM THE TRAINING

MANUAL (TM)

INFORMATION

EDUCATIONAL DEVELOPMENT PROGRAM
INFORMATION HAS BEEN GATHERED
INTO ONE DIRECTORY

EXAMINE THE DIRECTORY

Lists of SCHOOL DISTRICTS and PROGRAM TITLES can be found at the FRONT of the DIRECTORY.

Indexes for locating INDIVIDUAL SCHOOL DISTRICTS are at the BACK of the DIRECTORY.

INFORMATION CAN MAKE A DIFFERENCE

INFORMATION
FACILITATES
DECISIONS

Hire additional certified teachers
or paraprofessionals?
DECISION

Improve academic achievement! How?
--programmed materials
--teacher-made materials
--diagnosis
--consultants
--subject specialists
--full day kindergarten

DECISION

More community involvement!
Better human relations! How?

DECISION

Disadvantaged children!
What learning problems?
What teaching strategies?

DECISION

Cultural materials needed?
Purchase? Develop?
DECISION

Paraprofessionals in career-development programs?
DECISION

Consultant or staff led in-service programs?
DECISION

Saturday workshops--an asset?
DECISION

Plan in-service for teachers and paraprofessionals collectively?
Parent participation?
DECISION

SCHOOLS ARE MAKING THESE DECISIONS
AND MANY OTHERS THIS YEAR

MICHIGAN STATE UNIVERSITY LIBRARIES
3 1293 03146 3593